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REQUEST FOR PROPOSAL FOR CONTRACTUAL SERVICES FORM

By signing this Request for Proposal for Contractual Services form, the bidder guarantees

CONTRACTOR MUST COMPLETE THE FOLLOWING

compliance with the procedures stated in this Solicitation, and agrees to the terms and conditions unless otherwise indicated in writing and certifies that bidder maintains a drug free work place.

Per Nebraska's Transparency in Government Procurement Act, Neb. Rev Stat § 73-603 DAS is required to collect statistical information regarding the number of contracts awarded to Nebraska Contractors. This information is for statistical purposes only and will not be considered for contract award purposes.

_____ NEBRASKA CONTRACTOR AFFIDAVIT: Bidder hereby attests that bidder is a Nebraska Contractor. "Nebraska Contractor" shall mean any bidder who has maintained a bona fide place of business and at least one employee within this state for at least the six (6) months immediately preceding the posting date of this Solicitation.

_____ I hereby certify that I am a Resident disabled veteran or business located in a designated enterprise zone in accordance with Neb. Rev. Stat. § 73-107 and wish to have preference, if applicable, considered in the award of this contract.

_____ I hereby certify that I am a blind person licensed by the Commission for the Blind & Visually Impaired in accordance with Neb. Rev. Stat. §71-8611 and wish to have preference considered in the award of this contract.

FORM MUST BE SIGNED USING AN INDELIBLE METHOD OR BY DOCUSIGN

FIRM:	**Atos Public Safety, LLC**
COMPLETE ADDRESS:	4851 Regent Boulevard Irving, TX 75063
TELEPHONE NUMBER:	(469) 601-8440
FAX NUMBER:	-
DATE:	June 2, 2020
SIGNATURE:	DocuSigned by: Jayesh Maroo 80F9E98105BB453...
TYPED NAME & TITLE OF SIGNER:	Jayesh Maroo Chief Financial Officer North America Jayesh.Maroo@atos.net

June 3, 2020

NEBRASKA
Good Life. Great Opportunity.

CommITted to Future Growth

Atos Public Safety Response to RFP 6264 Z1 for the State of Nebraska

Option C: Deployment of an ESInet and Next Generation Core Services

Corporate Overview, Sections II – IV & Form A

Atos | Public Safety

June 3rd, 2020

Annette Walton / Nancy Storant Buyer(s)
State Purchasing Bureau
1526 K Street, Suite 130
Lincoln, NE 68508

Dear Annette and Nancy:

Atos Public Safety, LLC is pleased to provide this response to the State of Nebraska RFP 6264 Z1 for Next Generation 911 Emergency Services IP Network (ESInet) and Next Generation Core Services (NGCS).

As highlighted throughout our response, Atos' core competencies—a dedication to high quality, commitment to continuous improvement of services, carrier grade solutions and exceptional customer service—will enable you to realize your vision of being at the forefront of NG9-1-1, and your mission of representing the regional interests.

We fully understand your objectives of transitioning from a legacy 9-1-1 solution to a full NENA i3 compliant ESInet and NGCS solution and can ensure these are accomplished with minimal disruptions to the various stakeholders.

We look forward to the next phase of the process and to working with the State of Nebraska to help you become the leading NG9-1-1 provider in the State.

Thank you for the opportunity to work with you on this important initiative. Please contact me at (916) 834-7131 if you have any questions.

Sincerely,

Phillip R. Rotheram
Head of North America Sales, Public Safety

4851 Regent Blvd.
Irving TX 75063

Direct: (916) 834-7131
E-mail: phil.rotheram@atos.net

TABLE OF CONTENTS

CORPORATE OVERVIEW 4
A. BIDDER IDENTIFICATION AND INFORMATION 4
B. FINANCIAL STATEMENTS 6
C. CHANGE OF OWNERSHIP 7
D. OFFICE LOCATION 7
E. RELATIONSHIPS WITH THE STATE 8
F. BIDDER'S EMPLOYEE RELATIONS TO STATE 8
G. CONTRACT PERFORMANCE 8
H. SUMMARY OF BIDDER'S CORPORATE EXPERIENCE 9
I. SUMMARY OF BIDDER'S PROPOSED PERSONNEL/MANAGEMENT APPROACH 14
J. SUBCONTRACTORS 23

II. TERMS AND CONDITIONS 27
A. GENERAL 27
B. NOTIFICATION 28
C. BUYER'S REPRESENTATIVE 28
D. GOVERNING LAW (Statutory) 28
E. BEGINNING OF WORK 28
F. AMENDMENT 29
G. CHANGE ORDERS OR SUBSTITUTIONS 29
H. VENDOR PERFORMANCE REPORT(S) 29
I. NOTICE OF POTENTIAL CONTRACTOR BREACH 30
J. BREACH 30
K. NON-WAIVER OF BREACH 31
L. SEVERABILITY 31
M. INDEMNIFICATION 32
N. ATTORNEY'S FEES 34
O. PERFORMANCE BOND 34
P. ASSIGNMENT, SALE, OR MERGER 34
Q. CONTRACTING WITH OTHER NEBRASKA POLITICAL SUB-DIVISIONS OR STATE 35
R. FORCE MAJEURE 35
S. CONFIDENTIALITY 36
T. EARLY TERMINATION 36
U. CONTRACT CLOSEOUT 37

Table of Contents - continued

III.CONTRACTOR DUTIES 38
A. INDEPENDENT CONTRACTOR / OBLIGATIONS 38
B. EMPLOYEE WORK ELIGIBILITY STATUS 39
C. COMPLIANCE WITH CIVIL RIGHTS LAWS AND EQUAL OPPORTUNITY EMPLOYMENT 39
D. COOPERATION WITH OTHER CONTRACTORS 40
E. PERMITS, REGULATIONS, LAWS 40
F. OWNERSHIP OF INFORMATION AND DATA / DELIVERABLES 41
G. INSURANCE REQUIREMENTS 41
H. ANTITRUST 44
I. CONFLICT OF INTEREST 44
J. STATE PROPERTY 45
K. SITE RULES AND REGULATIONS 45
L. ADVERTISING 45
M. NEBRASKA TECHNOLOGY ACCESS STANDARDS (Statutory) 45
N. DISASTER RECOVERY/BACK UP PLAN 46
O. DRUG POLICY 46
P. WARRANTY 46

IV. PAYMENT 47
A. PROHIBITION AGAINST ADVANCE PAYMENT (Statutory) 47
B. TAXES (Statutory) 47
C. INVOICES 47
D. INSPECTION AND APPROVAL 48
E. PAYMENT (Statutory) 48
F. LATE PAYMENT (Statutory) 48
G. SUBJECT TO FUNDING / FUNDING OUT CLAUSE FOR LOSS OF APPROPRIATIONS 48
H. RIGHT TO AUDIT (First Paragraph is Statutory) 49

FORM A: BIDDER PROPOSAL POINT OF CONTACT 50

CORPORATE OVERVIEW

A. BIDDER IDENTIFICATION AND INFORMATION

The bidder should provide the full company or corporate name, address of the company's headquarters, entity organization (corporation, partnership, proprietorship), state in which the bidder is incorporated or otherwise organized to do business, year in which the bidder first organized to do business and whether the name and form of organization has changed since first organized.

Atos Response:

Corporate Name:	Atos Public Safety, LLC
Headquarter Address:	4851 Regent Boulevard, Irving, TX 75063
Entity Organization:	Limited Liability Corporation
State of Incorporation:	Delaware
Date of Incorporation:	November 14, 2016

Atos is a global leader in digital transformation with approximately 122,000 employees in 72 countries and annual revenue of around 15 billion, recognized as one of the world's leaders in Big Data, Cybersecurity, High Performance Computing and Digital Workplace. The Group provides Mission Critical Public Safety and Security Solutions, Secure Cloud services, Complex Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With our cutting-edge technologies, digital expertise and industry knowledge, Atos supports the digital transformation of its clients across various market sectors, the largest being Public Sector and Defense. **Atos Public Safety**, a **100% US-operated** and managed division of Atos registered in New York, was created specifically for the Public Safety market and the requirements of Next Generation 9-1-1. Sought after globally to build, secure, manage and transform some of the world's most mission critical communications ecosystems, Atos brings the North American Public Safety industry a breadth of solutions and expertise rooted in its heritage of Innovation through Siemens, Bull and Unify yet hyper-focused to serve the complex operational dynamics of this rapidly changing communications sector.

Atos Public Safety provides IT services across the spectrum of technology with a company focus and as a leader in the Public Sector as demonstrated by the following highlights:

- ***11,000 business technologists*** *focused on delivering Public Sector projects and solutions*
- *More than 22 percent of total revenues coming from work for* ***central, regional, and local governments***
- *40 years of experience of designing and delivering* ***Public Sector*** *projects*
- ***Experience*** *in developing and supporting comprehensive hosting solutions for government entities with proven government solutions deployed in a number of states, county and city environments, including a government hub in Texas.*
- ***US Operations*** *– Corporate headquarters in Irving, TX and local offices in Purchase, NY and Princeton, NJ, allow Atos to provide all services and operations from the US.*

Atos also **understands the pressures** for States to grow and develop and to ensure a great quality of life for citizens while becoming as efficient and modern as possible. This requires a new partnership among citizens, government, and business—and new technology-driven services that ensure seamless, safe, productive, and rewarding ways to live and work. Atos brings such services and capabilities to our client's domains.

Atos is **the partner for the Next Generation of Public Safety**, the company whose pillars of Managed Network Services, Communications and Collaboration Services, Cyber Security, Big Data Systems and Systems Integration bring an entirely new level of expertise and discipline to NG9-1-1, including foundational core competencies which are the nexus of an NG9-1-1 ecosystem.

Created to serve the highly specific, specialized requirements associated with Next Generation 9-1-1 (NG9-1-1), Atos Public Safety brings to the US market the most scalable NG Core Services (NGCS) **carrier-grade routing solutions** and Emergency Services IP Network (ESInet) managed service ecosystem available in the industry. Led by a team of seasoned industry Subject Matter Experts (SMEs) who comprise a veritable "Who's Who" of Public Safety professionals, our mission is to serve the nation's First Responder community as their NG9-1-1 transformation partner, designing custom-fit communication ecosystems leveraging existing investments and assets using Atos' **proven IT modernization methodologies.** The names you know and trust, the company known and trusted around the world for complex IT program management, bringing the Public Safety industry an **end-to-end NG9-1-1 managed network delivery system**. Atos Public Safety: By Digitalizing the Public Safety Experience, we Digitalize the Citizen Experience.

Company Vision

While initiating a voice call is always and will always be the fastest means to request help, there are situations and populations where using one's voice is not possible. We live in a multimedia (voice, video, photo, text, VoIM) world, and the way 9-1-1 is delivered and managed today simply will not support this continuing communications paradigm shift. Whereas users must have a "voice" without speaking, first responders must be able to not only "hear" that call for help, but efficiently manage and process the response; Public Safety Answering Points (PSAPs) require solutions that will empower their staff without burdening them with information overload.

The restrictive nature of the industry's hardware-based systems, which are used by the vast majority of PSAPs, was not designed for the software-specific environment of NG9-1-1. Products were once specific to a certain operational subset within a PSAP, but Next Generation solutions must seamlessly integrate across disparate subsystems and provide the user a configurable and scalable enterprise communications model.

NG9-1-1 is a collaboration of services and multimedia sources which must be managed as a unified call flow, not as separate product silos within a PSAP. The age of hardware systems is gone, and our industry is now adopting software platforms that were designed specifically for the way we all communicate today. Atos' vision for NG9-1-1 is one which breaks down system-originated silos of products into a unified ecosystem driven by network convergence. Voice is and will always remain king for public safety, but the way it is delivered and the data that accompanies an incident must be driven by a robust network engine.

Rather than leaping to a pure i3 environment, our team of industry experts has learned firsthand that having a highly robust network migration strategy is critical to achieving a pure i3 end-state, phasing the transition first to an all IP managed network domain through a systematic clustered cutover process. Upon full migration from the current Tandem Office construct to the multi-core layer i3 ESInet domain, geo-spatial routing features are seamlessly turned up in the same clustered approach as regional stakeholders are ready for them. As part of our proposal submission, we have included our industry position, ***Building the Business Case NG9-1-1***, as an attachment ***(Appendix A: Company Information)***.

The Atos team understands the requirements for this move toward a countywide NG9-1-1 transformation, as well as the requisite transitional steps, infrastructure modernization and long-term imperative NG9-1-1 operational requirements. Atos, a global leader in digital transformation, has assembled a team of industry leaders within their core-competencies to form an unrivaled team that will deliver the best solution for the County.

-Maggie Goodrich CIO, Los Angeles Police Department (ret.)

B. FINANCIAL STATEMENTS

The bidder should provide financial statements applicable to the firm. If publicly held, the bidder should provide a copy of the corporation's most recent audited financial reports and statements, and the name, address, and telephone number of the fiscally responsible representative of the bidder's financial or banking organization.

If the bidder is not a publicly held corporation, either the reports and statements required of a publicly held corporation, or a description of the organization, including size, longevity, client base, areas of specialization and expertise, and any other pertinent information, should be submitted in such a manner that proposal evaluators may reasonably formulate a determination about the stability and financial strength of the organization. Additionally, a non-publicly held firm should provide a banking reference.

The bidder must disclose any and all judgments, pending or expected litigation, or other real or potential financial reversals, which might materially affect the viability or stability of the organization, or state that no such condition is known to exist.

The State may elect to use a third party to conduct credit checks as part of the corporate overview evaluation.

Atos Response: Our audited Financial reports and statements provide a comprehensive overview of the financial and extra-financial performance of Atos. They present our vision, strategy, business model, governance and our main achievements of the year. Based on financial and Corporate Social Responsibility indicators, these reports analyze our risks and opportunities, summarizes our impact on our major stakeholders and describes our efforts to create value over time for all of them.

Financial Highlights – While key figures for 2019 are being prepared for publication, the Group closed the financial year 2018, with revenue organic growth at 1.2% and an operating margin of 10.3%. The Group's performance in 2018 positioned Atos as a global leader in digital transformation, with the Atos Digital Transformation Factory representing 30% of total revenue, up from 23% in the previous year.

Financial highlights included the acceleration of revenues in our Business & Platform Solutions division, powered by major digital transformation projects. We recorded double-digit growth in Big Data & Cybersecurity as customers around the world stepped up investments in their cyber defenses and data capabilities.

Our Infrastructure & Data Management business saw a strong performance from Orchestrated Hybrid Cloud, with growth of circa 35%. Atos strengthened its digital services global profile and capabilities with the acquisition of Syntel and enhanced Worldline's position as the undisputed payment leader in Europe through the acquisition of SIX Payment Services. Atos financial statements, including yearly and quarterly performance reporting, can be viewed and downloaded by visiting our Investor Financial Information page at https://atos.net/en/investors/financial-information/financial-reports

2019 Financial Statements are included herein as ***Appendix A: Company Information***. We have also included hyperlinks to individual past years below.

Atos Financial Report - 2019

Atos Integrated Report – 2018

Atos Financial Report – 2017

Atos Financial Report - 2016

Atos Financial Report - 2015

Atos Financial Report - 2014

Atos Public Safety, LLC has no judgments, pending or expected litigation, or other real or potential financial reversals, which might materially affect the viability or stability of the organization.

C. CHANGE OF OWNERSHIP

If any change in ownership or control of the company is anticipated during the twelve (12) months following the proposal due date, the bidder should describe the circumstances of such change and indicate when the change will likely occur. Any change of ownership to an awarded bidder(s) will require notification to the State.

Atos Response: Atos does not anticipate any change or control of the company during the twelve (12) months following the proposal due date.

D. OFFICE LOCATION

The bidder's office location responsible for performance pursuant to an award of a contract with the State of Nebraska should be identified.

Atos Response: Atos Public Safety, LLC is located at 4851 Regent Boulevard, Irving, TX 75063.

E. RELATIONSHIPS WITH THE STATE

The bidder should describe any dealings with the State over the previous five (5 years. If the organization, its predecessor, or any Party named in the bidder's proposal response has contracted with the State, the bidder should identify the contract number(s) and/or any other information available to identify such contract(s). If no such contracts exist, so declare.

Atos Response: Atos has had no dealings with the State over the previous five (5) years, nor our predecessor. Our i3 logging partner, ECaTS, has on-going work with the State. The associated contract number is: 84625 04.

F. BIDDER'S EMPLOYEE RELATIONS TO STATE

If any Party named in the bidder's proposal response is or was an employee of the State within the past five (5) months, identify the individual(s) by name, State agency with whom employed, job title or position held with the State, and separation date. If no such relationship exists or has existed, so declare.

If any employee of any agency of the State of Nebraska is employed by the bidder or is a subcontractor to the bidder, as of the due date for proposal submission, identify all such persons by name, position held with the bidder, and position held with the State (including job title and agency). Describe the responsibilities of such persons within the proposing organization. If, after review of this information by the State, it is determined that a conflict of interest exists or may exist, the bidder may be disqualified from further consideration in this proposal. If no such relationship exists, so declare.

Atos Response: Atos has had no dealings with the State over the previous five (5) years, nor our predecessor, or any party named in the Atos proposal response.

G. CONTRACT PERFORMANCE

If the bidder or any proposed subcontractor has had a contract terminated for default during the past five (5) years, all such instances must be described as required below. Termination for default is defined as a notice to stop performance delivery due to the bidder's non-performance or poor performance, and the issue was either not litigated due to inaction on the part of the bidder or litigated and such litigation determined the bidder to be in default.

It is mandatory that the bidder submit full details of all termination for default experienced during the past five (5)) years, including the other Party's name, address, and telephone number. The response to this section must present the bidder's position on the matter. The State will evaluate the facts and will score the bidder's proposal accordingly. If no such termination for default has been experienced by the bidder in the past five (5) years, so declare.

If at any time during the past five (5) years, the bidder has had a contract terminated for convenience, non-performance, non-allocation of funds, or any other reason, describe fully all circumstances surrounding such termination, including the name and address of the other contracting Party.

Atos Response: Atos has not been terminated for cause within the last 5 years, nor any proposed subcontractor.

H. SUMMARY OF BIDDER'S CORPORATE EXPERIENCE

The bidder should provide a summary matrix listing the previous projects similar to this solicitation in size, scope, and complexity. The State will use no more than three (3) narrative project descriptions submitted by the bidder during its evaluation of the proposal.

The bidder should address the following:

i. Provide narrative descriptions to highlight the similarities between the bidder's experience and this solicitation. Provide the number of ESInet and NGCS solutions implemented by the bidder that are in production today and lessons learned throughout the project that will be applied to the deployment of the Nebraska ESInet and NGCS solution. These descriptions should include:

a) The time period of the project;
b) The scheduled and actual completion dates;
c) The bidder's responsibilities;
d) For reference purposes, contracting entity name, contact name, contact title, contact email address, and contact telephone number. The Commission may request that references authorize a site visit and the opportunity to review event logs.); and
e) Each project description should identify whether the work was performed as the prime Contractor or as a subcontractor. If a bidder performed as the prime Contractor, the description should provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) budget.
ii. Contractor and subcontractor(s) experience should be listed separately. Narrative descriptions submitted for subcontractors should be specifically identified as subcontractor projects.
iii. If the work was performed as a subcontractor, the narrative description should identify the same information as requested for the Contractors above. In addition, subcontractors should identify what share of contract costs, project responsibilities, and time period were performed as a subcontractor.

Atos Response:

NG9-1-1 is a journey. It is a transition to an open and collaborative domain where no prescribed formula dictates success or completion. The only prescription for success is having a vision, a plan, a partner and a clear understanding of what it takes to achieve a Next Generation networked IP domain. Atos, having provided the exact type of migration necessary for client-partners in the US and around the world, has proven experience in an industry segment needing leadership beyond CPE and Tandem Offices. Our NG solution serves the high-volume calling and multimedia collaboration requirements of counties, states, even countries. In the United Kingdom, the OpenScape platform powers the national telecommunications system, mission critical included. And in California with a population of approximately 40 million, and 9-1-1 call volume approaching 30 million per year, Atos Public Safety was selected by CalOES as their Prime Network Service Provider.

No provider in this industry has the same scalability and deployment expertise in large scale migration programs to IP network domains as Atos, credentials 9-1-1 ACOG stakeholders can trust to lead Central Oklahoma's 9-1-1 operation into and beyond NG9-1-1. As we commit to all clients, our team works as your guide and partner as you migrate from TDM to IP independence and empowerment, serving as your trusted and proven advisor throughout the journey. The key to having a successful migration to an NG9-1-1 domain is leveraging a partner who has not only transformed some of the largest communications and infrastructure environments in the world but understands all of the operational nuances of the customer experience inherent in IT transformation journeys. To this end, in addition to the references provided below, we have included a recent case study for **St. Francois County** as an attachment (**See *Appendix A: Company Information).***

Client Name	Point of Contact	Time Period	Budget
California Office of Emergency Services (Cal OES)	**Name:** Budge Currier **Title:** 9-1-1 Branch Manager **Email:** budge.currier@CalOES.ca.gov **Phone:** (916) 657-9911	**2019 to Present** • **Scheduled Completion Date:** Q2, 2021 • **Actual Completion Date:** Ongoing	**$198M**

Project Type: Prime Network Service Provider and Systems Integrator for State of CA

Project Description: With a population of approximately 40 million, 9-1-1 call volume approaching 30 million per year, and 440 PSAP's Atos Public Safety was selected by CalOES as their Prime Network Service Provider (PNSP).

Atos Responsibilities: As the PNSP, Atos is providing the following services:

- Lead System Integrator
- Next Generation 9-1-1 Core Services
- Text to 9-1-1
- Next Generation 9-1-1 Alert and Warning
- Geo-Spatial Data Set development, maintenance and distribution
- Interface standards and governance of Regional Network Service Providers
- Aggregation of all Originating Service Provider (OSP) traffic except wireless and major LECs
- Secondary 9-1-1 network, backup to Regions
- System monitoring

Lessons Learned: The primary lesson learned as the PNSP was staffing for a project of this size. Atos under-estimated the amount of effort required to for a project of this size and scope. The benefit for Nebraska and all future clients is that Atos now has a significant team of industry experts in all aspects of ESInet & NGCS deployment.

A second lesson learned is the time and process to aggregate 9-1-1 traffic from the originating service providers. This can be a lengthy process with many potential delays from the carriers. This has now been mitigated by adding to our team an expert in this field.

A third lesson learned is the true requirements of GIS Data to allow for geo-spatial routing. The development, maintenance and distribution of this data set can be complex. Atos will bring the very valuable experience to the State of Nebraska.

A final lesson learned is around text to 9-1-1. The current TCC's have a set business model that doesn't fit well within the concept of a Statewide TCC aggregator. By working with both TCC's we have solutioned how this can be achieved and provisioned successfully. This will be shared as part of our deployment workshops to ensure that the State of Nebraska fully understands their options.

Client Name	Point of Contact	Time Period	Budget
California Office of Emergency Management	**Name:** Budge Currier **Title:** 9-1-1 Branch Manager **Email:** budge.currier@CalOES.ca.gov **Phone:** (916) 657-9911	**2019 to Present** • **Scheduled Completion Date:** Q2, 2021 • **Actual Completion Date:** Ongoing	**$198M**

Project Type: ESInet/NGCS and Systems Integrator for State of California – CalOES and the Northern Region (Synergem)

Project Description: With a population of approximately 11 million, 9-1-1 call volume of 7.5 million, and 163 PSAP's Atos Public Safety was selected by CalOES as the Prime Network Service Provider for the State of California NG9-1-1 project and ESInet-to-ESInet interface with the Northern Region (Synergem).

Atos Responsibilities: As the PNSP, Atos will provide the following services:

- Lead Systems Integrator
- ESInet to ESInet interface of Atos ESInet to Synergem ESInet
- Backup ESInet for Synergem ESInet in Northern Region
- Aggregation of all OSP traffic except Wireless and Major LEC's
- Next Generation 9-1-1 Core Services
- System Monitoring
- Integration standards and governance of Regional Network Service Provider

Lessons Learned: A key lesson learned is the collaborative approach required to work with any and all service providers within a State or Region. When dealing with NENA i3 Standards, especially when it pertains to interfaces, many have made assumptions and implemented functionality in unique ways. Creating Interface Control Documents that all agree upon is mandatory. Atos will bring this experience to the State of Nebraska.

A second key lesson learned is the provisioning the necessary circuits out to the PSAP's to create the ESInet. Two key elements are the time required to provision these, and when looking for true diversity the deconfliction exercise to make sure the same physical paths are not used when possible. Atos will bring this experience to the State of Nebraska.

Client Name	Point of Contact	Time Period	Budget
California Office of Emergency Management	**Name:** Budge Currier **Title:** 9-1-1 Branch Manager **Email:** budge.currier@CalOES.ca.gov **Phone:** (916) 657-9911	**2019 to Present** • **Scheduled Completion Date:** Q2, 2021 • **Actual Completion Date:** Ongoing	**$198M**

Project Type: Prime Network Service Provider and Systems Integrator for the with Southern Region (CenturyLink)

Project Description: With a population of approximately 11 million, 9-1-1 call volume of 7 million, and 89 PSAP's Atos Public Safety was selected by CalOES as the Prime Network Service Provider for the State of California NG9-1-1 project and ESInet-to-ESInet interface with the Southern Region (CenturyLink):

Atos Responsibilities:

- Lead Systems Integrator
- ESInet-to-ESInet interface of Atos ESInet to CenturyLink ESInet
- Backup ESInet for CenturyLink ESInet in Southern Region
- Aggregation of all OSP traffic except Wireless and Major LEC's
- Next Generation 9-1-1 Core Services
- System Monitoring
- Integration standards and governance of Regional Network Service Provider

Lessons Learned: A key lesson learned is the collaborative approach required to work with any and all service providers within a State or Region. When dealing with NENA i3 Standards, especially when it pertains to interfaces, many have made assumptions and implemented functionality in unique ways. Creating Interface Control Documents that all agree upon is mandatory. Atos will bring this experience to the State of Nebraska.

A second key lesson learned is the provisioning the necessary circuits out to the PSAP's to create the ESInet. Two key elements are the time required to provision these, and when looking for true diversity the deconfliction exercise to make sure the same physical paths are not used when possible. Atos will bring this experience to the State of Nebraska.

Client Name	Point of Contact	Time Period	Budget
California Office of Emergency Management	**Name:** Budge Currier **Title:** 9-1-1 Branch Manager **Email:** budge.currier@CalOES.ca.gov **Phone:** (916) 657-9911	**2019 to Present** • **Scheduled Completion Date:** Q2, 2021 • **Actual Completion Date:** Ongoing	**$198M**

Project Type: Prime Network Service Provider and Systems Integrator for the Central and Los Angeles Regions (NGA911)

Project Description: With a population of approximately 17 million, 9-1-1 call volume of 13.5 million, and 189 PSAP's Atos Public Safety was selected by CalOES as the Prime Network Service Provider for the State of California NG9-1-1 project and ESInet-to-ESInet interface with the Central and Los Angeles Region ESInet (NGA911):

Atos Responsibilities:

- Lead Systems Integrator
- ESInet-to-ESInet interface of Atos ESInet to NGA911 ESInet
- Backup ESInet for NGA911 ESInet in Central and Los Angeles Regions
- Aggregation of all OSP traffic except Wireless and Major LEC's
- Next Generation 9-1-1 Core Services
- System Monitoring
- Integration standards and governance of Regional Network Service Provider

Lessons Learned: A key lesson learned is the collaborative approach required to work with any and all service providers within a State or Region. When dealing with NENA i3 Standards, especially when it pertains to interfaces, many have made assumptions and implemented functionality in unique ways. Creating Interface Control Documents that all agree upon is mandatory. Atos will bring this experience to the State of Nebraska.

A second key lesson learned is the provisioning the necessary circuits out to the PSAP's to create the ESInet. Two key elements are the time required to provision these, and when looking for true diversity the deconfliction exercise to make sure the same physical paths are not used when possible. Atos will bring this experience to the State of Nebraska.

I. SUMMARY OF BIDDER'S PROPOSED PERSONNEL/MANAGEMENT APPROACH

The bidder should present a detailed description of its proposed approach to the management of the project.

The bidder should identify the specific professionals who will work on the State's project if their company is awarded the contract resulting from this solicitation. The names and titles of the team proposed for assignment to the State project should be identified in full, with a description of the team leadership, interface and support functions, and reporting relationships. The primary work assigned to each person should also be identified. Project managers assigned to the project shall be certified Project Management Professionals (PMP) and are highly encouraged to possess the Emergency Number Professional (ENP) certification.

The bidder should provide resumes for all personnel proposed to work on the project. The State will consider the resumes as a key indicator of the bidder's understanding of the skill mixes required to carry out the requirements of the solicitation in addition to assessing the experience of specific individuals.

Resumes should not be longer than three (3) pages. Resumes should include, at a minimum, academic background and degrees, professional certifications, understanding of the process, and at least three (3) references (name, address, and telephone number) who can attest to the competence and skill level of the individual. Any changes in proposed personnel shall only be implemented after written approval from the State.

Atos Response: A rigorous ongoing Client Management Approach is the cornerstone of our Management Approach to successfully delivery transformative ESINet and/or NGCS for the State.

ONGOING CLIENT MANAGEMENT SERVICES

The State of Nebraska expects a partner that will balance service delivery excellence while building and maintaining a strong relationship. Aided by a strong governance approach and strategy, account management provides the critical day-to-day presence and accountability, complementing and supporting the State's investment in managing its relationship with Atos and other service providers.

To provide the best support to the State, Atos applies governance that encompasses all aspects of our strategic direction, service offerings, technical integration, engagement model, relationship innovation, and market position. Our engagement model has built-in business value mapping, solution design capabilities tied to value, pricing flexibility, governance, and innovative service evolution. Our ability to execute is rooted in our core focus in the IT services market and our years of practical experience in managing complex infrastructures.

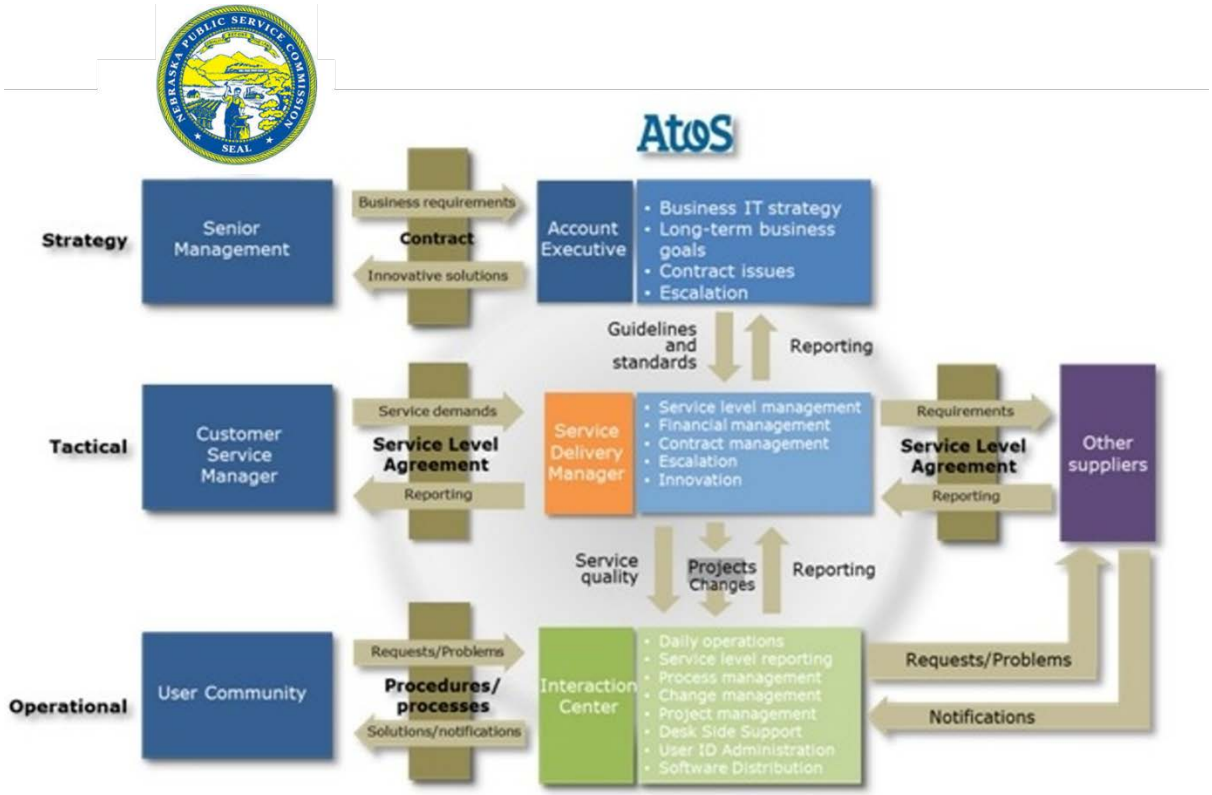
The State's support from Atos uses a model based on assigning an Account Management Office (AMO) to be the umbrella management organization for integrating services, communications, and change throughout the contract term. The AMO is responsible for overall management of the engagement, providing a single focal point for all ongoing service delivery and daily senior management presence.

Through the AMO, the State can expect the following activities:

- ***Relationship management*** that provides an interaction model for one-to-one alignment between the State and Atos
- ***Clearly defined escalation*** that will apply intelligent decision-making through a chain of command approach to issue resolution
- ***Regular, open communication*** through scheduled and ad hoc meetings that will keep the State's designated representatives informed and provide transparency to IT delivery activities and performance
- ***ITIL-based process control*** that will ensure consistency of service delivery and measurable results
- ***Bi-Annual Innovation Workshops*** that will present to the State the roadmap of future innovation Atos envisions and will provide specific recommendations for adoption within the State environment.

Relationship Management

The AMO is based on the IT governance principles. The following graphic illustrates the alignment of key functional teams by strategic, tactical, and operational capabilities for the client demand organization and the Atos delivery organization.



Governance Interaction: The recommended model for interaction follows defined levels that will provide frequent and open discussion between the State's staff and Atos' staff.

This framework illustrates the separation of the IT demand and supply functions and contact points for interaction. The essence of this concept is that the State retains responsibility for typical IT demand management tasks such as formulating the IT strategy and the resulting IT demands and for controlling the IT suppliers. The delivery of the agreed IT services, on the supply side, is the full responsibility of Atos and other IT suppliers.

Strategic

The State and its stakeholders can expect the vision, commitment, and behavior of senior management of both companies to contribute to the success of this agreement. Strategic activities are the topic of discussion at the senior management level. Typically, the leaders involved at this level ensure alignment between business objectives and joint initiatives. They establish the vision for the relationship. The framework agreement, which provides the overall process for each of the IT services to be delivered, is defined and monitored against key performance metrics. IT strategy and the consequences for IT demands are also defined at this level.

This layer in the governance model also acts as the highest point of escalation for issues and problems.

Tactical

To ensure a successful management and delivery of services, Atos will establish an AMO for service delivery to oversee and manage the execution of support services and to direct continuous improvement activities related to these services. The AMO will work to improve services through the implementation of established processes, tools, technology, and proven methodologies.

The AMO responsibilities include administering operational services and providing comprehensive reporting and communication. The AMO will focus on the analysis of information collected from the ESInet and NGCS solution. Atos will make judgments regarding the collected data and provide suggestions or change as necessary to help initiate service improvements. It is through this analysis that Atos will determine areas for future innovation opportunities within the State ESInet/NGCS environment, which will become topics for discussion at the Bi-Annual Innovation Workshop discussions.

Financial administration and contract management are important components within the governance of Atos' delivery model. These functions will perform continuous monitoring of service level commitments, human resource management, finance, and contractual issues. Their responsibility is to collect all the information required and provide all Atos contract reporting. This portion of the governance service secures the regular review of contractual and financial terms and conditions to ensure alignment with your specific requirements, even as they may change over the term of the contract.

Operational

This level provides service delivery and the operational contacts with the State's 9-1-1 governance committee, which ensures smooth daily operations. Operational activities are meant to fulfill the 9-1-1 strategy and are grouped into the following two areas:

- ***Service Level Management —*** *Meet or exceed service level requirements in the delivery of the current services. Atos' service delivery management will use the agreed upon Service Level Agreements (SLAs) to manage the interface with the 9-1-1 solution suppliers.*
- ***Implement New Projects —*** *The execution of the IT strategy includes the roll-out of new services or improvement of existing ones; these changes are performed by project management professionals trained in the methodologies required for a smooth implementation.*

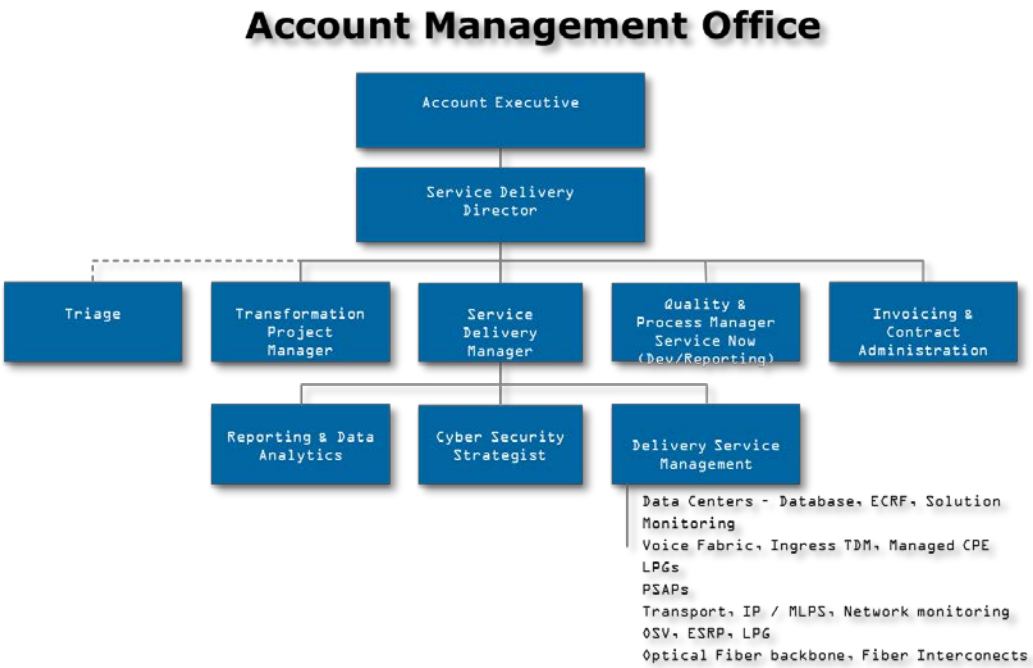
One of the keys to successful account management is strong governance. The State will have a single point of accountability for the delivery of the contracted services. The account governance model may also rely on Atos functional groups to support technology and business planning in addition to the dedicated team members.

Account Team Structure

Working with the State and providing accountability will be the Account Management Office (AMO), led by our NG911 practice Operations Account Executive, Scott Fischer. Mr. Fischer is an accomplished senior executive and head of Atos NG9-1-1 North America Operations. He brings more than 20 years of public safety experience and a strong portfolio of experience and success including strategic planning, business operations, developing high-performance management teams, and delivering exceptional financial results. Repeated success guiding teams in the development and launch of strategic business initiatives, fostering relationships with clients and partners that include Fortune 500 and Government organizations, and positioning companies for strategic acquisition. Mr. Fischer is a very active member in NG9-1-1 industry organizations and has been awarded COO of the Year by SmartCEO, Washington Executive Management Awards, and is a graduate of the University of Maryland.

The account governance model is not intended to be simply an aggregation of technology functions; rather, it defines a business structure that acts independent of boundaries to take advantage of operational and business synergies within the State and Atos organizations.

The following graphic shows the proposed functional structure of the AMO.



Atos' proposed Account Management Structure: Maintain consistent, reliable support through Atos' account management team with governance focus on the transition and subsequent steady state support services.

The following table lists the key roles and responsibilities for the Atos AMO:

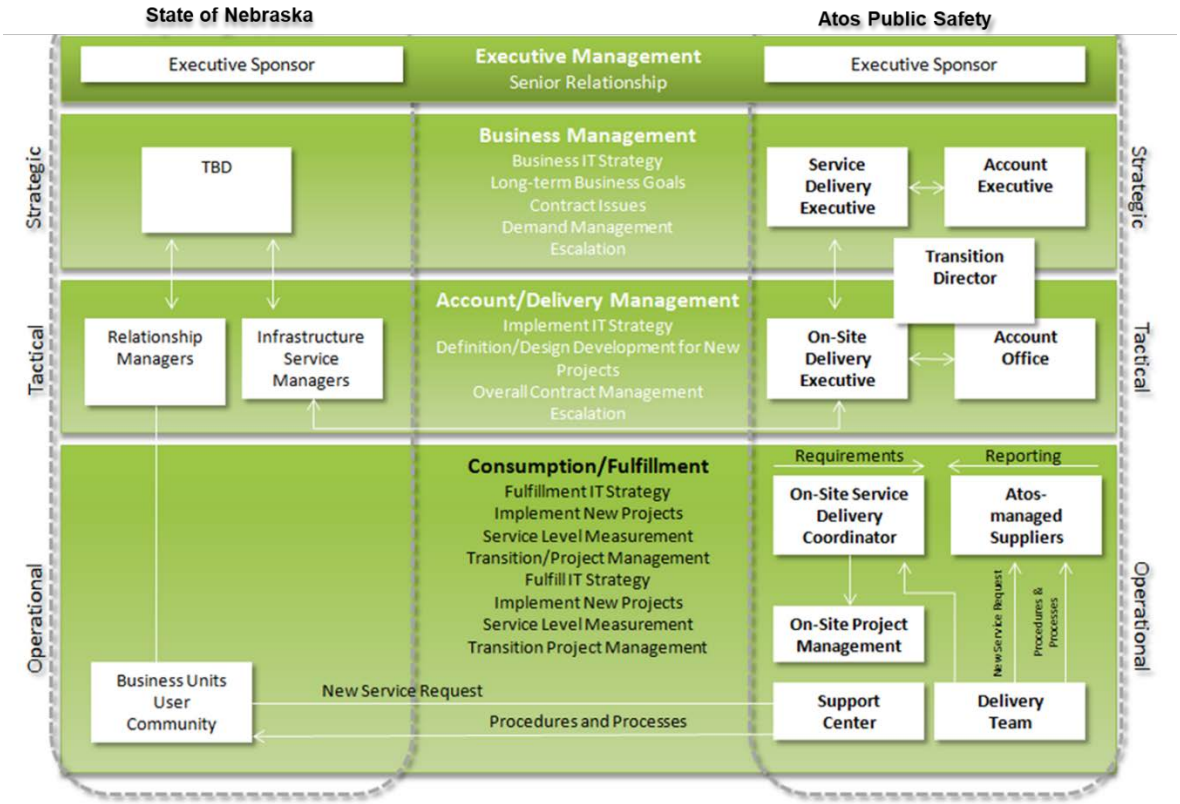
Atos AMO Team	
Transition Manager	Responsible for the transfer and transformation of the services to Atos' delivery organization. Has the following primary responsibilities: ➢ Manages all transition project activities ➢ Manages the staff transfer and relocation, when in scope ➢ Reports on the progress of all projects
Service Delivery Director	Carries overall responsibility for the successful delivery of Atos Services. Has the following primary responsibilities, in relation to the provision of services: ➢ Manages service escalations ➢ Manages strategic innovation and interface with Atos' Global Portfolio Delivery structure, ensuring global enhancements are cascaded through the North American region.

Atos AMO Team	
Service Delivery Manager	Runs and operates the day to day management between Atos and its partners with the State. Carries all formal responsibility on behalf of Atos and is the point of contact for the State of Nebraska. Has full authority for implementing decisions across the whole service structure. Has the following primary responsibilities, in relation to the provision of services: ➢ Handles contract management of the contractual and strategic relationship with the State stakeholders ➢ NG9-1-1 System ➢ Presents new services to the State via the Bi-Annual Innovation Workshop team ➢ Manages fulfillment of services, forecasting, and budgeting ➢ Handles partnership management ➢ Monitors service level performance ➢ Handles billing ➢ Provides human resources management of account staff ➢ Manages service escalations ➢ Directs Compliance management
Quality Assurance and Documentation	Responsible for monitoring the consistent execution against established standards. Has the following primary responsibilities: ➢ Maintains Quality Assurance manuals ➢ Obtains / maintains industry-based certifications ➢ Tracks and reports on key performance indicators
Reporting	Responsible for all reporting requirements for the delivery of services for this engagement. ➢ Generates and posts all reporting requirements ➢ SLA ➢ Service Level Objectives (SLO) ➢ Delivers data and documentation for analysis
Contract / SLA and Change Control	Responsible for maintaining the agreed contracts and service level agreements. Owns change management process as defined for the services contracted with the State. Atos will utilize its change management processes as we interface with the State's respective overall IT management of services. Has the following primary responsibilities: ➢ Maintains all contracts and SLAs ➢ Monitors and reports on the status of all change requests ➢ Implements change requests within contracts and SLAs

Atos' AMO will remain flexible to the State's needs and potential requirements for change.

Clearly Defined Account Interaction

The following graphic defines the account management interaction model. We would envision using this as a starting point to define how we will work together with the State and its other third-party vendors to provide our services to the State.



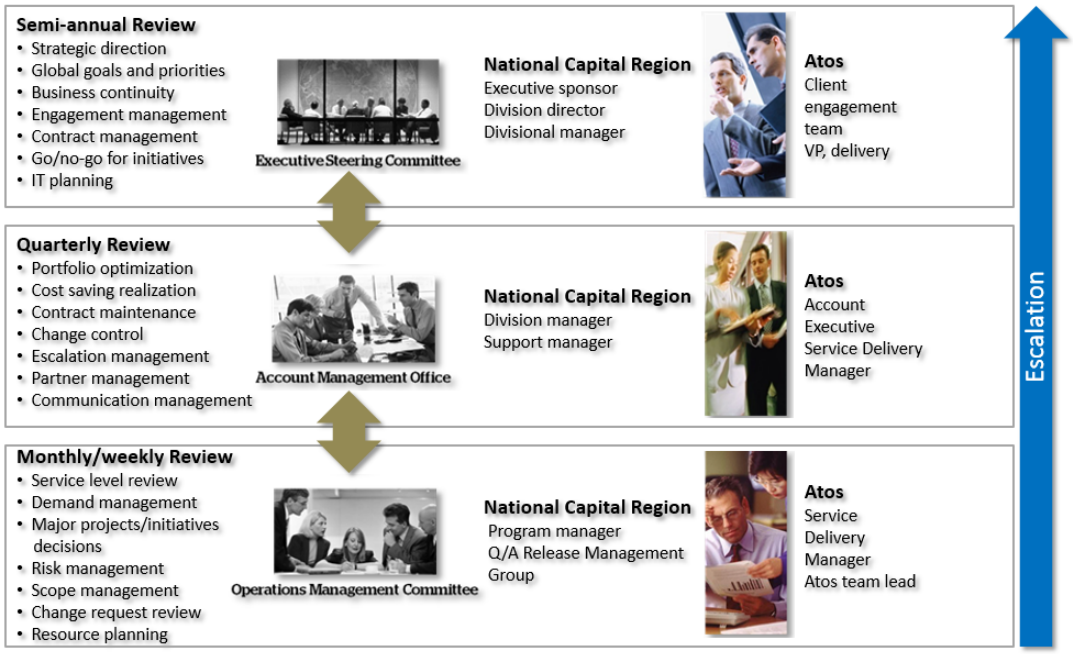
Atos' proposed Account Management – Interaction Model Structure
Maintain an account management structure that is clearly defined for strategic, tactical and operational support.

This focus ensures we have alignment across the State management teams and other third-party vendors.

Clearly Defined Escalation

Escalation of issues follows a chain of command from operational management up through the executive level. To ensure critical issues are raised soon enough to prevent undesirable impacts to the operating environment, the State and Atos will work during transition to identify the triggers and business rules for effective escalation. This activity includes proper identification of escalation timeframes, escalation paths, escalation procedures, and escalation contacts. In supporting the State, this process provides for proper alignment of resources to incidents based on severity and need to correctly drive key organizational performance objectives based on those priorities.

The following graphic provides a representation of the standard escalation path, from the operational management through the executive committee.



Escalation Management: Critical issues will follow a clearly defined chain of command to resolve issues at the most appropriate level.

The following sample escalation alerts will be triggered based on service levels:

- *Open calls within 30 minutes of service level expiration. These alerts are distributed to call allocators, enabling them to take immediate remedial action.*
- *Open calls at service level expiration distributed to the call allocators' team leader*
- *Alerts beyond service level expiration — two hours and four hours — distributed to the service account manager through to the national operations manager, depending on service level time exceeded*

When an issue is not resolved within service level expectations, we initiate proactive steps to achieve resolution through established escalation channels. In our approach to problem management escalation, we take the following actions:

- *Develop a problem management process specific to the State's requirements*
- *Include clearly defined responsibility and accountability*
- *Use management data to perform problem analysis, looking for opportunities to proactively address problem issues and opportunities for improvement*
- *Establish procedures and flow charts that define the processes for which we will be accountable and indicate the following criteria: 1) What is under our control; 2) How the event will be managed or executed; 3) How escalations will occur and 4) How we will interact with other organizations*

Open Communications

Effective account governance is based on honest, open, and frequent dialog between the Atos Account Executive and his or her counterparts in the State . The following list of activities reflects an example of the topics that may appear on the agenda during the various levels of communication.

- ***Strategic (usually half-yearly)***
  - Follow-up of the agreed action points
  - Benchmark results
  - Proposed updates of service performance and Innovation Workshop recommendations
  - Business developments and planning the State business activities, including expected increase or decrease of the required service volumes
  - Development and planning of the service delivery by Atos
  - Conclusions and improvement actions
- ***Tactical (usually monthly)***
  - Follow-up on agreed action points
  - Service performances concerning the preceding period
  - Change requests and problem reports regarding the service levels
  - Conclusions and improvement actions that must be agreed in the strategic review meeting
  - Proposed updates of service performance
  - Operational (usually weekly or daily)
  - A review of the day-to-day operations
  - Examine only deviations in the service delivery in relation to service levels
  - Regular forecast of demand in terms of service-related deployment plans of the State sites

Additionally, occasional meetings will be held to discuss matters needing direct communication or tuning. Atos will attend and participate in regularly scheduled meetings with the State and any third-party partners as the State team determines.

While our expertise is proven across the public sector in the US and abroad, Atos recognizes that 9-1-1 is a highly specialized segment of the market, one which requires a unique set of core competencies and subject matter expertise to not only assure customer objectives are understood and met, but that the transformational pillars of Atos are focused in their respective areas of expertise accordingly. This division of Atos was created to lead, govern and serve the needs of the 9-1-1 sector, managed by industry SMEs who know the operational requirements of this highly specialized industry: **Atos Public Safety**.

Atos has found that the staffing process must deliver people with skills to meet or exceed the City's needs. We look forward to discussing how the City can participate in this process and anticipate that direct involvement will be in the area of defining the skills needed for positions. Additionally, Atos anticipates that the City will be involved in the selection of key positions such as the Service Delivery Manager.

Working with the State and providing accountability will be the Account Management Office (AMO), led by our NG911 practice Operations Account Executive, Scott Fischer. Mr. Fischer is an accomplished senior executive and head of Atos NG9-1-1 North America Operations. He brings more than 20 years of public safety experience and a strong portfolio of experience and success including strategic planning, business operations, developing high-performance management teams, and delivering exceptional financial results. Repeated success guiding teams in the development and launch of strategic business initiatives, fostering relationships with clients and partners that include Fortune 500 and Government organizations, and positioning companies for strategic acquisition. Mr. Fischer is a very active member in NG9-1-1 industry organizations and has been awarded COO of the Year by SmartCEO, Washington Executive Management Awards, and is a graduate of the University of Maryland.

Specific assignments and roles will be determined by and between Atos and the State. Atos will assign personnel based on the requirements to meet the States service levels and transition objectives. The methods used in this approach are established and trusted. This approach focuses on mitigating risk, while retaining the highest possible percentage of employees. The overall effect is to avoid degradation of services and support throughout the duration of our relationship with the State.

J. SUBCONTRACTORS

If the bidder intends to subcontract any part of its performance hereunder, the bidder should provide:

i. name, address, and telephone number of the subcontractor(s);
ii. specific tasks for each subcontractor(s);
iii. percentage of performance hours intended for each subcontract; and
iv. total percentage of subcontractor(s) performance hours.

Atos Response: The team assembled for the State's NG9-1-1 program has extensive experience in ESInet and like-kind scale and scope mission critical communication initiatives. Having worked together on previous programs, the individuals comprising Team Atos have over a decade of previous project experience together, from early-stage NG9-1-1 trials through current NG Core Services (NGCS) powered ESInet initiatives; the sum of the parts is what makes Team Atos so strong, as the expertise among the core competency pillars and Subject Matter Experts (SMEs) bring the City the most balanced set of proven qualifications to fit the specific scope of this program.

With respect to an end-to-end ESInet program, the key to success lies not as much in the technology as it does the collective domain expertise of the members assembled, as there have been no successful end-to-end i3 deployments in total, but rather independent subsystem successes associated therein; Atos Public Safety's leadership and SMEs this team based on this industry reality, hand selecting the successes and designing the migration based on previous experience, knowing exactly what to avoid and how to deploy the ESInet domain and provide NGCS for the State without repeating any of the challenges and / or failures other programs experienced.

Subcontractor: ECaTS, www.ecats911.com

400 Sunrise Ave. Suite 100, Roseville, CA 95661 USA, Phone: 855-333-0827

Scope of Services Provided: For the State, our trusted partner ECaTS will provide the **i3 Logging** Service which offers an i3-ready interface that aggregates the logs within an ESInet and the logs available at a PSAP to provide data on calls before they get to the PSAP, thereby supporting true end-to-end transaction logging and retrieval. Basically, all significant steps in processing a call are logged by ESInet functional elements and call handling systems and submitted to the logging service. Each log contains a transaction ID to support log aggregation for end-to-end reporting. As part of our proposal submission, we have included the ECaTS ing Service brochure as an attachment ***(See Appendix A: Company Information)***.

We know it can be tricky to know if you can trust a logging service. ECaTS is a vendor-neutral solution for data gathering, logging and reporting; when you choose our service, we guarantee unbiased representation of your data from the functional elements on the ESInet. And don't worry, we've got you covered: Available as a standalone service or a complementary add-on to ECaTS Core, our i3 Logging Service conforms to NENA-STA-010.2-2016 Detailed Functional and Interface Specification for the NENA i3 Solution.ECaTS, or Emergency Call Tracking System, is the first ever MIS reporting service designed exclusively for the public safety industry. We turn mounds of raw 9-1-1 call data into a neat, informative package that tells you everything you everything you need to know about your PSAP's performance and future needs.

Percentage or Performance Hours: Atos is performing the labor except for that which are i3 Logging Services by ECaTS.

Percentage of Performance Hours Total: Atos is performing the labor except for that which are i3 Logging Services by ECaTS.

Subcontractor: 911 Datamaster, www.911datamaster.com

7500 College Boulevard, Suite 500, Overland Park, KS 66210, Phone: 913-469-6401

Scope of Services Provided: Our trusted partner, 911 Datamaster will provide the **Location Database (LDB)** via Databond. DataBond supports the migration to NG9-1-1 with database and management software providing request/response functionality with all leading ANI/ALI controllers, Legacy Network Gateways (LNGs) and Emergency Service Routing Proxies (ESRPs).

Scope of Services Provided:

- Provides cellular Phase I and Phase II solutions
- Extensive reporting capabilities
- History of all database requests
- Automatic synchronization of records
- Automatic import of NENA standard files
- Comprehensive record updating capabilities either manually or automatically
- Integrates with existing and NG9-1-1 infrastructure

DataBond is a powerful new tool that can serve double-duty as a LDB. As a LDB, it can process Automatic Location Information (ALI) and act as a Location Information Server (LIS) while operating within a 9-1-1 authority's jurisdiction. DataBond provides seamless transition to NG9-1-1 with built-in flexibility and redundancy. As part of our proposal submission, we have included the DataBond brochure as an attachment ***(See Appendix A: Company Information)***.

DataBond integrates seamlessly with SpatialStation, our NG9-1-1 GIS Self-Management software solution, as well as SpatialCentral DataNexus, our SI and LVF/ECRF software solutions, ensuring that every subscriber location record maintained is valid and routable.

911 Datamasters mission is to elevate 9-1-1 data quality and routing technology beyond NG9-1-1 standards. Founded in 1993 in Overland Park, Kansas, we've spent over 25 years building best-in-class 9-1-1 data validation and routing software. Our experience has given us the opportunity to study 9-1-1 data validation and routing needs at a granular level that has helped us identify key features for ease-of-use that go beyond NG9-1-1 standards.

We focus on providing NG9-1-1 solutions and transitional software needed to get public safety entities into a fully-functional NG9-1-1 ecosystem. We cover every data need for NG9-1-1 including:

- GIS Quality Assurance
- GIS services
- Multi-agency data interaction
- NG9-1-1 validation and routing databases, and much more.

Customer Focused

We have a passion for product support and software development. That's why we provide so much more than the minimum NG9-1-1 requirements.

- High Performance — Our software is designed for a database of up-to 100 million records.
- Scalable Solutions — Our software is scalable to cover any population size from less than 5,000 to tens of millions.
- Quality Control —We use a three-stage testing process to ensure the quality of each product and each installation.
- Quality Documentation — All of our products come with readable user manuals written by a language professional that understands the software. Custom documentation can also be provided.

Success Begins Before the Call is Made

911 Datamaster continues to evolve its technological capabilities to include LVF / ECRF, LDB, Spatial Data Management and Software, and Centralized GIS Warehouses to support critical NG9-1-1 functions. All of our systems are presently deployed and in use at customer / partner locations.

Percentage or Performance Hours: Atos is performing the labor except for that which are LDB services via DataBond by Datamaster.

Percentage of Performance Hours Total: Atos is performing the labor except for that which are LDB services via DataBond by Datamaster.

GEOCOMM

Subcontractor: GeoComm, www.geo-comm.com

601 W. Saint Germain Street, Saint Cloud MD 56301, 1-888-436-2666

Scope of Services Provided: Our trusted partner, Geocomm will provide the **Emergency Call Routing Function (ECRF) and Location Validation (LVF)**. GeoComm ECRF is part of an end-to-end NG9-1-1 GIS solution that delivers NENA i3 ECRF services to NG9-1-1 ESInets, replacing legacy 9-1-1 MSAG and Selective Router systems. It includes 9-1-1 GIS data management, aggregation, and quality control systems to provision GIS data to ECRF systems rapidly and with high frequency. Based on NENA standards, GeoComm ECRF works with ANY vendor, make, and model of NG9-1-1 compliant Emergency Services Routing Proxt (ESRP), PSAP equipment, and other LoST clients.

GeoComm ECRF uses a load balanced multi-server architecture supporting geographic redundancy with no single point of failure, providing high availability and lightning fast performance for any agency, large or small. As part of our proposal submission, we have included the GeoComm ECRF and LVF brochure as an attachment ***(See Appendix A: Company Information)***.

Percentage or Performance Hours: Atos is performing the labor except for that which are ECRF and LVF services.

Percentage of Performance Hours Total: Atos is performing the labor except for that which are ECRF and LVF services.

II. TERMS AND CONDITIONS

Bidders should complete Sections II through VI as part of their proposal. Bidders should read the Terms and Conditions and should initial either accept, reject, or reject and provide alternative language for each clause. The bidder should also provide an explanation of why the bidder rejected the clause or rejected the clause and provided alternate language. By signing the solicitation, bidder is agreeing to be legally bound by all the accepted terms and conditions, and any proposed alternative terms and conditions submitted with the proposal. The State reserves the right to negotiate rejected or proposed alternative language. If the State and bidder fail to agree on the final Terms and Conditions, the State reserves the right to reject the proposal. The State of Nebraska is soliciting proposals in response to this solicitation. The State of Nebraska reserves the right to reject proposals that attempt to substitute the bidder's commercial contracts and/or documents for this solicitation.

Bidders should submit with their proposal any license, user agreement, service level agreement, or similar documents that the bidder wants incorporated in the Contract. The State will not consider incorporation of any document not submitted with the bidder's proposal as the document will not have been included in the evaluation process. These documents shall be subject to negotiation and will be incorporated as addendums if agreed to by the Parties.

If a conflict or ambiguity arises after the Addendum to Contract Award have been negotiated and agreed to, the Addendum to Contract Award shall be interpreted as follows:

1. If only one Party has a particular clause then that clause shall control;
2. If both Parties have a similar clause, but the clauses do not conflict, the clauses shall be read together;
3. If both Parties have a similar clause, but the clauses conflict, the State's clause shall control.

A. GENERAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The contract resulting from this solicitation shall incorporate the following documents:

1. Request for Proposal and Addenda;
2. Amendments to the solicitation;
3. Questions and Answers;
4. Bidder's proposal (Solicitation and properly submitted documents);
5. The executed Contract and Addendum One to Contract, if applicable; and,
6. Amendments/Addendums to the Contract.

These documents constitute the entirety of the contract.

Unless otherwise specifically stated in a future contract amendment, in case of any conflict between the incorporated documents, the documents shall govern in the following order of preference with number one (1) receiving preference over all other documents and with each lower numbered document having preference over any higher numbered document: 1) Amendment to the executed Contract with the most recent dated amendment having the highest priority, 2) executed Contract and any attached Addenda, 3) Amendments to solicitation and any Questions and Answers, 4) the original solicitation document and any Addenda, and 5) the bidder's submitted Proposal.

Any ambiguity or conflict in the contract discovered after its execution, not otherwise addressed herein, shall be resolved in accordance with the rules of contract interpretation as established in the State of Nebraska.

B. NOTIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Contractor and State shall identify the contract manager who shall serve as the point of contact for the executed contract.

Communications regarding the executed contract shall be in writing and shall be deemed to have been given if delivered personally or mailed, by U.S. Mail, postage prepaid, return receipt requested, to the parties at their respective addresses set forth below, or at such other addresses as may be specified in writing by either of the parties. All notices, requests, or communications shall be deemed effective upon personal delivery or five (5) calendar days following deposit in the mail.

Either party may change its address for notification purposes by giving notice of the change, and setting forth the new address and an effective date.

C. BUYER'S REPRESENTATIVE

The State reserves the right to appoint a Buyer's Representative to manage (or assist the Buyer in managing) the contract on behalf of the State. The Buyer's Representative will be appointed in writing, and the appointment document will specify the extent of the Buyer's Representative authority and responsibilities. If a Buyer's Representative is appointed, the Contractor will be provided a copy of the appointment document, and is required to cooperate accordingly with the Buyer's Representative. The Buyer's Representative has no authority to bind the State to a contract, amendment, addendum, or other change or addition to the contract.

D. GOVERNING LAW (Statutory)

Notwithstanding any other provision of this contract, or any amendment or addendum(s) entered into contemporaneously or at a later time, the parties understand and agree that, (1) the State of Nebraska is a sovereign state and its authority to contract is therefore subject to limitation by the State's Constitution, statutes, common law, and regulation; (2) this contract will be interpreted and enforced under the laws of the State of Nebraska; (3) any action to enforce the provisions of this agreement must be brought in the State of Nebraska per state law; (4) the person signing this contract on behalf of the State of Nebraska does not have the authority to waive the State's sovereign immunity, statutes, common law, or regulations; (5) the indemnity, limitation of liability, remedy, and other similar provisions of the final contract, if any, are entered into subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity; and, (6) all terms and conditions of the final contract, including but not limited to the clauses concerning third party use, licenses, warranties, limitations of liability, governing law and venue, usage verification, indemnity, liability, remedy or other similar provisions of the final contract are entered into specifically subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity.

The Parties must comply with all applicable local, state and federal laws, ordinances, rules, orders, and regulations.

E. BEGINNING OF WORK

The bidder shall not commence any billable work until a valid contract has been fully executed by the State and the awarded bidder. The awarded bidder will be notified in writing when work may begin.

F. AMENDMENT

This Contract may be amended in writing, within scope, upon the agreement of both parties.

G. CHANGE ORDERS OR SUBSTITUTIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The State and the Contractor, upon the written agreement, may make changes to the contract within the general scope of the solicitation. Changes may involve specifications, the quantity of work, or such other items as the State may find necessary or desirable. Corrections of any deliverable, service, or work required pursuant to the contract shall not be deemed a change. The Contractor may not claim forfeiture of the contract by reasons of such changes.

The Contractor shall prepare a written description of the work required due to the change and an itemized cost sheet for the change. Changes in work and the amount of compensation to be paid to the Contractor shall be determined in accordance with applicable unit prices if any, a pro-rated value, or through negotiations. The State shall not incur a price increase for changes that should have been included in the Contractor's proposal, were foreseeable, or result from difficulties with or failure of the Contractor's proposal or performance.

No change shall be implemented by the Contractor until approved by the State, and the Contract is amended to reflect the change and associated costs, if any. If there is a dispute regarding the cost, but both parties agree that immediate implementation is necessary, the change may be implemented, and cost negotiations may continue with both Parties retaining all remedies under the contract and law.

In the event any product is discontinued or replaced upon mutual consent during the contract period or prior to delivery, the State reserves the right to amend the contract or purchase order to include the alternate product at the same price.

*****Contractor will not substitute any item that has been awarded without prior written approval of SPB*****

H. VENDOR PERFORMANCE REPORT(S)

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The State may document any instance(s) of products or services delivered or performed which exceed or fail to meet the terms of the purchase order, contract, and/or solicitation specifications. The State Purchasing Bureau may contact the Vendor regarding any such report. Vendor performance report(s) will become a part of the permanent record of the Vendor.

I. NOTICE OF POTENTIAL CONTRACTOR BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

If Contractor breaches the contract or anticipates breaching the contract, the Contractor shall immediately give written notice to the State. The notice shall explain the breach or potential breach, a proposed cure, and may include a request for a waiver of the breach if so desired. The State may, in its discretion, temporarily or permanently waive the breach. By granting a waiver, the State does not forfeit any rights or remedies to which the State is entitled by law or equity, or pursuant to the provisions of the contract. Failure to give immediate notice, however, may be grounds for denial of any request for a waiver of a breach.

J. BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** **The first sentence should read:** Either Party may terminate the contract, in whole or in part, if the other Party materially breaches its duty to perform its obligations under the contract in a timely and proper manner. **The fifth, sixth, seventh, and eighth sentences shall be deleted.** They state: ~~In case of default of the Contractor, the State may contract the service from other sources and hold the Contractor responsible for any excess cost occasioned thereby. OR In case of breach by the Contractor, the State may, without unreasonable delay, make a good faith effort to make a reasonable purchase or contract to purchase goods in substitution of those due from the contractor. The State may recover from the Contractor as damages the difference between the costs of covering the breach. Notwithstanding any clause to the contrary, the State may also recover the contract price together with any incidental or consequential damages defined in UCC Section 2-715, but less expenses saved in consequence of Contractor's breach.~~ **The eighth sentence shall be modified to state:** The State's failure to make payment **shall** be a breach, and the Contractor **shall** retain all available statutory remedies and protections. **Atos Reasons for Alternative** While Atos understands and agrees that the Parties should be able to terminate for default, such right should only occur if the default is material. In addition, as to committed costs, if there is a material breach, Atos should only be responsible for direct damages as they are defined by applicable law. If that includes the right to step in, or the difference in costs of obtaining a new service provider, Atos would agree to pay those. However, these should be left to their definition at law and not included as part of the contractual rights.

			Finally, Atos needs the ability to ensure it will receive payment. While there may be remedies at law, Atos would also need the right to terminate a contract that is not paying for services received.

Either Party may terminate the contract, in whole or in part, if the other Party breaches its duty to perform its obligations under the contract in a timely and proper manner. Termination requires written notice of default and a thirty (30) calendar day (or longer at the non-breaching Party's discretion considering the gravity and nature of the default) cure period. Said notice shall be delivered by Certified Mail, Return Receipt Requested, or in person with proof of delivery. Allowing time to cure a failure or breach of contract does not waive the right to immediately terminate the contract for the same or different contract breach which may occur at a different time. In case of default of the Contractor, the State may contract the service from other sources and hold the Contractor responsible for any excess cost occasioned thereby. OR In case of breach by the Contractor, the State may, without unreasonable delay, make a good faith effort to make a reasonable purchase or contract to purchase goods in substitution of those due from the contractor. The State may recover from the Contractor as damages the difference between the costs of covering the breach. Notwithstanding any clause to the contrary, the State may also recover the contract price together with any incidental or consequential damages defined in UCC Section 2-715, but less expenses saved in consequence of Contractor's breach.

The State's failure to make payment shall not be a breach, and the Contractor shall retain all available statutory remedies and protections.

K. NON-WAIVER OF BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The acceptance of late performance with or without objection or reservation by a Party shall not waive any rights of the Party nor constitute a waiver of the requirement of timely performance of any obligations remaining to be performed.

L. SEVERABILITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

If any term or condition of the contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the provision held to be invalid or illegal.

M. INDEMNIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** **The fifth and sixth lines of "1. GENERAL" shall be amended to state:** , or attributable to the **will**ful misconduct, gross negligence, gross error, or gross omission of the Contractor, **"3. Personnel" shall be amended to state:** The Contractor **shall**, at its expense, indemnify and hold harmless the indemnified parties from and against any claim with respect to withholding taxes, worker's compensation, employee benefits, or any other employment related claim, demand, liability, damage, or loss of any nature relating to any of the personnel, including subcontractor's and their employees, provided by the Contractor **As it is not addressed, a new section "6. LIMITATION OF LIABILITY" shall be added, which states:** UNDER NO CIRCUMSTANCES WILL EITHER PARTY BE LIABLE FOR ANY INDIRECT, CONSEQUENTIAL, EXEMPLARY, SPECIAL, OR INCIDENTAL DAMAGES. EACH PARTY'S TOTAL LIABILITY FOR ANY DAMAGES SHALL NOT EXCEED, IN THE CUMULATIVE, THE FEES PAID BY THE STATE TO CONTRACTOR OVER THE TWELVE MONTHS IMMEDIATELY PRECEDING THE FIRST EVENT GIVING RISE TO THE CLAIM. THIS SECTION SHALL APPLY WHETHER AT LAW OR IN EQUITY OR ARISING FROM CONTRACT, TORT, AGENCY, OR ANY OTHER CAUSE OF ACTION. This Section shall not apply to that cannot be limited as a matter of law or to the indemnities listed as 2. Intellectual Property or 3. Personnel. EXCEPT AS SET FORTH HEREIN, CONTRACTOR DISCLAIMS ALL WARRANTIES, STATUTORY OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. **Atos Reasons for Alternative** Atos agrees to the indemnities as written below; however, due to the nature of the Services, Atos would require liability for the indemnity associated only with gross negligence or willful misconduct. As to the indemnity for "Personnel", Atos understands and agrees to this; however, Atos would require this indemnity to be clarified that it is other employment related claims, as this could be interpreted to include any act of our personnel, including, negligence or breach of contract. Finally, Atos wants to be clear that it would require a 12-month cap on its liability and the exculpatory clause. Atos can agree to uncapped liability for certain claims as mentioned.

1. GENERAL

The Contractor agrees to defend, indemnify, and hold harmless the State and its employees, volunteers, agents, and its elected and appointed officials ("the indemnified parties") from and against any and all third party claims, liens, demands, damages, liability, actions, causes of action, losses, judgments, costs, and expenses of every nature, including investigation costs and expenses, settlement costs, and attorney fees and expenses ("the claims"), sustained or asserted against the State for personal injury, death, or property loss or damage, arising out of, resulting from, or attributable to the willful misconduct, negligence, error, or omission of the Contractor, its employees, subcontractors, consultants, representatives, and agents, resulting from this contract, except to the extent such Contractor liability is attenuated by any action of the State which directly and proximately contributed to the claims.

2. INTELLECTUAL PROPERTY (Optional)

The Contractor agrees it will, at its sole cost and expense, defend, indemnify, and hold harmless the indemnified parties from and against any and all claims, to the extent such claims arise out of, result from, or are attributable to, the actual or alleged infringement or misappropriation of any patent, copyright, trade secret, trademark, or confidential information of any third party by the Contractor or its employees, subcontractors, consultants, representatives, and agents; provided, however, the State gives the Contractor prompt notice in writing of the claim. The Contractor may not settle any infringement claim that will affect the State's use of the Licensed Software without the State's prior written consent, which consent may be withheld for any reason.

If a judgment or settlement is obtained or reasonably anticipated against the State's use of any intellectual property for which the Contractor has indemnified the State, the Contractor shall, at the Contractor's sole cost and expense, promptly modify the item or items which were determined to be infringing, acquire a license or licenses on the State's behalf to provide the necessary rights to the State to eliminate the infringement, or provide the State with a non-infringing substitute that provides the State the same functionality. At the State's election, the actual or anticipated judgment may be treated as a breach of warranty by the Contractor, and the State may receive the remedies provided under this solicitation.

3. PERSONNEL

The Contractor shall, at its expense, indemnify and hold harmless the indemnified parties from and against any claim with respect to withholding taxes, worker's compensation, employee benefits, or any other claim, demand, liability, damage, or loss of any nature relating to any of the personnel, including subcontractor's and their employees, provided by the Contractor.

4. SELF-INSURANCE

The State of Nebraska is self-insured for any loss and purchases excess insurance coverage pursuant to Neb. Rev. Stat. § 81-8,239.01 (Reissue 2008). If there is a presumed loss under the provisions of this agreement, Contractor may file a claim with the Office of Risk Management pursuant to Neb. Rev. Stat. §§ 81-8,829 – 81-8,306 for review by the State Claims Board. The State retains all rights and immunities under the State Miscellaneous (§ 81-8,294), Tort (§ 81-8,209), and Contract Claim Acts (§ 81-8,302), as outlined in Neb. Rev. Stat. § 81-8,209 et seq. and under any other provisions of law and accepts liability under this agreement to the extent provided by law.

5. The Parties acknowledge that Attorney General for the State of Nebraska is required by statute to represent the legal interests of the State, and that any provision of this indemnity clause is subject to the statutory authority of the Attorney General.

N. ATTORNEY'S FEES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

In the event of any litigation, appeal, or other legal action to enforce any provision of the contract, the Parties agree to pay all expenses of such action, as permitted by law and if ordered by the court, including attorney's fees and costs, if the other Party prevails.

O. PERFORMANCE BOND

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor maybe required to supply a bond executed by a corporation authorized to contract surety in the State of Nebraska, payable to the State of Nebraska, which shall be valid for the life of the contract to include any renewal and/or extension periods. The amount of the bond must be $500,000. The bond will guarantee that the Contractor will faithfully perform all requirements, terms and conditions of the contract. Failure to comply shall be grounds for forfeiture of bond as liquidated damages. Amount of forfeiture will be determined by the agency based on loss to the State. The bond will be returned when the contract has been satisfactorily completed as solely determined by the State, after termination or expiration of the contract.

P. ASSIGNMENT, SALE, OR MERGER

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Either Party may assign the contract upon mutual written agreement of the other Party. Such agreement shall not be unreasonably withheld.

The Contractor retains the right to enter into a sale, merger, acquisition, internal reorganization, or similar transaction involving Contractor's business. Contractor agrees to cooperate with the State in executing amendments to the contract to allow for the transaction. If a third party or entity is involved in the transaction, the Contractor will remain responsible for performance of the contract until such time as the person or entity involved in the transaction agrees in writing to be contractually bound by this contract and perform all obligations of the contract.

Q. CONTRACTING WITH OTHER NEBRASKA POLITICAL SUB-DIVISIONS OF THE STATE OR ANOTHER STATE

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor may, but shall not be required to, allow agencies, as defined in Neb. Rev. Stat. §81-145, to use this contract. The terms and conditions, including price, of the contract may not be amended. The State shall not be contractually obligated or liable for any contract entered into pursuant to this clause. A listing of Nebraska political subdivisions may be found at the website of the Nebraska Auditor of Public Accounts.

The Contractor may, but shall not be required to, allow other states, agencies or divisions of other states, or political subdivisions of other states to use this contract. The terms and conditions, including price, of this contract shall apply to any such contract, but may be amended upon mutual consent of the Parties. The State of Nebraska shall not be contractually or otherwise obligated or liable under any contract entered into pursuant to this clause. The State shall be notified if a contract is executed based upon this contract.

R. FORCE MAJEURE

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** **The following shall be added to the end of the paragraph:** The consideration scope and other essential elements (including, without limitation, dependencies, technical requirements, and State obligations) of this Agreement have been defined taking into account the "as is" status of COVID-19 in the place(s) where the delivery will take place at the time of the signature ("Current Status"). In the event of any change to the Current Status, Contractor shall have the right to submit a change request for a coherent revision of the Agreement and the Parties shall enter into good faith negotiations in order to implement such change. **Atos Reasons for Alternative** Atos' price is an accurate reflection of where Atos sees the costs now and in the future. Atos is concerned that if COVID were to have a significant increase it could further impair the Services. So, the purpose of this clause is to ask that in such a case, the parties sit down and agree on the best course of action.

Neither Party shall be liable for any costs or damages, or for default resulting from its inability to perform any of its obligations under the contract due to a natural or manmade event outside the control and not the fault of the affected Party ("Force Majeure Event"). The Party so affected shall immediately make a written request for relief to the other Party, and shall have the burden of proof to justify the request. The other Party may grant the relief requested; relief may not be unreasonably withheld. Labor disputes with the impacted Party's own employees will not be considered a Force Majeure Event.

S. CONFIDENTIALITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

All materials and information provided by the Parties or acquired by a Party on behalf of the other Party shall be regarded as confidential information. All materials and information provided or acquired shall be handled in accordance with federal and state law, and ethical standards. Should said confidentiality be breached by a Party, the Party shall notify the other Party immediately of said breach and take immediate corrective action.

It is incumbent upon the Parties to inform their officers and employees of the penalties for improper disclosure imposed by the Privacy Act of 1974, 5 U.S.C. 552a. Specifically, 5 U.S.C. 552a (i)(1), which is made applicable by 5 U.S.C. 552a (m)(1), provides that any officer or employee, who by virtue of his/her employment or official position has possession of or access to agency records which contain individually identifiable information, the disclosure of which is prohibited by the Privacy Act or regulations established thereunder, and who knowing that disclosure of the specific material is prohibited, willfully discloses the material in any manner to any person or agency not entitled to receive it, shall be guilty of a misdemeanor and fined not more than $5,000.

T. EARLY TERMINATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** The following shall be added to the last sentence of 2. In addition, the State shall also be responsible for payment of the termination settlement proposal agreed upon between the State and Contractor. If the Contractor and the State fail to agree on the amount to be paid because of the termination for convenience, the State will pay the Contractor the following amount: (i) The contract price for deliverables or services accepted or retained by the State and not previously paid for, adjusted for any savings on freight and other charges; and (ii) The total of: A) The reasonable costs incurred in the performance of the work terminated, including initial costs and preparatory expenses allocable thereto, but excluding any cost attributable to deliverables or services paid or to be paid; B) The reasonable cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract; and C) Reasonable storage, transportation, demobilization, unamortized overhead and capital costs, and other costs reasonably incurred by the Contractor in winding down and terminating its work. The Contractor will use generally accepted accounting principles, or accounting principles otherwise agreed to in writing by the parties, and sound business practices in determining all costs **Atos Reasons for Alternative** Atos agrees with this Section; however, Atos will have significant investments in the work. Should the State choose to end the term of the Contract, Atos would require an ability to recoup its costs, since the right to terminate for convenience is totally within the State's control.

The contract may be terminated as follows:

1. The State and the Contractor, by mutual written agreement, may terminate the contract at any time.

2. The State, in its sole discretion, may terminate the contract for any reason upon thirty (30) calendar day's written notice to the Contractor. Such termination shall not relieve the Contractor of warranty or other service obligations incurred under the terms of the contract. In the event of termination the Contractor shall be entitled to payment, determined on a pro rata basis, for products or services satisfactorily performed or provided.

3. The State may terminate the contract immediately for the following reasons:

- **a.** if directed to do so by statute;
- **b.** Contractor has made an assignment for the benefit of creditors, has admitted in writing its inability to pay debts as they mature, or has ceased operating in the normal course of business;
- **c.** a trustee or receiver of the Contractor or of any substantial part of the Contractor's assets has been appointed by a court;
- **d.** fraud, misappropriation, embezzlement, malfeasance, misfeasance, or illegal conduct pertaining to performance under the contract by its Contractor, its employees, officers, directors, or shareholders;
- **e.** an involuntary proceeding has been commenced by any Party against the Contractor under any one of the chapters of Title 11 of the United States Code and (i) the proceeding has been pending for at least sixty (60) calendar days; or (ii) the Contractor has consented, either expressly or by operation of law, to the entry of an order for relief; or (iii) the Contractor has been decreed or adjudged a debtor;
- **f.** a voluntary petition has been filed by the Contractor under any of the chapters of Title 11 of the United States Code;
- **g.** Contractor intentionally discloses confidential information;
- **h.** Contractor has or announces it will discontinue support of the deliverable; and,
- **i.** In the event funding is no longer available.

U. CONTRACT CLOSEOUT

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Upon contract closeout for any reason the Contractor shall within 30 calendar days, unless stated otherwise herein:

1. Transfer all completed or partially completed deliverables to the State;
2. Transfer ownership and title to all completed or partially completed deliverables to the State;
3. Return to the State all information and data, unless the Contractor is permitted to keep the information or data by contract or rule of law. Contractor may retain one copy of any information or data as required to comply with applicable work product documentation standards or as are automatically retained in the course of Contractor's routine back up procedures;
4. Cooperate with any successor Contactor, person or entity in the assumption of any or all of the obligations of this contract;
5. Cooperate with any successor Contactor, person or entity with the transfer of information or data related to this contract;
6. Return or vacate any state owned real or personal property; and,
7. Return all data in a mutually acceptable format and manner.

Nothing in this Section should be construed to require the Contractor to surrender intellectual property, real or personal property, or information or data owned by the Contractor for which the State has no legal claim.

III. CONTRACTOR DUTIES

A. INDEPENDENT CONTRACTOR / OBLIGATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

It is agreed that the Contractor is an independent contractor and that nothing contained herein is intended or should be construed as creating or establishing a relationship of employment, agency, or a partnership.

The Contractor is solely responsible for fulfilling the contract. The Contractor or the Contractor's representative shall be the sole point of contact regarding all contractual matters.

The Contractor shall secure, at its own expense, all personnel required to perform the services under the contract. The personnel the Contractor uses to fulfill the contract shall have no contractual or other legal relationship with the State; they shall not be considered employees of the State and shall not be entitled to any compensation, rights or benefits from the State, including but not limited to, tenure rights, medical and hospital care, sick and vacation leave, severance pay, or retirement benefits.

By-name personnel commitments made in the Contractor's proposal shall not be changed without the prior written approval of the State. Replacement of these personnel, if approved by the State, shall be with personnel of equal or greater ability and qualifications.

All personnel assigned by the Contractor to the contract shall be employees of the Contractor or a subcontractor, and shall be fully qualified to perform the work required herein. Personnel employed by the Contractor or a subcontractor to fulfill the terms of the contract shall remain under the sole direction and control of the Contractor or the subcontractor respectively.

With respect to its employees, the Contractor agrees to be solely responsible for the following:

1. Any and all pay, benefits, and employment taxes and/or other payroll withholding;
2. Any and all vehicles used by the Contractor's employees, including all insurance required by state law;
3. Damages incurred by Contractor's employees within the scope of their duties under the contract;
4. Maintaining Workers' Compensation and health insurance that complies with state and federal law and submitting any reports on such insurance to the extent required by governing law;
5. Determining the hours to be worked and the duties to be performed by the Contractor's employees; and,
6. All claims on behalf of any person arising out of employment or alleged employment (including without limit claims of discrimination alleged against the Contractor, its officers, agents, or subcontractors or subcontractor's employees).

If the Contractor intends to utilize any subcontractor, the subcontractor's level of effort, tasks, and time allocation should be clearly defined in the bidder's proposal. The Contractor shall agree that it will not utilize any subcontractors not specifically included in its proposal in the performance of the contract without the prior written authorization of the State.

The State reserves the right to require the Contractor to reassign or remove from the project any Contractor or subcontractor employee.

Contractor shall insure that the terms and conditions contained in any contract with a subcontractor does not conflict with the terms and conditions of this contract.

The Contractor shall include a similar provision, for the protection of the State, in the contract with any subcontractor engaged to perform work on this contract.

B. EMPLOYEE WORK ELIGIBILITY STATUS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor is required and hereby agrees to use a federal immigration verification system to determine the work eligibility status of employees physically performing services within the State of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program authorized by the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of an employee.

If the Contractor is an individual or sole proprietorship, the following applies:

1. The Contractor must complete the United States Citizenship Attestation Form, available on the Department of Administrative Services website at http://das.nebraska.gov/materiel/purchasing.html.

2. The completed United States Attestation Form should be submitted with the solicitation response.

3. If the Contractor indicates on such attestation form that he or she is a qualified alien, the Contractor agrees to provide the US Citizenship and Immigration Services documentation required to verify the Contractor's lawful presence in the United States using the Systematic Alien Verification for Entitlements (SAVE) Program.

4. The Contractor understands and agrees that lawful presence in the United States is required and the Contractor may be disqualified or the contract terminated if such lawful presence cannot be verified as required by Neb. Rev. Stat. §4-108.

C. COMPLIANCE WITH CIVIL RIGHTS LAWS AND EQUAL OPPORTUNITY EMPLOYMENT / NONDISCRIMINATION (Statutory)

The Contractor shall comply with all applicable local, state, and federal statutes and regulations regarding civil rights laws and equal opportunity employment. The Nebraska Fair Employment Practice Act prohibits Contractors of the State of Nebraska, and their subcontractors, from discriminating against any employee or applicant for employment, with respect to hire, tenure, terms, conditions, compensation, or privileges of employment because of race, color, religion, sex, disability, marital status, or national origin (Neb. Rev. Stat. §48-1101 to 48-1125). The Contractor guarantees compliance with the Nebraska Fair Employment Practice Act, and breach of this provision shall be regarded as a material breach of contract. The Contractor shall insert a similar provision in all subcontracts for goods and services to be covered by any contract resulting from this solicitation.

D. COOPERATION WITH OTHER CONTRACTORS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Contractor may be required to work with or in close proximity to other contractors or individuals that may be working on same or different projects. The Contractor shall agree to cooperate with such other contractors or individuals, and shall not commit or permit any act which may interfere with the performance of work by any other contractor or individual. Contractor is not required to compromise Contractor's intellectual property or proprietary information unless expressly required to do so by this contract.

E. PERMITS, REGULATIONS, LAWS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The contract price shall include the cost of all royalties, licenses, permits, and approvals, whether arising from patents, trademarks, copyrights or otherwise, that are in any way involved in the contract. The Contractor shall obtain and pay for all royalties, licenses, and permits, and approvals necessary for the execution of the contract. The Contractor must guarantee that it has the full legal right to the materials, supplies, equipment, software, and other items used to execute this contract.

F. OWNERSHIP OF INFORMATION AND DATA / DELIVERABLES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** Atos agrees with this, however, would require a statement that deals with Atos' IP, including it's IP in the solution, which states: Contractor, and its third parties, shall be the sole and exclusive owner of all of its pre-existing intellectual property, including, without limitation, all copyrights, trademarks, patents, trade secrets, software, processes, methodologies, tools, scripts, next generation 9-1-1 solution, know how, and all other proprietary rights whether developed prior to the performance of this Agreement or developed, enhanced, or modified in the course of performance of this Agreement ("Pre-Existing IP"). Under no circumstances will Pre-Existing IP, including, without limitation, the Contractor's next generation 9-1-1 solution be deemed a deliverable. However, the State shall receive a limited license to use the Pre-Existing IP during the term of this Agreement. **Atos Reasons for Alternative** Atos agrees with the requirements in this Section; however, there is nothing that deals with ownership of Atos IP or third-party software. As a result, Atos wants to ensure we include the requirements. Atos would also like to clarify that Atos' next generation 9-1-1 solution is not a deliverable and ownership will not belong to the state.

The State shall have the unlimited right to publish, duplicate, use, and disclose all information and data developed or obtained by the Contractor on behalf of the State pursuant to this contract.

The State shall own and hold exclusive title to any deliverable developed as a result of this contract. Contractor shall have no ownership interest or title, and shall not patent, license, or copyright, duplicate, transfer, sell, or exchange, the design, specifications, concept, or deliverable.

G. INSURANCE REQUIREMENTS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor shall throughout the term of the contract maintain insurance as specified herein and provide the State a current Certificate of Insurance/Acord Form (COI) verifying the coverage. The Contractor shall not commence work on the contract until the insurance is in place. If Contractor subcontracts any portion of the Contract the Contractor must, throughout the term of the contract, either:

1. Provide equivalent insurance for each subcontractor and provide a COI verifying the coverage for the subcontractor;
2. Require each subcontractor to have equivalent insurance and provide written notice to the State that the Contractor has verified that each subcontractor has the required coverage; or,
3. Provide the State with copies of each subcontractor's Certificate of Insurance evidencing the required coverage.

The Contractor shall not allow any subcontractor to commence work until the subcontractor has equivalent insurance. The failure of the State to require a COI, or the failure of the Contractor to provide a COI or require subcontractor insurance shall not limit, relieve, or decrease the liability of the Contractor hereunder.

In the event that any policy written on a claims-made basis terminates or is canceled during the term of the contract or within one (1) year of termination or expiration of the contract, the contractor shall obtain an extended discovery or reporting period, or a new insurance policy, providing coverage required by this contract for the term of the contract and one (1) year following termination or expiration of the contract.

If by the terms of any insurance a mandatory deductible is required, or if the Contractor elects to increase the mandatory deductible amount, the Contractor shall be responsible for payment of the amount of the deductible in the event of a paid claim.

Notwithstanding any other clause in this Contract, the State may recover up to the liability limits of the insurance policies required herein.

1. WORKERS' COMPENSATION INSURANCE

The Contractor shall take out and maintain during the life of this contract the statutory Workers' Compensation and Employer's Liability Insurance for all of the contactors' employees to be engaged in work on the project under this contract and, in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation and Employer's Liability Insurance for all of the subcontractor's employees to be engaged in such work. This policy shall be written to meet the statutory requirements for the state in which the work is to be performed, including Occupational Disease. **The policy shall include a waiver of subrogation in favor of the State. The COI shall contain the mandatory COI subrogation waiver language found hereinafter**. The amounts of such insurance shall not be less than the limits stated hereinafter. For employees working in the State of Nebraska, the policy must be written by an entity authorized by the State of Nebraska Department of Insurance to write Workers' Compensation and Employer's Liability Insurance for Nebraska employees.

2. COMMERCIAL GENERAL LIABILITY INSURANCE AND COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

The Contractor shall take out and maintain during the life of this contract such Commercial General Liability Insurance and Commercial Automobile Liability Insurance as shall protect Contractor and any subcontractor performing work covered by this contract from claims for damages for bodily injury, including death, as well as from claims for property damage, which may arise from operations under this contract, whether such operation be by the Contractor or by any subcontractor or by anyone directly or indirectly employed by either of them, and the amounts of such insurance shall not be less than limits stated hereinafter.

The Commercial General Liability Insurance shall be written on an **occurrence basis**, and provide Premises/Operations, Products/Completed Operations, Independent Contractors, Personal Injury, and Contractual Liability coverage. **The policy shall include the State, and others as required by the contract documents, Additional Insured(s). This policy shall be primary, and any insurance or self-insurance carried by the State shall be considered secondary and non-contributory**. **The COI shall contain the mandatory COI liability waiver language found hereinafter.** The Commercial Automobile Liability Insurance shall be written to cover all Owned, Non-owned, and Hired vehicles.

REQUIRED INSURANCE COVERAGE	
COMMERCIAL GENERAL LIABILITY	
General Aggregate	$2,000,000
Products/Completed Operations Aggregate	$2,000,000
Personal/Advertising Injury	$1,000,000 per occurrence
Bodily Injury/Property Damage	$1,000,000 per occurrence
Medical Payments	$10,000 any one person
Damage to Rented Premises (Fire)	$300,000 each occurrence
Contractual	Included
XCU Liability (Explosion, Collapse, and Underground Damage)	Included
Independent Contractors	Included
Abuse & Molestation	Included
If higher limits are required, the Umbrella/Excess Liability limits are allowed to satisfy the higher limit.	
WORKER'S COMPENSATION	
Employers Liability Limits	$500K/$500K/$500K
Statutory Limits- All States	Statutory - State of Nebraska
Voluntary Compensation	Statutory
COMMERCIAL AUTOMOBILE LIABILITY	
Bodily Injury/Property Damage	$1,000,000 combined single limit
Include All Owned, Hired & Non-Owned Automobile liability	Included
Motor Carrier Act Endorsement	Where Applicable
UMBRELLA/EXCESS LIABILITY	
Over Primary Insurance	$2,000,000 per occurrence
PROFESSIONAL LIABILITY	
All Other Professional Liability (Errors & Omissions)	$1,000,000 Per Claim / Aggregate
COMMERCIAL CRIME	
Crime/Employee Dishonesty Including 3rd Party Fidelity	$1,000,000
CYBER LIABILITY	
Breach of Privacy, Security Breach, Denial of Service, Remediation, Fines and Penalties	$10,000,000
MANDATORY COI SUBROGATION WAIVER LANGUAGE	
"Workers' Compensation policy shall include a waiver of subrogation in favor of the State of Nebraska."	
MANDATORY COI LIABILITY WAIVER LANGUAGE	
"Commercial General Liability & Commercial Automobile Liability policies shall name the State of Nebraska as an Additional Insured and the policies shall be primary and any insurance or self-insurance carried by the State shall be considered secondary and non-contributory as additionally insured."	

3. EVIDENCE OF COVERAGE

The Contractor shall furnish the Contract Manager, with a certificate of insurance coverage complying with the above requirements prior to beginning work at:

Public Service Commission
Attn: State 911 Director
PO Box 94927
Lincoln, NE 68509

These certificates or the cover sheet shall reference the RFP number, and the certificates shall include the name of the company, policy numbers, effective dates, dates of expiration, and amounts and types of coverage afforded. If the State is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall be responsible for all reasonable costs properly attributable thereto.

Reasonable notice of cancellation of any required insurance policy must be submitted to the contract manager as listed above when issued and a new coverage binder shall be submitted immediately to ensure no break in coverage.

4. DEVIATIONS

The insurance requirements are subject to limited negotiation. Negotiation typically includes, but is not necessarily limited to, the correct type of coverage, necessity for Workers' Compensation, and the type of automobile coverage carried by the Contractor.

H. ANTITRUST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor hereby assigns to the State any and all claims for overcharges as to goods and/or services provided in connection with this contract resulting from antitrust violations which arise under antitrust laws of the United States and the antitrust laws of the State.

I. CONFLICT OF INTEREST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

By submitting a proposal, bidder certifies that no relationship exists between the bidder and any person or entity which either is, or gives the appearance of, a conflict of interest related to this Request for Proposal or project.

Bidder further certifies that bidder will not employ any individual known by bidder to have a conflict of interest nor shall bidder take any action or acquire any interest, either directly or indirectly, which will conflict in any manner or degree with the performance of its contractual obligations hereunder or which creates an actual or appearance of conflict of interest.

If there is an actual or perceived conflict of interest, bidder shall provide with its proposal a full disclosure of the facts describing such actual or perceived conflict of interest and a proposed mitigation plan for consideration. The State will then consider such disclosure and proposed mitigation plan and either approve or reject as part of the overall bid evaluation.

J. STATE PROPERTY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor shall be responsible for the proper care and custody of any State-owned property which is furnished for the Contractor's use during the performance of the contract. The Contractor shall reimburse the State for any loss or damage of such property; normal wear and tear is expected.

K. SITE RULES AND REGULATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor shall use its best efforts to ensure that its employees, agents, and subcontractors comply with site rules and regulations while on State or any government premises. If the Contractor must perform on-site work outside of the daily operational hours set forth by the State, it must make arrangements with the State or any government to ensure access to the facility and the equipment has been arranged. No additional payment will be made by the State on the basis of lack of access, unless the State fails to provide access as agreed to in writing between the State and the Contractor.

L. ADVERTISING

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor agrees not to refer to the contract award in advertising in such a manner as to state or imply that the company or its goods or services are endorsed or preferred by the State. Any publicity releases pertaining to the project shall not be issued without prior written approval from the State.

M. NEBRASKA TECHNOLOGY ACCESS STANDARDS (Statutory)

Contractor shall review the Nebraska Technology Access Standards, found at http://nitc.nebraska.gov/standards/2-201.html and ensure that products and/or services provided under the contract are in compliance or will comply with the applicable standards to the greatest degree possible. In the event such standards change during the Contractor's performance, the State may create an amendment to the contract to request the contract comply with the changed standard at a cost mutually acceptable to the parties.

N. DISASTER RECOVERY/BACK UP PLAN

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

The Contractor shall have a disaster recovery and back-up plan, of which a copy should be provided upon request to the State, which includes, but is not limited to equipment, personnel, facilities, and transportation, in order to continue delivery of goods and services as specified under the specifications in the contract in the event of a disaster.

O. DRUG POLICY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Contractor certifies it maintains a drug free work place environment to ensure worker safety and workplace integrity. Contractor agrees to provide a copy of its drug free workplace policy at any time upon request by the State.

P. WARRANTY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Despite any clause to the contrary, the Contractor represents and warrants that its services hereunder shall be performed by competent personnel and shall be of professional quality consistent with generally accepted industry standards for the performance of such services and shall comply in all respects with the requirements of this Agreement. For any breach of this warranty, the Contractor shall, for a period of ninety (90) calendar days from performance of the service, perform the services again, at no cost to the State, or if Contractor is unable to perform the services as warranted, Contractor shall reimburse the State all fees paid to Contractor for the unsatisfactory services. The rights and remedies of the parties under this warranty are in addition to any other rights and remedies of the parties provided by law or equity, including, without limitation actual damages, and, as applicable and awarded under the law, to a prevailing party, reasonable attorneys' fees and costs.

IV. PAYMENT

A. PROHIBITION AGAINST ADVANCE PAYMENT (Statutory)

Neb. Rev. Stat. §§81-2403 states, "[n]o goods or services shall be deemed to be received by an agency until all such goods or services are completely delivered and finally accepted by the agency."

B. TAXES (Statutory)

The State is not required to pay taxes and assumes no such liability as a result of this solicitation. The Contractor may request a copy of the Nebraska Department of Revenue, Nebraska Resale or Exempt Sale Certificate for Sales Tax Exemption, Form 13 for their records. Any property tax payable on the Contractor's equipment which may be installed in a state-owned facility is the responsibility of the Contractor

C. INVOICES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** **Atos would require the following added at the end of the paragraph:** Contractor shall be entitled to invoice the State for the State's acceptance of, and the State shall have been deemed to accept, the Contractor's Next Generation 9-1-1 solution in the event the event it is used in a production environment, including, without limitation, handling, routing, directing, or otherwise touching, in any way, a live call. All other deliverables are deemed accepted, and may be invoiced, in the event the State fails to notify Contractor of its acceptance or rejection of said deliverables within 10 business days of delivery for acceptance testing. **Atos Reasons for Alternative** Atos agrees to the invoicing requirements in this section. Atos would just ask to clarify when Atos may invoice for the system, as well as other deliverables.

Invoices for payments must be submitted by the Contractor to the agency requesting the services with sufficient detail to support payment. Public Service Commission State 911 Director 1200 N St. Lincoln, NE 68509. The terms and conditions included in the Contractor's invoice shall be deemed to be solely for the convenience of the parties. No terms or conditions of any such invoice shall be binding upon the State, and no action by the State, including without limitation the payment of any such invoice in whole or in part, shall be construed as binding or estopping the State with respect to any such term or condition, unless the invoice term or condition has been previously agreed to by the State as an amendment to the contract.

D. INSPECTION AND APPROVAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
JM			

Final inspection and approval of all work required under the contract shall be performed by the designated State officials.

The State and/or its authorized representatives shall have the right to enter any premises where the Contractor or subcontractor duties under the contract are being performed, and to inspect, monitor or otherwise evaluate the work being performed. All inspections and evaluations shall be at reasonable times and in a manner that will not unreasonably delay work.

E. PAYMENT (Statutory)

Payment will be made by the responsible agency in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2403). The State may require the Contractor to accept payment by electronic means such as ACH deposit. In no event shall the State be responsible or liable to pay for any goods and services provided by the Contractor prior to the Effective Date of the contract, and the Contractor hereby waives any claim or cause of action for any such services.

F. LATE PAYMENT (Statutory)

The Contractor may charge the responsible agency interest for late payment in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2401 through 81-2408).

G. SUBJECT TO FUNDING / FUNDING OUT CLAUSE FOR LOSS OF APPROPRIATIONS (Statutory)

The State's obligation to pay amounts due on the Contract for a fiscal years following the current fiscal year is contingent upon legislative appropriation of funds. Should said funds not be appropriated, the State may terminate the contract with respect to those payments for the fiscal year(s) for which such funds are not appropriated. The State will give the Contractor written notice thirty (30) calendar days prior to the effective date of termination. All obligations of the State to make payments after the termination date will cease. The Contractor shall be entitled to receive just and equitable compensation for any authorized work which has been satisfactorily completed as of the termination date. In no event shall the Contractor be paid for a loss of anticipated profit.

H. RIGHT TO AUDIT (First Paragraph is Statutory)

The State shall have the right to audit the Contractor's performance of this contract upon a thirty (30) calendar days' written notice. Contractor shall utilize generally accepted accounting principles, and shall maintain the accounting records, and other records and information relevant to the contract (Information) to enable the State to audit the contract. (Neb. Rev. Stat. §84-304 et seq.) The State may audit and the Contractor shall maintain, the Information during the term of the contract and for a period of five (5) years after the completion of this contract or until all issues or litigation are resolved, whichever is later. The Contractor shall make the Information available to the State at Contractor's place of business or a location acceptable to both Parties during normal business hours. If this is not practical or the Contractor so elects, the Contractor may provide electronic or paper copies of the Information. The State reserves the right to examine, make copies of, and take notes on any Information relevant to this contract, regardless of the form or the Information, how it is stored, or who possesses the Information. Under no circumstance will the Contractor be required to create or maintain documents not kept in the ordinary course of contractor's business operations, nor will contractor be required to disclose any information, including but not limited to product cost data, which is confidential or proprietary to contractor.

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within Solicitation Response (Initial)	NOTES/COMMENTS:
		JM	**Alternative Language** **The paragraph below shall be modified as follows:** Prior to conducting any audit the State shall determine if it has reason to suspect Contractor has received an overpayment. The State shall notify Contractor of the areas the State suspects contain an overcharge and provide Contractor with 30 days to correct, if necessary, the overcharge. After the 30 day period, the State may conduct an audit. The Parties **shall** pay their own costs of the audit unless the audit finds a previously undisclosed overpayment by the State. If a previously undisclosed overpayment exceeds one-half of one percent (.5%) of the total contract billings, or if fraud, material misrepresentations, or non-performance is discovered on the part of the Contractor, the Contractor **shall** reimburse the State for the total costs of the audit. Overpayments and audit costs owed to the State **shall** be paid within ninety (90) days of written notice of the claim. The Contractor agrees to correct any material weaknesses or condition found as a result of the audit. **Atos Reasons for Alternative** Atos acknowledges and agrees with the State's right to audit; however, Atos has concerns about the amount of overcharge that would require Atos to be responsible for the costs of the audit. As a result, Atos would ask that if the State reasonably suspects Atos has overcharged, the State give Atos notice so Atos can correct it before the State performs the audit.

The Parties shall pay their own costs of the audit unless the audit finds a previously undisclosed overpayment by the State. If a previously undisclosed overpayment exceeds one-half of one percent (.5%) of the total contract billings, or if fraud, material misrepresentations, or non-performance is discovered on the part of the Contractor, the Contractor shall reimburse the State for the total costs of the audit. Overpayments and audit costs owed to the State shall be paid within ninety (90) days of written notice of the claim. The Contractor agrees to correct any material weaknesses or condition found as a result of the audit.

FORM A: BIDDER PROPOSAL POINT OF CONTACT

Request for Proposal Number 6264 Z1

Form A should be completed and submitted with each response to this solicitation. This is intended to provide the State with information on the bidder's name and address, and the specific person(s) who are responsible for preparation of the bidder's response.

Preparation of Response Contact Information	
Bidder Name:	**Atos Public Safety, LLC**
Bidder Address:	**4851 Regent Boulevard** **Irving TX 75063**
Contact Person & Title:	**Jim Crichton ENP, FBINA** **Senior Director of Sales, Public Safety**
E-mail Address:	James.crichton@atos.net
Telephone Number (Office):	**(720) 355-6787**
Telephone Number (Cellular):	**(720) 355-6787**
Fax Number:	NA

Each bidder should also designate a specific contact person who will be responsible for responding to the State if any clarifications of the bidder's response should become necessary. This will also be the person who the State contacts to set up a presentation/demonstration, if required.

Communication with the State Contact Information	
Bidder Name:	**Atos Public Safety, LLC**
Bidder Address:	**4851 Regent Boulevard** **Irving TX 75063**
Contact Person & Title:	**Jim Crichton ENP, FBINA** **Senior Director of Sales, Public Safety**
E-mail Address:	James.crichton@atos.net
Telephone Number (Office):	**(720) 355-6787**
Telephone Number (Cellular):	**(720) 355-6787**
Fax Number:	NA

June 3, 2020

NEBRASKA
Good Life. Great Opportunity.

CommITted to Future Growth

Atos Public Safety Response to RFP 6264 Z1 for the State of Nebraska

Option C: Deployment of an ESInet and Next Generation Core Services

Technical Approach

Atos | Public Safety

TABLE OF CONTENTS

UNDERSTANDING OF THE PROJECT REQUIREMENTS 3

ATOS DEVELOPMENT APPROACH FOR THE STATE OF NEBRASKA 5

ATOS SOLUTION DIAGRAMS & COMPONENT TABLE 10

ATOS NG9-1-1 ESINET/NGCS CONFIGURATION SOLUTION DIAGRAM 11

ATOS NG9-1-1 ESInet/NGCS: OSP INTERCONNECT & AGGREGATION DIAGRAM 12

ATOS NG9-1-1 ESINET AND NGCS DIAGRAM 14

ATOS NG9-1-1 CALL DELIVERY DIAGRAM 19

ATTACHMENT C: TECHNICAL REQUIREMENTS 21

HIGH LEVEL PROJECT PLAN AND PROJECT APPROACH 196

LIFECYCLE SCHEDULE 212

ONGOING CLIENT MANAGEMENT SERVICES 213

APPENDICES 221

UNDERSTANDING OF THE PROJECT REQUIREMENTS

Understanding the requirements of the State of Nebraska's (State) Emergency Services IP Network (ESInet) and Next Generation Core Services (NGCS) RFP (6264 Z1), which covers 93 counties, 68 PSAPs, 7 regional call handling host locations and represents 1.9 million stakeholders is crucial when defining a blueprint for the transitional steps, infrastructure modernization and long-term NG9-1-1 operational requirements necessary in a transformation of this magnitude. Atos has assembled a team of core-competency industry leading providers and subject matter experts (SMEs) to lead, manage and secure this transformation program. Entrusted to migrate some of the world's most threat-sensitive environments into and through their respective Digital Transformations, Atos brings the same world-class SIAM (Systems Integration and Management) leadership to an industry in need of choice and proven experience with the pillars of NG9-1-1. The State and its stakeholders can trust Atos as their NG9-1-1 transformation leader, their trusted service provider who will work collaboratively with the incumbent carrier and service providers to migrate the PSAPs from the legacy, circuit-switched voice-only 9-1-1 telephony backbone to a, redundant, scalable, secure and non-restrictive Emergency Services IP Network (ESInet).

State of Nebraska ESInet/NGCS

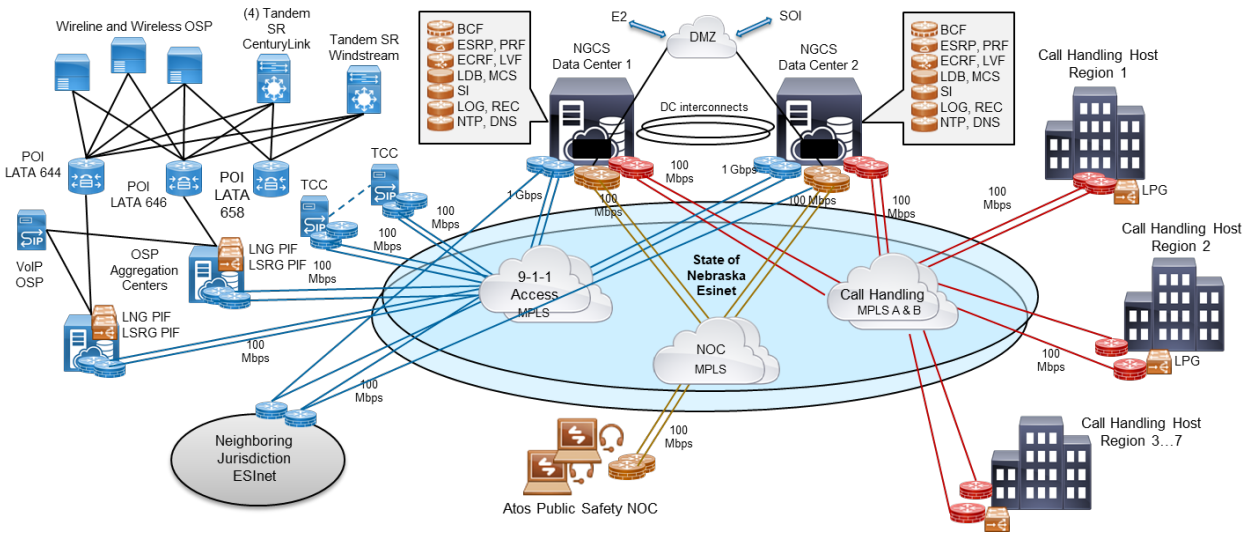


Diagram: *Atos Conceptual View – Statewide ESInet*

To achieve this, Atos has prepared a systematic, flexible transitional strategy to reshape the Nebraska playing field with a state of the art NG9-1-1 call routing solution. The strategy proposes the following approach with the understanding there may be multiple migration scenarios due to many factors, including PSAP membership to a designated region, the call handling host site readiness, operations readiness and GIS preparedness. We recognize the dates of this transition plan may change to meet the State's obligations but will adopt a plan that mitigates any disruption to the PSAPs cutovers.

Atos recently won the contract as the prime NGCS/ESinet service provider in California (CalOES). Atos Public Safety would like to continue our momentum and be the catalyst for the State of Nebraska's migration to a fully diverse, redundant and secure NGCS/ESInet 911 call delivery solution. Atos sees Nebraska as the perfect launching pad to establish the backbone core for what can become the blueprint for other NGCS systems in the Midwest

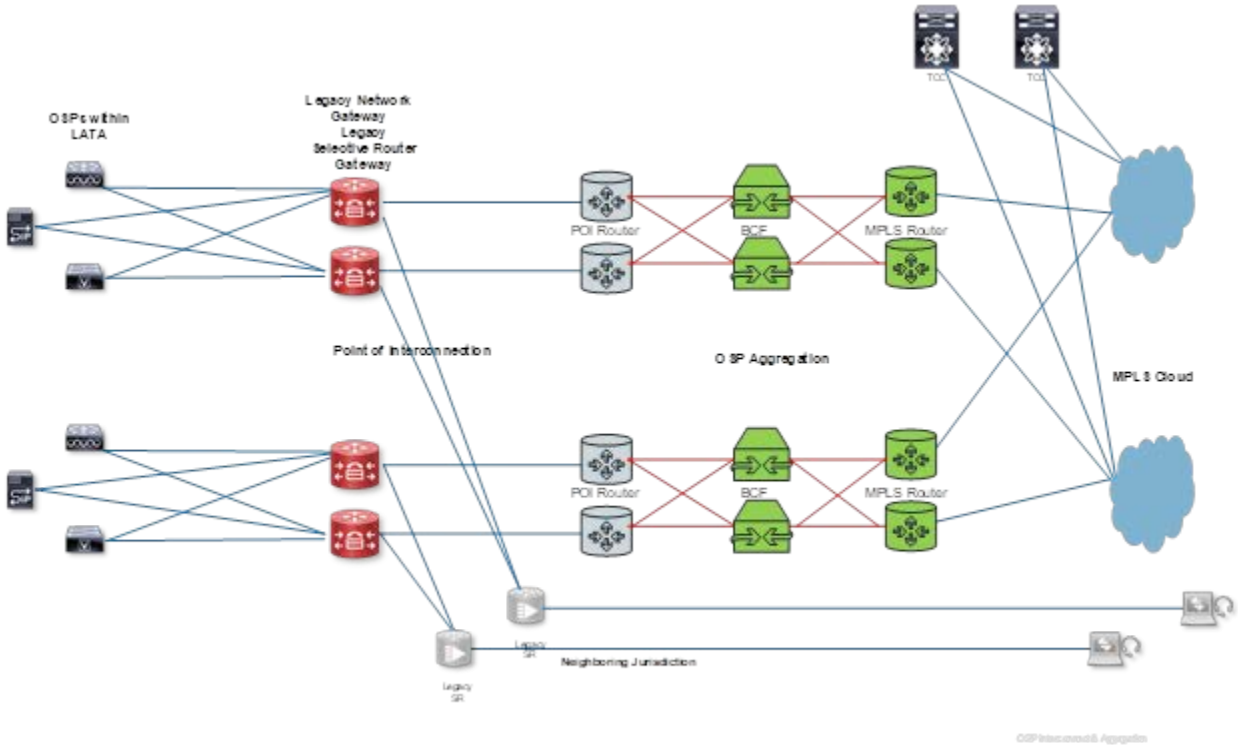
ATOS DEVELOPMENT APPROACH FOR THE STATE OF NEBRASKA NG9-1-1 ESINET/NGCS TRANSFORMATION

Phase 1 – Original Service Provider (OSP) Migrations. Establish Interconnects

Initial OSP outreach for migration planning is initiated and with ongoing communications, OSP management and network grooming are established.

Points of interconnects are provisioned within each Nebraska LATA and the 911 call traffic is transported to the Atos Aggregation Centers where Legacy Network Gateway (LNG) functionality will be deployed to convert legacy TDM call flow to a SIP based call flow. This allows for 911 call traffic to be routed into the NGCS systems securely through the Border Control Function (BCF) and delivered over the diverse redundant and secure IP based ESInet.

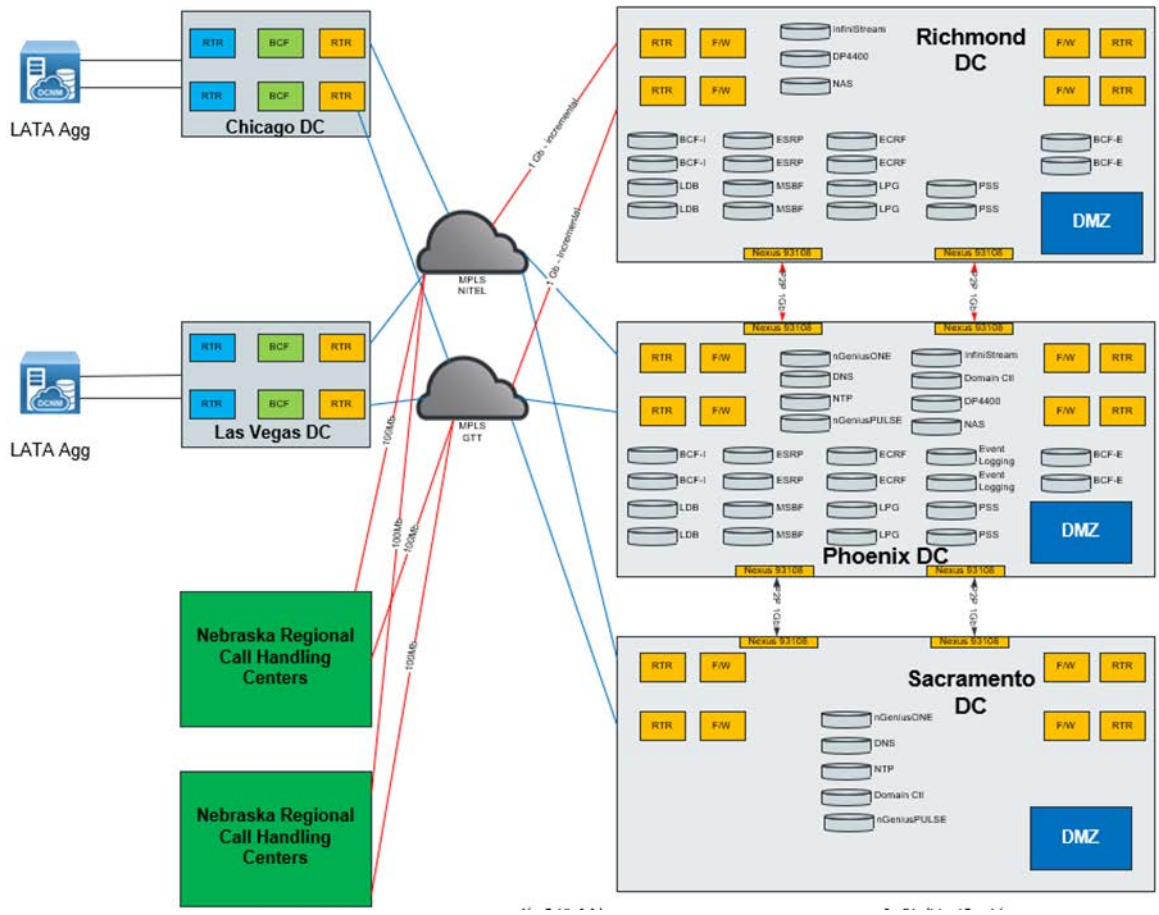
Functional testing of the ingress network will be conducted during this phase.



OSP Migrations – Aggregation POI's - Atos NGCS Data Centers

Phase 2 – Establish Core NGCS Data Center Sites

Atos believes in providing solutions that are second to none in resiliency and functionality. Our design includes two geo-diverse NGCS Data Centers (Richmond, VA and Phoenix, AZ) and a third Data Center (Sacramento, CA) for further physical redundancy and other shared services for a cost-effective redundant solution. Each Data Center will house the Atos-owned carrier-class VoIP OpenScape Emergency Router (OSER) switch will serve as the routing mechanism to deliver calls to the appropriate PSAP and eventually replace the legacy tandem/selective router. With embedded ESRP and PRF, the OSER VoIP switch provides the State with a solution to not only decommission the legacy selective routers but can also handle the 1.3 million+ call volumes placed upon this State and has multimedia delivery native to its call flow. The State will have the ability to process tens of thousands of calls per hour in full multimedia mode, call volumes traditionally found only in a carrier tandem office environment.



Atos NGCS Data Centers – Nebraska Call Handling Centers

Phase 3 – Regional Call Handling Host equipment installation

In order to provide the necessary local installation and support needed to provision a remote operation, Atos will use Turnkey Telecom, a local Nebraska sub-contractor to deploy and install redundant state of the art Cisco 4431 network routers, BCFs, LAN Switches and Legacy PSAP Gateway equipment, and serial-to-IP conversion for legacy LIF to interconnect each call handling host site to our NGCS Data Centers. Turnkey will also visit each PSAP throughout the state to install make-busy appliances.

Turnkey Telecom has offices throughout the State and will be used as local support services moving forward.

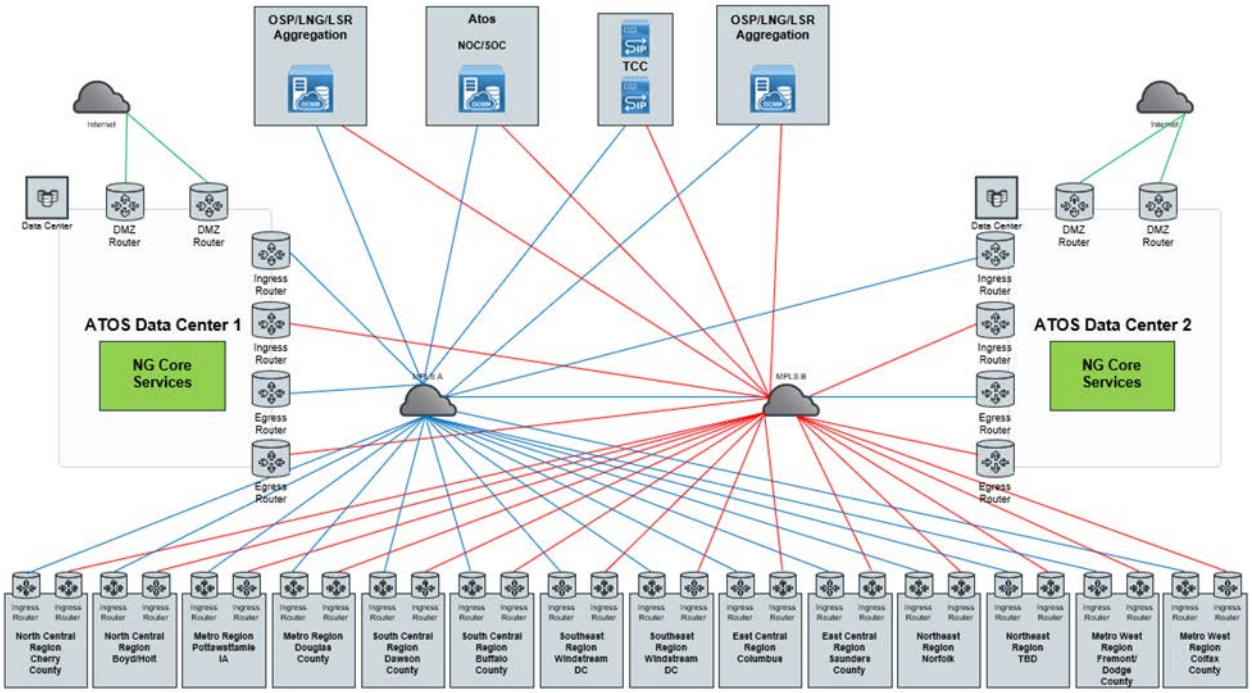
Phase 4 – ESInet MPLS Egress network provisioning.

By creating contractual working relationships with state and local network providers, Atos Public Safety has acquired familiarity with the State's network dynamics, interoperability objectives and network topology available throughout the State. Atos envisions true diverse MPLS network connections to each call handling host site and will conduct throughput network testing to assure end-to-end continuity of Next Generation 9-1-1 call routing.

The ESInet is made up of two diverse MPLS networks, each fully capable of running all State 911 traffic over one MPLS cloud. Atos will use 1Gbps connections from each Atos NGCS data center into each of the MPLS networks and 100 Mbps circuits into each of the regional Hosts location terminating into Atos provisioned edge routers. Atos will install diverse 1GB point-to-point circuits between our data centers for redundancy.

The Nebraska MPLS network will also point to Atos' NOC/SOC in Irving, TX and Atos' staging center in Boca Raton, FL.

Atos will build-out and perform extensive network connectivity testing to all egress endpoints.



Phase 5 – Regional Call Handling/PSAP Cutovers

The State of Nebraska has formed 7 regions for setting up the delivery of 911 call traffic which covers the entire State of Nebraska.

The regions are defined as North Central;South Central;Southeast;Metro; West Metro;East Central;Northeast.

In each of the regions two PSAPs are configured and engineered to be geo-diverse call handling host sites (Hosts). The Host sites will receive 911 traffic from the Atos NGCS data centers via the ESinet and deliver the 911 call to the approprite serving PSAP based on the location of the incident.

Atos knows the goal for the State of Nebraska is to move to true NENA i3 geospatial call routing/delivery in the near future, Atos will make the transition from Legacy (tabular) call routing to i3 seamless as possible by installing Legacy PSAP Gateway (LPG) appliances in each Host location to convert the SIP call traffic back into a TDM format for the Legacy Host systems. Atos will also collocate the ECRF/LVF/SI functional elements powering egress call delivery across the ESInet within its secure managed data center space, allowing each region to go to geospatial routing on their terms, not those of the call handling vendor.

Atos Public Safety proposes we utilize a flexible project plan that will take into consideration many factors, such as region readiness which includes call handling system application release levels and Tabular/GIS readiness.

Once all carrier traffic serving a region/PSAP is migrated into the Atos data centers, the cutover to NGCS call routing can commence.

Our recommendation is to conduct monthly regional migrations, estimated 2 Regional Call Handling Centers per month in order to minimize disruption and to allow for a smooth transition to the new call handling platform. These cutovers will likely be tabular call routing until a region becomes is i3 compliant and is ready for Geospatial routing.

Atos proposes we start with the North Central region to minimize risk, learn from our experiences and carry on what we learn to the next region cutover.

After contract finalization and final design can be determined, OSP migration, ESInet network provisioning and NGCS Data Center and Call Handling Host equipment can start. Beginning in month 5 we can initiate our first Region cutover completing the tabular cutovers in month 12.

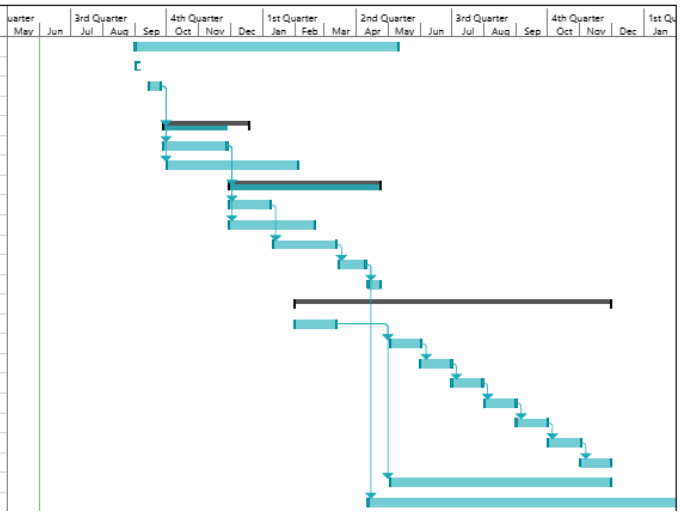
If any region becomes i3 compliant before their scheduled to cutover, we will migrate using i3 geospatial routing.

After each cut-over, PSAPs will go in the 30-day acceptance test period and project milestones will capture the specific tasks.

In the unlikely event calls are not routing properly, Atos will move the traffic back. This activity will be coordinated with your team prior to any fallback procedures being initiated.

For any future connections into neighboring state ESInets we will connect to those networks thru diverse point to point network-to-network interface (NNI) MPLS interconnections at our NGCS data centers. The State of Nebraska will be responsible for obtaining operational agreements with these entities where applicable.

Task Name	Duration	Start	Finish
State of Nebraska 9-1-1 NG9-1-1 Project	180 days	Tue 9/1/20	Mon 5/10/21
Contract Start Date		Tue 9/1/20	
Project Kickoff	10 days	Mon 9/14/20	Fri 9/25/20
Design, Planning, and Review			
Solution Architecture and Design	**60 days**	**Mon 9/28/20**	**Fri 12/18/20**
Solution Designs and As Builts	45 days	Mon 9/28/20	Fri 11/27/20
OSP Migration/Transition Plan	90 days	Thu 10/1/20	Wed 2/3/21
ESInet & NGCS	**105 days**	**Mon 11/30/2**	**Fri 4/23/21**
Build and Configure	30 days	Mon 11/30/2	Fri 1/8/21
Network	60 days	Mon 11/30/2	Fri 2/19/21
Stage Data Centers	45 days	Mon 1/11/21	Fri 3/12/21
Integration and Test Phase	20 days	Mon 3/15/21	Fri 4/9/21
Execute Formal SAT Testing	10 days	Mon 4/12/21	Fri 4/23/21
Call Handling Host Integration	**217 days**	**Mon 2/1/21**	**Tue 11/30/21**
Site Surveys	30 days	Mon 2/1/21	Fri 3/12/21
Region Cutover - Region # 1	22 days	Mon 5/3/21	Tue 6/1/21
Region Cutover - Region # 2	22 days	Tue 6/1/21	Wed 6/30/21
Region Cutover - Region # 3	22 days	Thu 7/1/21	Fri 7/30/21
Region Cutover - Region # 4	22 days	Mon 8/2/21	Tue 8/31/21
Region Cutover - Region # 5	22 days	Wed 9/1/21	Thu 9/30/21
Region Cutover - Region # 6	22 days	Fri 10/1/21	Mon 11/1/21
Region Cutover - Region # 7	22 days	Mon 11/1/21	Tue 11/30/21
Make Busy Intergation at PSAPs	152 days	Mon 5/3/21	Tue 11/30/21
Operational Day 2 Support	1146 days	Mon 4/12/21	Mon 9/1/25

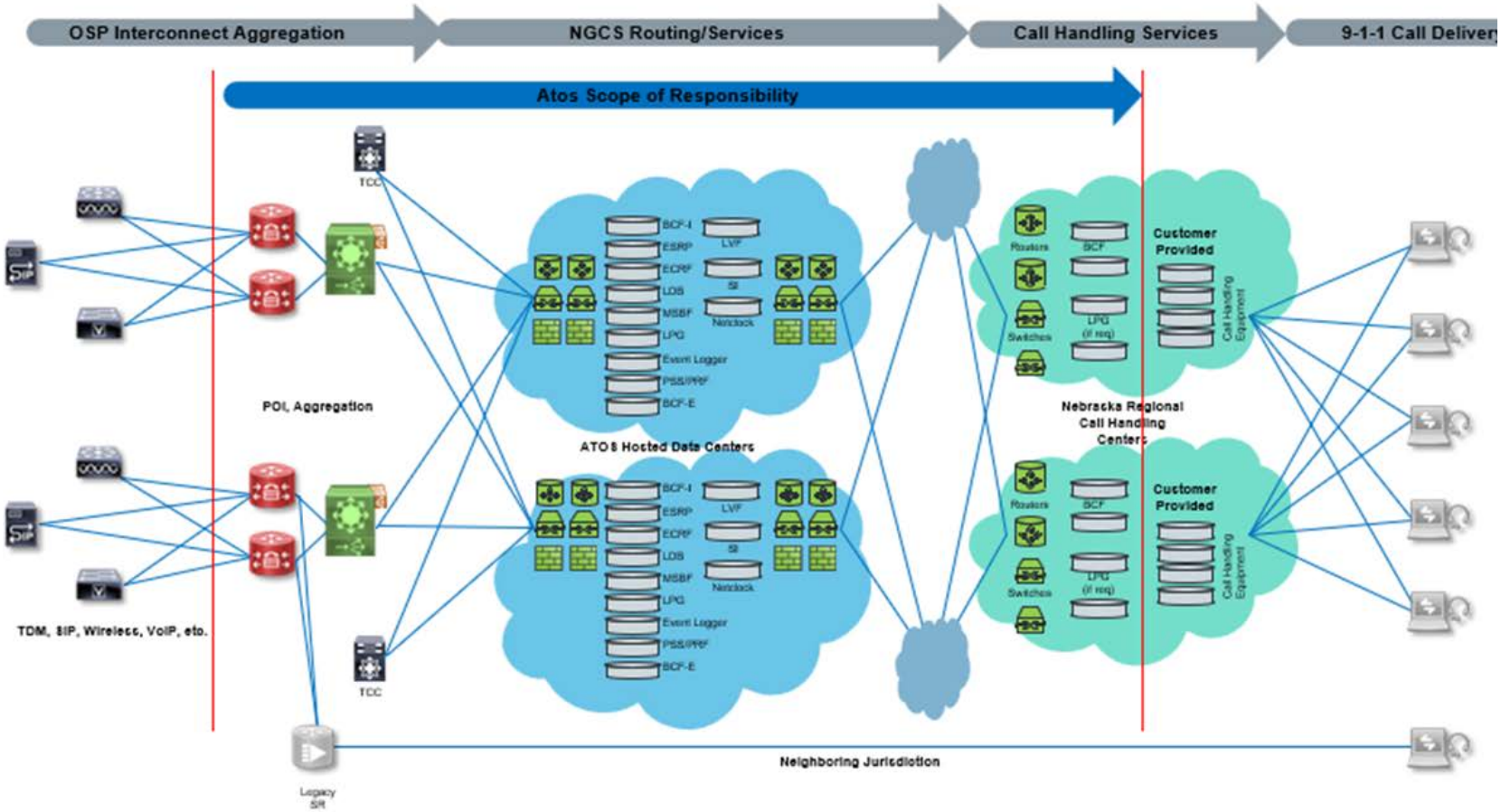


Atos Project Timeline View

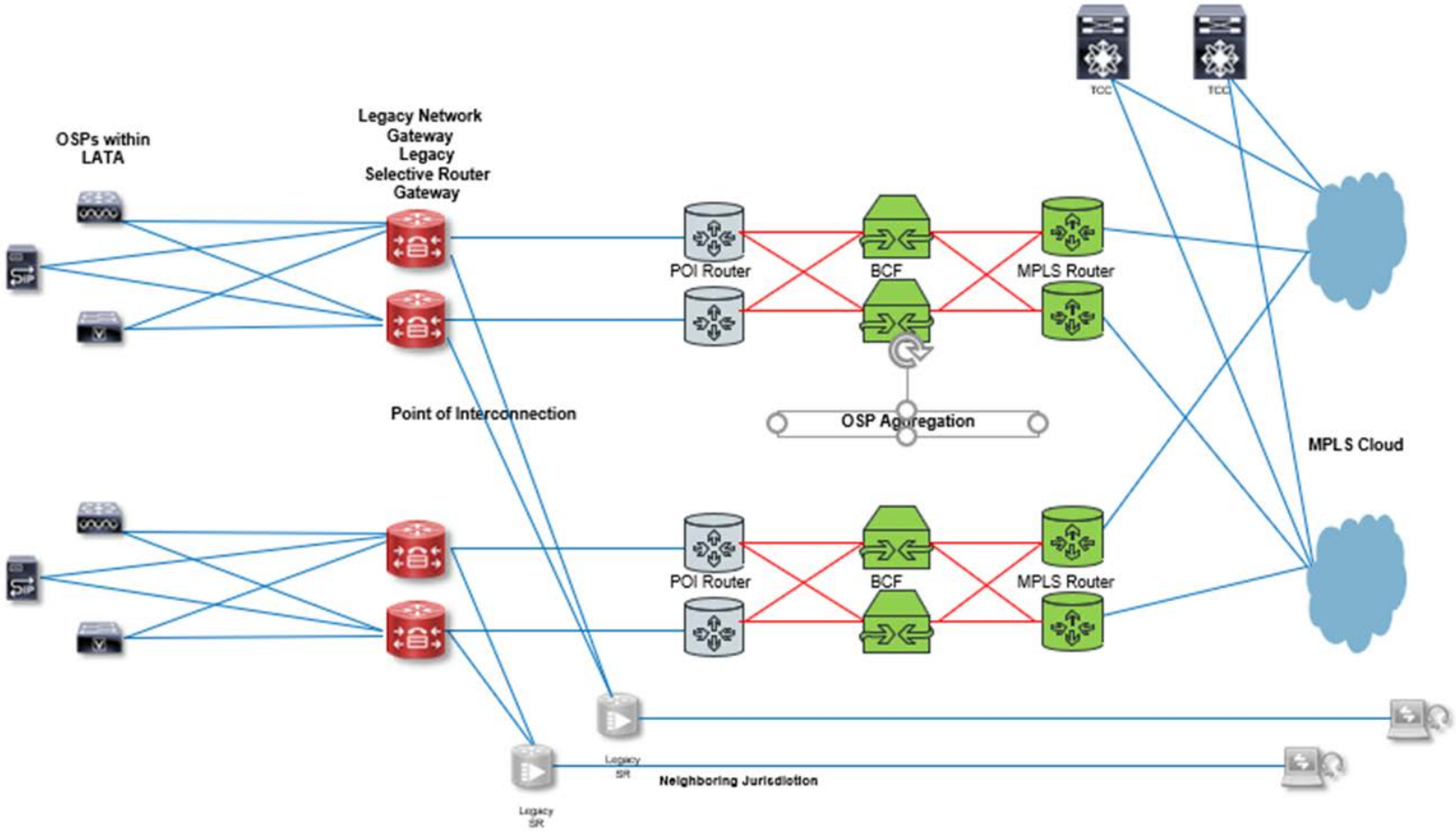
ATOS SOLUTION DIAGRAMS & COMPONENT TABLE

The section provides solution diagrams of the major components (hardware, software, and network layout) for the proposed Atos NG9-1-1 ESInet/NGCS solution. The diagrams are accompanied by tables containing short descriptions of the diagrammed components.

ATOS NG9-1-1 ESINET/NGCS CONFIGURATION SOLUTION DIAGRAM



ATOS NG9-1-1 ESInet/NGCS: OSP INTERCONNECT & AGGREGATION DIAGRAM



OSP INTERCONNECT & AGGREGATION DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
POI	Point of Interconnection	Entrance to ESInet – point where the local phone service providers handoff 911 calls to Atos
LNG	Legacy Network Gateway	Provides TDM (SS7, Analog, PRI) conversion to SIP – enables 911 calls with the ability to traverse the ESInet as IP calls. All gateway hardware will always be redundant with redundant power sources and supplies.
LSRG	Legacy Selective Router Gateway	Provides gateway functionality between the ESInet (IP) and TDM Selective Routers – handles call transfer interoperability between Nebraska ESInet and neighboring jurisdictions requiring TDM support. Just as the LNG are fully redundant, so are the LSRGs.
POI Router	Point of Interconnection Router	Redundant pair of routers all with redundant power sources and supplies. Server as the point where the circuits transporting the SIP 911 call traffic from OSPs (POIs and LNGs) enters the aggregation centers prior to traversing the ESInet.
BCF	Aggregation Border Control Function	High availability cluster of secure firewalls for SIP traffic entering the ESInet. Provides i3 signaling support, security, encryption/decryption as well as event logging functionality. These BCFs have been developed from the ground up by Atos and are built on Atos' industry leading OpenScape Session Border Controller architecture. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape SBCs are JITC certified and meet the highest security standards.
MPLS Router	Multiprotocol Label Switching Network Router	Routing functionality and demarc for MPLS circuits providing connectivity between OSP POIs and the ESInet. These routers, as are all within the end-to-end solution, support aggregate throughputs up to 500 Mbps and are redundant with redundant power sources and supplies.

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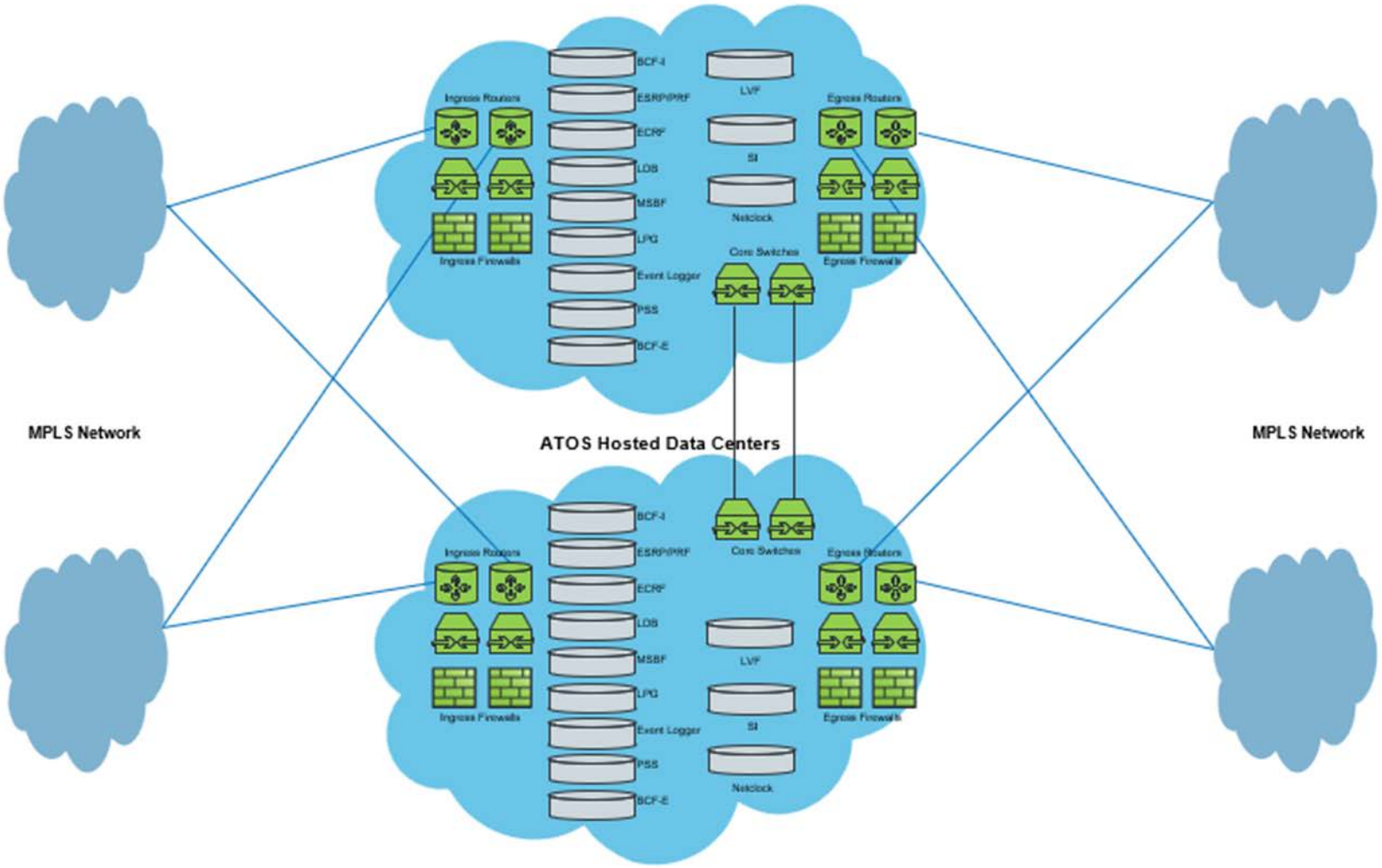
ATOS NG9-1-1 ESINET AND NGCS DIAGRAM



ESINET AND NGCS DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
Data Centers	Atos Data Centers	Geographically diverse Tier 3 or 4 Data Centers providing 24/7/365 security, controlled and highly restricted access, diverse redundant power as well as on-site backup power generation, and diverse building entrances for network connectivity.
Ingress Routers	Ingress Routers	Pair of routers providing the demarc for inbound 911 traffic. These routers, as are all within the end-to-end solution, support aggregate throughputs up to 500 Mbps and are redundant with redundant power sources and supplies
Ingress Firewalls	Ingress Firewalls	Two redundant High Availability Ingress bundles of threat-focused Next Generation Firewalls per Atos NGCS Data Center providing security for traffic prior to entering the NGCS. The Atos NGCS architecture requires two HA bundles of NexGen Firewalls for the Ingress data paths with advanced Threat Detection and URL Filtering per NGCS Ingress within each Atos NGCS Data Center. In addition, the NGFWs provide DDoS mitigation as well as IPS protection. The NGFWs used as part of the Atos solution support throughputs up to 4.75 Gbps.
BCF-I	Ingress Border Control Function	Two redundant high availability clusters of Ingress BCF per Atos NGCS Data Center providing security, encryption/decryption, SIPREC support, and event logging support for traffic entering the NGCS. These BCFs have been developed from the ground up by Atos and are built on Atos' industry leading OpenScape Session Border Controller architecture. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape SBCs are JITC certified and meet the highest security standards.

ESINET AND NGCS DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
ESRP / PRF	Emergency Services Proxy Router & Policy Routing Function	SIP Proxy Server responsible for selecting the destination PSAP for any 911 call entering the NGCS. The PRF works in conjunction with the ESRP to determine the target PSAP based on a set of policies defined by the PSAPs The ESRP/PRF are deployed as active/active pairs within each NGCS Data Center. The ESRP/PRF is built on the OpenScape Voice architecture. This is an architecture developed as a pure SIP calling engine designed to be a carrier grade solution capable of supporting 100,000 users per cluster. Within the cluster Resilient Telco Platform middleware is used to support constant exchange of the context pools between the two nodes. This platform assures that in the event of a loss of availability of either member of the cluster, the other node can immediately assume control of all calls in progress. As call media is never anchored to the ESRP/PRF, any loss of availability will not impact calls in progress. The Atos solution architecture provides an independent ESRP/PRF cluster per Atos NGCS Data Center. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape Voice is JITC certified and meet the highest security standards.
LDB	Location Database	This application provides ALI (Automatic Location Identification), LDB, LIS (Location Information Server) functionality all used in conjunction with HELD (HTTP Enabled Location Delivery) for the purpose of identifying the location the 911 caller. The LDB architecture is built to support ALI/LDB support and replication between the two Atos NGCS Data Center.
ECRF	Emergency Call Routing Function	The ECRF is the LoST (Location-to Service Translation) protocol server that provides the identification of the target PSAP based on the location of the 911 caller. The ECRF instances in each Atos NGCS Data Center run on Kubernetes/Docker architecture, which is designed to provide high availability and database replication between NGCS cores.
LVF	Location Validation Function	Provides validation of location information received against authoritative GIS (Geographic Information System) data base information. The LVF is incorporated within the ECRF architecture in each Atos NGCS Data Center run on Kubernetes/Docker architecture, which is designed to provide high availability and database replication between NGCS cores.
SI	Spatial Interface	An interface which publishes the GIS data to the ECRF and LVF within the NGCS. The SI is incorporated within the ECRF architecture in each Atos NGCS Data Center run on Kubernetes/Docker architecture, which is designed to provide high availability and database replication between NGCS cores.

ESINET AND NGCS DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
MSBF	Media Services Bridge Function	There will be two redundant pairs per Atos NGCS Data Center. The MSBF provides support for conferencing used during call transfers. In addition, the MSBF serves to support MSRP (message Service Relay Protocol) and RTT (Real Time Text). The MSBF is built on Atos' OpenScape Media Servers which are core components of the OpenScape Voice Solution Set. These applications will run as high availability clusters within each Atos NGCS Data Center and with two HA clusters per data center will assure the highest levels of resiliency. Each cluster is configured to support the entire 911 call volume for the state of Nebraska.
LPG	Legacy PSAP Gateway	There are two redundant clusters of high availability instances per Atos NGCS Data Center. The centralized LPG serves as the termination point for make-busy functionality at the PSAP level as well as providing any required legacy NIF support for PSAP that have not yet upgraded to i3 capabilities. These LPGs have been developed from the ground up by Atos and are built on Atos' industry leading OpenScape Session Border Controller architecture. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape SBCs are JITC certified and meet the highest security standards
PSS	Policy Store Services	Deployed as highly resilient Kubernetes/Docker components across the Atos NGCS Data Centers, this provides the PSAPs with the ability to manage and update policies used by the PRF and ESRP via a web-based interface. Each Atos NGCS Data Center will contain one complete PSS cluster. Each cluster will be in constant communication with it's partner in the other Atos NGCS Data Center. This architecture assures the highest levels of resiliency and availability.
Event Logger	i3 Event Logging	i3 event logging information from all ESInet/NGCS components will be transmitted via ECaTS into the Nebraska 911 ECaTS system in use by the PSAPs.
BCF-E	Egress Border Control Function	There are two redundant high availability clusters of Egress BCFs per Atos NGCS Data Center providing security, encryption/decryption, SIPREC, and event logging for traffic exiting the NGCS These BCFs have been developed from the ground up by Atos and are built on Atos' industry leading OpenScape Session Border Controller architecture. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape SBCs are JITC certified and meet the highest security standards.
Netclock	Network Time Source	The Atos NG9-1-1 ESInet/NGCS architecture is built to provision redundant combinations of Stratum 0 Network Clocks per Atos NGCS Data Center. In conjunction with Stratum 1 NTP servers deployed as needed the clocking solution is designed to provide highly

ESINET AND NGCS DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
		accurate and resilient time sources across the ESInet, NGCS and all Nebraska NG9-1-1 components.
Core Switches	NGCS Core Switching Fabric	A redundant pair of high-density, nonblocking fabric switches per Atos NGCS Data Center. The switches have an average latency of 1 to 2 *microseconds* with a switching fabric delivering 1.28 Tbps of switching throughput. Connectivity to servers and other network connected components support speeds of up to 10Gbps with 40 Gbps uplinks. These switches will also be supporting dual point-to-point 1 Gb links between the Atos NGCS Data Centers.
Core Firewalls	Core Firewalls	A redundant High Availability bundle of threat-focused Next Generation Firewalls per Atos NGCS Data Center providing security, including advanced Threat Detection and URL Filtering for traffic passing between applications and components within the NGCS. In addition, the NGFWs provide DDoS mitigation as well as IPS protection. The NGFWs used as part of the Atos solution support throughput up to 4.75 Gbps.
DMZ Firewalls	Core Firewalls	A redundant High Availability bundle of threat-focused Next Generation Firewalls per Atos NGCS Data Center providing security, including advanced Threat Detection, Malware Protection and URL Filtering for traffic passing between the DMZ and the NGCS. In addition, the NGFWs provide DDoS mitigation as well as IPS protection. The NGFWs used as part of the Atos solution support throughput up to 4.75 Gbps.
Egress Firewalls	Egress Firewalls	Two redundant High Availability Egress bundles of threat-focused Next Generation Firewalls per Atos NGCS Data Center providing security for traffic about to exit the NGCS. The Atos NGCS architecture requires two HA bundles of NexGen Firewalls for the Egress data paths with advanced Threat Detection and URL Filtering per NGCS Ingress within each Atos NGCS Data Center. In addition, the NGFWs provide DDoS mitigation as well as IPS protection. The NGFWs used as part of the Atos solution support throughputs up to 4.75 Gbps.
Egress Routers	Egress Routers	Redundant routers providing demarc for 911 traffic to be delivered to the Regional Call Handling Center. These routers, as are all within the end-to-end solution, support aggregate throughputs up to 500 Mbps and are redundant with redundant power sources and supplies

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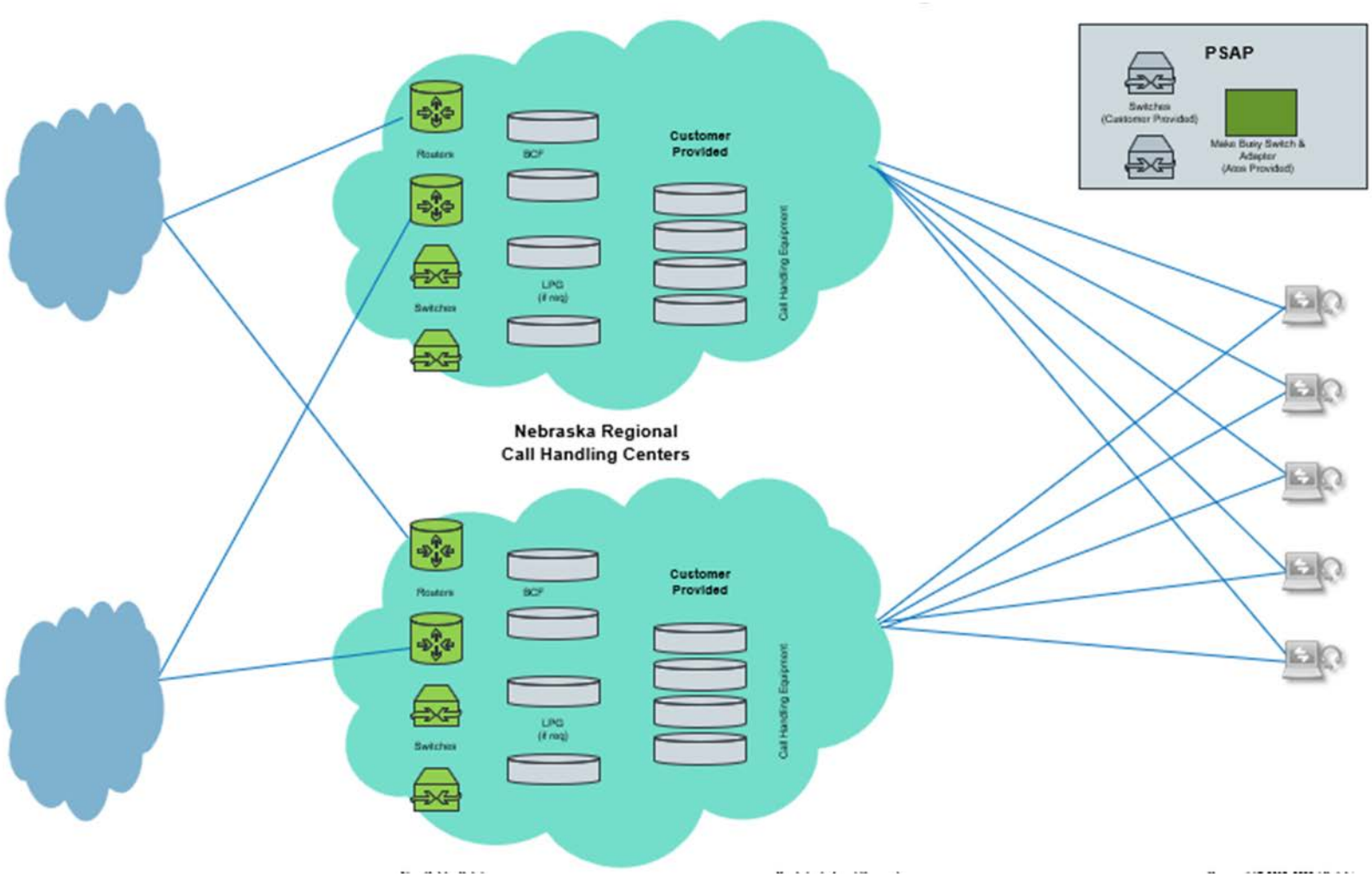
ATOS NG9-1-1 CALL DELIVERY DIAGRAM



ATOS NG9-1-1 CALL DELIVERY DIAGRAM COMPONENT TABLE		
Component	**Component Name**	**Description**
CHE Routers	Regional Call Handling Center Routers	Redundant pair of routers providing demarc and handoff of 911 traffic traversing the ESInet. These routers, as are all within the end-to-end solution, support aggregate throughputs up to 500 Mbps and are redundant with redundant power sources and supplies
CHE BCF	Regional Call Handling Center Border Control Function	Each Regional Call Handling Center will contain a redundant high availability cluster of BCFs providing security, encryption/decryption, and event logging for traffic entering the CHE Hosts. These BCFs have been developed from the ground up by Atos and are built on Atos' industry leading OpenScape Session Border Controller architecture. Each cluster is configured to support the entire 911 call volume for the state of Nebraska. It's worth noting that the OpenScape SBCs are JITC certified and meet the highest security standards.
CHE Switches	Regional Call Handling Center LAN Switches	Providing a switching capacity of 128 Gbps this redundant pair of LAN switches will serve as the physical handoff between the ESInet and the Nebraska CHE Host systems. Each switch is equipped with 24 1Gbps RJ45 ports and has redundant power supplies.
CHE LPG	Legacy Network Gateway	Where required, a pair of Legacy PSAP gateways will be provided. Depending upon the specific requirement of each Regional Call Handling Center the handoff will be FXO/FXS or T-1. In addition, again as required, Atos will install redundant serial to IP convertors for legacy LIF support. The LPGs will all be equipped with redundant power supplies.
Make-Busy Switch	PSAP Make-Busy Switch Interface	In order to support PSAP forced outages and make-busy functionality the Atos ESInet/NGCS solution will provision a network connected device at each PSAP that will be connected to a physical switch. This will enable the PSAP to signal the NGCS when a PSAP is unavailable so alternate policies can be invoked. The switch will remain in the off position until it is physically reset and the PSAP is ready top resume normal operations.

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ATTACHMENT C: TECHNICAL REQUIREMENTS

Bidders are instructed to complete a Matrix for Emergency Services Internet Protocol (IP) network (ESInet). Bidders are required to describe in detail how bidder's proposed solution meets the conformance specification outlined within each Requirement. The matrix is used to document and evaluate bidder's response to the requirements.

The matrix should indicate how the bidder intends to comply with the requirement and the effort required to achieve that compliance. It is not sufficient for the bidder to simply state that it intends to meet the requirements of the RFP. PSC will consider any such response to the requirements in this RFP to be non-responsive and the bid may be rejected. The narrative should provide The Public Service Commission (PSC) with sufficient information to differentiate the bidder's business solution from other bidders' solutions. Bidder shall not refer to other sections as a response. Even if the response is an exact duplicate of a previous response, the details shall be provided in the same paragraph as the requirement. Bidder shall not include pricing information in the description and shall not refer the reader to pricing.

The bidder must ensure that the original requirement identifier and requirement description are maintained in the matrix as provided by PSC. Failure to maintain these elements may render the bid non-responsive and result in for rejection of the bidder.

The bidder's response to each of the below requirements shall include an indication on the level of compliance that can be met. (Complies, Complies Partially, Complies with Future Capability, Does Not Comply) Bidder shall respond by placing an "X" in only **one** checkbox per requirement. Failure to complete this process properly will be treated the same as "Does Not Comply," and may result in the rejection of the response form.

1. Complies: Bidder's proposal complies with the RFP requirements and the products/services are included in the base price, are currently developed, generally available, and successfully deployed. Responding with "Complies" or "Complies with Future Capability" shall mean the bidder's solution meets or exceeds the requirement regardless of any comments included as additional information.

2. Complies Partially: Bidder's proposal addresses the RFP requirements through another method that currently is developed and available for implementation (i.e., shall be generally available), or the solution complies with some, but not all of the requirements. Bidder is responsible for clearly explaining how the proposed solution does not fully comply.

3. Complies with Future Capability: The RFP requirements will be met with a capability delivered at a future date. This response shall include a calendar quarter and year in which the requirement will be met with a generally available product or service at no additional cost.

4. Does Not Comply: Bidder's proposal does not/cannot meet the specific RFP requirement.

Req Identifier	Requirement Description				
GEN-1	**General Requirements - Bidder Vision of NG911** The Commission is issuing this RFP for the purpose of selecting a qualified bidder that understands and can clearly demonstrate alignment with the industry's evolution to NENA i3 -compliant ESInet and NGCS solutions. Describe bidder's vision of NG911 and how bidder's vision aligns with NENA's i3 standard, bidder's approach to monitoring and supporting evolving standards and the bidder's level of involvement in standards development and Industry Collaboration Events (ICE).	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			

Bidder Response: **Atos Public Safety** provides the key pillars required in any NG9-1-1 ESInet and NGCS domain. These are core competencies and industry leadership that The Commission gains by having an IT transformation partner managing its emergency network services transformation.

Atos is the partner for the Next Generation of Public Safety; the company whose pillars of Managed Network Services, Communications and Collaboration Services, Cyber Security, Big Data Systems and Systems Integration bring an entirely new level of expertise and discipline to NG9-1-1, including foundational core competencies which are the nexus of an NG9-1-1 ecosystem. While our expertise is proven across the public sector in the U.S. and abroad, Atos recognizes that 9-1-1 is a highly specialized segment of the market, one which requires a unique set of core competencies and subject matter expertise to not only assure customer objectives are understood and met, but that the transformational pillars of Atos are focused in their respective areas of expertise accordingly. This division of Atos was created to lead, govern and serve the needs of the 9-1-1 sector, managed by industry SMEs who know the operational requirements of this highly specialized industry: **Atos Public Safety**.

Created to serve the highly specific, specialized requirements associated with Next Generation 9-1-1 (NG9-1-1), Atos Public Safety brings to the U.S. market the most scalable NG Core Services (NGCS) carrier-grade routing solutions and Emergency Services IP Network (ESInet) managed service ecosystem available in the industry. Led by a team of seasoned industry Subject Matter Experts (SMEs) who comprise a veritable "Who's Who" of Public Safety professionals, Atos Public Safety's mission is to serve the nation's First Responder community as their NG9-1-1 transformation partner, designing custom-fit communication ecosystems leveraging existing investments and assets using Atos' proven IT modernization methodologies. The names you know and trust, the company known and trusted around the world for complex IT program management, bringing the Public Safety industry an end-to-end NG9-1-1 managed network delivery system. Atos Public Safety: By Digitalizing the Public Safety Experience, we Digitalize the Citizen Experience.

Atos Public Safety Company Vision

While initiating a voice call is always, and will always be, the fastest means to request help, there are situations and populations where using one's voice is not possible. We live in a multimedia (voice, video, photo, text, VoIM) world, and the way 9-1-1 is delivered and managed today simply will not support this continuing communications paradigm shift. Whereas users must have a "voice" without speaking, first responders must be able to not only "hear" that call for help, but efficiently manage and process the response. Public Safety Answering Points (PSAPs) require solutions that will empower their staff without burdening them with information overload.

The restrictive nature of the industry's hardware-based systems, which are used by the vast majority of PSAPs, was not designed for the software-specific environment of NG9-1-1. Products were once specific to a certain operational subset within a PSAP, but Next Generation solutions must seamlessly integrate across disparate subsystems and provide the user a configurable and scalable enterprise communications model.

NG9-1-1 is a collaboration of services and multimedia sources which must be managed as a unified call flow, not as separate product silos within a PSAP. The age of hardware systems is gone, and our industry is now adopting software platforms that were designed specifically for the way we all communicate today. Voice is and will always remain king for public safety, but the way it is delivered and the data that accompanies an incident must be driven by a robust network engine.

Atos Public Safety's vision for NG9-1-1 is one which breaks down system-originated silos of products into a unified ecosystem driven by network convergence.

Rather than leaping to a pure i3 environment, our team of industry experts has learned firsthand that having a highly robust network migration strategy is critical to achieving a pure i3 end-state, phasing the transition first to an all IP-managed network domain through a systematic clustered cutover process. Upon full migration from the current Tandem Office construct to the multi-core layer i3 ESInet domain, geo-spatial routing features are seamlessly turned up in the same clustered approach as regional stakeholders are ready for them.

The Atos team understands the requirements for this move toward a countywide NG9-1-1 transformation, as well as the requisite transitional steps, infrastructure modernization and long-term imperative NG9-1-1 operational requirements. Atos, a global leader in digital transformation, has assembled a team of industry leaders within their core-competencies to form an unrivaled team that will deliver the best solution for the County.

-Maggie Goodrich CIO, Los Angeles Police Department (ret.)

NG9-1-1 is a journey. It is a transition to an open and collaborative domain where no prescribed formula dictates success or completion. The only prescription for success is having a vision, a plan, a partner and a clear understanding of what it takes to achieve a Next Generation networked IP domain. Atos, having provided the exact type of migration necessary for client-partners in the U.S. and around the world, has proven experience in an industry segment needing leadership beyond CPE and Tandem Offices. Our NG solution serves the high-volume calling and multimedia collaboration requirements of counties, states, even countries. In the United Kingdom, the OpenScape platform powers the national telecommunications system, mission critical included. And in California with a population of approximately 40 million, and 9-1-1 call volume approaching 30 million per year, Atos Public Safety was selected by CalOES as their Prime Network Service Provider.

No provider in this industry has the same scalability and deployment expertise in large scale migration programs to IP network domains as Atos, credentials. As we commit to all clients, our team works as your guide and partner as you migrate from TDM to IP independence and empowerment, serving as your trusted and proven advisor throughout the journey. The key to having a successful migration to an NG9-1-1 domain is leveraging a partner who has not only transformed some of the largest communications and infrastructure environments in the world but understands all the operational nuances of the customer experience inherent in IT transformation journeys.

Atos Public Safety Standards Support

Atos Public Safety and our preferred partners are actively involved with NENA, EEMA, and IETF and supports open standards for interoperability between ESInet/NGCS functional elements and VoIP/Unified Communications endpoints. We participate in standards development workgroups, NENA Industry Collaboration Events (ICE), EEMA Plugtest Events, and NENA tradeshow events. We also work very closely with select subcontractors to ensure the ESInet/NGCS solution is consistent with interoperability standards.

	Workgroup participation includes: ➢ 911CS-911 Core Services Committee (NENA) ➢ 911CS-i3 Architecture WG (NENA) ➢ IOT WG (NENA) ➢ NG9-1-1 Impacts on the PSAP (NENA) ➢ Changing Role of the TC in the NG Environment (NENA) ➢ NG Data Flow (NENA) ➢ Review/Update PRR Docs WG (NENA) ➢ RTT WG (NENA) ➢ EIDD Conveyance WG (NENA) ➢ ICE 9 Planning Committee (NENA) ➢ ECRIT ➢ NENA Information Document for GIS Data Stewardship for Next Generation 9-1-1 (NG9-1-1) (Co-Chair) (NENA-INF-028.1-201x) ➢ NENA Request for Proposal Considerations Information Document (NENA-INF-021.1-201x) ➢ NENA Information Document for Location Validation Function Consistency (NENA-INF-027.1-2018) ➢ NENA Standard for NG9-1-1 GIS Data Model (NENA-STA-006.1-2018) ➢ Requirements for a National Forest Guide Information Document (NENA-INF-009.1-2014) ➢ NENA Information Document for Development of Site/Structure Address Point GIS Data for 9-1-1 (NENA-INF-014.1-2015) ➢ NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard (NEN-STA-004.2-201x) Through work with NENA, EENA, and IETF, Atos Public Safety and our preferred partners have served as a strong proponent of open standards and interoperability to enhance 9-1-1 services within the United States and Europe.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN-2	**Proprietary Solutions and Standards** 1. Describe any use of proprietary standards, interfaces, or protocols in bidder's proposed solution. 2. Describe any patented technology in the proposed solution, who owns the patent and describe any licensing arrangements. Disclose any technological limitations, in the response.	X			
	Bidder Response: The proposed solution complies with all relevant and applicable industry standards. As team members of the respective offering proposed are active members in standards setting and industry leadership with NENA, the State's investment will be assured of compliance as the standards for i3 continue to evolve. In addition, Atos Public Safety and our preferred partners participate in NENA Industry Collaboration Events (ICE) as well as EENA Plugtest events to ensure continuous interoperability now and in the future. The heart of the proposed ESInet/NGCS solution is built on the OpenScape Voice (OSV) platform and is owned by Atos. OSV has always been built using open standards methodology, with all text and media communications based on SIP, TLS, SRTP and MSRP protocols. Our interface to the ESInet and NGCS is fully based on the NENA-STA-010 standard. Server hardware used in our solution are COTS products with no custom development. Additionally, our partners' solutions, such as GeoComm and 911DM, do not use any proprietary standards, interfaces or protocols where industry standards exist. We limit proprietary protocols to internal applications used to deploy, configure and maintain the various components, while at the same time providing standards-based interfaces for things such as monitoring.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN-3	**System and Network Architecture** The Commission is seeking a Public Safety Grade Next Generation 911 System. System and network architecture, including the design and deployment of interface functions and security measures, shall comply with current NENA i3 requirements as established in NENA-STA-010.2-2016, NENA Detailed Functional and Interface Standards for the NENA i3 Solution. Describe how the solution meets or exceeds the requirements in Section V.D.1.b. of the RFP.	X			

Bidder Response**:**

The Atos Public Safety network design supporting the State's ESInet/NGCS initiative is architected to provide a highly resilient public-safety grade Next Generation 911 System. The Atos ESInet/NGCS solution includes multiple levels of redundancy across all components and is designed to comply with the current NENA i3 requirements as established in NENA-STA-010.2-2016, NENA Detailed Functional and Interface Standards for the NENA i3 Solution. The Atos ESInet/NGCS solution described within this document will provide the State of Nebraska with a secure, scalable and highly available NG9-1-1 system operating at or better than 99.999% uptime.

All server hardware is new and current manufacture model Dell-EMC PowerEdge servers that utilize Intel Xeon Platinum CPUs, SSD/SAS storage with RAID5 or RAID10, and redundant 10GbE Base-T network adapters. The ESInet/NGCS solution runs in a virtualized environment utilizing VMware vSphere Enterprise Plus with VM management provided by vCenter. All network hardware is new and current manufacture model Cisco ISR routers, Firepower Next Generation Firewalls, and Nexus switches in the solution cores. The network hardware is deployed in redundant, active pairs to eliminate any single point of failure. VLANs are implemented to isolate critical network traffic, increase security and performance, and to facilitate troubleshooting and SLA assurance.

At the heart of the ESInet/NGCS, Atos-developed NG9-1-1 components will be deployed with multiple levels of redundancy and resiliency. The BCF's operate as high availability pairs and each ESInet/NGCS includes 2 full HA pairs of both the BCF-Ingress and BCF-Egress. The ESRP is built on a carrier grade switch architecture and operates as an active/active cluster within each ESInet/NGCS data center. The Policy Store Services are fully redundant using a Kubernetes architecture assuring 99.999%availability also supporting database synchronization across both data centers. The text support, media bridge and centralized LPGs all offer the same levels of availability and resiliency.

The IP portion of our solution will leverage the strength of MPLS technologies by providing interconnectivity to diverse service provider networks and IP cores in the region. Our ESInet/NGCS solution, designed over a state-of -the -art IP network, will meet all IEEE and IETF standards as noted in this section. The resiliency of our layer 3 design will provide survivability and redundancy and deliver performance expectations and maintain production service integrity of the platform delivered. Multicast and QOS requirements will be met with a combination of Expedited Forwarding and high priority Assured Forwarding classes of service across the ESInet/NGCS MPLS configuration. Our diverse redundant MPLS solution will meet any NENA and IEEE 802.3 interoperability requirements and will be built as an agnostic platform that enables customer applications to be driven over the core without interference from the network components.

Additionally, the Atos partners integrated into the solution include Geo-Comm, 911Datamaster and ECaTS. All three are fully NENA compliant and heavily involved in the work under way to develop and ratify new standards.

- The GeoComm ECRF architecture is a load balanced, fault tolerant system of GIS servers, database servers, and web servers deployed using docker containers and Kubernetes, with no single point of failure, and is capable of 99.999% uptime when deployed across multiple data centers, as is the case with the solution being offered. ECRF and LVF are IETF RFC 5222 compliant servers which provide the NENA i3 functional elements of ECRF and LVF specified in NENA-STA-010.2, the second version of the i3 Standard (originally NENA 08-003). In addition to these standards, there are many related RFCs that define how the ECRF and LVF operate, including PIDF-LO, RFC 4119, and its revision RFC 5139. GeoComm ECRF and LVF utilize a load balanced, multi-server architecture supporting geographic redundancy with no single point of failure, and physical separation between ECRF and LVF systems and databases.

	➢ 911Datamaster has been involved with the NENA i3 working group since its inception. 911Datamaster also pioneered the concept of a Location Database (LDB) as a transitional element and authored the text about it in NENA-INF-008.2-2014 (NG9-1-1 Transition Plan Considerations Information Document). The proposed LDB can serve as an ALI to legacy PSAPs while simultaneously acting as a LIS to other Next Gen Core Services. 911DM's solutions will be deployed on multiple virtual machines (VMs), or alternatively on physical hardware, to support redundancy, geographic diversity, and scalability requirements. Location reference data is synchronized in near real time between all deployed instances. Additionally, 911DM's solution components distinguish between data provisioning (e.g. GIS validation or SOI provisioning) and call processing (e.g. request/response handling) requirements. For example, a service order update that will be used by the LDB is validated on a different component than is being used to respond to HELD queries. Components responsible for request/response can be deployed as necessary without the need to shut down the system to reconfigure the software. ➢ Currently ECaTS integrates with the PSAP's call handling equipment today to provide reporting on MIS Call Handling Reporting, Staffing Forecast, Wireless Routing Analysis and Text-to-911 Reporting. The proposed solution to provide ESInet/NGCS i3 Logger Reporting will give the State and all PSAP personnel a single solution to access reports both from the local call handling equipment and the ESInet/NGCS for a complete end-to-end view of a call. Like ECaTS MIS call handling reporting, all ESInet/NGCS i3 Logger Reporting is accessible via the same portal and same login as ECaTS MIS. The State will have the ability to access one User Interface (UI) to pull call handling statistics, i3 logger data and text-to-911 reports. All reports are accessible via the web and made available anywhere anytime. Additionally, all reports are accessible via specific roles provided by the State, giving the ability to partition report access based on role, PSAP and agency. Atos ESInet/NGCS will have visibility to all deployed hardware, appliances and soft layer termination points provided and allow us to proactively manage the core infrastructure for optimal performance and reliability. Our ESInet/NCGS design incorporates the best of breed design for the transport, local access, core technologies diversity and redundancy to support mission critical services for the State's NG9-1-1 project.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN-4	**General Requirements – Capacity- Initial Design and Deployment** The bidder's initial design and deployment of the ESInet and NGCS elements, including all components and physical network segments, shall provide capacity that will support current and planned ESInet traffic and usage that occurs as a result of data sharing in, and between, all participating PSAPs, the Commission, and designated support agencies. Additionally, the system and network design shall allow for 50 percent traffic and usage growth for the life of the contract. All current and potential core functions and applications shall be considered, e.g., call-handling systems, CAD, logging, GIS data, streaming media, real-time text (RTT), IP traffic, traffic management systems, communications systems, and incident management systems. Describe how bidder's solution will meet or exceed the above requirements.	X			
	Bidder Response: The RFP states current annual call volume of 1.13 million. Atos has engineered this solution to easily support volumes of greater than 5 million calls per year. If support for greater volumes is needed, additional scale can be added simply by increasing licensing counts and network port speeds.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN-5	**Capacity - Scalable Deployment** As the Commission migrates toward a fully compliant NG911 environment, additional PSAP functions will transition to the systems and network. The bidder's systems and network solution shall be designed and deployed in a way that is easily scalable, with the capability to grow in both capacity and coverage without disruption in service. Describe in detail how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos Public Safety was created to serve the highly specific, specialized requirements associated with Next Generation 9-1-1 (NG9-1-1), Atos Public Safety brings to the U.S. market the most scalable NG Core Services (NGCS) carrier-grade routing solutions and Emergency Services IP Network (ESInet) managed service ecosystem available in the industry. The Atos ESInet/NGCS solution is deployed across multiple Tier 3 (or better) data centers using a reference architecture developed by Atos. This architecture allows for virtually unlimited scale. The reference architecture provides four (4) independent call processing lanes, each of which have the capability of supporting the State's entire 9-1-1 call volumes. It's exactly because of this architectural approach that allows us to add hardware, software, additional application instances, licensing, etc. to provide capacity and scale growth.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SEC 1	**Security - Cybersecurity** For the purposes of this RFP, cybersecurity (security) is considered to be the established systems and processes focused on protecting computers, networks, programs, and data from unintended or unauthorized access, modification, or destruction. **Security Requirements and Standards** The security requirements established in applicable standards listed in Section V.D.1. Table 1 of the RFP apply equally to all elements of the system requested in this RFP, including but not limited to components located in the following building types: 1. Data centers; 2. Network-housing structures ; and, 3. Regeneration sites and other buildings housing any element or device that is part of the overall system. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos' Next Generation Core Services are collocated in secure and managed data centers. All data center and aggregation sites are tier 3 classification utilizing physical key card access and caged floor space with locks. Atos will have direct physical security integration of the cage housing its servers (physically secured by both parties and logically secured by Atos). All edge devices connecting into and/or within the ESInet domain will be managed by Atos, assuring all potential threat entry points are closed and that all attempts of entry (regardless of type) are not only prevented but traced, reported upon and presented to the State. For applications and the network interfaces, Atos uses four layers of security: ➢ Encryption at the protocol level at each external interface. This is provided by the BCF (Border Control Function) and is used to provide IP network security for the ingress SIP calls from OSPs and egress SIP call delivery to the PSAP. Encryption types include IPSEC, TLS, SRTP and other secure protocols. ➢ Next generation Firewalls at each external interface in the data centers. Through the deployment of redundant HA pairs of Cisco Firepower Next Generation Firewalls, all data traversing the ESInet and NGCS undergo intense scrutiny using deep packet inspection. The NextGen Firewalls in place also provide IPS (Intrusion Prevention System) features. IPS is a network security prevention technology which examines network traffic flow to detect and prevent vulnerability exploits. ➢ HIDS (Host-based Intrusion Detection System) monitors and analyzes network packets for each application server. The NextGen Firewalls are also leveraged to do further deep packet inspection of all ESInet/NGCS data as packets pass between native Atos application as well as between third party applications ➢ Access controls via CyberArk, which utilizes Privilege Access Security to secure cloud applications and IT infrastructure.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SEC 2	**Security Plan** A comprehensive security plan is a critical component of the Nebraska's NG911 network solution. Describe the security plan, including the 1. mitigation; 2. monitoring; 3. alerting and incident-response processes; and 4. provide information on specific hardware components and software systems incorporated in the proposed security plan. The proposed solution's security plan is required to utilize the latest NENA specifications and incorporate the intentions of the Communications Security, Reliability and Interoperability Council (CSRIC) and Task Force on Optimal PSAP Architecture (TFOPA) best practices.	X			

Bidder Response:

The key to any successful NG9-1-1 program is the degree of focus and expertise provided towards security. Atos has real-world experience and additional threat mitigation tools which are paramount to the safeguarding of an ESInet/NGCS domain. These tools and program disciplines are rooted in the detailed security process employed by our team, starting with the design of the infrastructure itself and the operational processes and real-time management of all devices, services, appliances and queues.

For this program, Atos will apply the same rigorous security practices which adhere NGSEC standards to ensure the multitude of attacks and threat types out there do not enter the ESInet/NGCS domain. As CSRIC and TFOPA are best practices based on the latest National Emergency Number Association's (NENA's) i3 standard, Atos implements and test our solutions for compliancy to these standards. We also implement any gaps found in these working groups identified. Additionally, we follow related standards needed from other organizations such as Internet Engineering Task Force (IETF), 3rd Generation Partnership Project (3GPP), and Alliance for Telecommunications Industry Solutions (ATIS).

Atos has redundant NOC and SOC support centers in the USA to fully support the security and operational needs of the proposed solution. Atos has dedicated onshore staff working on security and service operations activities. This staff is fully trained on our complete NG9-1-1 solution. The team will have documented security processes and ensure 24/7/365 monitoring of the solution to ensure proactive and timely resolution to issues.

All security updates will be planned and scheduled. As security bulletins are released by vendors, Atos will perform adequate testing in our NG9-1-1 lab prior to rolling out. Security patches are rolled out per scheduled maintenance once they have been approved for use. All security updates are rolled up into the minor release for long term release management of the solution software. In the event there is a high risk / high priority security update that must be deployed, particularly in the cases where there is a potential exploit in the wild, a mutually agreed upon exception process will be developed to plan / execute expedited rollouts of fixes in a timely manner.

All system components will be configured to deliver alarms and traps as well as crucial logs to the NOC / SOC centers. The following components make up the Atos security posture for mitigating, monitoring and alerting any potential security vulnerabilities.

- Intrusion Prevention System (IPS) for signature-based volumetric attack detection based on predicted volumes
- DDoS (Distributed Denial of service) detection
- Cisco Firepower (NextGen FW and IPS)
- Infloblox for DNS Security
- Splunk SIEM (Security Information Event Management) for real-time security monitoring, threat detection, forensics and incident management
- Atos SBC/BCF (Session Border Controller/Border Control Function) SIP session security at all external network interfaces

	➢ CrowdStrike (HIDS) to monitor and analyze network packets for each application server ➢ Certificates (Digicert) – Atos uses the PK to create, manage, distribute, store and revoke digital certificates for TLS ➢ CyberArk for Privilege Access Security to secure access to cloud applications

Any additional documentation can be inserted here:

SEC 3	**Security Compliance Matrix** Describe how the proposed solution addresses compliance in each of the following categories in NENA 75-502, NENA NG-SEC Audit Checklist.

Category
1. Senior Management Statement
2. Acceptable Use Policy
3. Authentication/Password Policy
4. Data Protection
5. Exception Request/Risk Assessment
6. Hiring Practices
7. Incident Response
8. Information Classification and Protection
9. Physical Security
10. Compliance Audits & Reviews
11. Network/Firewall/Remote Access
12. Security Enhancement Technical Upgrade
13. Technical Solutions Standards
14. Wireless Security

Bidder Detailed Response:

1. Senior Management Statement of Policy

Atos recognizes the importance of an effective security program to protect the State of Nebraska against NG9-1-1 related threats and risks. Atos has created an overarching Global NG9-1-1 Senior Management Statement governing all security aspects in the NG9-1-1 Public Safety domain. This Statement documents the security goals and objectives of Public Safety solutions, as described below. For each Public Safety solution that Atos is engaged in, a Senior Management Statement is derived from the Global NG9-1-1 Senior Management Statement. A Security Administrator, designated for each Public Safety solution, is responsible for compliance with all security-related aspects of the solution, as specified in the Senior Management Statement.

Core Principles: This is a companywide focus at Atos everyone is involved and must be vigilant.

Security Goals and Objectives

a. Alignment with NENA 75-001 and NENA 75-502
b. The security and protection of employees must be the overriding priority of all NG9-1-1 activity.
c. Security policies and procedures must be implemented

d. The Atos NG9-1-1 Senior Manager or Security Administrator is responsible for definition and implementation of our overarching NG9-1-1 Security Plan
e. Heads of Department and Line Management must be continually aware of and take responsibility for the security aspects of NG9-1-1. Security organization and resources must reflect this commitment.
f. Prevention must be the first priority. Threats analysis and risk evaluation must be carried out on a continuous basis.
g. Preparedness is essential to mitigate incidents rapidly and effectively. Response plans must be developed and tested to deal with assessed risks.
h. The level of professionalism, knowledge and integrity of staff involved in security matters on behalf of Atos must be tightly controlled and exemplary.
i. All incidents, including security breaches and irregularities must be reported and recorded. Corrective action must be taken and followed up through regular verifications to improve the overall security standard.

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2. Acceptable Use Policy

All actual, attempted, and/or suspected misuses breaches of Public Safety assets are reported and documented in accordance with contractual and compliance requirements. In order to provide guidance and clarity to all employees and external resources, the Atos Acceptable Use Policy enumerates acceptable use cases for the entirety of the Public Safety solution.

The Policy furthermore enumerated examples of unacceptable use cases. Employees and external resources are advised of personal liability for damages resulting from the violation of the Acceptable Use Policy. All employees and external resources are required to acknowledge their understanding of the Policy and to adhere by its rules.

Examples of use cases covered by the Acceptable Usage Policy are:

- access to and use of the Internet
- use of emails
- handling of data imported into or exported from system components, incl. use of downloaded data
- disclosure of information specific to the operation of a Public Safety system to external parties (incl. operational procedures, data specific to operation incidents, data specific to public safety agencies)
- use of system resources for purposes other than the intended purpose according to system design
- installation of software or hardware components that are not part of the system design
- use and disclosure of credentials of another employee

The Atos Acceptable Use Policy establishes responsibilities for ownership, ongoing maintenance and review of the policy.

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3. Authentication / Password Policy

Assigning unique user logins and requiring password or PIN protection is one of the primary safeguards employed to restrict access to NG9-1-1 solution and the data stored within it to only authorized users. If a password or PIN is compromised, access to information systems can be obtained by an unauthorized individual, either inadvertently or maliciously. All individuals are responsible for safeguarding their unique system authentication login and password credentials. Passwords must comply with the requirements and standards identified in this policy. Passwords must meet the complexity requirements specified in this policy and must not be shared with or made available to anyone in any manner that is not consistent with this policy.

With respect to authentication information (logins, passwords), the Policy specifically governs the following aspects, among others:

- Sharing of information with other individuals

- Documentation and logging of new accounts and access rights
- Verification of validity of requests for new user accounts
- Periodic verification if access to individual system components is a continued requirement or needs to be deactivated or deleted
- Procedures for modification of access rights for individuals
- Display of authentication credentials in clear text or obscured format
- Session timeout and lockout rules
- Password complexity, content and age rules
- Requirements for modification of default logins and passwords
- Authentication guidelines for system to system access
- Use of digital certificates and trust chains
- Revocation procedures for digital certificates
- Separation of responsibilities (developer vs. system administrator)

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4. Data Protection Policy

Data protection is a central pillar of all IT systems, and in particular of Atos Public Safety solutions. All data management at Atos is governed by data protection guidelines, including the General Data Protection Regulation (GDPR), as well as local laws and regulations concerning personal data protection aimed at ensuring the confidentiality, integrity and security of such personal data.

A Compliance Assessment of Data Processing (CADP) is performed for every new Public Safety solution contract or service. This analysis is conducted annually unless otherwise agreed with a customer. An Atos Data Privacy Officer (DPO) will review and approve the results of the CADP prior to the start of the transition into service of the Public Safety solution, and following any CADP updates. Prior to the end of the transition into service, the customer must provide a complete inventory of the personal data processed for the managed environment to Atos. This inventory is validated annually. The Data Protection Policy establishes that all personal data be encrypted at rest, in transit, and in backups, unless otherwise agreed in writing with the customer.

Any additional services, additions to the managed environment, or contract changes must be evaluated for their potential impact to personal data. If personal data is identified as part of this change, the CADP must be reassessed, appropriate measures and controls be implemented and changes be enacted as part of the contract change control process. When processing personal data, Atos as the Processor must operate in accordance with written instructions provided by the customer (categories of data processed, categories of processing activities, term of retention of the data, security measures, subcontracting, etc.).

Atos' internal Data Protection Policy includes guidelines and regulations for the following areas, among others. It is mandatory that all guidelines in this Policy be adhered to.

- Detailed guidelines for the periodic execution and retention of self-review assessments for system and network administrators
- Definition of purpose and mission of all networks in the Public Safety solution, for the purpose of establishing appropriate security measures
- Documentation and classification of inventory of all systems and devices on each network in the solution
- Documentation and protection of all network ingress and egress points
- Detailed logging of all types of system access
- Verification procedure of uniform security posture of multi-homed computers, if such computers are part of the Public Safety solution
- Enhanced security measure guidelines for multi-homed computers
- Guidelines for assignment of required account privileges, based on principle of minimal access and minimal data visibility

- Review of appropriate use of user accounts for intended purpose
- Modeling guidelines for access security based on user roles
- Use of boot and login warning notices
- Deactivation of anonymous accounts
- Prevention of access to personal portable storage devices
- Strict separation of production and non-production/test/lab systems
- Removal of all software development tools from production systems
- Guidelines for releasing 911 data to the public or to the media
- Regulations for data encryption, incl. key generation, following industry standards and local laws, leveraging Atos' Public Key Infrastructure
- Regulations for scanning for viruses and malicious code
- Regulations for data backup
- Establishment of a security alarm plan
- Guidelines for environmental conditions and harmful factors, incl. furniture, cabinets, power supplies, food, drinks, smoking.

5. Exception Request / Risk Assessment

Atos will abide by the principles and guidelines laid out in NG-SEC standard for the protection of NG9-1-1 assets, wherever possible. The State and Atos will contractually agree on the process used for reviewing, recording and approving existing and new exceptions to policy. Unresolved non-compliance that introduce risk, along with risk acceptance or exception documents, will be stored in a risk register for the period of the contract and reviewed on a quarterly basis by the Security Working Group.

Atos' approach closely follows the risk acceptance process, as laid out in the NENA NG-SEC standard. This specifically includes the aspects of risk justification, identification, assessment, analysis and acceptance/approval.

6. Hiring Practices

Atos relies on guidelines for hiring employees. These guidelines govern the selection of potential candidates for roles required to develop, deploy, provision, operate and manage our Public Safety systems and solutions.

7. Incident Response

All Atos employees, contractors and other third parties participating in the operation of an Atos Public Safety solution are required to report any observed or suspected security weaknesses in systems or services, and any security incidents, including any incident affecting the confidentiality, integrity or security of personal data to the appropriate CSM or other Atos identified security point of contact. The customer receives direct notification of security incidents in accordance with the terms established in the contract. Atos handles all aspects of incidents that are under the control of Atos. Atos provides an optional security incident response service for those security incidents that are not handled within the context of subscribed services. In the event the customer suspects a security incident that impacts its environment and may also impact Atos, the customer is expected to immediately notify Atos of the suspected incident.

All Business Continuity and Disaster Recovery measures that are provided as part of the NG9-1-1 solution will be adequately documented and tested prior to transition to service. The BC/DR test procedures are designed to be conducted annually.

8. Information Classification and Protection

As part of the delivery and operation of the NG9-1-1 solution, Atos will provide a comprehensive Information Classification and Protection Policy, encompassing both administrative and production systems. The responsibilities for Data Owners and Data Custodians will be defined in the Policy. The Policy regulates the handling of sensitive data received from a third party or of data where the classification of information is unknown. All classified information is protected from unauthorized access. When equipment and media containing sensitive information are disposed of, the prescribed process ensures the sanitation of the media so that information cannot be retrieved at a later point.

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9. Physical Security

Atos computing and networking areas (e.g. data centers, server farms, NOC, SOC) are operated as closed facilities with controlled access restricted to authorized personnel. As per the Atos Physical Security Policy, access is limited to Atos personnel with valid requirements or justifications for accessing these areas. The designated individuals responsible for the physical security of these areas must review access authorizations on an annual basis. All personnel entering controlled facilities must follow physical access controls in place for the facility. The use of automated access control and logging devices is mandatory. The proposed NG9-1-1 solution will operate in two geo-diverse colocation data centers that house the NGCS functional elements. These are hardened tier 3 category data centers with locked and monitored cages accessed with card keys and two-factor authentication, biometrics, iris scan.

Atos systems located on customer premises must be installed in an area that can be controlled by Atos. Atos computing and networking areas must be physically protected from security threats. The Physical Security Policy requires that all equipment be situated such that risks from environmental threats and hazards such as fire and smoke damage, extreme heat or cold, water flooding, power failures, humidity problems, lightning, technical malfunctions, sabotage and theft are eliminated or minimized. Appropriate controls must be established. Equipment must be maintained in accordance with the suppliers' documented procedures, to ensure uninterrupted availability.

The Atos Policy also provides guidelines for redundant power supply and UPS arrangements in order to protect data. Unused network connections are required to be disabled.

The Atos Policy requires access to sensitive information on machine-readable media or paper to be protected by appropriate controls. Sensitive information must not be left where it can be accessed, read, copied or taken away by Atos staff or anyone else not authorized to do so. All workstations and laptops are required to be secured to prevent unauthorized access when they are unattended. This is also applicable to portable electronic equipment (e.g. laptop computers, personal digital assistants, mobile telephones, desktop computers when moved outside Atos premises for any use).

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10. Compliance Audits & Reviews

Atos will work with the Commission on scheduling non-intrusive security audits on an annual basis. As the cyber-security provider for some of the most mission critical, threat sensitive domains in the world, Atos has extensive experience working with third parties in the scheduling and execution of audits to optimize the customer and information protection process. Atos employs a variety of methods to assess the security of networks, platforms, processes, applications and services, including checklists, automated tools, penetration testing and review of documentation

Compliance with the Security Audits and Reviews Policy is the responsibility of the Security Officer. Non-conformities are documented and reported to responsible management. Line managers ensure that timely, appropriate and auditable action is taken to resolve the non-conformities.

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11. Network/Firewall/Remote Access

As part of the NG9-1-1 solution, Atos provides a complete set of policies for Networks, Firewalls and Remote Access.

The Networks Policy regulates connectivity between the NG9-1-1 core networks and networks of other components that are part of the overall NG9-1-1 solution. These components may be located at geographically distinct data centers or cloud locations of Atos or third-party providers.

Examples of regulations include:

- encryption of traffic between individual networks, using encryption types like IPSEC, TLS, SRTP and other secure protocols, including details about certificates and key lengths
- deactivation of unsecure communication protocols (e.g., telnet)
- use of Intrusion Detection and Intrusion Prevention systems (IDS, IPS) and associated update policies

The Firewalls Policy defines configuration details of the firewalls deployed throughout the networks of the NG9-1-1 solution. Examples of organizational and technical requirements and required configurations include:

- Certifications and experience levels of firewall administrators, incl. knowledge levels in networking, operating systems and application and system protocols
- Evaluation of security risks for every computer and device that interacts with outside elements
- Periodic review procedures of firewall rules, accounting for network vulnerabilities identified since last review
- Types of required firewalls (i.e., application layer firewalls)
- Log retention periods
- Log replication to network monitoring platforms
  Access control to firewalls
- Control of exposed ports that permit ingress and egress traffic

The Remote Access Policy establishes rules for remote computers and devices that intend to connect to the Public Safety solution. Examples of such rules include:

- Remote access to NG9-1-1 networks is restricted to originate only from the Atos Service Network (ASN) or the Atos Development network (ADN). The ASN and ADN connect to the NG9-1-1 solution via private facility networks. The use of public transport is avoided or limited to remote connections where no private network is available.
- All ingress and egress points of each network in the NG9-1-1 solution are clearly defined and documented in detail. All ingress and egress points are secured by firewalls.
- Remote access is only allowed via Atos's standard solutions. When the Internet or a dedicated third-party connection is used to access the NG9-1-1 networks, strong authentication combined with encryption is required.
- While the remote computer is connected to the NG9-1-1 networks, no other connections to any other network are allowed (via modem, Wi-Fi, DSL or other types of connectivity).
- Remote access via a VPN connection requires a configuration that ensures that all ingress and egress traffic to and from the computer be routed via the VPN connection, thus preventing simultaneous connections to other networks.
- The remote computer must use the latest version of anti-virus tooling along with the latest anti-virus definition files. The anti-virus tool must be continuously enabled, in order to constantly monitor any virus activity.

Full details of the policies will be provided as part of the NG9-1-1 solution deliverables.

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12. Security Enhancements Technical Upgrade

As part of the evolution of the NG9-1-1 solution that Atos is offering, the Security Enhancement and Upgrade Policy controls the process of modifications and enhancements to the existing technological infrastructure of the ESInet/NGCS solution.

The Policy mandates that a security assessment of any new technical resource, device, hardware or software system, application, plugin or type of communications be conducted before being incorporated into the NG9-1-1 solution. This assessment ascertains compliance of any new element with the established Security Policy of the solution. Components with auto-upgrade features must be evaluated to ensure they comply with the Policy.

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13. Technical Solutions Standards

Atos as a leader in the digital transformation industry has an extensive focus on the security aspects of any IT solution, in particular NG9-1-1 solutions. Rigorous change control processes ensure that any modifications to architecture and design maintain the required security posture of the solution. We conduct security reviews with internal and external entities. Technical experts from the relevant domains participate in the review and approval of any change affecting security. The teams involved in planning and applying changes to hardware and software systems are required to follow documented procedures. The procedures call for appropriate approvals before changes are being made. Audit trails of all modifications are being maintained and reviewed periodically. Any new or modified components being applied to the solution are required to be tested in a non-production environment. As a safeguard against unintended consequences of changes, the Policy requires backups of software and data of the production environment, prior to applying changes, in order to facilitate swift recovery.

Atos follows NIST standards for hardening of computers and devices of the NG9-1-1 solution, to the extent possible and appropriate. In a further effort to minimize security risks, unused components and modules are disabled and cannot be enabled by end users.

For the purpose of understanding system resiliency and options for disaster recovery, an analysis will be conducted to identify and document all single points of failure of the solution, along with remediation measures. A comprehensive system monitoring and alarming infrastructure is part of the NG9-1-1 solution, as described in the relevant section of this RFP response.

Time synchronization across all components of the solution is accomplished by adhering to the NENA 04-002 Master Clock standard.

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14. Wireless Security

The proposed NG9-1-1 ESInet/NGCS solution is based entirely on wired network connectivity. As such, wireless security considerations are not applicable. Wireless networks used by remote users connected to components of the NG9-1-1 solution using mobile devices are beyond the scope and control of the Atos NG9-1-1 solution. Wireless security should be assured by the operators of those wireless networks. Should technical modifications or extensions be made to the solution in the future, the Wireless Security guidelines laid out in the NENA NG-SEC standard will be followed to the extent possible.

Any additional documentation can be inserted here:

	Predictive Analysis and Monitoring Describe solution's capabilities to provide predictive analysis and modeling to combat security threats.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
SEC 4	Bidder Response: Atos will have a baseline protocol and volume rates per protocol as a benchmark: ➢ The Intrusion Prevention System (IPS), as incorporated into the Cisco NextGen Firewalls, detects changes in the baseline and provide system alerts. ➢ DDoS and malware detection are prominent at all edge devices in the network ➢ SIEM (Security Information Event Management) tool will look for anomalies in real-time security posture monitoring, threat detection, forensics and incident management ➢ NEXTHINK will be used to measure, monitor and manage predictive behavior across applications, networks and devices to reduce security threats The heart of the proposed ESInet/NGCS solution is built on the OpenScape Voice platform, which includes OpenScape Session Border Controller (SBC). OpenScape Voice (on which the ESRP is based) and OpenScape Session Border Controller (on which the BCF is based) underwent a bombardment of attacks from Miercom security professionals. The ESRP shares the same codebase as OpenScape Voice and the BCF shares the same codebase as the OpenScape SBC. Both are mature products with a proven track record. The results on a product by product basis were phenomenal and showed once again Atos commitment to protecting our customer's networks. These products achieved Miercom certification. Key findings from Miercom security testing are summarized below: ➢ OpenScape Voice was tested against 10,800,231 attacks and protocol mutations launched by state-of-the-art security tools and Miercom scripts ➢ The management interface, implemented via the Apache web server, fully blocked all Denial of Service (DoS) attacks (notably Slowloris and THC SSL DoS) ➢ An attacker is not able to circumvent the Intrusion Detection System by using a slow rate of traffic to achieve a false login via a brute-force attack ➢ Exhibited no vulnerability to the Heartbleed exploit as well as a wide variety of SIP penetration attacks ➢ Maintained normal operation and call functionality while blocking attempted exploits ➢ High-availability configuration worked as designed, providing maximum uptime				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SEC 5	**Credentialing Process** Solution shall provide a process so that devices and carriers outside the IP network shall not have credentials, per NENA-STA-010.2-2016. Provide details regarding how the solution ensures that devices and carriers outside the IP network are not provided credentials.	X			
	Bidder Response: Using Public Key Infrastructure (PKI), Atos will engage a NENA credentialing agency to create a sub domain Certificate Authority (CA) for Nebraska. This sub domain will be internal to the Nebraska ESInet and will assure that the network cannot provide credentials to any unauthorized devices or carriers outside the ESInet. Atos will use digital certificates at the following interfaces: ➢ Network encryption ➢ SBC/BCF ➢ Application protocols such as SIP/TLS, HTTPS ➢ Security event logs SNMPv3, secure syslog Atos uses Eonti and DigiCert as providers of the PKI infrastructure. In effect, all certificates result from within the official NENA PSAP Credentialing Agency.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SEC 6	**Third-Party Security Audits** Bidder shall allow for annual third-party security audits at the request and cost of the Commission. Describe bidder's current process for third party security audits.				
	Bidder Response: Atos Public Safety adheres to and advocates NENA's Next Generation 9-1-1 security standard (NG-SEC) and NIST's (National Institute of Standards and Technology) cyber security framework. Atos will work with the Commission on scheduling non-intrusive security audits on an annual basis. As the cyber-security provider for some of the most mission critical, threat sensitive domains in the world, Atos has extensive experience working with third parties in the scheduling and execution of audits to optimize the customer and information protection process.	X			

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SEC 7	**Physical Security** All structures outside the Commission's control that will house components of the ESInet and NGCS shall have security and access-control systems that ensure that only duly authorized individuals can access the areas housing the Commission's systems and network equipment. Any workstations or other equipment connected to, or capable of accessing, the ESInet and NGCS systems shall be housed in secured, access-controlled areas. Any devices, power distribution, and cross-connect panels feeding the cages or rooms housing the Commission's systems similarly shall be protected. Identify any elements that are not under the direct control of the bidder, and a description of the building's security and access-control systems shall be provided.	X			
	Bidder Response: Atos will utilize two geo-diverse colocation data centers for housing our ESInet/NGCS functional elements. These sites are hardened tier 3 category data centers with the following attributes: ➢ Caged access with card keys in the customer space will use 2FA (two-factor authentication, which requires users to provide two means of identification before access is granted) ➢ Provider-controlled spaces are multi-layer concentric zones: badge reader, biometrics, iris scan and security vestibules up to customer space ➢ Locked and monitored equipment cages ➢ Physical security for building access controlled 24x7x365 ➢ N+1 power distribution ratio				

Any additional documentation can be inserted here:

	General Requirements – Network Operations Center (NOC)/Security Operations Center (SOC)	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 1	**Centralized NOC/SOC** All services and components deployed and interconnected as part of the solution shall be monitored 24 hours a day, 7 days a week, 365 days a year (24 x 7 x 365) by a centralized Network Operations Center (NOC) and Security Operations Center (SOC). These functions may be in separate buildings or combined in a single building located in the continental United States.	X			
	NOC/SOC Interoperability Contractor shall have the ability to communicate, troubleshoot and connect with other vendors NOCs should there be a different ESInet and NGCS provider. In addition, the Contractor shall interface with the NOCs that support the regions throughout the state. This shall include ebonding of the ticket systems to support transparency throughout the troubleshooting process.	X			
	NOC/SOC Operations Model Provide documentation including organizational structure and procedures that describe bidder's 1. NOC/SOC operations model, 2. Continuity Of Operations Plan (COOP), 3. problem and change management systems, 4. reporting systems, 5. escalation plan, and 6. conformance with best practices (Information Technology Infrastructure Library (ITIL) or equivalent methodology)) for service-delivery management. The Contractor shall confirm the requirement compliance of any interconnected network utilized by the Contractor not previously identified to the Commission.	X			

Bidder Response:

Centralized NOC/SOC

Atos has redundant NOC and SOC support centers in the USA to fully support the operations needs of the proposed solution. Atos has dedicated onshore staff working on 9-1-1 service operations activities. This staff is fully trained on our complete NG9-1-1 solution. The support staff for 9-1-1 operations will be located in the USA.

The team will have documented processes compliant to ITIL for service delivery and operations management. Our team will ensure 24/7/365 monitoring of the solution and various levels of support capability to ensure proactive and timely resolution to issues. Atos will adhere to the SLA guidelines set forth in the response to the RFP.

The system shall be monitored 24/7/365 through various data collection tools. All system components will be configured to deliver alarms and traps as well as crucial logs to the NOC / SOC centers. The teams will be performing proactive monitoring of the solution as well as constantly evaluating thresholds for detecting anomalies. The monitoring will be configured for all equipment at the data centers, POI / Aggregation centers, and PSAPs. All active triggers for alarms, logs and traps will result in autogenerated tickets in our ticketing system; ServiceNow. These tickets will be dispatched to Level 1 support.

Aside from proactive monitoring through thresholds, our solution will also have automated synthetic tests that are run periodically from end to end. This synthetic test solution contains probes throughout the solution at critical component junctions to ensure the following is met:

- Packet Latency
- VOIP Jitter
- Media quality (MoS)
- Packet loss
- Optimal routes

The synthetic testing will have a default VOIP configuration to test voice calls and can also be used for troubleshooting other issues around data delivery and load testing. These tests can be configured for different times of the day and during critical events to ensure smooth operations. Any anomalies detected from the synthetic testing will generate automatic tickets and alerts into our NOC.

All security updates will be planned and scheduled. Atos does not support automatic security updates to be applied to the NG9-1-1 solution. As security bulletins are released by vendors, Atos will perform adequate testing in our NG9-1-1 lab prior to rolling out in operations. Security patches are rolled out per scheduled maintenance once they have been approved for use. All security updates are rolled up into the minor release for long term release management of the solution software.

In the event there is a high risk / high priority security update that must be deployed, particularly in the cases where there is a potential exploit in the wild, a mutually agreed upon exception process will be developed to plan / execute expedited rollouts of fixes in a timely manner.

NOC/SOC Interoperability

The Atos ITSM platform is ServiceNow. ServiceNow has the ability to connect with other providers ITSM platforms, as required. Specific configuration details will be gathered upon award and identification of the other provider systems. Atos will work with all vendors until an incident/issue is resolved and expects the same from all providers and their vendors who are providing support to the State of Nebraska.

NOC/SOC Operations

Atos has included a generic Maintenance Plan as well as a generic Continuity of Operations Plan ("COOP"). These will be customized following award. Please see below for additional details:

1. NOC/SOC operations model is described above and in the DRAFT Maintenance Plan (see Appendix B: Services Support).
2. A DRAFT of the Continuity of Operations Plan (COOP) is attached (see Appendix B: Services Support).
3. Atos uses ServiceNow as its ITSM platform which includes problem and change management modules.
4. Atos will leverage all tools within its ITSM landscape that support the State of Nebraska to facilitate reports. A sample report has been attached (see Appendix B: Services Support)
5. An escalation plan specific to the State of Nebraska will be developed following award and will become part of the Maintenance Plan; and
6. Atos confirms that we, along with all of our partners and providers, will be in conformance with best practices (Information Technology Infrastructure Library (ITIL) or equivalent methodology for service-delivery management.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 2	**NOC/SOC - Remote Connectivity Required** Contractor shall provide any network connectivity required to support Contractor's NOC/SOC services. Describe any remote connectivity required by the solution including, but not limited to, Virtual Private Network (VPN), phone-home connection, and tech support remote access.	X			
	Bidder Response: Atos establishes secure VPN tunnels between its NOC/SOC and the ESInet/NGCS Data Centers whereby full system monitoring, management and subsystem remediation activities are conducted: ➢ All remote connections to the solution are through CyberArk (both for Atos and third-party access) ➢ All CyberArk access is recorded and monitored ➢ All corporate access is through Atos secure network				

Any additional documentation can be inserted here:

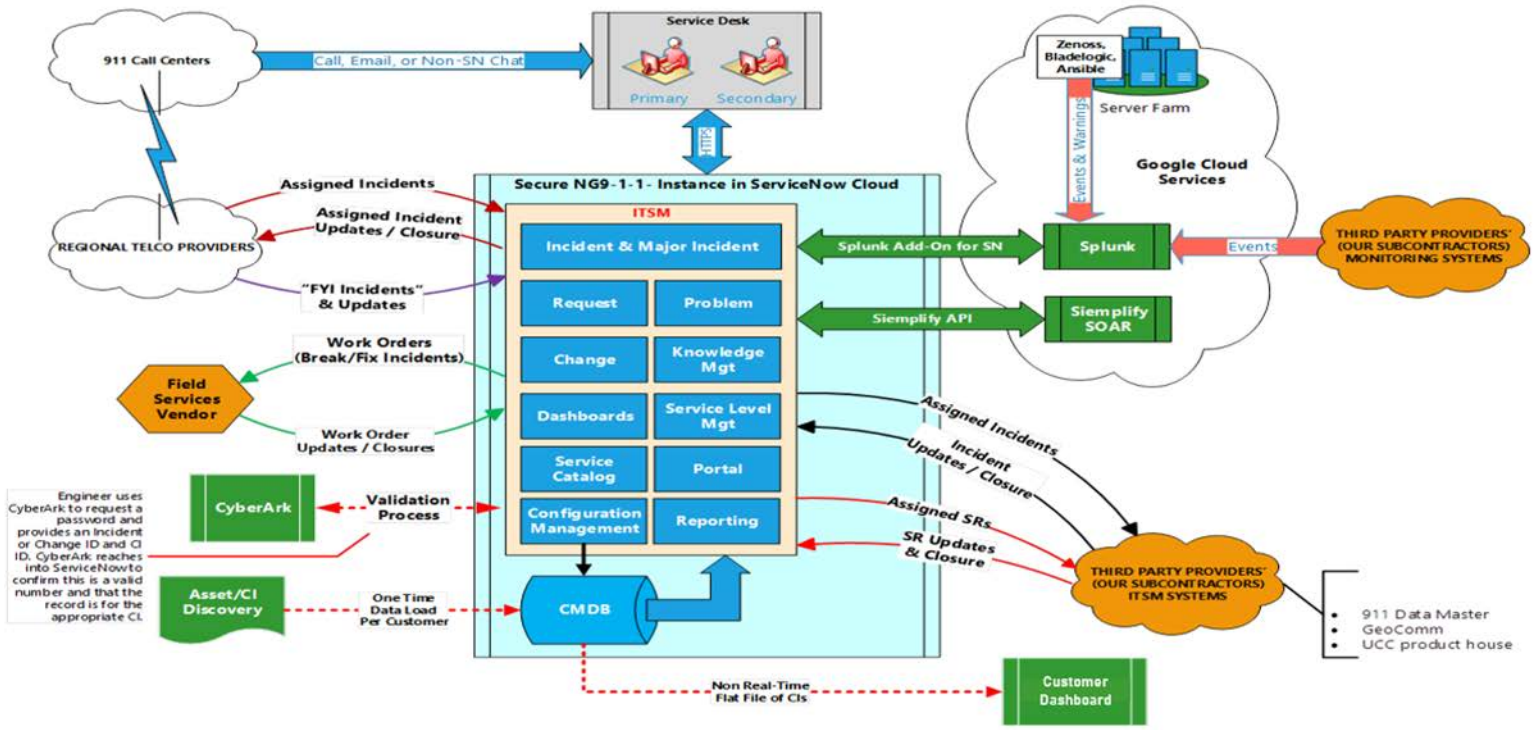
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 3	**NOC/SOC - Network Security Monitoring and Management** **Security Management Solution** The bidder's security management solution shall control access to network resources in accordance with public safety network security best practices such as NIST, NENA and the FCC to prevent sabotage, service interruption (intentional or unintentional) and the compromise of sensitive information. Security management shall comply with security- and data-integrity standards listed in Section V.D.1. Table 1 in the RFP, to monitor users logging into network resources and to refuse access to those who enter inappropriate access codes. The proposed IP network and systems shall support standard security policies that may include the use of firewall rules, Access -Control Lists (ACLs), Virtual Local-Area Networks (VLANs), VPNs, and Transport Layer Security (TLS) protocols to control network traffic and access. The systems shall support the use of software to detect and mitigate viruses, malware, and other attack vectors. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: Atos solution supports: ➢ IEE 802.1Q VLAN segregation between applications ➢ Border Controller Functions\ SBC and Cisco NextGen Firewalls to encrypt ESInet traffic and protect Nebraska NG911 Services from the Aggregation Centers to the regional Demarks. End-to-End protection in accordance to the standards in Table 1. ➢ Application protocols are IEEE TLS Protocol level encryption\ HTTPS ➢ Locked down ports and protocols ➢ CyberArc- all admin connections to the solution are through CyberArk (both for Atos and third-party access). All CyberArk access is recorded and monitored ➢ Security event logs SNMPv3, secure syslog				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 4	**NOC/SOC - Connected Systems Compliance** Any system that connects to an IP network shall be required to comply with listed standards in Table 1, including security standards, and demonstrate compliance through an initial and recurring audit. **Security Reports and Recommendations** Contractor shall provide, within 30 days of the end of each calendar month, security summary reports and recommended improvements on a monthly basis (at a minimum), including incidents and incident response; building, facility, and network access reports, including failed attempts; and updates or changes to security systems and software. All related data shall be retained for the period of the contract and provided to the Commission electronically at the end of the contract. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: Atos will comply with the stated requirement.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 5	**NOC/SOC – Connected Systems Compliance Support for Similar Solutions** Provide details concerning how bidder provides security monitoring and management for similarly deployed production solution. Provide details, including drawings, which explain how the proposed solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos has a NOC and SOC that has been designed specifically for NG9-1-1 solutions only. This NOC/SOC will provide complete lifecycle support, management of the ESInet/NGCS domain, maintenance (remote and dispatched) and security assurance with connectivity to our respective subcontract partner NOCs and incident management platforms. Our team is well versed in the mission-critical operations and proactive management requirements of 9-1-1 systems, having secured and ensured delivery of city, county and commercial client infrastructure for years. Atos' team of NG9-1-1 SMEs has brought our NOC and SOC to the forefront for the needs of public safety, recognizing the benefit it brings to all clients undergoing their respective migration and transition of infrastructure to that of an ESInet ecosystem. For this program, Atos will apply the same rigorous security practices which not only adhere to the NG-SEC standards but, as evidenced in our delivery of all IT services to the Olympic Games, ensure that the multitude of attacks and threat types do not enter the ESInet/NGCS domain. Since the core services are housed in secure collocated and managed data centers, Atos will have direct physical security integration of the cage housing its servers (physically secured by both parties and logically secured by Atos). All edge devices connecting into and / or within the domain will be managed by Atos, assuring all potential threat entry points are closed and that all attempts of entry (regardless of type) are not only prevented but traced, reported upon and presented to the State. The following diagram provides an overview of the solution:				



Trouble Category	Response Time
Severity Level 1	15 minutes
Severity Level 2	30 minutes
Severity Level 3	Next Business Day
Severity Level 4	Next Business Day

Trouble Category	Repair Time
Severity Level 1	2 hours
Severity Level 2	4 hours
Severity Level 3	48 hours
Severity Level 4	5 business days

Any additional documentation can be inserted here:

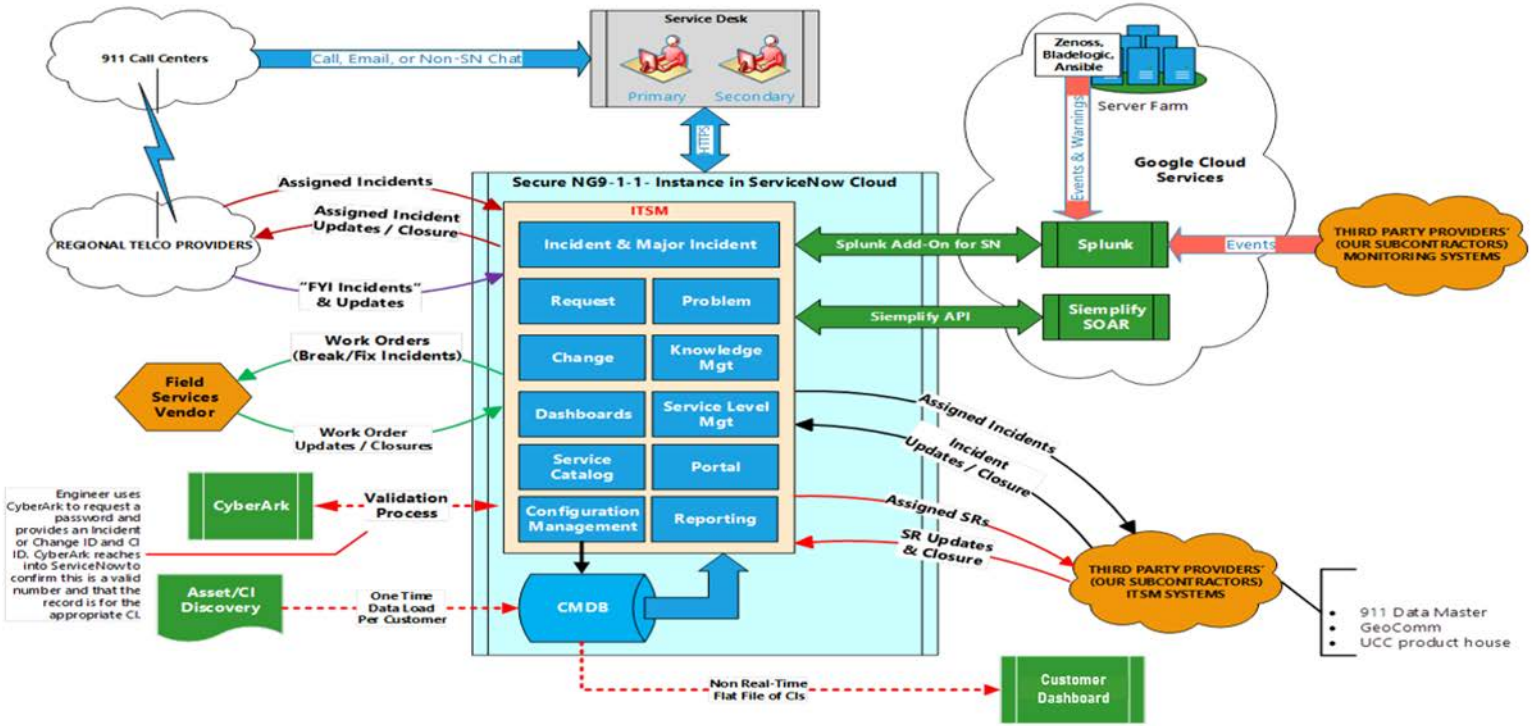
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 6	**NOC/SOC - Physical Access Monitoring and Management** Contractor shall track and log all physical access to structures housing IP network components serving the Commission or have the capability to obtain access logs for structures not under immediate control of the bidder. Reports may be requested and shall be made available for review upon request. All related data shall be retained for the period of the contract and provided to the Commission electronically at the end of the contract. Provide a detailed explanation of bidder's processes and procedures for logging physical access to ESInet /NGCS components, and how the bidder's solution generates the required reports.	**X**			
	Bidder Response: All access into Atos-provided location, cages, cabinets or rooms is tightly controlled and proactively monitored in real time by our NOC/SOC team. For all Atos data centers, we can provide, as required, tracks and logs of access via the access control system. All the data is available through us to our NOC/SOC team which manages the access system, gives a real-time view of personnel on site and handles badge reports. Atos data center locations onsite experts focus on physical and logical security to deliver an uncompromising level of security 24x7x365 from the property perimeter to the data center floor. Atos data centers use a comprehensive set of security features and controls including setbacks, fencing, active guard patrols, ID checks, visitor screening, active video monitoring, key card and biometric access controls. Upon request, Atos will provide additional information with regard to how physical access is controlled and data centers are protected.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 7	**NOC/SOC - Incident Management System** The bidder's incident management system shall log all support requests, both from users and those automatically generated. 1. Provide examples of monthly reports detailing tickets opened, pending, resolved, and closed. 2. Provide a matrix outlining Service Impact Levels in a detailed response, to include notification times and response times.	X			

Bidder Response:

Atos ITSM platform is ServiceNow and it will log all support requests, both from users and those automatically generated. A sample report is attached as well as the Service Level matrix. The system will also provide a web portal that can be accessed by authorized users for a dashboard.



Any additional documentation can be inserted here:

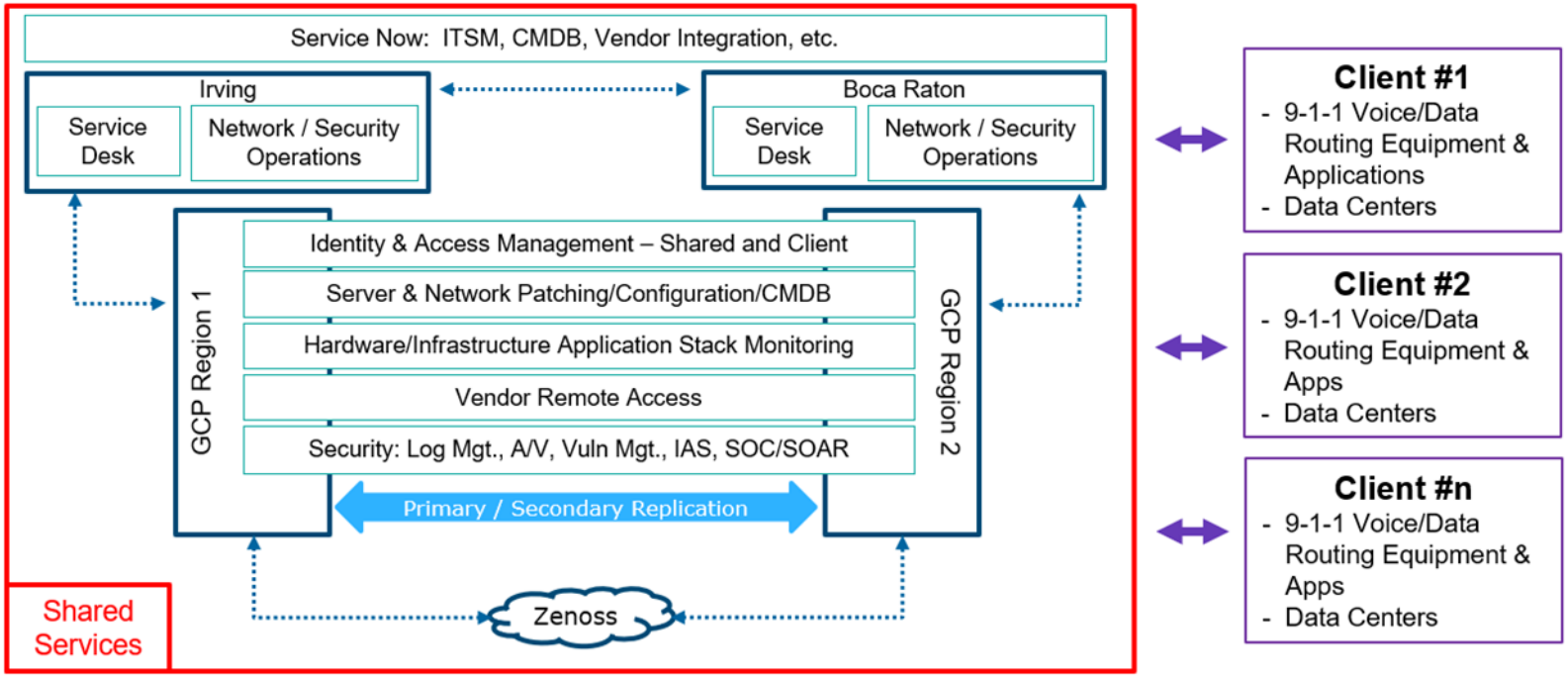
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 8	**NOC/SOC - Change Management System** **Change Management Review System** Describe bidder's change management system and the ability to provide the Commission's program manager and designated PSAP representatives with the ability to review proposed change requests and the client approval process. The Contractor shall provide monthly reports detailing change tickets opened, pending, resolved, and closed.	X			

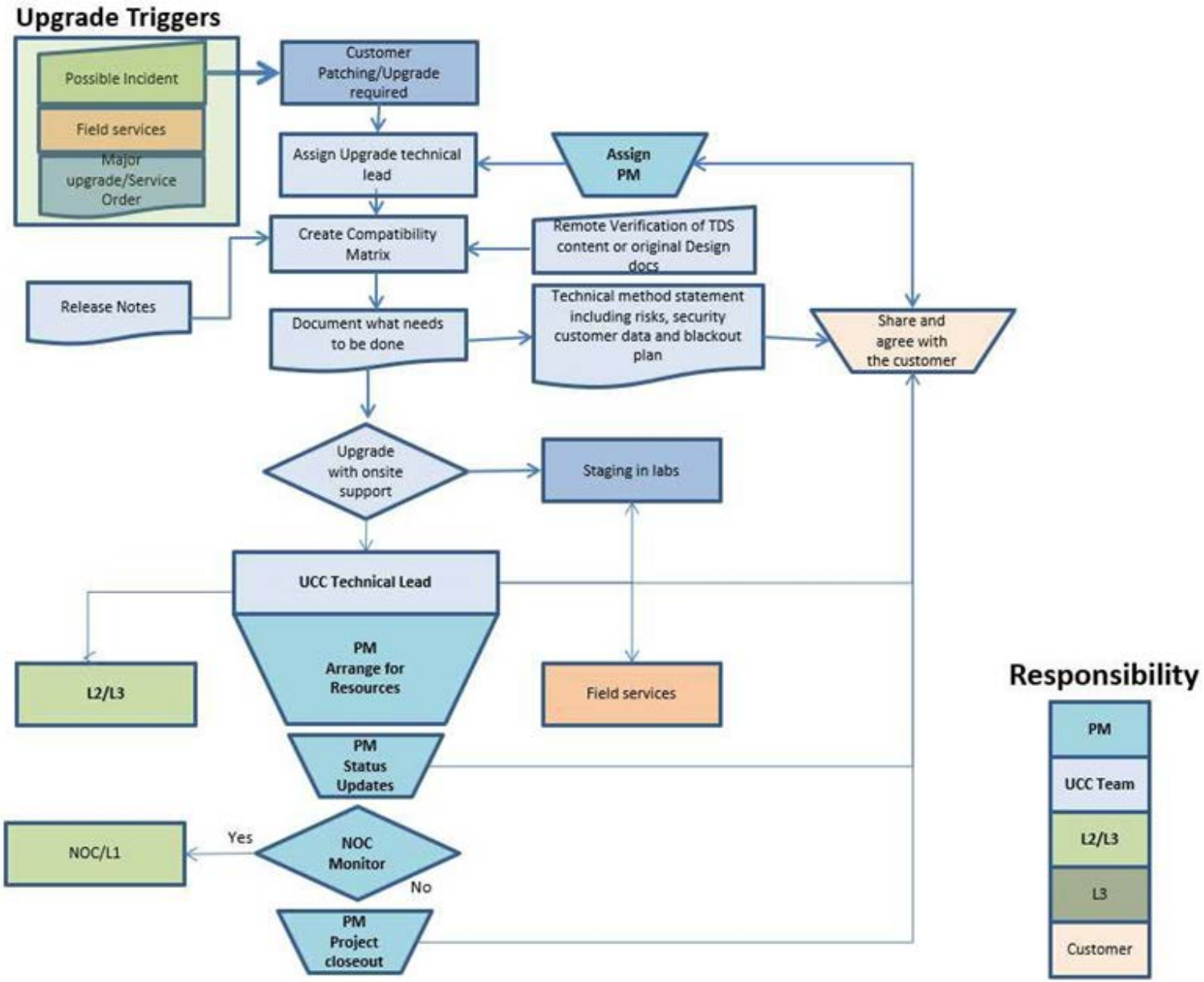
Bidder Response:

Atos ITSM platform of ServiceNow includes a Change Management module. The Atos change management system will handle all valid changes. A valid change can be a client request within the scope of the services or Atos configuration changes within the service agreement. The objective of our change management process is to manage changes to configuration items with minimum disruptions, risk, and complexity while maintaining agreed service levels.

All changes to the system will be documented, approved and executed within a mutually agreed upon, ITIL based change management process. As part of this process, detailed pre-change test results, implementation plans and backout plans will be provided.

A bulletin will be issued to all operations staff at the PSAP and State of Nebraska designated resources advising of the changes and impacts prior to the maintenance window.

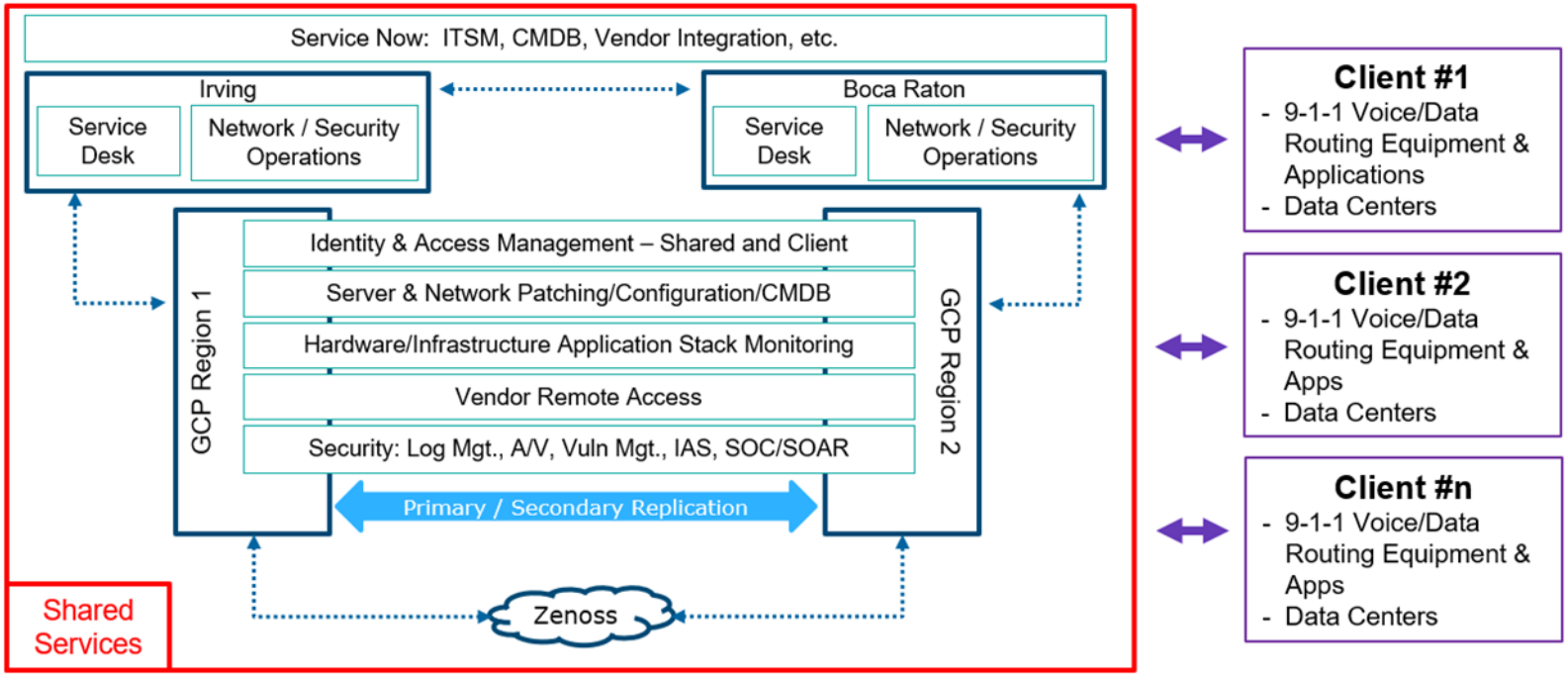



Upgrade Triggers
Possible Incident
Field services
Major upgrade/Service Order
Customer Patching/Upgrade required
Assign Upgrade technical lead
Assign PM
Create Compatibility Matrix
Remote Verification of TDS content or original Design docs
Release Notes
Document what needs to be done
Technical method statement including risks, security customer data and blackout plan
Share and agree with the customer
Upgrade with onsite support
Staging in labs
UCC Technical Lead
PM Arrange for Resources
L2/L3
Field services
PM Status Updates
NOC/L1
Yes
NOC Monitor
No
PM Project closeout
Responsibility
PM
UCC Team
L2/L3
L3
Customer

	As an example, change management will be comprised of the following activities: ➢ Align with other key processes to ensure overall planning can be obtained by asking questions ➢ Perform quality checks on registration so that all evidence necessary for applicable standards are met ➢ Provide continual service improvement for the process ➢ Provide compliancy reports on process and extrapolate data to drive improvement plans ➢ Provide overview of progress of process improvements plans and define corrective action ➢ Provide a closed-loop feedback system ➢ Manage the complexity associated with changes to services and service delivery processes while minimizing impact to the business ➢ Control risks or potential disruptions to the business ➢ Provide timely escalations to management when proposed changes introduce unnecessary risk into the business ➢ Provide visibility for account teams and management with KPIs and key metrics ➢ Regularly improves global process to align with ITIL and meet quality standards (e.g., ISO 20000) ➢ Govern changes required to support standards and audit requirements

Any additional documentation can be inserted here:

	NOC/SOC - Change Management System **Change Management Tools** Provide detailed descriptions of any other tools bidder intends to use to provide access to the change management system, such as web portals and client software.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
NOC/ SOC 9	Bidder Response: The Change Management module of the Atos ITSM platform of ServiceNow will provide the necessary interface for the change management process. Specific access details will be discussed and configured appropriately during the transition of services upon award and can include a web portal.				



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 10	**NOC/SOC – Change Management System** **Change Testing and Training Environment** A non-production ESInet replica / NGCS replica, test lab, or similar system shall be established to test, and exercise proposed upgrades, third-party interfaces, and applications prior to release in live production. This system also could be leveraged for training purposes. Provide detailed descriptions of how the solution satisfies this function in the change management process.	X			
	Bidder Response: Atos has a non-production ESInet and NGCS replica that will be used to test changes prior to them being deployed in the production environment. As part of the change management process, the method of testing and the results of the test will be provided to stakeholders. All change management items will also have a "backout" roadmap should any unacceptable challenges present themselves. Atos will make the non-production system available for training upon request and as mutually agreed.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 11	**NOC/SOC – Change Management System** **Change Management Process** 1. Outline bidder's proposed change management process. The ITIL change management standard methods and procedures are preferred. 2. Include a description of the process for notifying the Commission and affected PSAPs. Notification shall be made no less than ten (10) business days in advance of the change, except in emergency situations, in which case notification shall be provided immediately. 3. Include explanation of solution's Fault, Configuration, Accounting, Performance, and Security (FCAPS) procedures. 4. Provide a detailed explanation describing how the proposed solution meets or exceeds the requirements for the ITIL and FCAPS processes.	X			

Bidder Response:

Atos ITSM platform of ServiceNow includes a Change Management module and Atos processes are based on the ITIL model. The Atos change management system will handle all valid changes. A valid change can be a client request within the scope of the services or Atos configuration changes within the service agreement. The objective of our change management process is to manage changes to configuration items with minimum disruptions, risk, and complexity while maintaining agreed service levels.

All changes to the system will be documented, approved and executed within a mutually agreed upon, ITIL based change management process. As part of this process, detailed pre-change test results, implementation plans and backout plans will be provided.

A bulletin will be issued to all operations staff at the PSAP and State of Nebraska designated resources advising of the changes and impacts prior to the maintenance window. The specific method of communication will be identified as part of the development of the Operations Process Document. Notification will be made no less than ten (10) business days in advance of the change, except in emergency situation, in case notification shall be provided immediately.

The following is an overview of some typical Atos configuration changes.

Security Updates

All security updates will be planned and scheduled. Atos does not support automatic security updates to be applied to the NG9-1-1 solution. As security bulletins are released by vendors, Atos will perform adequate testing in our NG9-1-1 lab prior to rolling out in operations. Security patches are rolled out per scheduled maintenance once they have been approved for use. All security updates are rolled up into the minor release for long term release management of the solution software.

In the event there is a high risk / high priority security update that must be deployed, particularly in the cases where there is a potential exploit in the wild, a mutually agreed upon exception process will be developed to plan / execute expedited rollouts of fixes in a timely manner.

Hot Fix

Atos will publish critical patches system upgrades as needed. Installation of these updates will be performed during planned maintenance periods as described above. Critical patches releases contain fixes critical to the operations and will only be limited to correct any outage condition.
All patches and upgrades will be performed by first isolating a processing lane from the rest of the solution. The patch or minor upgrade will be performed on the isolated lane and thoroughly tested before rolling out the change in the rest of the system.

A Hotfix release contains a fix for an urgent priority 1 trouble ticket. These are only produced in the most exceptional of circumstances and are typically only installed at one customer. For example, v7 R1.1.1.

	Minor Releases Atos will publish non-critical patches or minor system upgrades four (4) times a year. Installation of these updates will be performed during planned maintenance periods as described above. Minor releases contain fixes and minor enhancements that are beneficial to the operations. Patches may be required at different periods during operations. These patches may contain fixes for issues found during troubleshooting. Patches will be applied either for diagnostics or for stopgap issues to resume operations. Atos goal is not to keep patches in the system longer than the minor upgrade period once a quarter. All patches and upgrades will be performed by first isolating a processing lane from the rest of the solution. The patch or minor upgrade will be performed on the isolated lane and thoroughly tested before rolling out the change in the rest of the system. ***Major Releases*** Atos will public either one (1) or two (2) major release updates a year. These major releases are categorized as either architectural changes or major changes to functionality of the system. These will be released in a control manor into operations during a planned maintenance window via the change management process. In some cases, Major releases may require the maintenance period for a single lane to extend beyond the typical 6-hour window, if so, extended maintenance windows or multiple maintenance windows may be required to minimize impact. Major release updates follow the same guidelines as minor releases and patches. They are first sanity tested in our NG9-1-1 lab before approved for use. They are also applied to an isolated lane in the operational datacenter and support rollback as needed. Thorough system testing is performed on the N+1 lane before a decision to rollout through the remaining solution. A major release contains significant new functionality in addition to change requests and trouble ticket resolutions. For example, v10.

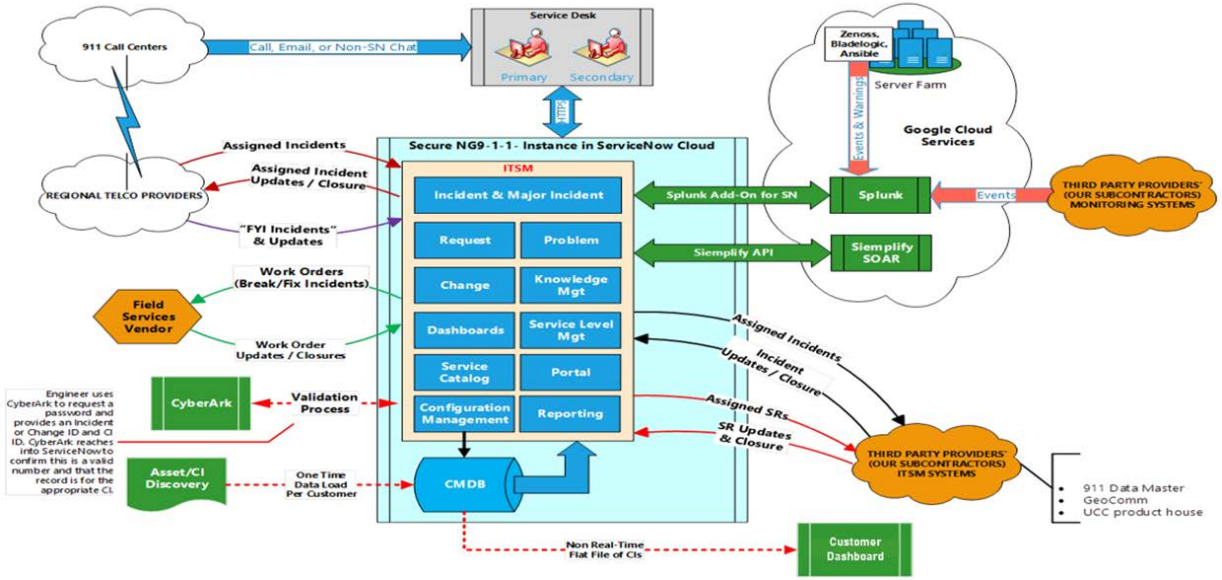
Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 12	**NOC/SOC - Network Management System** **System and Network Management Software** Software packages are widely available for capturing, analyzing, and reporting the network's health based on the Simple Network Management Protocol (SNMP) traffic it receives. Provide the name and description of the management software that will be implemented including all functional modules associated with it (e.g., reporting, backup, and IP address management).	X			

Bidder Response:

The Atos solution will leverage the following to monitor and manage the State of Nebraska ESInet and NGCS solutions provided by Atos:

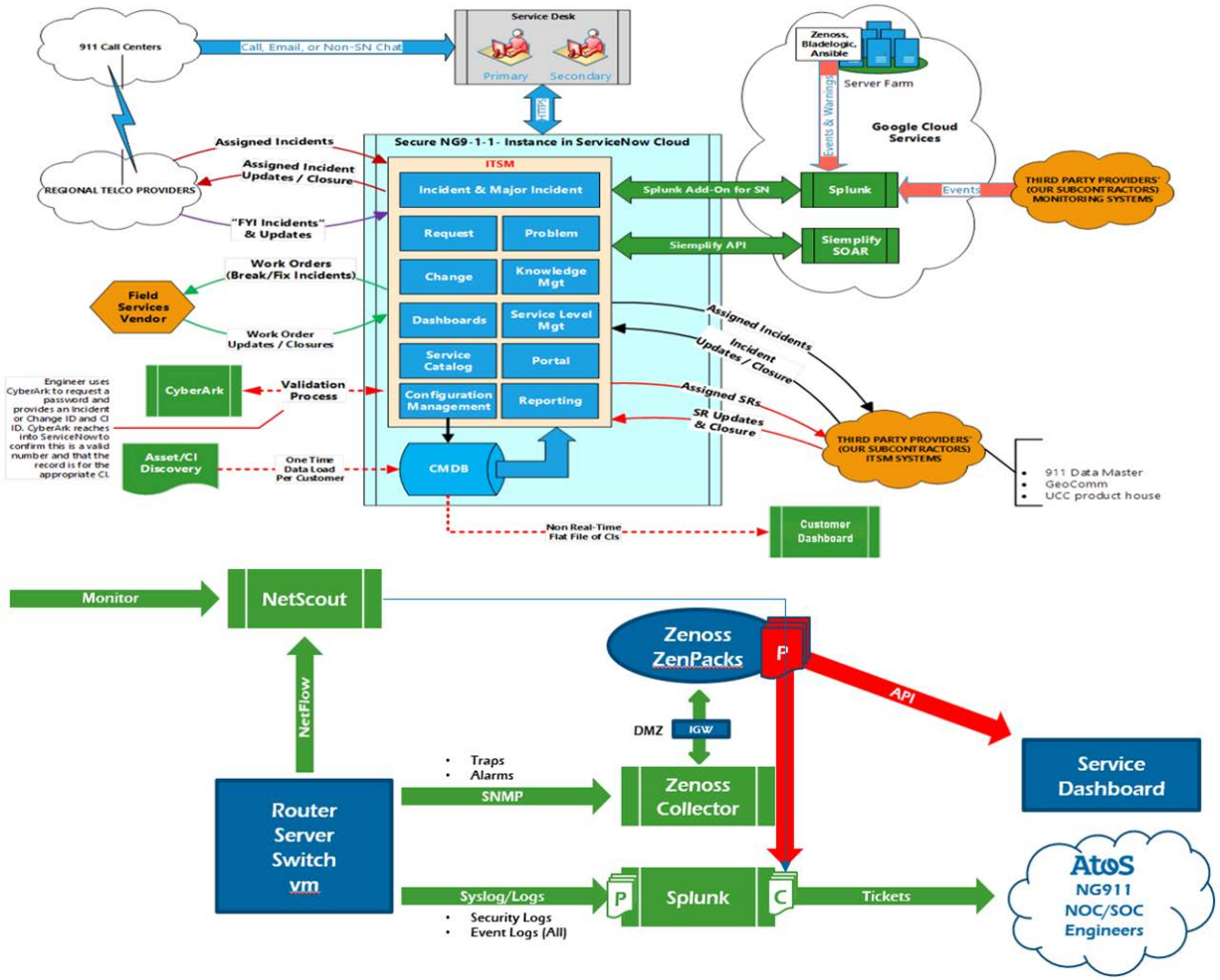
- SNMP/SYSLOG monitoring will be provided using Zenoss and Splunk
- Network and call monitoring (network monitoring) will be provided using NetScout
- IP address management will be provided using Infoblox
- The ITSM platform of ServiceNOW will provide the following:
  - Incident Management
  - Escalation Management
  - Patch, Release and Change Management
  - Reporting
- Backup services will be provided using a DELL DPS solution



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 13	**NOC/SOC – Network Management System** **NMIS Interworking with Elements and Services** Provide a detailed explanation and associated drawings explaining how the proposed solution interworks with all of the various elements and services of the proposed systems and network elements.	X			

Bidder Response:



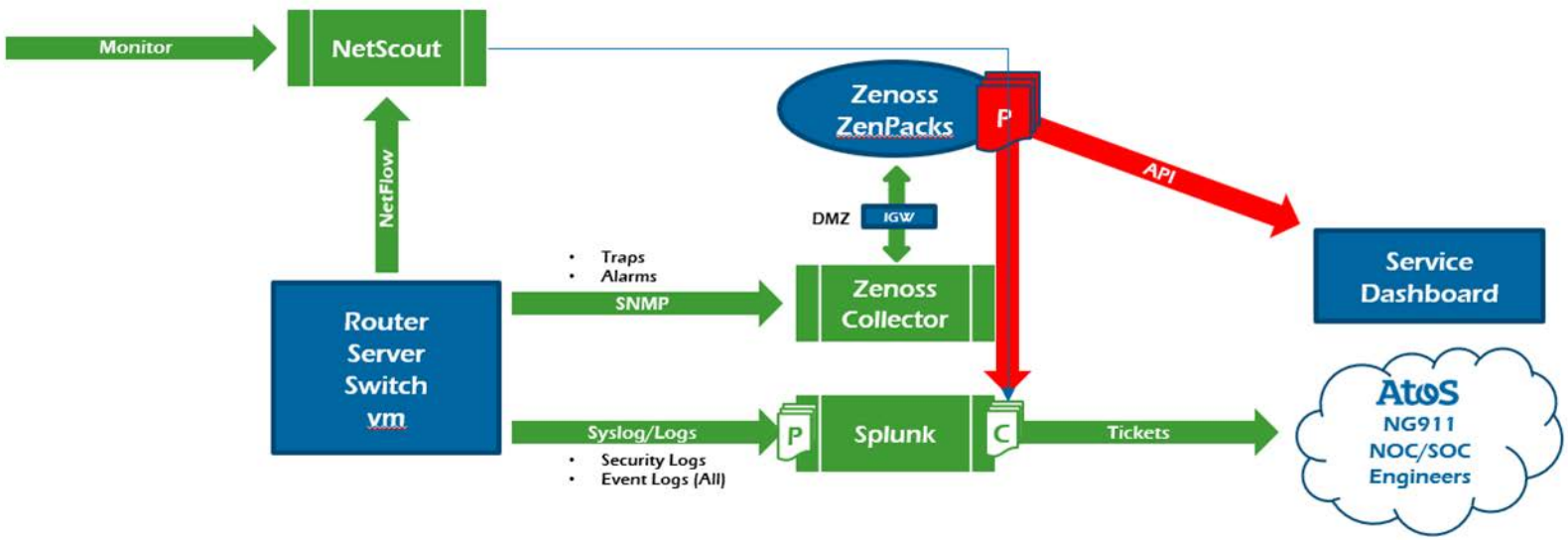
Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 14	**NOC/SOC - Network Event Logging** **System and Network Event Logging and Reporting** The network management system shall capture real-time and historical tracking of network and system events, as well as event resolution of the IP network and attached systems. This is for logging errors and statistical information related to the health of the network and attached systems. Events shall include, but are not limited to, hardware (power, processor, interface cards, ports), software (operating system errors, database errors, application errors and failures), network (Quality of Service (QoS), Mean Opinion Score (MOS), jitter, latency, and packet loss)). The events recorded in this section are not related to the event logging of 911 requests for service as part of NGCS Option B requirement NGCS 13 Event Logging. Describe how the solution meets or exceeds the above requirement.	X			

Bidder Response:

Atos will leverage its NG911 NOC/SOC tools suite to monitor the health of the network and attached systems and applications. This will include, but is not limited to, hardware (power, processor, interface cards, ports), software (operating system errors, database errors, application errors and failures), network (Quality of Services (QoS), Mean Opinion Score (MOS), jitter, latency and packet loss).

- QoS and MOS scores are collected from NetScout for each call and averaged over time
- Network monitoring using NETFLOW from all network components
- Zenoss is used for SNMP alarms
- Splunk is used for system logs

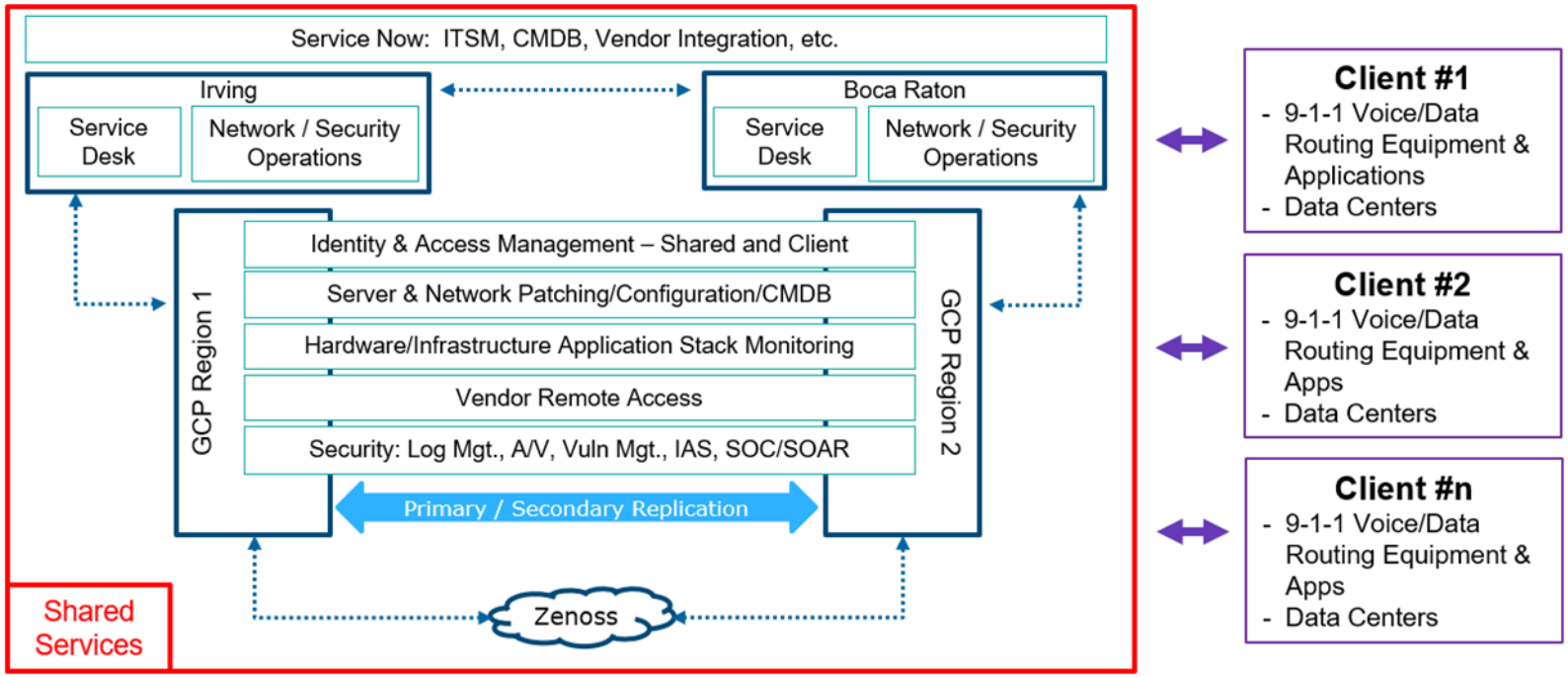


Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 15	**NOC/SOC - Network Event Logging Management System Interface to Incident Management System** This system should be part of, or interfaced with, the bidder's incident management system, or contain cross-reference abilities. Contractor shall maintain historical information for the term of the contract and provide copies of the data to the Commission on request, and at the end of the contract. Describe how the solution meets or exceeds the above requirements.	X			

Bidder Response:

Atos utilizes the industry leading ServiceNow platform to provide ITSM services to its NG 9-1-1 customers. The State will have access, via a web portal to submit incidents and view their status and enter service requests to request changes. The State designated change managers would have access to review and approve changes requests as required. Atos will maintain historical information for the term of the contract and provide copies of the data to the Commission on request, and at the end of the contract.

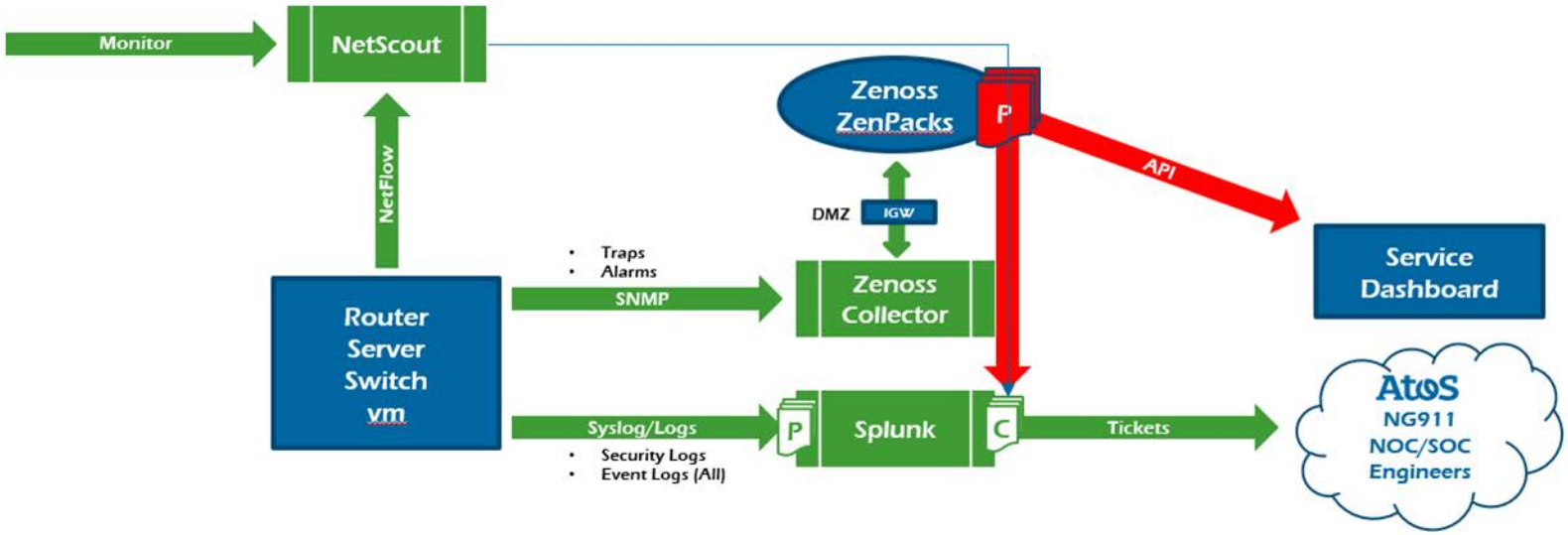


Any additional documentation can be inserted here:

	NOC/SOC - Network Event Logging Interfacing Between Solutions Provide a detailed explanation and associated drawings explaining bidder's processes, tools, and procedures for interfacing with the bidder's monitoring solutions.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 16		X			

Bidder Response:

Atos processes can be found in the attached DRAFT Maintenance Plan (see Appendix B: Services Support) which will be finalized upon award. Commission personnel will have access to a Customer dashboard and Atos will provide training on how to access and interpret the dashboard. This access will be provided via a web portal. A diagram showing the Atos monitoring tools is shown below.



Any additional documentation can be inserted here:

	NOC/SOC - Access to Technical Staff 1. Detail the procedures by which bidder communicates with technical personnel from participating subcontractors, the Commission, and the participating PSAPs. 2. Specify the level of assistance required from such technical personnel to resolve service-related issues.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 17		X			

Bidder Response:

The Atos Level 1/Service Desk support team will coordinate with Atos support personnel, subcontractors and authorized Commission personnel. Communications will continue until the incident is resolved. Atos support personnel will remain engaged until service is restored to normal operations and it expects the same from subcontractors and Commission vendors and personnel. All information will be updated in the Atos ITSM ServiceNow platform.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 18	**NOC/SOC - Notification** Specify how the bidder's NOC informs the Commission and the affected PSAPs or their designees of problems with the network, scheduled service and maintenance outages, and upgrades. Include all methods of notification used. Notifications for scheduled maintenance or outages shall be made no less than ten (10) business days in advance, except for emergency situations in which case, notification will be given immediately. Tickets related to the services delivered to subcontractors shall be forwarded automatically. Notification shall be provided via multiple communications means to the Commission and applicable PSAPs. Entities requiring notification may change, depending on the alarm or incident. Provide a detailed explanation explaining how the solution meets or exceeds the above requirements, including the methods of communications used.	X			
	Bidder Response: All changes to the system will be documented, approved and executed within a mutually agreed upon, ITIL based change management process. As part of this process, detailed pre-change test results, implementation plans and backout plans will be provided. A bulletin will be issued to all operations staff at [Customer] of the changes and impacts prior to the maintenance window. This bulletin can be displayed on the dashboard or distributed via email. In addition, notification can be by telephone to a list of authorized personnel. Atos has included phone notifications for up to two authorized personnel. Notification will be made no less than ten (10) business days in advance, except for emergency situations in which case, notification will be given immediately. Tickets to Atos partners and subcontractors will be delivered via the Atos ITSM platform.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 19	**NOC/SOC - Executive Dashboard** Contractor shall provide a web-based executive dashboard or similar tool, providing near real-time visibility of network status displayed geographically with service impact levels color-coded. Open ticket status shall be available to users through this dashboard. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: Atos will provide a web-based executive dashboard: ➢ The Dashboard will be organized by site ➢ The dashboard will display all services within a site ➢ The dashboard will display the status of the services per site ➢ The dashboard will display the utilization of the service ➢ Each service will have configurable thresholds for normal, degraded, and outage for the service ➢ Each service will indicate the cause for degradation or outage with the following data: - Component that caused issue - Time of issue - Duration counter - Ticket number associated with issue - Description of the issue - Service name and site ➢ A relationship view of the service to other sites will be visible on a map ➢ The service status will have a visible color indicator for easy distinction, green = normal, yellow = degraded, red=outage				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 20	**NOC/SOC - Escalation Procedures** 1. Outline a detailed regional-level escalation process to be used during incidents that affect service, particularly those that result in critical service outages. 2. Describe how discrepancies in the perception of service level agreement (SLA) incident levels may be escalated and addressed. These procedures shall be maintained and accessible via an online portal. This escalation notification process shall be integrated with the notification processes described above, based on the problem reported.	X			

Bidder Response:

Escalation procedures will be maintained and accessible via an online portal. Escalation procedures will be integrated with the notification processes and aligned with SLA timeframes. An example is provided below. This document will be finalized upon award, as mutually agreed.

Interval	NG911 Engineers	Service Delivery Manager (SDM)	Client Manager (CM)	Head, Public Safety Operations	Head, Global Services Operations
15 minutes	If no progress for incident/ problem isolation or fix identification, L2 escalates to L3.	N/A	N/A	N/A	N/A
One Hour	If no progress for incident/ problem isolation or fix identification, Solutions Operations Management and GVS / Manufacturer remote support engaged; escalated to SDM and CM.	SDM can contact Client Manager and manufacturer for affected systems and/or applications	N/A	N/A	N/A
Two Hours	Engineers continue to work with all engaged resources. Ownership of ticket will belong to the most senior resource engaged.	SDM orchestrates a conference call with all necessary resources to review progress and establish a comprehensive action plan. SDM creates a communication with incident description, impact and action plan	Provide updates	Engaged	Notified
Subsequent Hours **Set up conference bridge as appropriate**	Engineers continue to work with all engaged resources.	SDM orchestrates another conference call to review progress and further action plans. SDM updates previous communications with actions taken and progress made in resolution. Regularly scheduled conference calls can hold until resolution or customer concurrence. (Optional)	Escalate with manufacturers and development organizations as required	Notified and engaged as required to support resolution.	Notified and engaged as required to support resolution.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 21	**NOC/SOC -Statement on Standards for Attestation Engagement Number 16** Bidder shall demonstrate compliance with the Statement on Standards for Attestation Engagements Number 16 (SSAE 16). The applicable report from an SSAE 16 engagement is the Service Organization Controls 1 (SOC 1) report. 1. If bidder is proposing services, provide a detailed explanation of how bidder has complied with SSAE 16 for similar solutions, and how this would be implemented with the Commission's NG911 implementation. 2. Provide with the detailed explanation and graphical representation explaining how the solution meets or exceeds the above requirement.	X			
	Bidder Response: Atos and its data centers have gone through the respective SSAE 16, SAS 70 and SOC 1 compliance parameters. Atos is familiar with these standards and our partner provide services in these ESInet/NGCS Data Centers for some of the most stringent, high security clients in the nation wherein SSAE 16 related accounting parameters are required, the Commission can rest assured that these locations and the company reporting necessary to support this requirement will address the scope.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NOC/ SOC 22	**NOC / SOC - Configuration Backup and Restoration** 1. The bidder shall deploy and provide detailed descriptions of bidder and any subcontractors' capabilities to automatically or routinely back up configuration data and define the conditions under which the configuration of network elements, such as routers or switches, will be restored, and the process that will be used. A reporting process shall confirm regularly scheduled (e.g., monthly, quarterly) backup and restoration, and provide sufficient details on backup and restoration activity. 2. Describe the bidder's abilities to perform on-demand backups, such as at the end of a successful configuration change. A reporting process shall confirm on-demand backup and restoration and provide sufficient details on backup and restoration activity. 3. Describe bidder's COOP as it applies to the NGCS and delivery of 911 traffic via IP network to the respective host locations. 4. Provide a detailed explanation and any associated drawings explaining how the proposed processes and procedures provide the ability to manage these configuration backup and restoration processes in a manner that has no negative impact on the total Commission ESInet and NGCS solution.	X			

Bidder Response:

All equipment HW and SW will provide logs through Splunk and SNMP alarms integrated into ServiceNow for automated tickets. The solution will also perform automated backups of the configuration and data to facilitate disaster recovery for all components in the solution. Reports will be generated regularly in weekly and monthly intervals. A real-time dashboard provides an overview of the operational situation. These dashboard and reports will be available to the State for review.

Atos will perform regular maintenance through maintenance windows negotiated with the State for critical upgrades and equipment failure swap out. We follow the traditional upgrade process for minor and major software changed on planned dates and intervals. These updates will be performed within a predetermined maintenance window. All updates are tested for acceptance and system validation.

Atos maintains a state of the art NG9-1-1 solution lab at our engineering facility. All system changes and updates are tested at this location before deployment at operational sites. The engineering solution lab is identical to the operational system with version control. All solution changes are managed through documentation and change control processes outlined in ITIL. Our solution also tracks date and time of changes as well as authorized individuals who made changes.

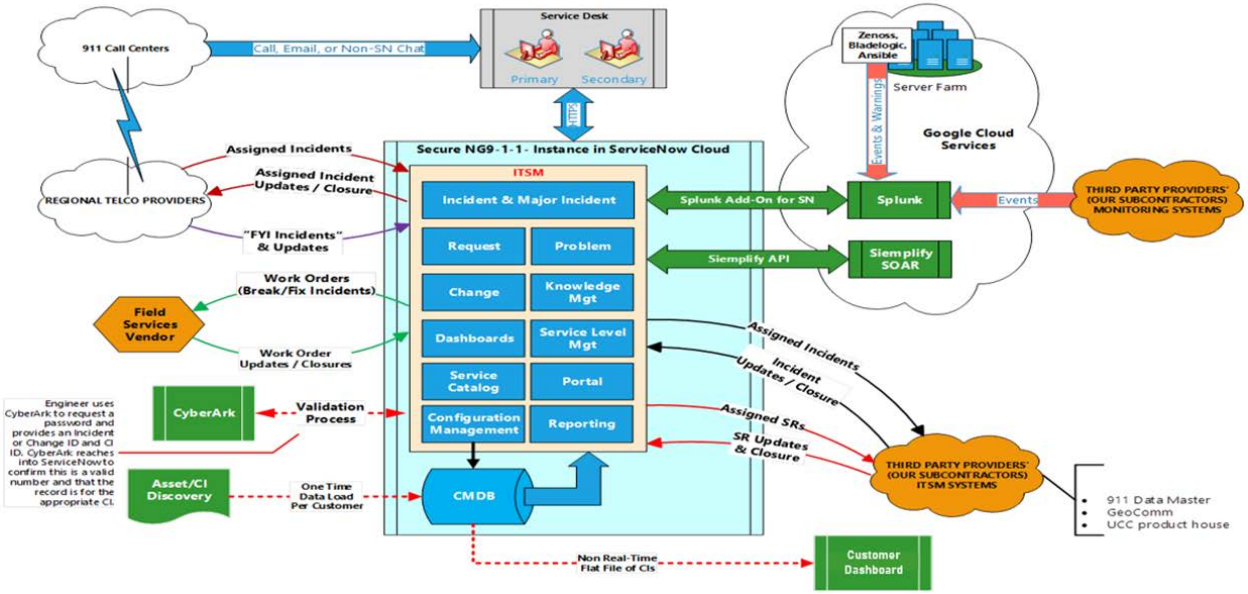
Process flow:

1. Help desk requests and automated ServiceNow tickets go to Level 1
2. Level 1 engineers qualifies the issue; basic troubleshooting
3. Level 2 engineers are invoked to apply analytics and troubleshooting on advanced issues
4. Escalations are handed over to Level 3, along with data collection of critical information
5. Level 3 resources reproduce and troubleshoot the issue, as required
6. Further escalation to product house and partners
7. Resolutions are tested first in the lab and then on production systems
8. Rollback support is available on live systems, as required
9. SLA reporting and dashboard along with trouble reports are provided to the State

Any additional documentation can be inserted here:

NOC/ SOC 23	**NOC/SOC - Third-Party Management** The Commission is seeking the optimum value provided by best-of-class products and services integrated as part of the total IP network solution. This may present a situation where no single manufacturer or supplier can provide a public safety-grade, unified NOC/SOC accountable for all components, products, and services that comprise the Commission's total IP network solution. Consequently, the Commission may find it beneficial to have a third party provide that overarching NOC/SOC service. A third-party NOC/SOC provider may be responsible for functioning as an umbrella for monitoring all of the Contractor's products and services, including collaboration with the Contractor's NOC/SOC. To facilitate that capability, the third-party NOC/SOC shall have a view into all elements that are under SLAs. Bidder's NOC/SOC NMIS and/or incident-tracking tools shall have the ability to perform eBonding, which enables bidirectional data synchronization. 2. Provide a detailed narrative discussing bidders experience in providing access to third-party NOC/SOC, overarching support as well as for each of the requirements in Third-Party NOC/SOC Support below.	X			
	Bidder Response: Atos has experience in functioning as an umbrella for monitoring of other service providers. This can be done via eBond of the ITSM platforms or other access as determined by the systems. The Atos platform will support this capability. Additional details will be required and can be determined upon award and a scope of work that outlines the requested services. This support can include: ➢ Ebond to 3rd party vendors into a single SNOW ticketing system ➢ All 3rd party tickets are consolidated into a single dashboard for NOC/SOC As an example, Atos has worked with 911 DataMaster to establish an eBond that enables bidirectional data synchronization. 911DM has a well-documented change management process with Atos. We provide Tier 2 and Tier 3 support for all 911DM provided elements. All changes to these elements are coordinated with Atos to ensure that proper lab testing has been performed before introducing changed functionality into the State's production environment. Trouble tickets are exchanged between 911DM and Atos on a near real-time basis. Management reports and trends are shared on a monthly basis. ➢ 911DM complies with the current Atos change management process. ➢ 911DM complies with current Atos processes of coordinating and managing trouble tickets with bidder/suppliers. Workflow between 911DM HelpDesk and Atos NOC has already been established ➢ 911DM's HelpDesk can provide trouble ticket reporting daily, weekly, quarterly, or yearly detailing ticket opened, pending, resolved, or closed status. As well as priority given (low/normal/critical) and amount of time from ticket requested to resolution. ➢ As a subcontractor, 911DM will conform to Atos's notification process for bidders and suppliers or other entities designated by the Commission. ➢ 911DM has already provided alarms for the Atos NOC to build system cases on. Communication and escalation flow have also been standardized and will apply here (WEL: Windows Event Log). ➢ As subcontractor, 911DM will conform to Atos processes for interworking of multiple public safety data system suppliers.				

As subcontractors, 911DM, GeoComm and eCats will conform to Atos processes for interworking of multiple public safety data system suppliers.



1. In support of the Commission's consideration of such an option, bidder shall indicate the compliance level of experience in providing access to third-party NOC/SOC overarching support, as related to the requirements identified in the table below.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
Change management processes	X			
Coordinating and managing trouble tickets to resolution from bidder and multiple suppliers.	X			
Trouble ticket report management (reports may be daily, weekly, monthly, quarterly, or yearly).	X			
Notification processes for bidder and suppliers, and any other entities or people designated by the Commission.	X			
System alarm access in the form of SNMP or syslog data.	X			
Experience and processes for interworking of multiple public safety data system suppliers.	X			

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 1	**General Operations - Service Level Agreements** **System Capacities and Performance** 1. Provide capacity levels of each element of the IP Network This may be in terms of busy-hour calls, network bandwidth, or any other applicable measure. The proposed solution shall be capable of handling current and planned IP traffic and usage plus 50 percent capacity growth over the term of the contract. 2. Specify lead times required to increase capacities on each element of the IP network.	X			

Bidder Response:

The Atos ESInet/NGCS proposed for the state of Nebraska has been engineered with the following capacity levels:

- All routers have a minimum throughput of 500 Mbps with multiple 1 Gbps network interfaces
- MPLS bandwidth between aggregation centers (used for aggregation of OSP POIs and entrance/exit for LNG/LSRG) and data centers is fiber based and has a minimum port speed of 1 Gbps – this allows for over 11,000 simultaneous 9-1-1 calls.(in the absence of specific call volumes the Busy Hour traffic was calculated based on the following assumptions:
  - 1.13 million calls per year
  - an assumed average call duration of 120 seconds
  - busy hour was taken at 100% of the average daily call volume
  - this gave a result of 103.2 erlangs which gives us a requirement to support a maximum of 121 concurrent calls.
- All network switching (aggregation centers, data centers, Regional Call Handling Centers) supports either 1 Gbps or 10 Gbps
- All hardware components contain network interfaces supporting either 1 Gbps or 10 Gbps
- MPLS bandwidth to all Regional Call Handling Centers is fiber based with port speeds of 100 Mbps – this allows for over 1,100 simultaneous 9-1-1 calls
- Licensing is provisioned to match a minimum of two times the maximum of 121 concurrent calls.
- If, by some event the call volume was to exceed two times the anticipated maximum call volume the components that are license based can immediately exceed their current allocated licenses
- Additional capacity can be very quickly added by either permanently increasing allocated license assignments or by increasing network port speeds

The lead times to incorporate changes described above can be anywhere from a few hours for permanent license allocations, or as quickly as our MPLS partner can react to increase network port speeds. Bear in mind that since all MPLS network connectivity is fiber, support for bursting above assigned port speeds is supported.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 2	**Service Level Agreements - System Performance** **Network Latency** Specify the guaranteed maximum latency across the backbone network under a full-load condition, and include how that information will be gathered, calculated and provided to the Commission and the affected PSAPs.	X			
	Bidder Response: Atos' network specifications are for the entire network from the POP to the hosts' premises entrance (Endpoints), which includes all connections and internal networking components. The Maximum One-Way Delay is 150ms across the entire managed network under a full load condition. The Maximum Round Trip Delay is 300ms. Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality: ➢ Realtime network traffic monitoring ➢ Dashboard status of network latency, jitter, and packet loss for SLA reporting ➢ Calculated MOS for audio quality ➢ Alerts for proactive resolution ➢ Alert generation and input into ServiceNow NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 3	**Service Level Agreements - System Performance** **Point of Presence (POP) to POP** Specify the guaranteed maximum latency from interconnection facility to interconnection facility, and include how that information will be gathered, calculated and provided to the Commission and the affected PSAPs.	X			
	Bidder Response: Atos' network specifications are for the entire network from the Point of Presence (POP) to POP, which includes all connections and internal networking components. The Maximum One-Way Delay is 150ms across the entire managed network under a full load condition. The Maximum Round Trip Delay is 300ms. Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality: ➢ Realtime network traffic monitoring ➢ Dashboard status of network latency, jitter, and packet loss for SLA reporting ➢ Calculated MOS for audio quality ➢ Alerts for proactive resolution ➢ Alert generation and input into ServiceNow NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 4	**Service Level Agreements - System Performance** **POP to Endpoints** Specify the guaranteed maximum latency from interconnection facilities to the network interface device located at the entrance to the hosts' premises, and include how that information will be gathered, calculated and provided to the Commission and the affected PSAPs.	X			
	Bidder Response: Atos' network specifications are for the entire network from the POP to entrance of hosts' premises, which includes all connections and internal networking components. The Maximum One-Way Delay is 150ms across the entire managed network under a full load condition. The Maximum Round Trip Delay is 300ms. Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality: ➢ Realtime network traffic monitoring ➢ Dashboard status of network latency, jitter, and packet loss for SLA reporting ➢ Calculated MOS for audio quality ➢ Alerts for proactive resolution ➢ Alert generation and input into ServiceNow NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 5	**Service Level Agreements - System Performance** **Mean Opinion Score (MOS)** Bidder shall guarantee, in the response, a consistent MOS of 4.0 or better across all network links transporting media streams from interconnection facilities to the network interface device located at the entrance to the hosts' premises, and include how that information will be gathered, calculated and provided to the Commission and affected PSAPs monthly or as requested. Describe how the solution meets or exceeds the above requirements.	**X**			

Bidder Response:

Atos' network solution will ensure a consistent MOS score of 4.0 across all network links transporting media streams from the interconnection facilities to the network interface device located at the entrance of hosts' premises (regional call handling centers)..

Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality:

- Realtime network traffic monitoring
- Dashboard status of network latency, jitter, and packet loss for SLA reporting
- Calculated MOS for audio quality
- Alerts for proactive resolution
- Alert generation and input into ServiceNow

NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.

The NetScout core monitoring solution provides telecommunications-accepted Quality of Service (QOS) statistics for each call. Mean Opinion Scores (MOS) are included with this.

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 6	**Service Level Agreements - System Performance** **Packet Loss** Specify the guaranteed maximum end-to-end packet loss across the network. This specification also shall include any loss characteristics associated with another carrier's network or any applicable wireless links, including how that information will be gathered, calculated and provided to the Commission and affected PSAPs monthly or as requested.	X			
	Bidder Response: Atos packet loss specification for the entire managed network is less than 1% of the total packets for a call. Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality: ➢ Realtime network traffic monitoring ➢ Dashboard status of network latency, jitter, and packet loss for SLA reporting ➢ Calculated MOS for audio quality ➢ Alerts for proactive resolution ➢ Alert generation and input into ServiceNow NetScout will be configured with threshold alerts and automated configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time. Atos does not guarantee any specification for networks outside of our control. This includes the carriers and callers' own networks. Atos will only report network performance for the networks managed under this proposal.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 7	**Service Level Agreements - System Performance** **Network Latency** Specify the guaranteed maximum end-to-end network latency across the network. This specification also shall include any latency associated with another carrier's network or any applicable wireless links, including how that information will be gathered, calculated and provided to the Commission and affected PSAPs monthly or as requested.	X			

Bidder Response:

Atos' network specifications are for the entire network from the POP to the hosts' premises entrance (Endpoints), which includes all connections and internal networking components. The Maximum One-Way Delay is 150ms across the entire managed network under a full load condition. The Maximum Round Trip Delay is 300ms.

Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality:

- Realtime network traffic monitoring
- Dashboard status of network latency, jitter, and packet loss for SLA reporting
- Calculated MOS for audio quality
- Alerts for proactive resolution
- Alert generation and input into ServiceNow

NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.

Atos does not have visibility into other carrier networks, wireless networks or other OSPs to be able to measure network latency or other statistics.

Atos does not guarantee any specification for networks outside of our control. This includes the carriers and callers' own networks. Atos will only report network performance for the networks managed under this proposal.

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 8	**Service Level Agreements - System Performance** **Jitter** Specify the guaranteed maximum end-to-end jitter across the network. This specification also shall include any jitter characteristics associated with another carrier's network or any applicable wireless links, including how that information will be gathered, calculated and provided to the Commission and affected PSAPs monthly or as requested.	X			

Bidder Response:

Atos' network specifications are for the entire network from the POP to the hosts' premises entrance (Endpoints), which includes all connections and internal networking components. The maximum jitter is 30ms.

Atos utilizes NetScout, a provider of application and network performance management tools. NetScout will provide latency measurements and the following functionality:

- Realtime network traffic monitoring
- Dashboard status of network latency, jitter, and packet loss for SLA reporting
- Calculated MOS for audio quality
- Alerts for proactive resolution
- Alert generation and input into ServiceNow

NetScout will automate configured reports to send to Atos NOC and designated Commission personnel. This information is provided with our network monitoring tools and is available at any time.

Atos does not have visibility into other carrier networks, wireless networks or other OSPs to be able to measure network latency or other statistics.

Atos does not guarantee any specification for networks outside of our control. This includes the carriers and callers' own networks. Atos will only report network performance for the networks managed under this proposal.

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 9	**Service Level Agreements - System Performance** **Network Traffic Convergence** Specify convergence protocols and the estimated or guaranteed network convergence time (less than 54 ms) of IP traffic at any point within the proposed solution, including how convergence information will be gathered, calculated and provided to the Commission and affected PSAPs monthly or as requested.	X			

Bidder Response:

Atos solution will be deployed to meet or exceed the <54ms convergence time at any point. This is supported on Layer 2 networks (LANs) throughout the design. In order to achieve this measurement, Atos will deploy L2 protocols such as Fast Reconfiguration of Network Topology (FRNT) and Rapid Spanning Tree Protocol (RSTP). Convergence incidents and times are detected and reported by the NetScout nGeniusONE product, which uses NetFlow to collect and analyze the high-volume flow data. The NetScout products work in concert with the rest of the Atos suite of tools to report on the packets as they traverse the network. These tools detect and alarm when the specified tolerances are exceeded.

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 10	**Service Level Agreements - System Performance** **Mean Time to Repair (MTTR)** Specify the MTTR characteristics of the proposed solution. These specifications shall reflect the end-to-end solution, as well as components or subsystems that are subject to failure. Include how MTTR information will be gathered, calculated and provided to the Commission and affected PSAPs.	X			
	Bidder Response: Atos' solution has been designed using industry standard data center components with stated MTTR. MTTR is dependent on the component being replaced and/or repaired. The solution has been designed to be fully redundant with onsite parts support for replacement. Atos will use actual downtime figures of the solution to provide the MTTR to the Commission. The goal of the design of a fully redundant system is that the MTTR is as close to zero as possible meaning that the transfer of service is as close to immediate as possible eliminating any degradation of service. MTTR is applicable only in the case that there is a degradation or loss of service.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 11	**Service Level Agreements - System Performance** **Mean Time Between Failures (MTBF)** Specify the MTBF characteristics of the proposed solution. These specifications shall reflect the end-to-end solution, as well as components or subsystems that are subject to failure. Include how MTBF information will be gathered, calculated and provided to the Commission and affected PSAPs.	X			
	Bidder Response: Atos' solution has been designed using industry standard data center components with stated MTBF. MTBF will reflect the end-to-end solution provided and supported by Atos. The solution has been designed to be fully redundant to minimize any downtime. Atos will use actual downtime figures of the solution to provide the MTBF to the Commission. Failure is defined as absence of functionality. If a system is functioning but operating on a redundant component, it will not be considered a failure in the calculation but noted in reports. The MTBF information will be provided in the monthly service reports and reviews.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 12	**Service Level Agreements - System Performance** **Network Reliability** Network reliability is defined as the ability for system end-points to effectively communicate with each other, and all associated data and information is exchanged in usable formats. An IP-based network looks at reliability as an overall redundancy design, rather than component by component. Specify in the response the overall reliability service level of the IP network, including all bidder-provided components and facilities.	X			
	Bidder Response: Atos' network is designed to mitigate situations where any single device or multiple devices can impact availability. Data processing or call processing environments are setup in a parallel configuration consisting of four call processing lanes within the Atos NGCS Data Centers. The ESInet/NGCS solution proposed by Atos contains multiple levels of redundancy and resiliency to assure smooth operation of NG9-1-1 functions without any loss of service or interruptions: ➢ The solution is replicated across two hardened geographically separated data centers. ➢ All NGCS applications will be running as virtual instances within a VMware environment. By using vSphere features stability and availability of these core critical applications will be assured. ➢ Key components such as the BCF and ESRP functions will be deployed as active / active and high availability instances. ➢ Network infrastructure, such as routers, firewalls and LAN switches are all redundant within each data center. Routers and other any other Atos provisioned network equipment is also redundant at OSP POI and Aggregation points as well as Nebraska Regional Call Handling Centers. In addition, each appliance has redundant power supplies. ➢ As resilient as a single data center might be, the entire solution is replicated across both data centers with fully redundant inter-data center connectivity. Data Center infrastructure will include dual diverse power to each rack as well as redundant diverse network connectivity throughout the solution. ➢ As a final measure of resiliency there will be a backup/data recovery solution to provide full replication of all applications and data across both data centers. ➢ Overall, this solution is designed to meet and exceed 99.999% uptime requirements.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 13	**Service Level Agreements - System Performance** **Network Availability** 1. Specify the service level offered as a percentage of time when the service is available, and the maximum period of total outage before remedies are activated. Availability is defined as MTBF/(MTBF+MTTR). 2. Include how system availability information will be gathered, calculated and provided to the Commission and affected PSAPs.	X			
	Bidder Response: Overall, this solution is designed to meet and exceed 99.999% uptime requirements. Availability will be calculated on a per month basis and will be based on actual performance. Atos' solution has been designed using industry standard data center components with stated MTTR. MTTR is dependent on the component being replaced and/or repaired. The solution has been designed to be fully redundant with onsite parts support for replacement. Atos will use actual downtime figures of the solution to provide the MTTR to the Commission. The goal of the design of a fully redundant system is that the MTTR is as close to zero as possible meaning that the transfer of service is as close to immediate as possible eliminating any degradation of service. MTTR is applicable only in the case that there is a degradation or loss of service. Atos' solution has been designed using industry standard data center components with stated MTBF. MTBF will reflect the end-to-end solution provided and supported by Atos. The solution has been designed to be fully redundant to minimize any downtime. Atos will use actual downtime figures of the solution to provide the MTBF to the Commission. Failure is defined as absence of functionality. If a system is functioning but operating on a redundant component, it will not be considered a failure in the calculation but noted in reports. This information will be gathered with the Atos ITSM and monitoring tools and presented in the monthly reports. This information will also be part of RFO reporting.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 14	**Service Level Agreements - System Performance** **End-of-Support Equipment** Contractor shall proactively replace, at Contractor's expense, any hardware that has reached end of support (EOS) no later than 90 calendar days prior to the manufacturer's EOS date. All equipment must be new and of current manufacture, not refurbished. Describe your procedures for End-of-Support Equipment.	X			
	Bidder Response: All CPE is maintained to current physical logical standards and continually managed and updated with latest version and patch releases. At the end of the first 5-year term, Atos will engage an equipment refresh program detailed within the terms of this contract eliminating any equipment end of support issues. If manufacturer's EOS date is anticipated prior to the refresh in Year 6, Atos will replace no later than 90 calendar days prior to the manufacturer's EOS date.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 15	**Service Level Agreements –** **SLAs for Incident Management** The Commission requires the Contractor to establish processes and procedures for supporting a NOC/SOC that can rapidly triage and manage reported network incidents. Bidder shall develop an ITIL compliant severity-level scale that includes levels one through four, with level one being the most severe incident. The top two levels shall capture all incidents affecting the level of service of one or more end-points. Include a description of incident severity-level attributes, including response and resolution times for each severity level, and how response and resolution times are measured.	X			

Bidder Response:

Atos employs a comprehensive escalation policy for addressing customer troubles, service interruption, network events, and other service incidents. To ensure that customer service levels and support are maintained, customers and employees should follow current policy and adhere to Atos' escalation process. Atos' Service Desk is staffed 24 hours per day, and is available via a toll-free number, 365 days a year to ensure prompt responses to technical issues.

The following are the proposed Severity Levels:

Severity Level 1 – Critical

- An incident shall be categorized as a "Severity Level 1" incident if the incident is characterized by the following attributes: the incident
  a. renders a business critical system, service, software, equipment or network component unavailable or substantially unavailable, or seriously impacts normal business operations, in each case prohibiting the execution of productive work, and
  b. affects either
     i. a group or groups of people, or
     ii. a single individual performing a critical business function. Conditions in which a system function, workflow or process problem may include:
        - Isolation of any single site or sites from the rest of the network, resulting in the inability for affected sites to communicate with the rest of the network
        - Loss of any single circuit
        - Decrease in throughput equal to or greater than 20 percent of capacities at any data center

Severity Level 2 – Major

- An incident shall be categorized as a "Severity Level 2" incident if the incident is characterized by the following attributes: the incident
  a. does not render a business-critical system, service, software, equipment or network component unavailable or substantially unavailable, but a function or functions are not available, substantially available, or functioning as they should, in each case prohibiting the execution of productive work, and
  b. affects either
     i. a group or groups of people, or
     ii. a single individual performing a critical business function. Examples of conditions may include:
        - Loss of redundancy at data center connections
        - System or component problem that could result in loss of a site without timely repair
        - Decrease in throughput equal to or greater than 20 percent on any one circuit

Severity Level 3 – Minor

An incident shall be categorized as a "Severity Level 3" incident if the incident is characterized by the following attributes: the incident causes a group or individual to experience an incident with accessing or using a system, service, software, equipment or network component, or a key feature thereof, and a reasonable workaround is not available, but does not prohibit the execution of productive work.

Severity Level 4 – Maintenance

An event shall be categorized as a "Severity Level 4" incident if the incident is characterized by the following attributes: the incident impacts a group or individual affected by planned maintenance of the "service" or non-service impacting incident.

Resolution Time

Severity 1	2 hours
Severity 2	4 hours
Severity 3	48 hours
Severity 4	5 business days

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 16	**Service Level Agreements –** **Outage Notification and Reason for Outage (RFO) Report** **Outage Summary and Lessons Learned** Provide a summary of FCC reportable outage situations that interrupted 911 service to bidder's clients over the past three years, where 911 calls were not delivered or not delivered to the appropriate PSAP as a result of the issue. The response shall include the deployment type (legacy, ESInet, and NGCS), month, year, duration, number of PSAPs or population impacted, number of PSAPs or population served by the impacted system, impacted system, and lessons learned from each outage. **Regulatory Compliance** Contractor shall comply with all applicable local, state, and federal outage and notification rules throughout the term of the contract.	X			
	Bidder Response: Atos shall comply with all applicable local, state and FCC rules as a certified 9-1-1 Service Provider throughout the contract. Atos has had no FCC reportable outage situations that interrupted any of our clients over the past three years.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 17	**Service Level Agreements –** **Outage Notification and Reason for Outage (RFO) Report** **Outage Notification** Contractor shall notify the Commission and affected PSAPs within a maximum 30 minutes of discovering an event or outage that may impact 911 services. All events that meet criteria for local, state, or federal reporting shall also be completed by the Contractor. At the time of initial notification, the Contractor shall convey all available information that may be useful in mitigating the effects of the event or outage, as well as a name, telephone number, ticket or reference number, and email address at which the service provider can be reached for follow-up. The Contractor is responsible for coordinating data gathering, troubleshooting and reporting on behalf of subcontractors. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos will comply and notify the Commission stakeholders within a maximum of 30 minutes of discovering an event or outage that may impact 911 services and maintain communication during the remediation process with all affected parties. All events that meet criteria for local, state, or federal reporting will also be completed by Atos. At the time of initial notification, Atos will convey all available information that may be useful in mitigating the effects of the event or outage, as well as: ➢ name; ➢ telephone number; ➢ ticket or reference number; and ➢ email address at which the service provider can be reached for follow-up. Atos is responsible for coordinating data gathering, troubleshooting and reporting on behalf of its' subcontractors.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 18	**Service Level Agreements –** **Outage Notification and Reason for Outage (RFO) Report** **Status Updates** The Contractor shall communicate any updated status information to the Commission and affected PSAPs no later than two hours after the initial contact, and at intervals no greater than two hours thereafter until normal 911 service is restored. This information shall include the nature of the outage, the best-known cause, the geographic scope of the outage, the estimated time for repairs, and any other information that may be useful to the management of the affected operations. Describe how the solution meets or exceeds the above requirements.	X			

Bidder Response:

During transition, Atos will work with the project stakeholders to determine the appropriate escalation policy and contacts. This activity includes proper identification of escalation timeframes, escalation paths, escalation procedures, and escalation contacts. In supporting the State, this process provides for proper alignment of resources to incidents based on priority and need to correctly drive key organizational performance objectives based on those priorities.

The following escalation alerts will be triggered based on service levels:

- Open escalation alerts within 30 minutes of service level expiration and no later than two hours after the initial contact and at internals no greater than two hours until normal 911 service is restored. These alerts are distributed to call allocators, enabling them to take immediate remedial action and will include:
  - the nature of the outage;
  - the best-known cause;
  - the geographic scope of the outage;
  - the estimated time for repairs, and
  - any other information that may be useful to the management of the affected operations.
- Open escalation alert at service level expiration distributed to the call allocators' team leader
- Alerts beyond service level expiration — two hours and four hours — distributed to the service account manager through to the national operations manager, depending on service level time exceeded
- When an issue is not resolved within service level expectations, we initiate proactive steps to achieve resolution through established escalation channels. In our approach to problem management escalation, we take the following actions:
  - Develop a problem management process specific to the customer's requirements
  - Include clearly defined responsibility and accountability
  - Use management data to perform problem analysis, looking for opportunities to proactively address problem issues and opportunities for improvement
  - Establish procedures and flow charts that define the processes for which we will be accountable and indicate the following criteria:
  - What is under our control
  - How the event will be managed or executed
  - How escalations will occur
  - How we will interact with other organizations (if any) providing or receiving services in the problem / escalation chain

	Regional stakeholders can also initiate an escalation on any active service ticket by contacting the Account Management Office (AMO). The escalation process will be defined during transition.

Any additional documentation can be inserted here

SLA 19	**Service Level Agreements –** **Outage Notification and Reason for Outage (RFO) Report** **Reason For Outage (RFO) Reporting** Following the restoration of normal 911 service, Contractor shall provide a preliminary RFO report to the Commission and affected PSAPs no later than three (3) calendar days after discovering the outage. An in-depth RFO report, including a detailed root-cause analysis, shall be provided to the Commission and affected PSAPs no later than ten (10) calendar days after discovering an outage. 1. Describe how bidder will comply with the notification and reporting requirements above. 2. Describe the NOC/SOC tools and techniques at bidder's disposal to ensure that bidder's various subcontractor perform troubleshooting and post-event analysis and provide associated reports.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: Atos uses a Continuous Process Improvement (CPI) model for service level performance. Because all service level metrics are the result of the process execution, the CPI model provides a familiar and well-understood method of identifying root causes, assessing risk and implementing change. We begin root cause analysis for failed processes at the lowest level. The support group providing service for a reported issue will assign the ticket to an individual within that team (the assignee). As additional updates are available, the assignee will add information to the ticket to develop an accurate status of the activities associated with the resolution. As soon as the problem or request is resolved, the assignee documents the resolution by completing various fields, performing a root cause analysis on all Severity Level 1 and Level 2 tickets or for any tickets that failed to meet the service level commitment. Open tickets are reviewed daily at a morning meeting with management, or timing of the meeting can be arranged as best suited to accommodate as many operating time zones as possible. If needed, alternate daily review meetings can be scheduled to account for concentrations of tower-specific support personnel in a specific time zone. Special attention is applied to Severity Level 1 and Level 2 problems, their resolutions, and other problem tickets that failed to meet their service level performance requirement objective. Atos will participate with the Commission in-sourced and out-sourced support groups, to investigate and identify root cause and corrective measures where collaboration is required across the multi-vendor environment. We'll also perform post-implementation reviews to confirm solutions have been effective in resolving the problem. Atos will provide a preliminary RFP report to the Commission and affected PSAPs no later than three (3) calendar days after discovering the outage. An in-depth RFO report, including a detailed root-cause analysis will be provide to the Commission and affected PSAPs no later than ten (10) calendar days after discovering an outage.				

Any additional documentation can be inserted here

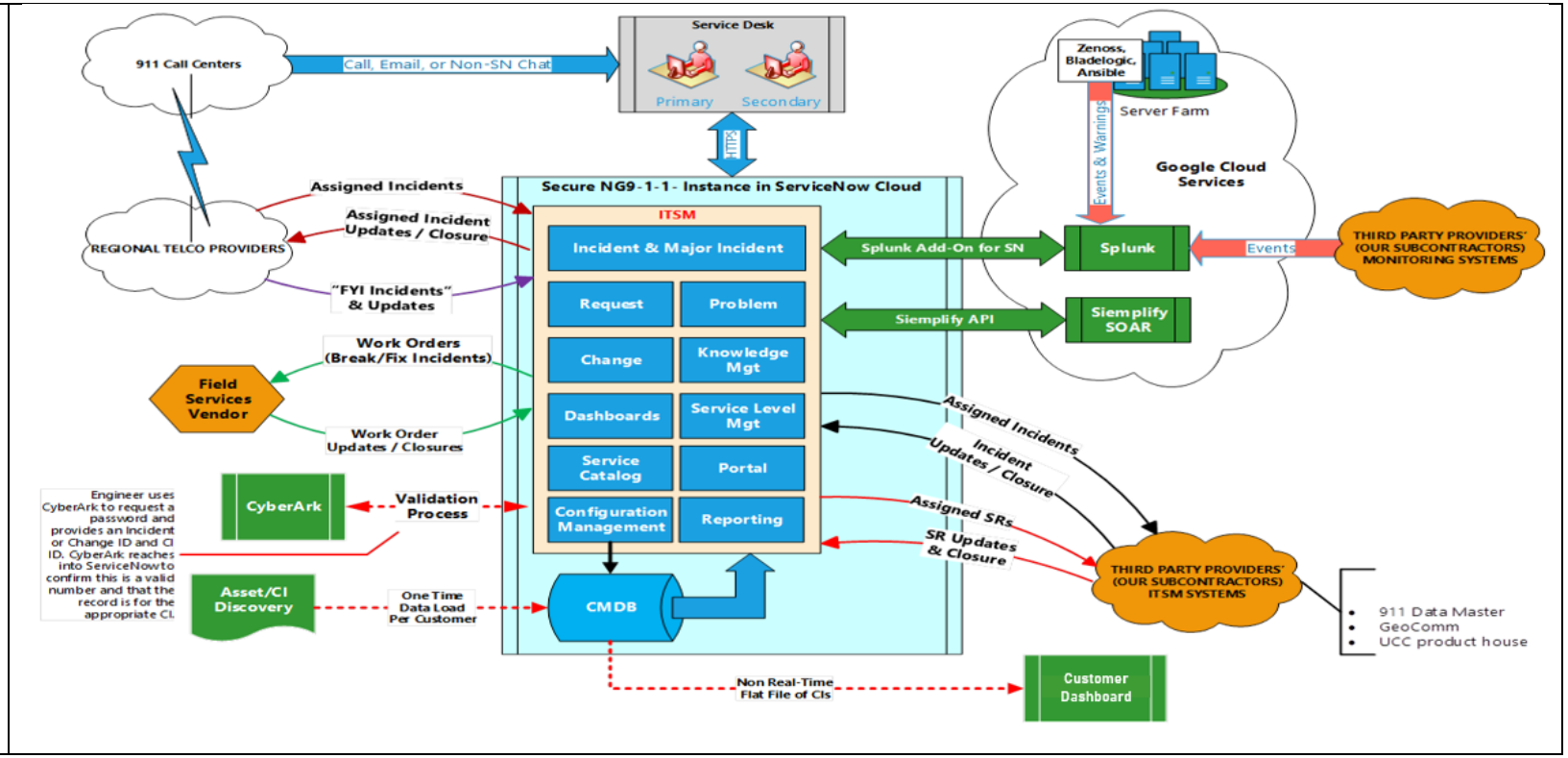
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 20	**Service Level Agreements –** **Outage Notification and Reason for Outage (RFO) Report** **PSAP Notifications** Outage notifications and follow-up analysis of outages are a critical element to understanding overall system health and preventing future service interruptions. Having awareness of issues that exist in a neighboring PSAP provides valuable insight into potential issues that may begin impacting another PSAP's operations. The Commission' is seeking an outage notification service that allows for each PSAP to elect the outage notification types and PSAPs for which it will receive outage notifications, outage updates and RFO reports. A web portal for authorized users to select/deselect outage notifications is required. Provide a detailed description of how bidder will support such an outage notification service.	X			
	Bidder Response: Atos will provide outage notifications and subsequent notifications via the web portal, email and telephone as mutually agreed in the development of the Operating Process Document. This will include communication intervals and methods based on severity. The dashboard provided via a web portal to authorized users will allow visibility to the network. ➢ The Dashboard will be organized by site ➢ The dashboard will display all services within a site ➢ The dashboard will display the status of the services per site ➢ The dashboard will display the utilization of the service ➢ Each service will have configurable thresholds for normal, degraded, and outage for the service ➢ Each service will indicate the cause for degradation or outage with the following data: - Component that caused issue - Time of issue - Duration counter - Ticket number associated with issue - Description of the issue - Service name and site ➢ A relationship view of the service to other sites will be visible on a map ➢ The service status will have a visible color indicator for easy distinction, green = normal, yellow = degraded, red=outage				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 21	**Service Level Agreements –** **Media Contact** 1. Contractor shall provide a 24 x 7 spokesperson who will be available for media contact regarding ANY outage of 911 service due to any failure of 911 call delivery to the Commission's host equipment and to the affected PSAPs. **Government & Regulatory Contact** 2. Contractor shall provide a 24 x 7 representative who will be available for government and regulatory contact regarding ANY outage of 911 service due to any failure of 911 call delivery to the Commission's host equipment and to the affected PSAPs Describe bidder's experience in providing both a Media Contact and Government & Regulatory Contact for similar contracts.	X			
	Bidder Response: Atos will provide a Media Contact and a Government & Regulatory Contract who will be available 24x7 as required for ANY outage or 911 service due to any failure of 911 call delivery. To date, Atos has not experienced an outage or failure that required a media contact however Atos will provide an experienced representative who will be identified to the Commission.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 22	**Service Level Agreements –** **SLA Violations** An SLA violation shall have occurred whenever: A. The Contractor fails to meet any single performance level; or, B. The average of any single performance item over the preceding two-month period fails to meet the service level stated in response to requirements SLA 1 through SLA 22. Contractor shall deliver an SLA violations report to the Commission on a monthly basis. **SLA Reporting** Provide a detailed description of how bidder measures and reports incidents, including immediate notifications and regularly scheduled reports. SLA results shall be delivered to the Commission on the 10th business day of the month. The report shall include all performance items identified in the bidder's proposal and documented in contract negotiations.	X			
	Bidder Response: Atos has a 24 x 7 x 365 NOC/SOC dedicated to NG9-1-1 support. The key infrastructure components are: ➢ ServiceNow by Engage ESM, an Atos company which will provide: o Dedicated, U.S.-based, domain-separated ServiceNow environment; o Trouble ticket management; and o Transparent oversight (dashboard) for SLA reporting ➢ Zenoss, which will provide: o SNMP, Syslog, and Windows Event collection; o Event analytics for SLA reporting; and o Alert generation and input into ServiceNow ➢ NetScout, which will provide: o Realtime network traffic monitoring; o Dashboard status of network latency, jitter, and packet loss for SLA reporting; o Calculated R-Factor and MOS for audio quality; alerts for proactive resolution; and o Alert generation and input into ServiceNow The Service Delivery Manager will be responsible for reporting on all SLAs to the Commission. The report will also include performance data in addition to any SLA violations. The information for the report will be gathered using the Atos ITSM and monitoring tools.				



Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SLA 23	**Service Level Agreements –** **SLA Violation Financial Remedies** Contractor shall provide financial remedies to the Commission for each event in which service levels are not maintained. The Commission requires that all of the Contractor's network facilities, devices, and services will be measured on a rolling, 12-month calendar. Failure to meet SLAs shall be measured per service-affecting outage. Financial remedies shall be assessed for failure to meet SLAs. For service-affecting incidents, a 10 percent (10%) discount shall be accessed against the Monthly Recurring Charge (MRC) applicable to the source of the failure, whenever the initial period of resolution is exceeded. If the resolution period length of time doubles, then the discount shall increase to 20 percent of the MRC. If the resolution period length of time quadruples the initial period, then 50 percent of the MRC shall be assessed. The amount related to the damages is to be credited to the invoice for the month immediately following the violation. Bidder shall include how uptime information will be gathered, analyzed and provided to the Commission.	X			

Bidder Response:

Atos is responsible for managing the performance of partner services and enforcement of SLA and agreed upon services for impairment..

Atos would require the following language be added:

In no event will the cumulative amount owed or discounted for any and all SLA violations in any given month exceed ten percent (10%) of the monthly recurring service costs across all Services. SLA credits or discounts are issued for only the month in which they apply. In the event there is a single incident giving rise to multiple SLA violations, the State shall only be entitled to recover a single credit or discount for the failure, which shall be the highest SLA credit or discount available to it hereunder (including, without limitation, where Contractor missed an SLA performance in one month and the resulting performance impact constitutes a two month average below the SLA target). Contractor shall not be responsible for issues that would otherwise cause SLA violations: 1) that are not a result of Contractor's acts or omissions; 2) that are a result of the use of out of support hardware or software; or 3) where an outage does not cause an impairment in the receipt of the Services. In the event Contractor pays a SLA credit or issues a discount in a given month, then meets or exceeds its service delivery requirements for a period of three consecutive months, then Contractor shall be deemed to earn back the credit or discount from the State and the State shall refund or return such credit or discount.

Atos Rationale for Additional Language

Atos agrees to the concepts proposed (including the 10%, 20% and 50% of discount of the impacted MRC); however, if there are numerous failures across all Services (and not just including service affecting incidents), then Atos would require that there be a cap on the maximum amount Atos can be responsible for. In addition, Atos has included certain exclusions related to issues that aren't Atos fault, can't be supported, or where there is technically an outage, but Atos is leveraging a redundant portion of the system.

Finally, Atos would also seek clarification as to whether the State is seeking a discount or credit. The way the language reads, it appears the State is asking for a discount on the impacted MRC for the month of the Service failure. However, Atos would likely not be able to assess a discount for the impacted MRC, as Atos will invoice at the end of the month and will not have delivered the SLA report until the 10th business day of the next month. Thus, Atos thinks a credit is more appropriate then a discount.

Any additional documentation can be inserted here

Operational Scenarios

Safeguards shall be established to minimize the impact of human or system error. Describe bidder's risk-mitigation and issue-resolution strategies for the following hypothetical scenarios:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN SCEN 1	**Scenario 1** At 0300 hours, a series of SBC alarms previously unseen by the NOC staff on duty begin to increase in volume and frequency. At 0330, multiple critical alarms are received. At 0345, a few PSAPs start reporting garbled audio while others report an inability to obtain location information. At 0600, some PSAPs are reporting that they have not received a call in the last 15 minutes.	X			
	Bidder Response: 1. We would start seeing alarms at 0300 on the SBC and at 0330 for critical alarms, the Atos NOC/SOC would be notified immediately and would begin investigation. Splunk is used to correlate alarms and thresholds. 2. Before 0345 NetScout will start seeing MOS degradation and flow the alerts to Splunk for correlation to SBC alarms. 3. Before PSAP call flow is affected, Atos can apply policy routing and deliver calls to another PSAP by utilizing failover thresholds for the SBC across both data centers.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN SCEN 2	**Scenario 2** All originating service providers in the state are connected directly via Signaling System Number 7 (SS7) protocol to the bidder's LNGs that serve the PSAPs in Nebraska, as well as others outside the Commission's footprint. Each LNG consistently processes about 10,000 calls per day, but each is capable of processing in excess of 100,000 calls per day. One of the LNGs experiences a catastrophic failure and is unable to process any calls. In a review of the prior day's logs, it is found that the two surviving LNGs only are processing 2,000 calls each.	X			
	Bidder Response: ➢ Atos can detect volume degradation at an aggregation point of interconnection but not at the LNG level. Atos will use an Intrusion Prevention System (IPS) to examine traffic flow and if an LNG fails, the Atos NOC/SOC would be notified via alarms. ➢ Material fluctuations in call volume are identified quickly and researched as appropriate. Atos has complete, end-to-end visibility into network statistics. Problems would be identified and corrected as then occur and not be treated after the fact. ➢ As the system has been designed to be fully redundant, any devices that are not performing as designed would be removed from service and calls would be rerouted. ➢ A root cause analysis would likely be conducted to determine how the issue that precipitated the reduction in volume was not identified at the time of the reduction.				

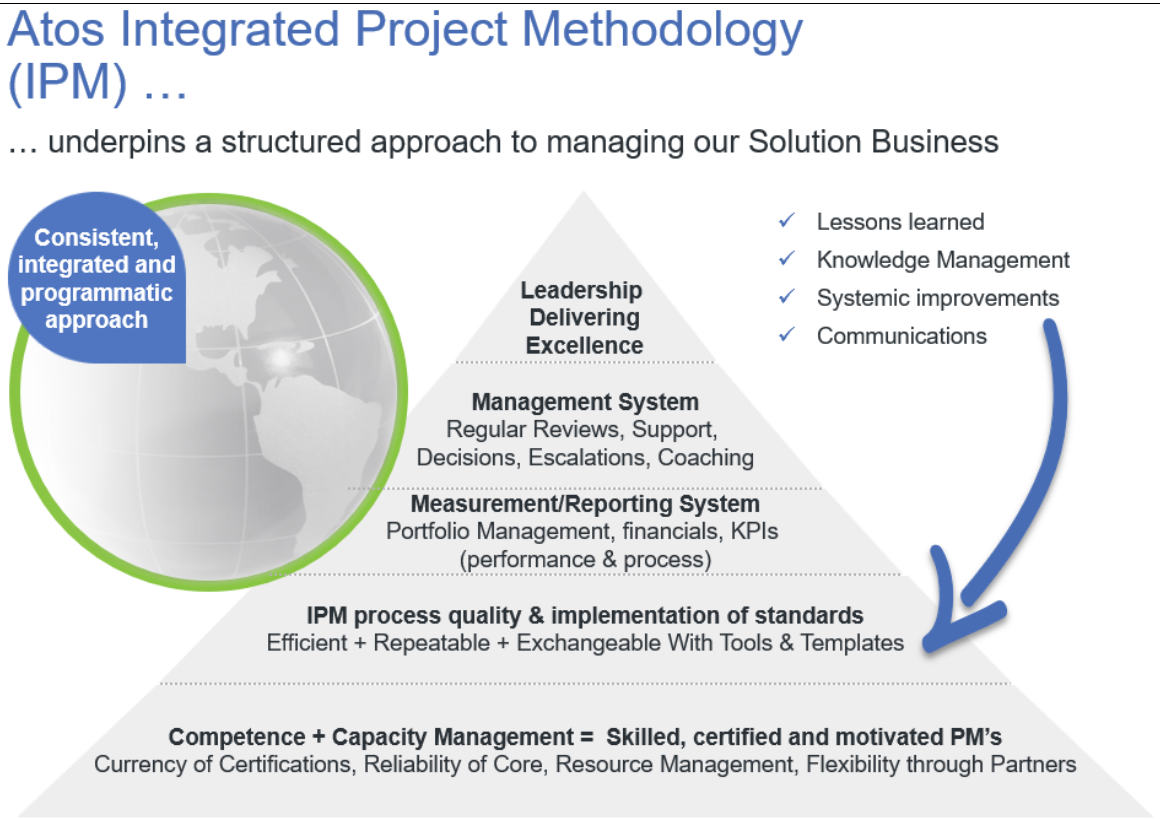
Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN SCEN 3	**Scenario 3** As part of normal data-maintenance procedures, the bidder has uploaded six minor recent changes. The bidder's Quality Assurance/Quality Integrity (QA/QI) process provides a discrepancy report detailing 15,000 errors resulting from the updated file.	X			
	Bidder Response: Proposed changes and procedures will be tested on the test system prior to deployment to decrease the likelihood of any errors. As part of the change management process which would be used for any data-maintenance procedures, monitoring will be done as described in the documentation. Upon discovery, the errors would be investigated to determine impact to service and for resolution. If the errors cannot be resolved in the required timeframe and service is impacted, rollback processes would be put into place with testing to confirm that the errors are no longer occurring.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
GEN SCEN 4	**Scenario 4** At 0700, the NOC has received an alarm reporting loss of connectivity for a single path to Host A. At 0705, the NOC contacts Host A to confirm the loss of connectivity. The PSAP has found that the link lights are off, but the system appears to be operational. At 0725, the redundant link appears to be bouncing for Host A. At 0900, the PSAP is reporting a decrease in typical call volume.	X			
	Bidder Response: ➢ NOC will detect failure in network router for LINK A ➢ From a call delivery perspective, the calls are still sent to PSAP on link B ➢ There will not be any call delivery impact since our MPLS is provisioned for either MPLS circuit can carry the load ➢ From a policy routing perspective, PSAP A is still a viable target ➢ Atos will confirm that there is no service degradation and continue investigation until all services are returned to normal				

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
PM 1	**Project Management and Ongoing Client Management Services** **Project Management Methodology** 1. Describe bidder's project management methodology and support structure. 2. Describe the daily, weekly, and monthly interactions during the migration. 3. Include a proposed high-level project plan. 4. Include a schedule for the through implementation of this project.	X			
	Bidder Response: Atos' Project Managers take ownership and with strong leadership of experienced project teams, utilizing best in class process will deliver on time with measures to minimize the risk and impact upon our customers operations. The Atos Project Manager has critical responsibilities within Atos' project methodology process; the duties of the Project Manager are part of one or more of the following activities during the implementation: ➢ Project Coordination ➢ Scope Management ➢ Schedule Management ➢ Quality Management ➢ Communications Management ➢ Risk Management				



Atos Integrated Project Methodology

Full details on our methodology, support structure, migration interactions and proposed high-level project plan with schedule can be found after Attachment C in the following sections of this Technical Approach Proposal

- HIGH LEVEL PROJECT PLAN AND PROJECT APPROACH
- LIFECYCLE SCHEDULE
- ONGOING CLIENT MANAGEMENT SERVICES

Any additional documentation can be inserted here:

	Project Management and Ongoing Client Management Services **Post-Deployment Client Management** Describe the post-deployment client management service, including client management reports, executive briefings and the fielding of ad hoc support requests.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			

PM 2

Bidder Response:

Atos will provide an assigned Client Manager and an assigned Service Delivery Manager. The Client Manager will have overall responsibility for the State of Nebraska account.

The Client Manager is a single point of contact who will be responsible to provide the following to the State, at a minimum;
Contract Administration;

- Escalation Management
- Compliance
- Business Reviews
- Service Reviews
- Continuous Service Improvement

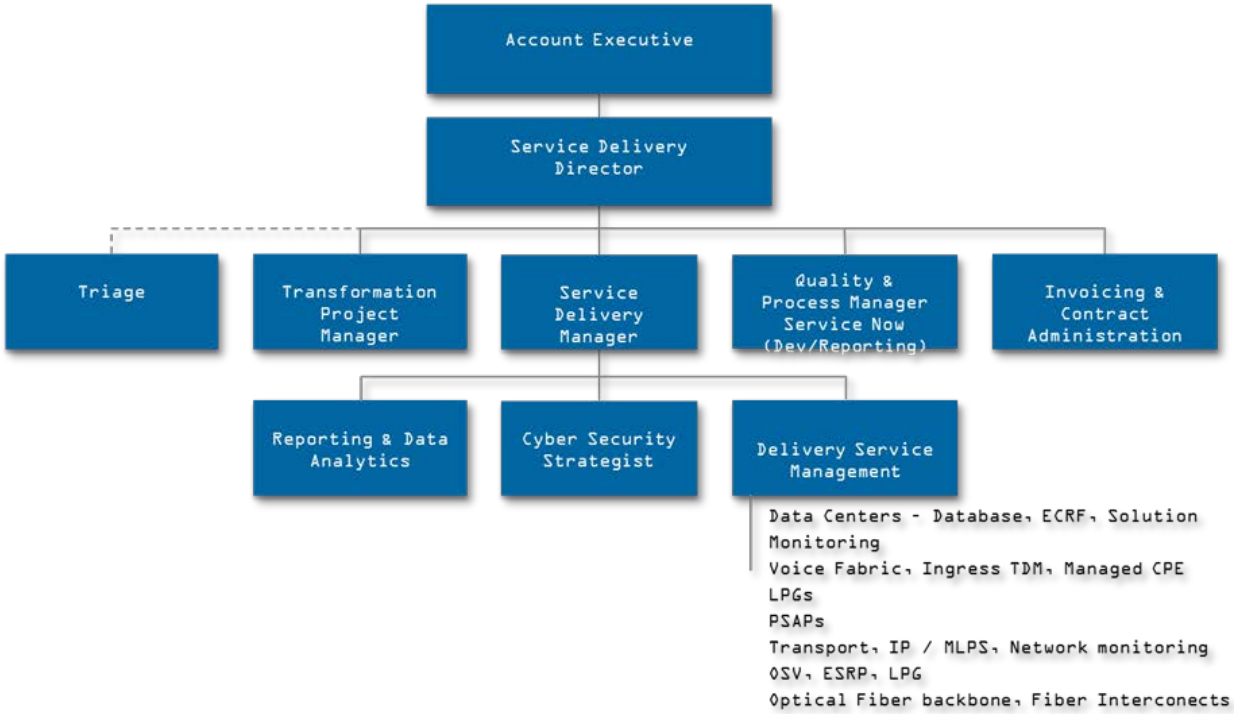
The Service Delivery Manager will be responsible for managing the daily operations management to include the following:

- Service Level Management
- Availability Management
- Reporting
- Governance of Policies and Procedures, including:
    - Availability Management;
    - Release Management
    - Capacity Management
    - Change Management; and
    - Patch Management

Account Team Structure

The account governance model is not intended to be simply an aggregation of technology functions; rather, it defines a business structure that acts independent of boundaries to take advantage of operational and business synergies within the State and Atos organizations.

The following graphic shows the proposed functional structure of the AMO supporting the State.



Atos' proposed Account Management Structure: *Maintain consistent, reliable support through Atos' account management team with governance focus on the transition and subsequent steady state support services.*

Any additional documentation can be inserted here:

The following table lists the key roles and responsibilities for the Atos AMO:

Atos AMO Team Roles and Responsibilities	
Service Delivery Director	Carries overall responsibility for the successful delivery of Atos Services. Has the following primary responsibilities, in relation to the provision of services: ▶ Manages service escalations ▶ Manages strategic innovation and interface with Atos' Global Portfolio Delivery structure, ensuring global enhancements are cascaded through the North American region.
Service Delivery Manager	Runs and operates the day to day management between Atos and its partners with the State. Carries all formal responsibility on behalf of Atos and is the point of contact for the State. Has full authority for implementing decisions across the whole service structure. Has the following primary responsibilities, in relation to the provision of services: ▶ Handles contract management of the contractual and strategic relationship with the State stakeholders ▶ NG9-1-1 System ▶ Presents new services to the State via the Bi-Annual Innovation Workshop team ▶ Manages fulfillment of services, forecasting, and budgeting ▶ Handles partnership management ▶ Monitors service level performance ▶ Handles billing ▶ Provides human resources management of account staff ▶ Manages service escalations ▶ Directs Compliance management
Quality Assurance and Documentation	Responsible for monitoring the consistent execution against established standards. Has the following primary responsibilities: ▶ Maintains Quality Assurance manuals ▶ Obtains / maintains industry-based certifications ▶ Tracks and reports on key performance indicators
Reporting	Responsible for all reporting requirements for the delivery of services for this engagement. ▶ Generates and posts all reporting requirements – SLA – Service Level Objectives (SLO) ▶ Delivers data and documentation for analysis

Atos AMO Team Roles and Responsibilities	
Contract / SLA and Change Control	Responsible for maintaining the agreed contracts and service level agreements. Owns change management process as defined for the services contracted with the State. Atos will utilize its change management processes as we interface with the State's respective overall IT management of services. Has the following primary responsibilities: ▶ Maintains all contracts and SLAs ▶ Monitors and reports on the status of all change requests ▶ Implements change requests within contracts and SLAs
Transition Manager	Responsible for the transfer and transformation of the services to Atos' delivery organization. Has the following primary responsibilities: ▶ Manages all transition project activities ▶ Manages the staff transfer and relocation, when in scope ▶ Reports on the progress of all projects

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
TRN 1	**General Requirements – Training** **Comprehensive Training** Contractor shall provide comprehensive training to designated Commission representatives responsible for varying layers of network/system monitoring and system maintenance. Describe bidder's training program for system implementation and ongoing operation and maintenance, including but not limited to the following topics: 1. user-configurable elements; 2. NOC/SOC procedures; 3. escalations; 4. trouble reporting; 5. help desk portal; 6. executive dashboard; and, 7. service monitoring tools. Training shall be available at the user level and delivered to the PSC and each region (up to 10) and also the train-the-trainer level (up to 25 individuals).	X			
	Bidder Response: Atos will provide a training program for the implementation and ongoing maintenance of the ESInet/NGCS solution. Our training program will consist of topics set forth by the State above. An outline of the learning objectives is provided below. We will customize each the course for the State's project. We will provide the State's NG9-1-1 project team with draft training courses for approval, prior to delivery. After approval of the training materials, we will work with the State's project team to schedule, plan the location, identify participants for each course and assign instructors for delivery of the courses. ➢ **User-configurable elements:** Atos will provide on the Policy Store. The course will introduce the participants to the concepts and uses of the Policy Routing Function (PRF), Policy Store (PS), and the Policy Editor (PE). The course will review the role of the NG9-1-1 Policy Routing Function (PRF) in establishing the policies for call routing and handling within their PSAP coverage area. o Understand the purpose, use, and operation of the Policy Routing Function Policy Store Interface o Understand the role and features of the Policy Store and the Policy Editor o Purpose of Policy Routing Rules (PRRs) and the role of the 9-1-1 Governing Authority o Review the NG9-1-1 Routing Data rules established by the State or regional Governing Authority o Become familiar with the use of the PSI to monitor the condition of the NG9-1-1 functional elements o How to use the PSI to monitor and / or change Policy Rules o Learn how to plan and document the configuration and verification of routing rules and rule changes using the Policy Store Interface o Introduction to identifying, analyzing, and matching routing functions and benefits for routing efficiencies in network operations ➢ **NOC/SOC, trouble reporting and escalation procedures:** Atos will introduce participants to the Atos Trouble Reporting system, including: o Understand the reporting trouble procedures o Understand the reporting procedures o Escalation procedures for Tier One, Tier Two, and Tier Three support o Use the trouble reporting escalation procedure o Use the trouble reporting application o Creating and closing out a trouble report o Obtaining reports on the incident and related workflow				

	o Understand the Service Level Agreement (SLA) procedures and metrics o Reporting resolution and closeout procedures ➢ **Help Desk Web Interface:** Introduces participants to the Atos Help Desk Web Interface. The use of the HDWI is reviewed and participants will utilize hands-on exercises to learn the use of the interface for preparing tickets, reports and monitoring Service Level Agreement (SLA) compliance. o Understand how to install and configure the Help Desk application o Utilizing different request types o Preparing request tickets and priority levels o Understand the SLAs related to maintenance services o Reporting ➢ **Executive Dashboard:** Atos will provide training on the features associated with the dashboard tool that will be used by the State.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
TRN 2	**General Requirements – Training Attendees and Curriculum** 1. Describe the number and types of attendees required to attend training, training curriculum, number of training attendees included in the proposed price, and the duration of the training program per attendee (expressed in hours per day and number of days), as well as the location of the training and whether such training is available online or onsite. Preference is given to training that can be conducted in an onsite setting for attendees. 2. Provide Examples of the proposed training plans. 3. Provide a sample of the training materials to be used. Training classes shall be recorded for future reference and training of new Commission and PSAP employees.	X			

Bidder Response:

Training will be delivered to the PSC and each region (up to 10 participants per region) for the following classes:

- **User-configurable elements:** For Policy Store**, t**he target audience for the training is directors, managers, supervisors and system administrators. 4-hour class with up to 10 participants per class.
- **NOC/SOC, trouble reporting and escalation procedures:** The target audience for the training is directors, managers, supervisors and/or technical support staff. 1-hour class with up to 10 participants per class.
- **Help Desk Web Interface:** The target audience for the training is directors, managers, supervisors and system administrators as well as any personnel that will request assistance from the Help Desk. 1-hour class with up to 10 participants per class.
- **Executive Dashboard and Service Monitoring tools:** The target audience for the training is system support staff. 2-hour class with up to 10 participants per class.

Atos tailors training materials to accommodate the State's particular needs. We will provide the State NG9-1-1 project team with draft course content and training material for approval prior to delivery. After approval of the training materials, we will work with the State NG9-1-1 project team to schedule, plan the location, identify participants for each course and assign instructors for delivery of the courses. The course scheduling will depend on the overall implementation schedule for the State's solution in order to provide training as close to the dates that staff will utilize the new systems and training content.

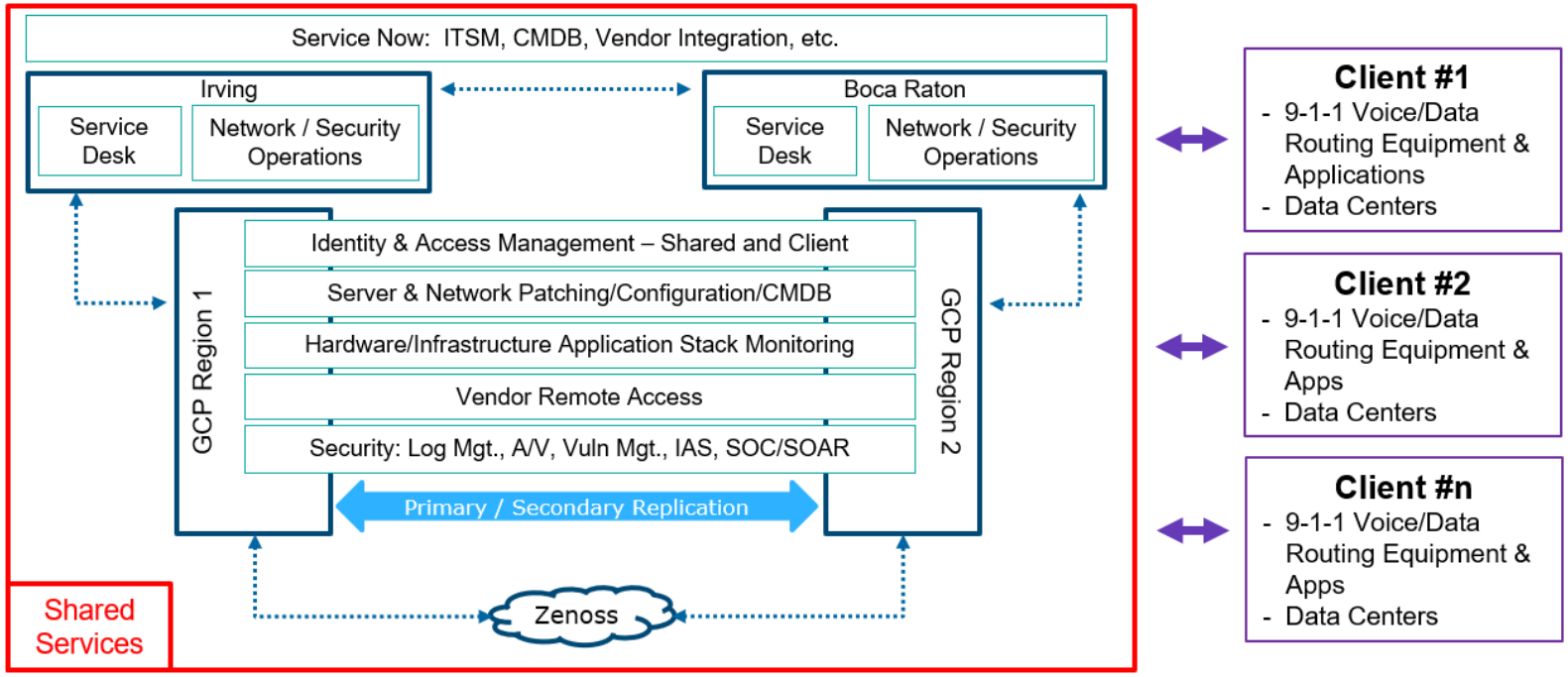
Atos has assumed on-site training, for most content. Web-based training may be used for certain sub-elements of the solution, depending on the State's specific needs. A Train-the-Trainer approach is also available.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRAR 1	**General Requirements – Service, Repair and Advance Replacement** The Commission shall not be responsible for the replacement and maintenance of hardware and software required to provide the NGCS or ESInet connectivity provided as part of the bidder's solution. The Contractor shall resolve all faults or malfunctions at no additional cost to the Commission. **Support Maintenance** 1. Describe in detail bidder's 24 x 7 x 365 maintenance support for the life of the contract. 2. Describe bidder's understanding of public safety maintenance windows and associated notification processes. 3. Describe bidder's problem resolution and change management processes, the supporting systems, and adherence to best practices, such as those described in the ITIL version 3 or most current version.	X			

Bidder Response:

Atos has provided a DRAFT maintenance plan (see Appendix B: Services Support) which will be finalized upon award during transition. Atos understands the critical importance of NG9-1-1 services and any changes will be completed in accordance with the change management process to mitigate risk and minimize negative impacts.



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRP 1	**General Requirements – Software Release Policy** **Scheduled Releases** **Frequency of Scheduled Releases** 1. Describe the frequency of scheduled software releases, the feature release testing process, and the decision-making processes involved in deciding what features and defect resolutions to include in a scheduled release. 2. Include a current roadmap of feature updates and additions with projected release by quarter and year.	X			

Bidder Response:

For Atos Public Safery, the Product Management (PdM) organization is responsible for the definition of product requirements, the planning of systems solutions, future roadmaps and individual release contents. As such, Software Release Management is a function owned by the Product Management organization.

Software release management includes insuring simplification of a software update, harmonization of the process between different product lines and reduction of the number of software configurations in the field. Additional responsibilities include adherence to industry standards, obedience of government regulations and improvement of overall product quality.

The process of determining a product release involves several factors including but not limited to customer-input, adherence to industry standards, emerging market needs, sustainability of the product platform and ensuring the highest quality of fielded product. To enable customer-focused release agility, Atos utilizes three software release programs; long-term, intermediate and as-needed.

The decision-making process involved in selecting which software defects are prioritized for remediation is based on the severity of the resulting user experience. Most critical is a system failure or a major loss of functionality that renders the entire system inoperable. This drives a rapid program code correction effort and release. Least critical is a class of problem that is not service affecting, such as incorrect minor functionality or problems that have feasible work-arounds available. In these cases, code correction may be provided in a future intermediate maintenance release.

Software releases can be classified into two categories, Major Releases – which provide feature enhancements and additional functionality and Software Maintenance Releases (SMR) which are aimed primarily at correcting reported issues. Major Releases typically follow a 12 to 18-month timeframe. SMRs are issued on an as needed basis.

Feature testing undergoes a rigorous internal acceptance process which attempts to assure that impacted items within the release are functioning properly in numerous test case scenarios and don't have any impact on other release functionality. The release then is put through internal and customer-based Alpha and Beta testing, including the test system.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRP 2	**General Requirements – Software Release Policy** **Maintenance Releases** Describe the frequency of defect-resolution software releases, as well as the decision-making processes involved in selecting which software defects to fix.	X			
	Bidder Response: Atos adheres to a defect resolution software release schedule as below. In all instances, strict regression testing is performed against a compatibility matrix to ensure software and hardware associated with each interacting application does not negatively impact normal business operation. Release schedules are as follows: ➢ Minor Releases – approximately four per year ➢ Major Releases – approximately one per year ➢ E-patches and Hot Fixes – as needed for critical issues or bespoke circumstances Determination of which defects to fix is based on a number of factors, however priority is given to those defects which; a) have been reported to occur with the greatest frequency, b) have proven negative business impact on our customers, and c) those that pose interoperability issues with interacting software or applications.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRP 3	**General Requirements – Software Release Policy** **Test Environment** Prior to install of new releases, bidder shall explain how Contractor replicates the production environment for software release testing to provide assurances that future software releases will not negatively impact PSAP operations.	X			
	Bidder Response: Atos houses a complete NGCS test environment in our labs in Boca Raton, FL which mirrors the production environment for all critical systems and where all future software releases are fully tested prior to installation in live systems.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRP 4	**General Requirements – Software Release Policy** **Access to Defect Tracking System** Contractor shall provide the Commission with access to the Contractor's defect tracking system for the Commission to track the progress of defect resolutions. **Software Defect Tracking Process** Provide a detailed description of the software defect tracking process and describe how bidder will provide training for no more than ten (10) Commission staff prior to Final Acceptance Testing.	X			
	Bidder Response: Atos will provide incident management and reporting associated with any software defect as outlined in the response to the RFP. Additionally, training on the trouble ticketing system and procedures is included in the proposal. Atos is willing to discuss this requirement further if the incident management and reporting included in our proposal is not deemed sufficient to meet the State's needs.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
SRP 5	**General Requirements – Software Release Policy** **Software Defect Aging** Describe how service-affecting software defects are aged. If minor problems (from the Contractor's perspective) are not identified and resolved immediately, these minor problems can become major or critical problems. Describe in detail how/when this minor problem gets scheduled or automatically escalated, and the feedback mechanism in place for keeping the Commission informed.	X			
	Bidder Response: As stated, minor incidents can compound and may be symptomatic of a larger problem that requires a code modification by way of patch, hot fix, service release, or updates within the next software version. Through our Service Management System (SMS), Atos maintains a matrix of incidents, minor and major, to gage frequency of occurrence, customer impact, and resolution or workaround. If the same defect shows a pattern of recurrence, Atos elevates the issue to Development for analysis and remediation. Development forensically analyzes the cases to assess customer impact and analyze the effectiveness of implemented workarounds and if the workaround was successful and permanent. Through this analysis, Atos can determine the most effective route of permanent remediation via code changes. Once code changes are made and the vehicle for distribution is determined (hot fix, patch, Service Maintenance Release, or version), Release Notes are produced documenting the content of the patch and what behavior it remediates. These Release Notes and software are available to qualified Commission personnel for download. Regarding the processes involved in selecting which software defects to fix, GeoComm has a zero-defect policy which means there is no selection process, rather all defects are fixed. The timing as to the delivery of the fix is based on the severity level of the defect. In general, based on the product, the typical release cycle is annually. However, as previously noted, GeoComm's development teams plan and develop in 12-week increments. Defect-resolution releases can be released at the end of each of these increments, again based on the severity. In the case of a P1 severity level defect, GeoComm will deliver a hotfix outside of these increments will not be delayed. The feedback mechanism is through 911DM HelpDesk. A ticket will be opened and 911DM will communicate updates on progress of bug resolution throughout the ticket resolution process.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
DOC 1	**General Requirements – Documentation** The Contractor shall provide the Commission with all pertinent documentation for the ESInet and/or NGCS connectivity provided as part of the Contractor's solution as implemented, No more than 30 days after completion of the network construction, and update the Commission as configurations change over the term of the contract. The required documentation shall include the following: **1.** Detailed project plan; **2.** Escalation procedures; **3.** Circuit identification; **4.** Single points of failure; **5.** Network path diversity drawings into each PSAP; **6.** Network path diversity drawings into each non-PSAP site or structure housing any element or device that is part of the overall system; **7.** PSAP backroom as-built drawings; **8.** PSAP demarcation point drawings; and, **9.** All user interface training and reference materials. **Network As-Built Documentation** Upon implementation, Contractor shall provide a network or solution diagram that clearly depicts the Contractor's solution as implemented. The Contractor shall provide all documentation in agreed-upon electronic format via a Contractor-hosted web portal. Please describe how bidder's solution meets or exceeds this requirement.	X			

Bidder Response:

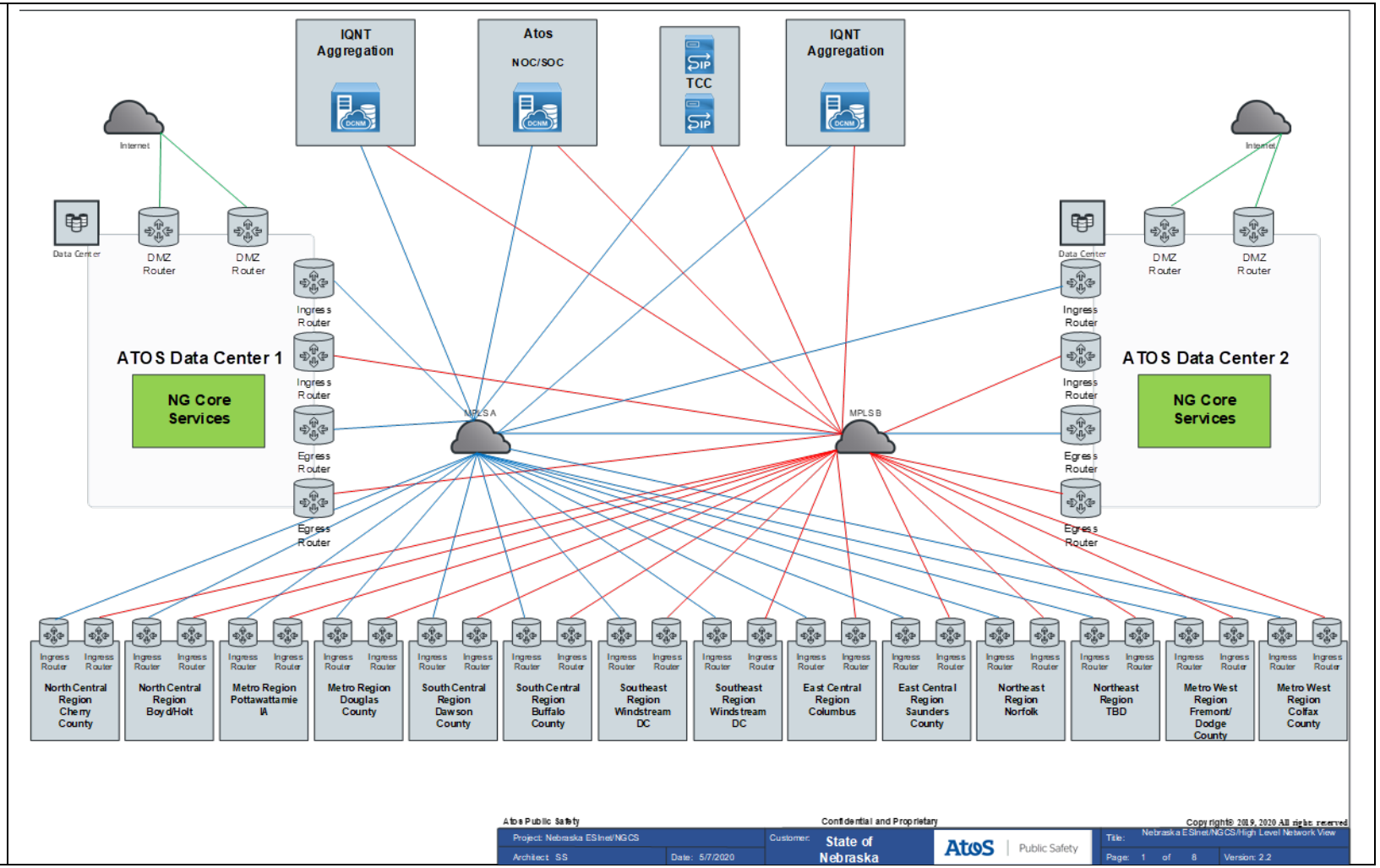
Atos will provide the Commission with complete ESInet/NGCS documentation as stated above. To ensure effective control and coordination throughout a project's lifecycle, Atos methodology includes provision of the following documentation as part of our standards practice:

- ***Scope of Work (SOW)*** — This document lists the products, services and other key information that will be provided to the Commission as a result of the contract award. This document describes the proposed solution and also typically includes high-level technical requirements, key assumptions, customer-provided products or services, and other critical information about the project; it is incorporated into the final contract between the parties
- ***Budget*** — The approved project budget is documented as part of the contract documents.
- ***Project Deployment Plan (PDP)*** — This roadmap from Project Initiation through Close Out formally documents the Commission's needs and objectives for the solution, its design, and Atos approach to implementing it. The PDP incorporates, minimally:
  - ***Project Management Organization and Key Contractor Staff***
  - ***Communications Plan and Meetings:*** *preferred communication mechanisms (e.g., audio, video, email, etc.) used during your project, identifying subjects, accountable people, and distribution frequency. Regular status reports, project meetings, and periodic executive reviews keep all stakeholders informed.*
  - ***Escalation Procedure:*** *During the course of a project, topics, problems and issues arise that require quick resolution. Those that have a significant impact on project scope or budget, or where there may be conflict between the requirements and the technical/service architecture will be high priority, so we document the escalation procedures to be used in such circumstances.*
  - ***Project Scope***
  - ***Planning, Implementation, Roles & Responsibilities***
  - ***RACI Matrix***

	o ***Project Phases & Deliverables*** o ***Test Plans*** o ***Solution Acceptance Criteria*** o ***Project Assumptions*** o ***Project Documentation*** *including drawings, diagrams, manuals, user guides, etc.* o ***Risk Management Plan:*** Identifying project risks to assess their impact and develop mitigation strategies and contingency plans. o ***Change Management Process:*** To control and manage changes during the project, this plan covers contractual commitments and the approval processes for reviewing change requests, approving changes, and communicating them to the appropriate personnel. o ***Project Schedule & GANNT Chart*** o ***Post Implementation Services Overview*** ➢ **Ongoing Support Plan:** This includes a process presentation and "handover to operations", SLAs and Services Reporting, Operational Support Phase Throughout the implementation process, Atos Project Manager use standard methodologies, tools, and processes to ensure that the project is tracking to the proposed schedule, within the proposed budget parameters, and according to the content and quality the State expects. Agreed upon format and delivery methods for documentation will be documented and adhered to as part of the process.

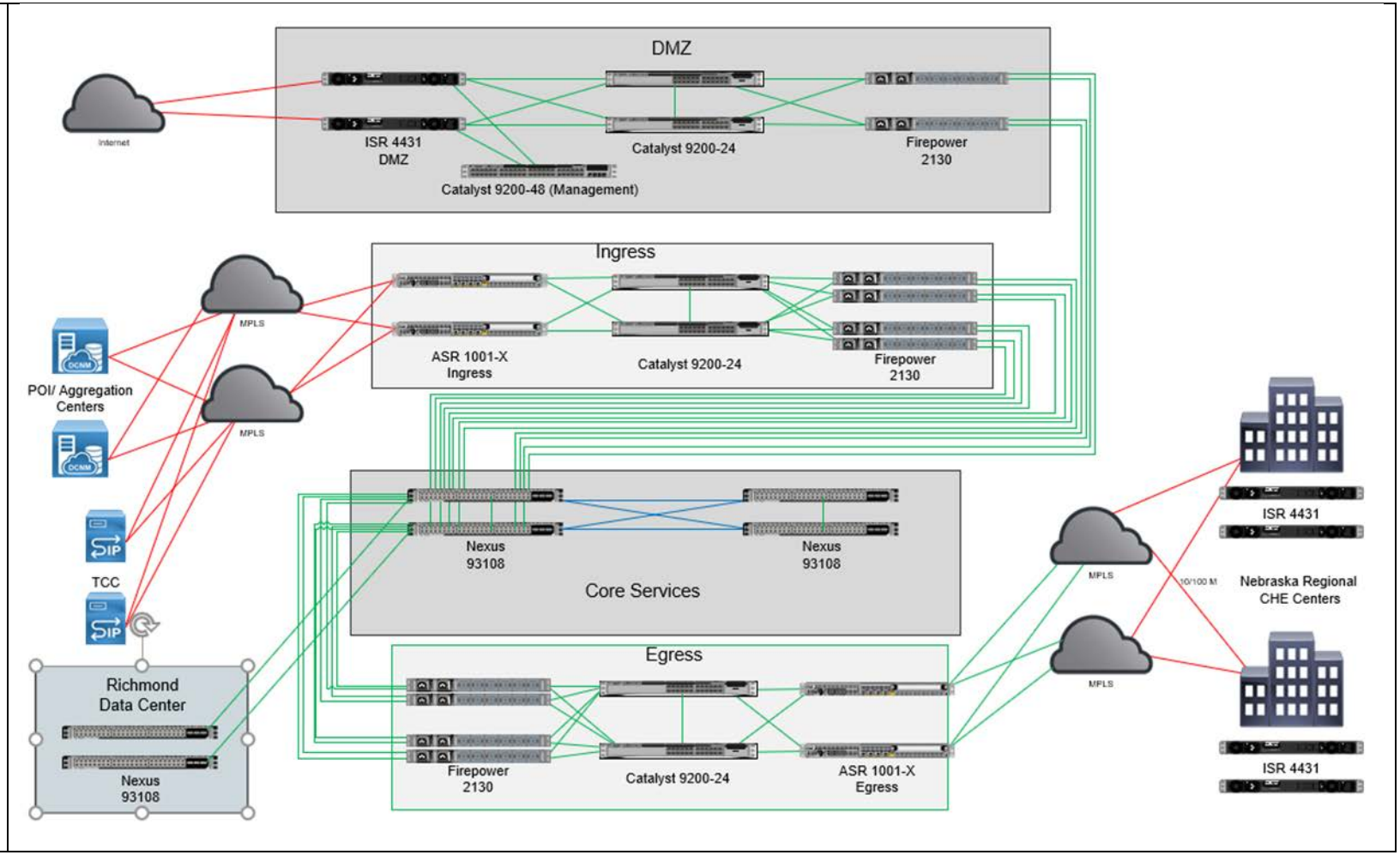
Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 1	**Emergency Services IP Network (ESInet)** **Diversity** The network shall be designed with diverse entrances (e.g., east-west entrances) into specified buildings that are part of the ESInet. This requirement shall apply to the core network sites, including data centers and PSAPs specified in Attachment A - PSAP Host End-Point Locations, Equipment List and Selective Router Locations. Primary and redundant links shall not share common routes, trenches, or poles. If last-mile facility or building construction is required, bidder shall so indicate. If this is not possible at a given location, indicate how bidder intends to provide redundant and resilient connectivity to that location. Describe how bidder's solution meets or exceeds the above requirement.	**X**			
	Bidder Response: The ESInet/NGCS will be housed at Atos data centers in Richmond, VA and Phoenix, AZ. These are Tier 3 (or better) data centers that are currently equipped with diverse fiber entrances. In addition to diverse MPLS circuits, Atos will provision dual, diverse 1 Gbps point-to-point circuits for direct connectivity between the core services switching backbones. For the connection of Reginal Call Handling Centers, Atos Public Safety will utilize all available fiber entrances and add new diverse access points in case diverse entrances do not exist today. All call-handling endpoints will have two edge routers for the termination of diverse MPLS circuits.				



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 2	**Emergency Services IP Network (ESInet)** **Network Design** Bidder shall design the physical network using the most robust facilities available. Use of fiber-optics is the preferred method for connectivity due to available capacity (bandwidth) and increased reliability. Given the amount of fiber-optic facilities and interconnections between the fiber-optic networks in Nebraska, the ESInet design should include as much fiber as possible, not only on the transport side but on the access side as well. Describe the design of proposed network with specific details on connectivity.	X			
	Bidder Response: Atos Public Safety will utilize fiber connectivity for our MPLS ESInet, connecting all state-of-the-art redundant aggregation and data center facilities. Atos will also utilize fiber connectivity whenever available for MPLS connectivity to the Regional Call Handling Centers. The proposed network includes Cisco ASR and ISR routers at all network demarcation points. Atos uses firewall security between our core components and 3rd party applications allowing entry into our core services only on a port by port assignment basis. We also use a DMZ firewall to secure access to our core services. All PSAPs will be equipped with redundant edge routers with embedded firewall features. These routers will terminate diverse MPLS circuits.				



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 3	**Emergency Services IP Network (ESInet)** **No Single Points of Failure** The mission-critical ESInet shall be designed with no single points of failure. All equipment shall include redundant processors and power supplies and be supported by an uninterruptible power supply (UPS) system and alternate power source in a properly conditioned environment. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: The Atos solution is fully redundant with no single points of failure. All equipment is racked with dual PDU's and UPS's and housed in state-of-the-art data centers and/or point of interconnection co-location sites. Atos includes redundant/diverse paths in our network design, uses primary and backup application modules running in active/active mode, operate with dual database instances running VM and utilizes geo-diverse redundant OSP aggregation points of interconnection. Every element of the Call Aggregation service is deployed to avoid any single points of failure. ➢ *Redundant and diverse network connections between the Call aggregation facilities and the ESInet/NGCS data centers.* ➢ *A pair of TDM POIs will be deployed in each LATA. Every OSP will connect to both POIs to allow redundant and diverse paths to the LNGs at the POIs.* ➢ *A pair of SIP POIs will be deployed at each of the two aggregation centers. These POIs will provide for redundancy and diversity.* ➢ *LNGs and BCFs are deployed in a redundant and diverse configuration. LNGs and BCFs are deployed in a redundant and diverse configuration. Each is capable of support 150% of the peak call volume of the state.* LNGs and BCFs are all interconnected via the Atos network. If the BCF that an LNG routinely delivers calls to is unavailable, the LNG can divert calls to any other BCF that is delivering calls to the Atos ESInet/NGCS data centers.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 4	**Emergency Services IP Network (ESInet)** **IPv4 and IPv6 Support** All network equipment shall be new and of current manufacture at the time of implementation. All servers, systems, routers, switches, and other network equipment shall support IPv4 and IpPv6 and have the capability to run dual protocol stacks. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: All proposed production networking equipment, including servers, routers and switches, is the latest in technology and are fully compliant to both the IP version 4 and IP version 6 standards as defined by the IETF.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 5	**Emergency Services IP Network (ESInet)** **Open Standards** Open standards-based protocols shall be used, and the use of proprietary routing protocols is prohibited. **Resiliency** Resiliency, or fast failover, may be achieved through the use of the Bidirectional Forwarding Detection (BFD) protocol as defined in IETF Request for Comments (RFC) 5880 and RFC 5881, or other standards-based, non-proprietary methods. Describe how the bidder's solution will achieve resiliency.	X			
	Bidder Response: No proprietary protocols are used in the proposed solution. Atos' ESInet is in compliance with the requirements set forth by NENA-STA-010.2-2016 and the Emergency Services IP Network Design for NG9-1-1 (NENA-INF016.2-2018). The NENA i3 standard is based on the Internet Engineering Task Force (IETF) framework for routing emergency calls as defined in Framework for Emergency Calling Using Internet Multimedia (RFC6443) and Best Current Practice for Communications Services in Support of Emergency Calling (RFC6881), which call upon a number of supporting IETF standards such as SIP (Session Initiation Protocol, RFC3261), LoST (Location-to-Service Translation Protocol, RFC5222) and HELD (HTTP-Enabled Location Delivery, RFC5985), among others. Dynamic routing protocols such as Border Gateway Protocol (BGP) and Open Shortest Path First (OSPF) with bidirectional forwarding detection are used to detect network anomalies and to re-converge the network as quickly as possible thereby providing the required level of resiliency and fast failover. We can also support the use of the BFD protocol to achieve network resiliency.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 6	**Emergency Services IP Network (ESInet)** **Multicast Routing and Switching** Routers and switches must support multicast routing and switching. The applicable base protocols are Internet Group Management Protocol (IGMP) and Protocol Independent Multicast (PIM). Describe how the solution meets or exceeds the above requirement.				X
	Bidder Response: The network components of the Atos solution support IGMP for IPv4 and Multicast Listener Discovery (MLD) for IPv6. In addition, PIM is supported. Note that the proposed ESInet and NGCS do not employ multicast transmissions.				

Any additional documentation can be inserted here:

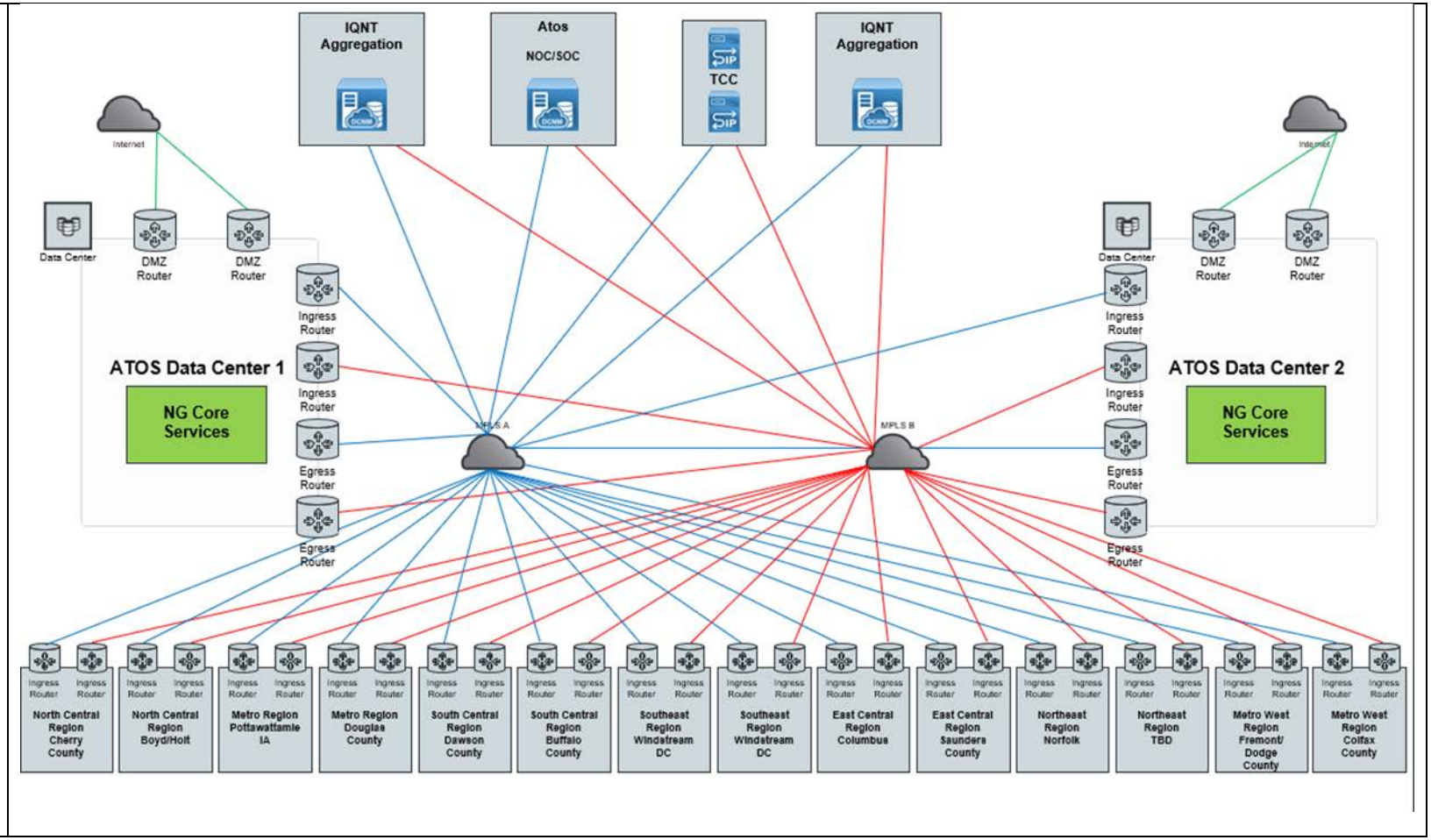
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 7	**Emergency Services IP Network (ESInet)** **Quality of Service (QoS)** The network equipment shall support Quality of Service (QoS) marking for prioritizing traffic in the network using the Differentiated Services Code Point (DSCP) protocol. While the network can change DSCP values through rules, the values typically are set by the system or functional element that originates the traffic. Network routers and switches shall not be configured in such a manner as to change DSCP values set by originating functional elements. Describe how the solution meets or exceeds the above requirement.	X			
	Bidder Response: Atos understands and complies with the QoS requirement. Our QoS settings will be applied by the originating host at the time the traffic is transmitted. Traffic entering the ESInet will have the QoS markings applied at the point of Ingress. Atos will not alter or modify any of the traffic markings once they have entered the network. The solution uses the following DSCP markings for traffic classes: ➢ QoS settings: DiffServ per RFC 2475 ➢ SIP signaling: AF12 ➢ Media traffic: EF ➢ HELD: AF12 ➢ LoST: AF12 ➢ Text-to-9-1-1: AF12 ➢ Monitor (Rest API): AF21 ➢ eBonding: Best Effort ➢ Logging: Best Effort ➢ SFTP: Best Effort				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 8	**Emergency Services IP Network (ESInet)** **ESInet Properties** The proposed ESInet shall be private, robust, scalable, secure, diverse, redundant, sustainable, and self-healing. Bidder shall propose a network solution for all host sites listed in Attachment A - PSAP Host End-Point Locations and any future identified regions throughout the term of the contract. Describe how the proposed system meets each of these individual requirements.	X			
	Bidder Response: Atos' ESInet solution used a private secure IP network. All locations are connected via redundant geo-diverse links. The network is self-healing through network routing protocols and policy routing rules. We use Border Gateway Protocol (BGP) convergence routing on the network layer and PSAP policy routing on the SIP layer.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 9	**Emergency Services IP Network (ESInet)** **Special Construction** Bidder is responsible for any fees incurred through system commissioning, construction permits, make-ready costs, and other subcontracted activity. **Use of Existing Network Assets** There is already a microwave network in place that may be used as a backup network, as well as other local and state-owned network assets that may be suitable for inclusion in the ESInet. The final network design may make use of any of these facilities that are determined by the bidder to be suitable for inclusion in the ESInet. The bidder may support the router configuration necessary to make use of these facilities. **Network Design Documentation** Provide a network or solution diagram that clearly depicts the bidder's proposed transitional and end-state designs for the ESInet.	X			
	Bidder Response: Atos' will contract with MPLS providers in the State to perform any construction required for circuit termination, physical security needs, power feeds, grounding and rack installation at the call-handling hosts sites, where needed. Atos is utilizing existing hardened data centers for our core ESInet/NGCS elements. A solution diagram is provided below. During negotiations, Atos would like to propose deploying the ESInet solution as an SD-WAN where additional levels of circuit redundancy could be used (such as the State's microwave network, Cellular, etc.).				



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 10	**Emergency Services IP Network (ESInet)** **Provide Network to Network Interface with Other IP Networks** Contractor shall provide an ESInet solution capable of interfacing with neighboring state and regional NG911 IP networks as they are established, and capable of transferring voice and data between PSAPs. Describe how the solution will meet these requirements.	X			

Bidder Response:

Atos supports ESInet to ESInet transfer and policy routing between ESInets by establishing IP connectivity using IPv6 and Border Gateway Protocol (BGP) as well as performing NENA protocol level configuration for stateful exchange and policy routing. An example of the steps that make up the ESInet to ESInet peering process are:

- Atos ASN (autonomous system number) is to be determined
- BGP MD5 password will be used. Atos will supply the BGP MD5 password.
- The peer will provide their ASN (non-RFC 6996 Private ASNs) to us
- Participating ESInets must exchange a list of network prefixes. Import policies will be programmed based on this information
- A hard limit will be placed on the number of routes that a peer may announce. The limit is based on the list of network prefixes plus a small safety margin
- The BGP neighbor peering will use IPv6 addresses provided by Atos
- Advertisement routes received with RFC 6996 Private ASNs in the path will be dropped
- Advertisement routes received containing our address space will be dropped
- Providers shall not re-advertise received routes
- Providers shall not advertise any default route
- The use of AS-PREPEND will be used to indicate preferred path
- BGP keepalive timer values are TBD
- BFD will be employed
  - Timer values TBD
  - BGP speakers must be BFD-capable

At the time of connecting to other ESInets, discussions with the respective providers will determine details regarding policies and expectations for each peer, as well as the specific BGP policies advertised.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
ESI 11	**Emergency Services IP Network (ESInet)** **Provide Network to Network Interface with Other IP Networks** **Connecting to Other IP Networks** At such time as neighboring ESInets and NGCS systems are able to interconnect and exchange traffic, Contractor shall establish such connections and provide routing and security to allow traffic to be exchanged with neighboring ESInets and NGCS systems, regardless of the respective vendors of those systems. Describe how the solution meets or exceeds the above requirement.	**X**			

Bidder Response:

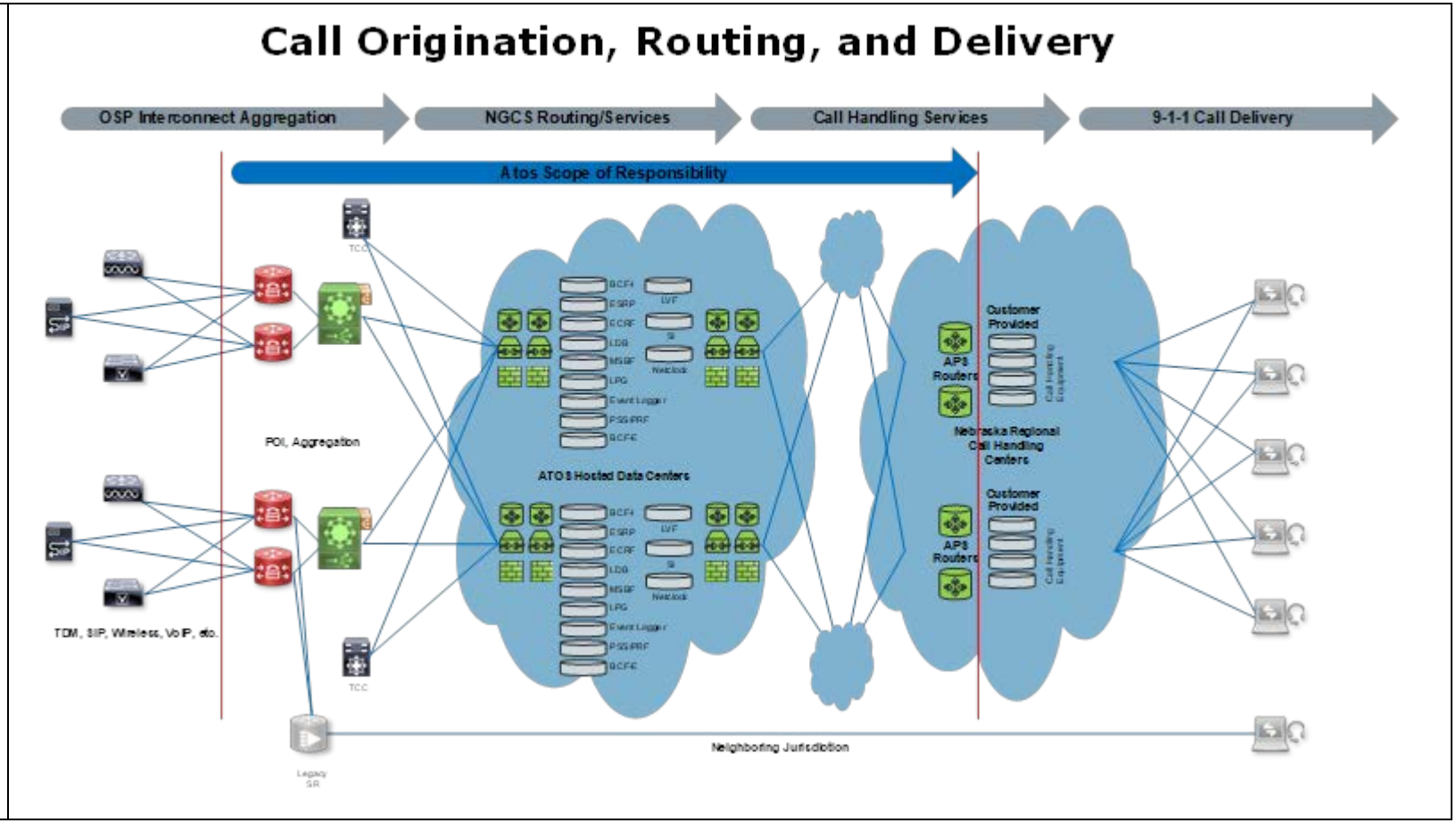
Atos supports ESInet to ESInet transfer and policy routing between ESInets by establishing IP connectivity using IPv6 and Border Gateway Protocol (BGP) as well as performing NENA protocol level configuration for stateful exchange and policy routing. An example of the steps that make up the ESInet to ESInet peering process are:

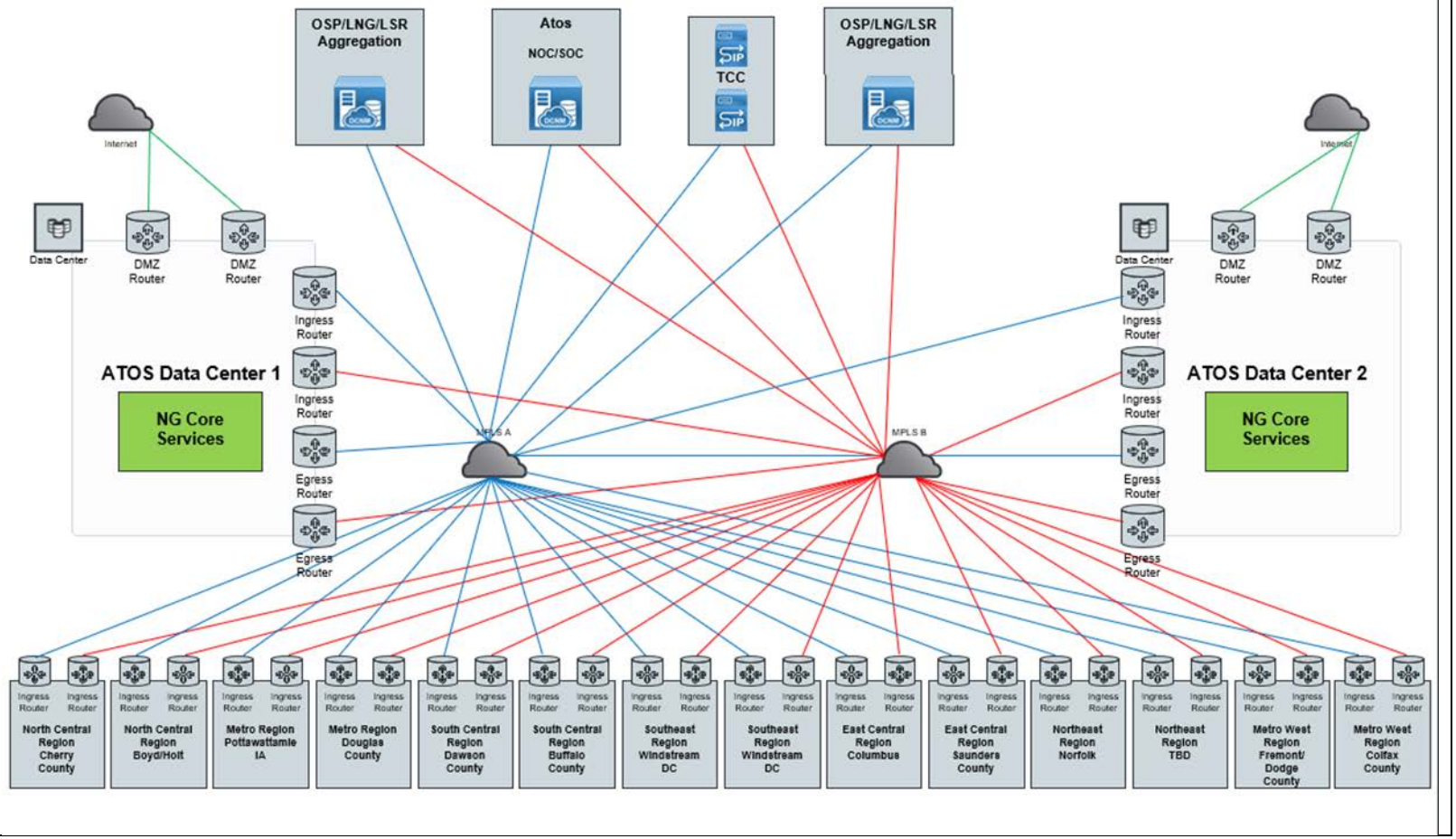
- Atos ASN (autonomous system number) is to be determined
- BGP MD5 password will be used. Atos will supply the BGP MD5 password.
- The peer will provide their ASN (non-RFC 6996 Private ASNs) to us
- Participating ESInets must exchange a list of network prefixes. Import policies will be programmed based on this information
- A hard limit will be placed on the number of routes that a peer may announce. The limit is based on the list of network prefixes plus a small safety margin
- The BGP neighbor peering will use IPv6 addresses provided by Atos
- Advertisement routes received with RFC 6996 Private ASNs in the path will be dropped
- Advertisement routes received containing our address space will be dropped
- Providers shall not re-advertise received routes
- Providers shall not advertise any default route
- The use of AS-PREPEND will be used to indicate preferred path
- BGP keepalive timer values are TBD
- BFD will be employed
  - Timer values TBD
  - BGP speakers must be BFD-capable

At the time of connecting to other ESInets, discussions with the respective providers will determine details regarding policies and expectations for each peer, as well as the specific BGP policies advertised.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 1	**Next Generation Core Services Elements (NGCS)** Provide a network or solution diagram that clearly depicts the bidder's proposed transitional and end state for the Commission's ESInet and NGCS, taking into account the hosts and PSAPs listed in Attachment A - PSAP Host End-Point Locations. The following functional elements and services be included: a. Originating Service Provider (OSP) Connectivity; b. Legacy Network Gateway (LNG); c. Border Control Function (BCF); d. Emergency Services Routing Proxy (ESRP); e. Policy Routing Function (PRF); f. Emergency Call Routing Function (ECRF); g. Location Validation Function (LVF); h. Spatial Interface (SI); i. Location Database (LDB); j. Discrepancy Reporting; k. Logging and Recording; l. Time Server; m. Alarm Integration; and, n Message Session Relay Protocol (MSRP). **Originating Service Provider (OSP) Connectivity** **Due Authorization** Bidder shall possess a certificate of public necessity to operate as a telecommunications provider in the state of Nebraska. The Contractor shall provide a copy of current certificate of public necessity prior to award of contract. **Identification of Service Providers Connected to the Legacy Selective Router** Contractor shall be responsible for identifying and for connecting all wireline, wireless, Voice over IP (VoIP), telematics, and other third-party service providers currently connected to the existing legacy selective router. Contractor shall be responsible for updating this information quarterly for the term of the contract. Bidder shall identify each service provider that will be utilized by Contractor.	X			
	Bidder Response: As can be seen in the diagrams below, all NGCS components are located in, and redundant across, two Atos-owned data centers. The ESInet/NGCS solution utilizes redundant originating network aggregation centers that are connected to POI's within the LATA's in Nebraska. Protocol Interworking Function (PIF) gateways for LNG and LSRG functionality are co-located within the aggregation centers. Circuits to the existing Tandem offices in Nebraska provide the interconnection for legacy selective routers. The aggregation centers provide support for all OSP connectivity to include wireline, wireless, VoIP traffic and multiline telephone systems. Atos will comply with providing a current certificate to operate as a telecommunications provider in the State. We will also comply with the identification of service providers connected to Legacy Selective Routers.				


Call Origination, Routing, and Delivery
OSP Interconnect Aggregation
NGCS Routing/Services
Call Handling Services
9-1-1 Call Delivery
Atos Scope of Responsibility
POI, Aggregation
TDM, SIP, Wireless, VoIP, etc.
ATOS Hosted Data Centers
Customer Provided
APS Routers
Nebraska Regional Call Handling Centers
Neighboring Jurisdiction



Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 2	**Next Generation Core Services Elements (NGCS)** **Interconnection and Commercial Agreements, and Trunking** **Originating Service Provider (OSP) Connectivity** Contractor shall be responsible for negotiating interconnection or commercial agreements, and for data and network connection arrangements with each service provider identified in requirement NGCS 1. Interconnection or commercial agreements shall cover subjects including, but not limited to, split rate centers and cell sectors, tandem-to-tandem connections to legacy selective routers and NGCS, Local Number Portability (LNP), National Number Portability (NNP), and Function of Code R (FoCR). Describe the process and provide timelines for meeting the requirements of this section, as well as the expected process for resolution of disputes.	X			
	Bidder Response: Once Atos has a Letter of Authorization from the State, the OSP outreach begins. An initial email to all OSPs introduces the migration to NG9-1-1 along with a high-level timeline for the planning, testing and turn up of the new system. The initial email is followed by a package with detailed information regarding the location of POIs (Points of Interconnect) and a standard ICA (Interstate Cooperative Agreement), if one is not already in place. The Atos NG9-1-1 Services Operations group then engages the OSPs and manages the process of getting the ICAs signed and a migration plan established. Typically, OSPs require 3 to 6 months after the initial notification to be interconnected to the Atos Aggregation Service. The first phase of migrations are those OSPs that have established network facilities to the POIs. These OSPs require only a cross connect to be installed. Thesecond phase are those OSPs that require ordering new network facilities. This can be required if the OSP is moving to a SIP interface to the NG system or if they don't have a network to the facilities hosting the TDM POIs. The third phase includes the "long tail" of OSPs. Invariably, there will be some OSPs that experience challenges in migrating and will therefore take longer than expected. Regardless of any issues encountered during this process, Atos will manage the transition from start to finish.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 3	**Next Generation Core Services Elements (NGCS)** **Originating Service Provider (OSP) Connectivity** **Management of OSP Connectivity** Contractor shall be responsible for managing moves, adds, changes, and deletions of the connections from the OSPs to the Contractor's systems for the term of the contract. Contractor shall allow for both Time-Division Multiplexing (TDM) and IP ingress to the network, proactively monitor these connections, and work with the respective service providers to resolve problems as they arise. Describe the process and provide timelines for meeting these requirements.	X			
	Bidder Response: Atos will deploy TDM POIs (Points of Interconnect) within the LATA to support OSPs that require a TDM SS7 interface. Atos will also deploy SIP POIs for those OSPs ready to move to SIP. All moves, additions and changes are included at no additional cost. This includes normal OSP network grooming and the migration from TDM to SIP. The Atos NOC monitors all calls from the time they are presented to the POIs to the delivery of the calls at the Atos ESInet/NGCS data centers. Atos takes responsibility for all communications with the OSPs. The Atos NOC takes all calls from OSPs as it does today for other customers. The NOC also handles communications to the OSPs, as required. The call aggregation service will be available 4 to 6 months after contract award.				

Any additional documentation can be inserted here

NGCS 4	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **LNG Description** The LNG is a signaling and media interconnection point between callers in legacy call-originating networks, i.e., Enhanced 911 (E911), and the NENA NG911 i3 architecture. The LNG shall log all calls it receives and processes and shall permit the uploading of daily log files to a network monitoring and management system for analysis. The LNG shall allow for ad hoc uploads of log files for troubleshooting and incident response. All call activity on both the legacy side (TDM) and the IP side of the LNG shall be logged. The LNG shall have Intrusion Detection System (IDS)/ Intrusion Prevention System (IPS) functionality to detect and mitigate Distributed Denial of Services (DDoS) attacks from both the TDM side and the IP side. Describe how the solution meets or exceeds the above requirements.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: Atos' solution collects LNG logs for TDM and SIP calls through i3 logging and performs network monitoring from the LNG. Security functions, such as IDS, IPS and DDoS will be performed at the ingress firewalls, before the traffic reaches the BCF-I (Ingress) of the NGCS at the Atos data centers. This allows Atos to mitigate any risks to NGCS data prior to entering the core services.				

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 5	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** Contractor shall provide redundant, resilient LNGs with legacy selective router gateway (LSRG) functionality to allow the legacy selective routers to transfer calls with Automatic Number Identification (ANI) and Automatic Location Identification (ALI) information to deployed NGCS and vice versa. Legacy functionality and components shall be in place and operational during the NG911 transitional phase until all 911 authorities and PSAPs served by the legacy selective router have completed the transition. Describe the steps bidder will take to meet the transition timelines and minimize overlapping network costs.	X			
	Bidder Response: Currently, the LNG will get ANI/ESRK/ESQK data and pass it to the ESRP via the BCF-I (Ingress). The BCF-I then applies the i3 SIP header to the call (NENA CALLID/Incident ID, service URN). This gets passed to the ESRP which performs the HELD query for location information from the LDB/LIS. In the case of a call transfer from the ESInet to a destination only reachable through a legacy SR, the LSRG extracts the destination phone number from the SIP header received from the ESRP and provides it to the legacy SR. The legacy SR then sends the call to the intended destination over TDM or analog circuits. Throughout the project transition, Atos will work with the all associated OSPs and the State to first develop a schedule and timeline for the transition. Once the project timelines have been defined, Atos will coordinate and manage the transition to assure minimal overlapping network costs.				

Any additional documentation can be inserted here

	Next Generation Core Services Elements (NGCS) **Legacy Network Gateway (LNG)** **Previous Work on Similar Solutions** 1. Explain how bidder has worked with legacy OSPs with similar solutions on similar projects. 2. Submit specific plans for working with established legacy 911 service providers in Nebraska.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 6		X			
	Bidder Response: In California, with a population of approximately 40 million and 9-1-1 call volume approaching 30 million per year, Atos Public Safety was selected by CalOES as their Prime Network Service Provider. In this role, we provide aggregation of all Originating Service Provider (OSP) traffic except wireless and major LECs. For other clients, Atos has had to integrate with local OSP in various counties, including interfacing with CAMA, T1 and SS7 circuits as well as SIP trunks in the regions. Atos makes it easy for OSPs to migrate from the existing 5 LSRs (Legacy Selective Routers) to 2 interconnect points into the NGCS. In Nebraska, the reduction in the number of interconnections required of OSPs doing business statewide is an important motivator. Deploying TDM POIs in every LATA makes it easier, especially when the TDM POIs are collocated with selective router tandem switches. Offering SIP interconnection is also very attractive to some of the OSPs. These features of the Atos service act as an incentive for the OSPs. Atos will also use other influencers when necessary. Early in the project Atos will engage the state regulatory body to brief staff on the planned migration. This will ascertain the level of support Atos can count on to encourage the OSPs to migrate. Atos will work to establish a relationship with the Public Safety and Homeland Security Bureau (PSHSB) of the FCC. While the PSHSB will likely not get engaged directly in any challenges that may be faced in migrating OSPs in Nebraska, keeping the Bureau up to date provides an additional point of influence.				

Any additional documentation can be inserted here

	Next Generation Core Services Elements (NGCS) **Legacy Network Gateway (LNG)** **Traffic Engineering Process** Describe the process that will be utilized to analyze the current trunk engineering for 911 traffic, and to validate any applicable trunk rebalancing for public-safety grade service.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 7		X			
	Bidder Response: During the migration planning, Atos will document current OSP interconnections and provide requirements for interconnecting to the Atos ESInet/NGCS solution. The solution requires that OSPs interconnect at two POIs for redundancy. Atos will work with the State to establish the bandwidth required for both interconnections. In Nebraska, migrating from 5 (single-sided) interconnections to just two provides the OSPs an opportunity to re-groom their network. Atos will work with OSPs to make their interconnections cost effective while ensuring the required grade of service.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 8	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Location Information** The LNG shall obtain location information to define, create, populate and send the correct Presence Information Data Format Location Object (PIDF-LO) parameter to the correct ESRP or terminating PSAP, as described within NENA-STA-010.2-2016. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Call-related data in the form of ANI/ESRK/ESRQ is delivered with legacy calls for subsequent location lookup in the NGCS LDB database. In conformance with NENA-STA-010.2-2016, the LNG PIF component that is part of the Atos NGCS solution interworks with legacy circuits and converts calls to SIP format. It inserts pANI/ANI into the SIP headers of legacy calls. This information is subsequently used by the ESRP for location queries (HELD) to the LDB which acts as a LIS. This location query results in an i3-compliant location result (PIDF-LO for fixed locations and reference for mobile locations). The location result is subsequently sent to the appropriate PSAP or external ESRP.				

Any additional documentation can be inserted here:

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		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 10	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Protocol Conversion** **External Interfaces** The LNG external interfaces shall comply with NENA-STA-010.2-2016, requirements SLA 1-23, and other applicable standards and requirements. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos' LNG complies with NENA-STA-010.2-2016 and all` SLA requirements. The LNG will terminate OSP legacy trunks and circuits from the OSPs and provide an interface between SS7, analog 9-1-1 (CAMA), and CAS and a SIP-based Next Generation 9-1-1 Core Services (NGCS) enabled network. IP-enabled traffic (SIP) will ingress through a firewall and terminate on the Border Control Function (BCF).				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 11	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Baudot Code Transcoding** The bidder's BCF solution shall support transcoding of Baudot tones to real-time text (RTT), as described in IETF RFC 4103. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos supports Baudot Code Transcoding through the BCF.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 12	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Callback Number** The LNG shall support obtaining the callback number associated with any pseudo ANI data that does not include the callback number. This may require the Contractor to obtain the callback number from the wireless or VoIP provider and may include additional recurring and non-recurring costs that are independent of this RFP. The Contractor shall be responsible for all recurring and non-recurring costs associated with this requirement. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The LNG systems included in the NGCS solution supports location queries required to resolve location information for pANI values (ESRD, ESRK, ESQK). To enable this capability, the ESME E2 interface to the MPC of the wireless carriers is required. Wireless service providers will connect their E2 interface into each data center to enable the LDB to retrieve location updates from the MPC.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 13	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Event Logging** The LNG shall facilitate logging of all significant events and 911 calls received and processed. Each call log shall contain all relevant parameters defined in Section 5.13.3 of NENA-STA-010.2-2016. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response The Atos ESInet/NGCS solution includes an i3-compliant event logging mechanism (ECaTS). This logging mechanism supports the log event types defined in Sec. 5.13.3 of the NENA-STA-010.2-2016 standard. A web-browser based reporting portal provides an extensive series set of i3 event log reports. The LNG generates the applicable i3 log events as specified in NENA-STA-010.2.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 14	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Extraction of Log Files** All LNG log files shall be capable of being extracted in near real-time and shall be in a format suitable for importing into a spreadsheet or word-processing program. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The LNG logs all calls it receives and uploads daily log files to a network monitoring and management system for analysis. Atos supports on demand and manual log collection through the SYSLOG (Sys Log Protocol) tool. All i3 log events are available to be searched and retrieved from the ECaTS i3 logger system included in the Atos ESInet/NGCS solution. All LNG system events are available to be searched and retrieved from the Splunk syslog system.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 15	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **High-Availability Design** The LNG solution shall be deployed in a high-availability design to meet public safety-grade resiliency and redundancy requirements, Section V.D.1.b. (General Requirements – Technical – Public Safety Grade). Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The Atos ESInet/NGCS solution utilizes redundant originating network aggregation centers that are connected to POIs within each of the three LATAs (644,646 and 958). Protocol Interworking Function (PIF) gateways for LNG and LSRG functionality are to be collocated within the Atos aggregation centers as a redundant pair. A pair of LNGs will be deployed at each aggregation center. Each LNG will have a primary BCF for call delivery; however, both LNGs and both BCFs will be connected to the Atos network. Either LNG can send calls to either BCF. Similarly, each BCF can send calls to the other BCF if network conditions dictate that.. This configuration allows for multiple call paths in the face of outages in an LNG, network connections between the LNGs and the BCF, or network connections between BCFs and the Atos ESInet/NGCS data centers.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 16	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Legacy Selective Router Gateway (LSRG) Functionality** The LSRG functionality shall support selective transfer, commonly referred to as "star code" transfers, made by legacy PSAPs for calls destined for the NextGen911 PSAPs or to neighboring legacy PSAPs outside of the ESInet. Describe how bidder's LNG solution provides for LSRG functionality.	X			
	Bidder Response: Atos will have a pair of LSRG in place to support OSP and ESInet migration for a defined period of time during production (12-18 months). Atos will build out ITTs (inter-tandem trunks, SS7) to legacy selective routers that service PSAPs that have not yet migrated to the Atos ESInet/NGCS solution. These ITTs will be in place until the PSAPs are serviced by one of the 7 pairs of regional call handling hosts. Once migration is complete, the ITTs will be decommissioned. The Atos OSP Aggregation network provides the connectivity between Atos NGCS and the LSRs. The LSRGs will also perform protocol conversion (i.e. SS7 to NG and NG to SS7). This could involve mapping information from one format to another. It is incumbent on the call handling hosts serving migrated PSAPs to provide the information necessary to determine the LSR that should receive the call. Similarly, for calls transferred from a legacy PSAP the transferring call handling system will be obligated to provide routing information.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 17	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Proposed LNG Locations** Provide the proposed locations for hosting the primary LNGs for the NextGen911 system, including the data center tier level for the host sites.	X			
	Bidder Response: Existing LNGs in Las Vegas and Chicago have been proposed. One of the two TDM POIs deployed in the each of the Nebraska LATAs (644,646,958) will be homed to Chicago and the other to Las Vegas. Redundant and diverse DS3s will be used to backhaul the calls from each TDM POI to the LNG. Atos data centers are in Richmond, VA and Phoenix, AZ with Atos aggregation meet-points in Las Vegas, NV and Chicago, IL. All data center and aggregation sites are tier 3 (or better) facilities.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 18	**Next Generation Core Services Elements (NGCS)** **Legacy Network Gateway (LNG)** **Charges for Dual Service** The bidder shall be responsible for meeting the timelines outlined above in requirement NGCS 2 and 3. If the transition from the legacy selective routers to NGCS exceeds the committed timeline, and is attributable to the acts or omissions of the Contractor, the Contractor will accept responsibility for financial support of the legacy network until such time as the full transition is complete. Describe how bidder's solution meets this requirement.	X			
	Bidder Response: Atos will utilize an existing pair of LNGs within the regions of Nebraska to support OSP migration and will meet the timeline requirements of the migration project.				

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 19	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **BCF Description** The BCF shall provide logical network security functions between external networks and the ESInet, and between the ESInet and PSAP networks. The BCF is responsible for numerous functions, including the following: a. Border firewall; b. VPN; c. IDS/IPS; d. Session Border Control (SBC); e. Opening and closing of pinholes; f. Limiting access to critical components through the use of VLANs; g. Call admission control; h. Media transcoding; i. Signaling protocol normalization and interworking; j. Network Address Translation (NAT); k. Codec negotiation; l. Support for QoS and priority markings; and, m. Media proxy. Provide details, including drawings, describing how the proposed BCF meets or exceeds all functions listed above and the requirements described in NENA-STA-010.2-2016, as well as additional firewall requirements described in NENA 04-503, NENA-INF-015.1-2016, and NENA 75-001, or the next subsequent version of the NENA documents listed that are publicly available at the proposal release date.	X			
	Bidder Response: The BCF provides robust security, routing and policy management, overload controls and SIP normalization. It also delivers IPv4-IPv6 interworking, high density media and transcoding. The BCF is engineered to support rapid scalability as well as the following features: ➢ Media transcoding ➢ Centralized call routing and policy management ➢ Support for IPv4 and IPv6 devices ➢ SIP message manipulation (SMM) to support legacy voice applications ➢ Call Admission Control (CAC) ➢ Security services to for compliance ▪ Session aware firewall; topology hiding ▪ Line rate DoS / DDoS, and Rogue RTP protection ▪ Line rate malformed packet protection ➢ High availability design ▪ 1:1 redundant system for service availability ▪ 1:1 redundant management / control ports ▪ 1:1 redundant media port				

	Support for QoS and priority markings are critical facets of any ESInet solution ensuring that the network elements apply consistent treatment to traffic flows as they traverse the network supported by applying QoS and prioritization. The factors contributing to the QoS and prioritization are: ➢ Network Quality—Availability, latency, jitter, packet loss, and QoS changes ▪ Bandwidth management ▪ Call admission control (CAC) per trunk group, per zone ▪ Per call statistics ▪ TOS / COS packet marking ▪ E9-1-1 support; priority call handling ➢ Voice quality—Objective quality measures such as MOS & R-Factor ➢ Signaling paths—Availability, Least Busy Route, Least Sustained rate, Post Gateway Ringing Delay (PGRD), Call Setup Delay, Call Tear Down Delay, SIP Registrars, etc.

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 20	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **High-Availability Design** The BCF solution shall be deployed in a manner to achieve 99.999 percent availability. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ESInet/NGCS solution proposed by Atos contains multiple levels of redundancy and resiliency to assure smooth operation of NG9-1-1 functions without any loss of service or interruptions including a geo-diverse solution. The BCF functions are deployed on a common virtual machine (VM) platform across multiple ESXi Hosts using high availability configuration operating in an active/active mode with no single points of failure and achieving 99.999% availability.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 21	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **Auditing of System Log Files** Management of the BCF shall include continuous auditing of the system log files for anomalies, and processes for responding to and managing security incidents. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The Atos solution contains a full array of tools that manage, log, monitor and alert on all activities within the core elements, in order to proactively identify error conditions, security concerns and general performance statistics of individual system components and the system as a whole. The BCF functionality allows for full auditing and log file extraction to proactively manage security incidences.				

Any additional documentation can be inserted here

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 22	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **Silence Suppression Detection** The BCF shall be capable of detecting when silence suppression is present in the 911 call and of disabling silence suppression if it is detected in the call. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: If silence suppression is detected, the BCF will continue delivery of call media in its natural state (silence suppressed or unsuppressed).				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 23	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **SIP Call Mediation** The BCF shall mediate all incoming 911 calls from VoIP providers to Session Initiation Protocol (SIP) calls and should be done in accordance with NENA-STA-010.2-2016. Any specific variations or non-compliance with this requirement shall be identified and documented below. Describe how the solution meets or exceeds the above requirements.				
	Bidder Response: The Atos ESInet/NGCS solution supports mediation of incoming 911 calls from VoIP Providers as per the NENA standard. Where necessary this will include conversion to G.711 codec for high quality SIP calls.	X			

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 24	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **Event Logging** The BCF shall provide the functionality to maintain logs of all 911 sessions and all additional BCF logging and recording requirements, as specified in NENA-STA-010.2-2016. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The BCF of the Atos ESInet/NGCS solution supports i3 event logging as per NENA-STA-010.2-2016.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 25	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **NAT/NAPT Detection and Mediation** Provide details on how the proposed Session Border Control (SBC) will recognize that a Network Address Translation (NAT) or Network Address and Port Translation (NAPT) has been performed on Open Systems Interconnection (OSI) Layer 3, but not above, and correct the signaling message for SIP.	X			
	Bidder Response: The Atos ESInet/NGCS solution supports NAT and NAPT and will recognize if either of those manipulations have been performed. The Atos solution design does not require NAT since we are using IPv6 on public interfaces and a private network for the Nebraska project.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 26	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **IPv4/IPv6 Interworking** Provide details on how the proposed SBC shall enable interworking between networks utilizing IPv4 and IPv6 through the use of dual stacks, selectable for each SBC interface, based on NENA-STA-010.2-2016. All valid IPv4 addresses and parameters shall be translated to/from the equivalent IPv6 values.	X			
	Bidder Response: The BCF (SBC) component of the Atos ESInet/NGCS solution supports dual stacks for IPv4 and IPv6, the support of SIP, SDP and RTP. All traffic native to the ESInet/NGCS will be transported as IPv6 with conversion taking place prior to the handoff to the Regional Call Handling CPE. The services of the solution can join an existing network in almost any transition state of the network (i.e., regardless of whether the network transition is in the planning stages or has already started). The term "Dual-IP" indicates a mode of operation in which IPv4 and IPv6 are available in parallel; the selection of the appropriate IP version is done on demand (e.g., on a per-call basis). Through the BCF interface, all valid IPv4 addresses are translated to IPv6 equivalent values allowing for seamless internetworking of addressing for all protocols necessary for handling 911 call.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 27	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **SIP Support Over Multiple Protocols** Provide details on how the proposed SBC shall support SIP over the following protocols: 1. Transmission Control Protocol (TCP), 2. User Datagram Protocol (UDP), 3. Transport Layer Security over TCP (TLS-over-TCP), and 4. Stream Control Transmission Protocol (SCTP). Protocols supported shall be selectable for each SBC interface to external systems. These transport layer protocols are generated and terminated at each interface to external systems.	**X** Comply with all except SCTP			
	Bidder Response: The BCF (SBC) component of the Atos ESInet/NGCS solution supports SIP over TCP, UDP and TLS-over-TCP protocols (among others), serving as the logical interconnect point for all ingress and egress IP traffic. Each protocol may be selected via the BCF interface and connected to external systems.				

Any additional documentation can be inserted here:

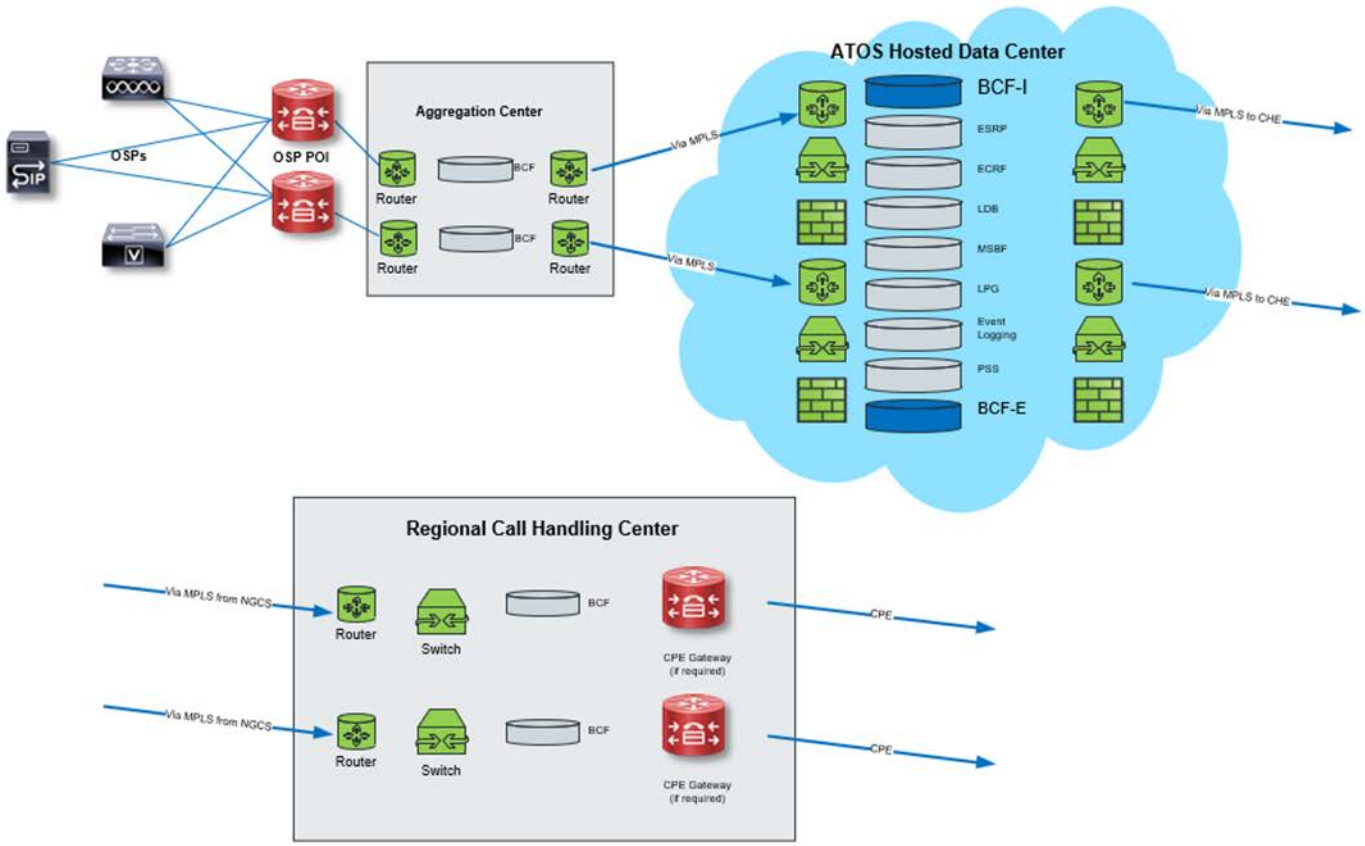
		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 28	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **Packet Prioritization Based on Session Type** Provide details on how the proposed SBC shall be capable of populating the Layer 3 headers, based on call/session type (e.g., 911 calls) in order to facilitate priority routing of the packets.	**X**			
	Bidder Response: The Atos provided BCF (SBC) platform has been managing VoIP traffic in high-volume traffic environments for over a decade, using industry-proven and standards-based methods to populate ESInet-specific Layer 3 headers and parameters in the SIP INVITE message. The BCF also provides special handling for Text-to-911 calls, passing the Session Descriptor Protocol (SDP) parameters and ensuring the transport of the Message Session Relay Protocol (MSRP) data packets analogous to voice or video media packets. The BCF supports setting of different priorities through the DiffServ mechanism based on traffic type as specified in section 3.7 of the i3 document Unlike traditional data firewall solutions, Atos BCF is specifically designed to provide VoIP traffic security. It terminates a SIP session on the WAN side of the BCF before entering the NGCS, ensures the traffic is originating from an authorized source, and inspects the SIP and media packets for protocol violations or irregularities. Only when the traffic is deemed valid is it passed on to the NGCS components. The BCF performs the necessary interoperability, security, management, and control capabilities to support SIP based i3 operations.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 29	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **Encryption of Unencrypted Calls** Provide details on how the proposed SBC supports encryption for calls that are not protected entering the ESInet, based on NENA-STA-010.2-2016.	X			
	Bidder Response: All interfaces are encrypted in the Atos ESInet/NGCS solution. Our BCF enhances network security by providing SIP-aware security functionality including dynamic RTP / SRTP pin-holing through its internal firewall, stateful SIP protocol validation, DoS / DDoS mitigation, and network topology hiding. It also supports TLS encryption on core and access-side SIP signaling interfaces as well as SRTP media encryption on a termination / mediation or pass-through basis, all of which will provide for ESInet security against incoming calls that are unprotected.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 30	**Next Generation Core Services Elements (NGCS)** **Border Control Function (BCF)** **BCF Elements** 1. Provide details, including drawings, describing the different BCF elements that the proposed solution comprises. 2. As part of the details, identify all of the elements and/or interfaces to be provided by the Commission and/or PSAPs to the bidder.	**X**			
	Bidder Response: As depicted in the diagram below, BCFs will be placed at each Aggregation Center before the handoff from the OSPs, this is the entrance to the ESInet. The Atos ESInet/NGCS solution also has two redundant pairs of BCFs per data center at the ingress point to the NGCS core as well as two redundant pairs of BCFs per data center at the egress point of the NGCS core. The Commission will be responsible to provide the LAN connectivity, as well as the necessary racks and power for the BCFs that will be located at the Regional Call Handling Centers.				



Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 31	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **ESRP Description** The ESRP routes a call to the next hop. It also evaluates the originating policy rules set for the queue the call arrives on, extracts the location of the caller from the SIP signaling, queries the Emergency Call Routing Function (ECRF) for the nominal next-hop route, evaluates the route based on policy rules and queue states of the downstream entity queues, and then forwards the call to the resulting next hop. Bidder's proposed ESRP must meet or exceed NENA-STA-010.2-2016. Describe how the proposed solution meets or exceeds the standards.	X			
	Bidder Response: The OpenScape First Response Emergency Services Routing is Atos Public Safety's product offering for the Emergency Services Routing Proxy (ESRP) function within the ESInet/NGCS. The ESRP is located at the heart of the ESInet/NGCS and provides emergency call routing services. An emergency call arrives at the ESRP from the Border Control Function (BCF) or another ESRP. The Atos ESRP makes routing decisions based on information in the incoming SIP INVITE message (possibly including the caller's location), on information returned from routing databases, and the routing policies in effect at the time of the call. The ESRP makes what is referred to as 'next-hop' decisions and routes the call to the appropriate Regional Call Handling Center providing host services for the designated PSAP or to another ESRP for further routing. One of the legitimate outcomes of a policy routing decision may be to provide busy treatment to the caller. The ESRP relies on the Policy Routing Function (PRF), as defined by NENA-STA-010.2-2016 and the ETSI/EENA Long-Term Definition document. A number of conditions are defined that the ESRP will consider when making routing decisions. These decisions are broken down into the origination policy and the termination policy. The origination policy is executed prior to determining the next hop for the call by querying the ECRF. Once the next hop has been determined, the termination policy for that destination is applied. Routing conditions are administrable on centralized Policy Store Services (PSS) and are checked in a priority order as defined by the administrator.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 32	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **Transition to Geospatial Routing** Bidder understands that all PSAPs and regions may not be ready for geospatial routing on day one of operations and shall provide tabular routing services, also known as Internet Protocol Selective Routing (IPSR), until such time as PSAPs and regions are ready for geospatial routing. In bidder's separate cost proposal response, indicate the pricing difference between tabular and geospatial routing. Describe the process for transitioning each PSAP or region from tabular routing to geospatial routing as PSAP's becomes ready and the manner in which the solution provides for routing by both means simultaneously.	X			
	Bidder Response: Atos' partner, GeoComm, currently manages GIS data for the majority of Nebraska Counties and regions. GeoComm strongly recommends using the MCS (MSAG Conversion Service) and GIS MSAG Delta processing service to support the transition process to i3. GeoComm ECRF can support either legacy fields or i3 compliant fields based in CLDXF. The ECRF can be ready to provide geospatial routing information at initial cutover. MCS supports legacy CPE and LDB database in the transition of records from MSAG-based address to PIDF-LO by using the GIS data. MCS is a web service defined by NENA for the transition from legacy to i3 systems. GIS MSAG Delta services include one-time services to build a GIS-derived MSAG as well as MSAG delta processing services to assist the State with maintaining ongoing synchronization between the State's NG9-1-1 Road Centerline layer and the GIS derived MSAG used by the LDB.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 33	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **Policy Routing Function (PRF) Description** The PRF is a required function of the ESRP. The ESRP interacts with the PRF to determine the next hop of a call or event. Before the ESRP sends the call to the next hop, it first queries the PRF to check the status of the next hop to determine if a unique routing rule or policy is in place that would direct the call to another location. The destination of the next hop is typically a queue. The PRF monitors the downstream queues of ESRPs for active understanding of the entity's queue status. Describe how the solution meets or exceeds the standards.	X			
	Bidder Response: The Policy Routing Function (PRF) has been implemented in the ESRP according to the i3 standards, including originating rules/policies, terminating rules/policies, rule priority and determination of the normal-next-hop. Routing policies are retrieved from the central Policy Store Server (PSS). The policy syntax and interface to the PSS is compliant to the i3 standards. The ESRP interfaces to the third-party ECRF for retrieval of the next-hop destination. The interface to the ECRF is the Location to Service Translation (LoST) protocol as specified by the i3 standards. The ESRP also contains both the server- and client-side functions necessary for exchanging state information with other nodes in the network via SIP SUBSCRIBE/NOTIFY event packages, as specified by the i3 standards. This includes element state, service state, queue state and security posture events.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 34	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **PRF Policy Store and User Interface** The PRF shall allow defining of policy rules for distributing a wide range of calls in an efficient manner. 1. Describe the solution's Policy Store and the PSAP's ability to effect changes to the PRF. 2. Describe the user interface, role-based authentication, the ability of each PSAP or region to manage PSAP's own policy rules, and the types of policy rules available at the time of proposal submission, as well as those on the product roadmap. Roadmap items must include an estimated time of feature availability.	X			

Bidder Response:

Wherein all OpenScape platforms utilize IPSec based authentication protocols, biometric authentication may be provisioned at the PSAP if so requested. Users will have a single sign-on (SSO) which must authenticate against no less than two (2) steps. The first step of authentication is via specific password conforming to Atos and PSAP policy. Once this is achieved, the second stage of authentication is performed; depending on PSAP policy and preference, this can be done via RSA key or on-screen biometrics. After successful authentication, the user will be able to adjust policy rules, including attributes pertaining to policy request and response, associated agency name(s) and specific policies for each, status and specific timeframes, which are configurable through the user interface.

Policy rules available include:

- Time of Day
- Call Suspicion
- LoST URN
- Request URI
- Normal-Next Hop
- Location
- MIME Body Type
- MIME Body Contents
- SIP Responses
- Element State
- Service State
- Queue State
- Security Posture
- SIP Header Contents
- Additional Data present
- Call Source
- Incoming Queue

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 35	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **Next-Hop Queues** A next-hop queue may be a Uniform Resource Identifier (URI) that routes the call to an interactive multimedia response system (as described in IETF RFC 4240) that plays an announcement (in the media negotiated by the caller) and potentially accepts responses via Dual-Tone Multi-Frequency (DTMF) signaling or other interaction protocols. Describe how the bidder's solution implements next-hop queueing.	X			
	Bidder Response**:** The PRF functionality in the ESRP accommodates the next hop routing model according to policy definition. The MSBF (Media Services Bridge Function) supports DTMF or voice responses to prompts in order to control the next hop of the call routing process.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 36	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **High-Availability Design** The ESRP/PRF solution shall be designed with resiliency and redundancy to provide a minimum of 99.999 percent availability. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ESRP / PRF resides in the OpenScape Emergency Router (OSER) which is designed for 99.999% availability and runs in an active-active array which gives the highest degree of resiliency and redundancy at no extra cost. Each Atos data center will contain a redundant pair of OSER instances. The OSER has been designed from the ground up to be extremely resilient. Its original architecture was designed as a carrier grade SIP switch. The Policy Store Services (PSS), which will be used to maintain and administer policies, uses a Kubernetes cluster architecture. Each data center will be equipped with a cluster built with a minimum of three master and three worker containers spread across a minimum of three ESX hosts. The PSS Database will be replicated between the clusters in each data center.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 37	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF)** **Keep-Alive Signaling Between Elements** Provide an explanation of how the proposed ESRPs use the SIP "options" transactions for maintaining "keep -alive" signaling between ESRPs, LNGs, Legacy PSAP Gateways (LPGs) and session recording services.	X			
	Bidder Response: The Atos ESRP contains a mechanism to 'ping' external nodes (PSAPs, LPGs, BCFs, other ESRPs) using the SIP OPTIONS method. The time intervals and which nodes to include in this mechanism are administrable. This is all per the published i3 standards.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 38	**Next Generation Core Services Elements (NGCS)** **Emergency Service Routing Proxy (ESRP) and Policy Routing Function (PRF** **TCP/TLS Implementation** The upstream interface on the proposed non-originating ESRPs shall implement Transmission Control Protocol/Transmission Layer Security (TCP/TLS), but shall be capable of fallback to UDP, as described in NENA-STA-010.2-2016. Stream Control Transmission Protocol (SCTP) support is optional. The ESRP shall maintain persistent TCP and TLS connections to the downstream ESRPs or User Agents (UA) that it serves. Provide detailed documentation describing how the non-originating ESRP interface supports TCP/TLS with fallback to UDP.	X			
	Bidder Response: Both TCP / TLS and UDP protocols are supported regardless of the downstream ESRP user agent served.				

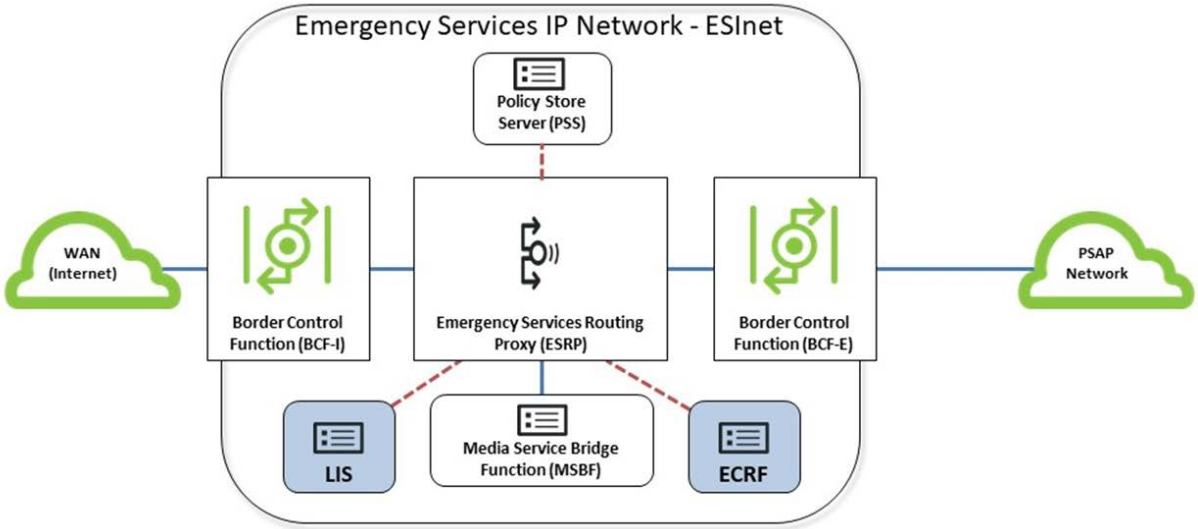
Any additional documentation can be inserted here:

NGCS 39	**Next Generation Core Services Elements (NGCS)** **NENA Compliance Chart** Provide a description of how the proposed ESRPs meet or exceed all functional requirements below as defined in NENA-STA-010.2-2016, which are listed below.	X			

Bidder Response:

The OpenScape First Response Emergency Services Routing Proxy is Atos' product offering for the Emergency Services Routing Proxy function within an Emergency Services IP Network (ESInet).

The Emergency Services Routing Proxy (ESRP) sits within the ESInet and provides emergency call routing services. An emergency call arrives at an ESRP from a Border Control Function (BCF) or another ESRP via the Atos BCF.



The ESRP makes routing decisions based on information in the incoming INVITE message (possibly including the caller's location), on information returned from routing databases, and the routing policies in effect at the time of the call. The ESRP makes what is referred to as a 'next-hop' decision and routes the call to the Regional Call Handling Center responsible for the designated Public Safety Answering Point (PSAP) or another ESRP for further routing. One of the legitimate outcomes of a policy routing decision may be to provide busy treatment to the caller.

The Emergency Services Routing Proxy is implemented based on the NENA i3 Architectural specifications and the ETSI/EENA Long-Term Definition document. Features available in the ESRP include the following:

- Configurable for NENA-based or ETSI/EENA-based ESInets
- Selective Router Replacement
- Service URN handling
- Location Service Translation (LoST) Query handling
- Location-URI dereferencing using HTTP-Enabled Location Delivery (HELD)

- Pseudo-ANI (pANI) dereferencing using HTTP-Enabled Location Delivery (HELD)
- ESInet-specific SIP parameter handling
- ESInet MIME handling
- Handling of Message Session Relay Protocol (MSRP) Text-to-911 Calls
- Policy Routing Functions
  - Time Conditions
  - Call Suspicion Condition
  - Request-URI Condition
  - Normal Next-Hop Condition
  - LoST Service URN Condition

Policy Routing Function

The heart of an Emergency Services Routing Proxy is the Policy Routing Function (PRF), as defined by NENA-STA-010.2-2016 and the ETSI/EENA Long-Term Definition document. A number of conditions are defined which the ESRP will consider when making routing decisions; these decisions are broken down into the origination policy and the termination policy. The origination policy is executed prior to determining the next hop for the call by querying the ECRF. Once the next hop has been determined, the termination policy for that destination is applied. Routing conditions are administrable on the ESRP and are checked in a priority order as defined by the administrator. The following routing conditions are some of the conditions supported by the ESRP:

- **Time Period Condition:** A time period condition can be defined, using start time, end time and repetition information. A time period condition might be used in cases where a PSAP is not staffed around-the-clock, and another PSAP takes over call answering responsibility after hours.
- **Call Suspicion Condition:** A condition can be set on the spam-score or call-suspicion value of the call being routed by specifying a from-value and a to-value; an example would be to route a call suspected of being malicious (i.e. with a high suspicion value) to a specific answering queue
- **Request-URI Condition:** A condition can be set to trigger on the URI associated with the call. Normally this would be a service URN, but could also apply to non-emergency calls (such as administrative lines) that transit the ESInet
- **Normal Next-Hop Condition:** A condition can be set to trigger on the next-hop value returned by the LoST query made to the ECRF.
- **LoST Service URN Condition:** A LoST Service URN condition can be specified that triggers on whether or not the result of the LoST query to the ECRF was successful. If the query was successful, the call is routed using the value returned by the ECRF. The use of this condition represents the standard default routing applied by the ESRP.

Any additional documentation can be inserted here:

	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
Overview Section 5.2.1.1	X			

Call Queueing Section 5.2.1.2	X			
Queue State Event Package Section 5.2.1.3	X			
De-queue Registration Event Package Section 5.2.1.	X			
Policy Routing Function Section 5.2.1.5	X			
ESRP Notify Event Package Section 5.2.1.6	X			
INVITE Transaction Processing Section 5.2.1.7	X			
BYE Transaction Processing Section 5.2.1.8	X			
CANCEL Transaction Processing Section 5.2.1.9	X			
OPTIONS Transaction Processing Section 5.2.1.10	X			
Upstream Call Interface Section 5.2.2.1	X			
Downstream Call Interface Section 5.2.2.2	X			
ECRF Interface Section 5.2.2.3	X			
Location Information Server (LIS) Dereference Interface Section 5.2.2.4	X			
Additional Data Interfaces Section 5.2.2.5	X			
ESRP, PSAP, Call-Taker State Notification and Subscriptions Section 5.2.2.6	X			
Time Interface Section 5.2.2.7	X			
Logging Interface Section 5.2.2.8	X			
Data Structures Section 5.2.3	X			
Policy Elements Section 5.2.4	X			
Provisioning Section 5.2.5	X			

NGCS 40	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** Describe how the ECRF interfaces with other ECRF solutions which may interface with the bidder's solution. Awarded Contractor shall coordinate with other ECRF solution providers to ensure interoperability between the respective solutions.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: The ECRF is designed and tested to support recursive queries within an ECRF hierarchy. This will allow for interoperability with neighboring states, sub-state level regions that choose to operate their own ECRF, ECRF/Forest Guide operated by an OSP or a national Forest Guide.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 41	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **ECRF Description** The ECRF shall be designed according to NENA-STA-010.2-2016 and be implemented using diverse, reliable and secure IP connections. Describe how the solution meets or exceeds the above requirements.	X			

Bidder Response:

The ECRF and LVF:

- Provide fast, secure, and reliable core network ECRF services for NG9-1-1
- Enable fast geo-spatial 9-1-1 call routing and location based selective transfers
- Provide industry standard i3 location validation
- Include an ad-hoc routing boundary editor
- Include a Network Operations Center (NOC) dashboard, and monitoring and reporting capabilities
- Were tested for interoperability at NENA ICE1-8, and EENA/ETSI Plugtest #1
- Support NG9-1-1 additional data discovery
- Accept NENA i3 standardized Spatial Interface (SI feeds) for ingesting GIS updates
- Support NENA i3 event logging, SNMP, as well as raw log data outputs for third party monitoring and logging solutions

The ECRF and LVF solution is designed for flexibility, consistency, security, and scalability. It consists of four high-level components:

- ECRF and LVF Web Service: the engine that services LoST (Location to Service Translation) queries
- GIS Database: centralized, highly available source of GIS data for servicing LoST queries
- Provisioning: services for loading and updating GIS data from GIS Data Hub into the GIS database
- Dashboard and Ad-hoc Routing Web Applications: web applications for monitoring system health and creating ad-hoc routing boundaries

GIS Data is provisioned in one of two ways:

1. Bulk load of a full GIS dataset from GIS Data Hub, or,
2. Incremental update provisioning through the NG9-1-1 GIS data management SI Feed

Generally, bulk loads would occur during the initial system set up and incremental update provisioning would occur after cutover. Regardless of the method, provisioning is performed without interruption to the ECRF and LVF Web Services running in the same cluster and is coordinated to ensure data is consistent across clusters.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 42	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **High-Availability Design** Bidder shall supply an ECRF function that meets a minimum of 99.999 percent availability. Describe how the solution meets or exceeds the above requirements**.**	X			
	Bidder Response: The ECRF's architecture is a load balanced, fault tolerant system of GIS servers, database servers, and web servers deployed using docker containers and Kubernetes, with no single point of failure, and is capable of 99.999% uptime when deployed across multiple data centers. To meet the 99.999% up time requirement the system is designed with N+1 capacity and redundancy on all tiers. The system is designed to handle 50k requests per hour even during a maintenance event or a component failure.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 43	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Accessibility by Outside Functional Elements** Contractors providing an ECRF shall ensure that it is accessible from outside the ESInet and that the ECRF permits querying by an IP client/endpoint, an LNG, an ESRP in a next-generation emergency services network, or by some combination of these functions. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ECRF responds to LoST queries defined in the Internet Engineering Task Force (IETF) Request for Comments (RFC) 5222, established in NENA-STA-010.2-2016. To discover a service URI for a particular location, the LoST protocol specifies a <findService> request. The ECRF responds to <findService> requests as well as other LoST protocol requests. The ECRF is provisioned with the changes to the GIS dataset supplied by GeoComm SI. Authorized i3 functional elements, such as an NG9-1-1 ESRP, may query the ECRF with a geodetic or civic location and a service URN describing the type of service requested, in a LoST <findService> request. The ECRF queries the GIS database that has been provisioned to discover and return a service URI, which is used by the ESRP to send the call to the correct next hop destination. While the ECRF may technically be accessed both from inside and outside the ESInet, for security purposes it is not recommended that the same ECRF cluster is accessible both inside and outside the ESInet. If the State requires an ECRF which is accessible from outside the ESInet, we recommend deploying a separate ECRF cluster. We further recommend that the ECRF outside the ESInet be deployed at a later date, after the overall structure of the relationship(s) with the originating service provider(s) has been established.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 44	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Accessibility Inside the ESInet** Contractor shall provide an ECRF accessible inside an ESInet, which shall permit querying from any PSAP (or future entity authorized to connect to the ESInet) inside the ESInet. ECRFs provided by other entities may have their own policies regarding who may query them. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ECRF can be queried by any entity authorized to connect to the ESInet. The ECRF is fully compliant with all standard call types.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 45	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Origination Network ECRF** An origination network may use an ECRF, or a similar function within its own network, to determine an appropriate route—equivalent to what would be determined by the authoritative ECRF—to the correct ESInet for the emergency call. Describe the functionality of such an ECRF equivalent and document where this functional element resides within the proposed solution.	X			
	Bidder Response: An origination network may query an external ECRF, use its own forest guide or use the national forest guide. In the event an OSP would like GIS call routing data in their own solution, they would be able to use the supplied NENA i3 compliant SI to update GIS data within their network.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 46	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Routing Query Interface** The ECRF shall support a routing query interface that can be used by an endpoint, ESRP or PSAP to request location-based routing information from the ECRF. Additionally, it shall support both iterative and recursive queries to external ECRF sources. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: As detailed in RFC 5222, the ECRF supports iterative and recursive LoST queries to other ECRFs that provide appropriate geographic coverage, or to the Forest Guide. The ECRF may also be queried by authorized ESRP and PSAP equipment.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 47	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **LoST Protocol Support** The ECRF shall interface with the Location-to-Service Translation (LoST) protocol (as described in IETF RFC 5222) and support LoST queries via the ESRP, PSAP CHE, or any other permitted IP host. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ECRF is an IETF 5222 compliant LoST Server that provides the NENA i3 functional elements of ECRF as specified in NENA-STA-010.2-2016,. There are many related RFCs that define how the ECRF operates, including PIDF-LO, RFC 4119 and its revision RFC 5139. The ECRF responds to LoST queries defined in IETF RFC 5222 to discover a service URI for a particular location, the Atos ECRFaccepts a<findService> request. The ECRF responds with a <findServiceResponse> . The ECRF is provisioned with the aggregated GIS dataset supplied by the GIS Data Hub. Authorized i3 functional elements, such as an NG9-1-1 ESRP, may query the ECRF with a geodetic or civic location and a service URN describing the type of service requested, in a LoST <findService> request. The ECRF queries the GIS database that has been provisioned to it in order to discover and return a service URI, which is used by the ESRP to send the call to the correct next hop destination.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 48	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Query Rate-Limiting** The proposed ECRF shall allow for rate-limiting queries from sources other than the proposed ESRP(s), and provide logging of all connections, connection attempts, and LoST transactions. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The ECRF may be configured to rate-limit queries. The ECRF queries are sent to a URL with high priority. All other queries (from a source other than the ESRP or other authorized LoST client) are sent to a different URL with a lower priority. The ECRF has several logging mechanisms to facilitate transaction auditing, debugging, and activity monitoring. Diagnostic logs exist for all servers in the system, tracking any internal server errors that occur, which can then be analyzed for configuration and server errors. All LoST transactions are logged as well for a complete archive of activity. In addition, the logging mechanisms include i3 compliant log event reporting, meaning that within an ESInet, the ECRF can send request/response logs to an i3 compliant logging service. Finally, the ECRF includes a browser-based dashboard that shows current activity, generates transaction reports, and views the logs directly. Atos' compliance with this requirement is predicated on the interpretation of "connection attempts" defined as connection attempts which hit the ECRF load balancer only.				

Any additional documentation can be inserted here:

	Next Generation Core Services Elements (NGCS) **Emergency Call Routing Function (ECRF)** **Supported Functions** The ECRF shall support each of the following items. Describe how the solution meets or exceeds each of the requirements below:	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 49	Bidder Response: ***Logging all connections, connection attempts, data updates, ECRF query results and LoST transactions*** The ECRF has several logging mechanisms to facilitate transaction auditing, debugging, and activity monitoring. Diagnostic logs exist for all servers in the system, tracking any internal server errors that occur, which can then be analyzed for configuration and server errors. All LoST transactions passing through the ECRF are also logged, for a complete archive of activity. As part of the SI proposed to the State, GIS data updates will include QA/QC measures performed on the statewide dataset aggregated by GIS Data Hub. This will include reporting to outline update start time, completion time, update outcome, etc. Connection and connection attempt logging may be enabled by a network technician for trouble shooting. Connection and connection attempts logging are disabled by default. ***Location Error Correction*** The ECRF is highly configurable for routing locations that fall into a gap or overlap beyond using a default route. A buffer tolerance is set that allows for a gap or overlap to not return a default route. If the input is a point, reference the multiple match policy to identify the error. The policy would be either Return First, Return Limit Warning, or Return Error. In the case of Return Limit Warning, there is an additional configuration value which dictates the maximum number of results to return. If there are more results to return than the established threshold, the response will include a warning. The default response warning is Return First. If the input is a polygon, a user may reference the polygon multiple match policy to identify the error. The policy would be either Return First, Return Area Majority, or Return Error. In the case of Return Area Majority, there is an additional configuration value which indicates the maximum number of results to return. If there are more results to return than the established threshold, the response will include a warning. The default response warning is Return Area Majority with results listed in order of largest overlap to smallest. ***Updates from the SI in near real-time with no degradation of LoST services*** The ECRF and LVF both connect to a NENA compliant Spatial Interface (SI) an accept transactional updates without any disruption of services. The GIS Data Hub takes care of the GIS User interface that manages the QC process, once data passes QC it is provisioned into the Spatial Interface. Updates normally move from the Spatial Interface in the live ECRF call routing data within 30 seconds. Atos also provide a bulk load option for both ECRF and LVF that doesn't impact service availability. ***Routing of calls based on geographic coordinates, geodetic shapes and civic addresses***	X			

	The ECRF can provide route mappings for geodetic location profiles as well as civic location profiles. Geodetic (coordinate based) locations may be point, polygon, circle, ellipse, or arc-band. Civic locations are street addresses including house number, street name, city name, etc. In the case of Return Limit Warning, there is an additional configuration value which dictates the maximum number of results to return. If there are more results to return than the established threshold, the response will include a warning. The default response warning is Return First. If the input is a polygon, a user may reference the polygon multiple match policy to identify the error. The policy would be either Return First, Return Area Majority, or Return Error. In the case of Return Area Majority, there is an additional configuration value which indicates the maximum number of results to return. If there are more results to return than the established threshold, the response will include a warning. The default response warning is Return Area Majority with results listed in order of largest overlap to smallest. The ECRF also implements a "best efforts" scheme in the event a civic location provided in a LosT <findService> request does not completely match GIS data that has been provisioned to the ECRF. For example, with a civic location containing an unrecognized street name, but valid city and state, the ECRF can return a service URI based on a PSAP service area boundary polygon wholly containing the civic location's city. In this case, the <findServiceResponse> returned from the ECRF will also contain a <defaultMappingReturned> warning, indicating to the querying function that a default mapping was determining the route. An ESRP/CTI solution may display warning condition to a call taker when the <findServiceResponse> sent from the ECRF to the ESRP contains a <defaultMappingReturned> warning. This feature in the ECRF is a configurable option that may be turned on or off as a matter of policy. An alternative approach is for a CTI application to invoke LVF on every received call. If any part of a proffered civic location fails LVF, the call taker may be notified by the CTI application that the location is suspect. ***Utilization of common GIS boundaries, including, but not limited to, PSAP, law enforcement, fire and emergency medical services (EMS)*** There is no limit to the number of GIS boundaries the ECRF is capable of consuming. However, as a matter of practicality, it is recommended the ECRF utilize the common GIS boundaries listed above (PSAP, law enforcement, fire, and EMS). ***Permitting of LoST queries for find service request association with each layer*** The ECRF responds to LoST queries defined in IETF RFC 5222, as specified in NENA-STA-010.2-2016. To discover a service URI for a particular location, the LoST protocol specifies a <findService> request. The ECRF responds to <findService> requests as well as other LoST protocol requests. The ECRF is provisioned with the aggregated GIS dataset supplied by the GIS Data Hub. Authorized i3 functional elements, such as an NG9-1-1 ESRP, may query the ECRF with a geodetic or civic location and a service URN describing the type of service requested, in a LoST <findService> request. The ECRF queries the GIS database that has been provisioned to it in order to discover and return a service URI, which is used by the ESRP to send the call to the correct next hop destination.				

	Compliance with NENA 02-010 and NENA 02-014 The ECRF complies with industry GIS standards, including NENA 02-010V9 and NENA 02-014v1. ***Dynamic updates to GIS without disruption of the ECRF*** <Same as Updates from the SI in near real-time> ***Validation of GIS update s before they are provisioned into the ECRF*** <Same as Updates from the SI in near real-time>				

Any additional documentation can be inserted here:

	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
Logging of all connections, connection attempts, data updates, ECRF query results, and LoST transactions	X			
Location error identification.	X			
Updates from the SI in near real-time with no degradation of LoST services	X			
Routing of calls based on geographic coordinates, geodetic shapes, and civic addresses	X			
Utilization of common GIS boundaries, including, but not limited to, PSAP, law enforcement, fire and emergency medical services (EMS).	X			
Permitting of LoST queries for find service request association with each layer.	X			
Compliance with NENA 02-010 and NENA 02-014.	X			
Dynamic updates to GIS without disruption of the ECRF.	X			
Validation of GIS updates before they are provisioned into the ECRF.	X			

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 50	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **User Interface and Provisioning** Define bidder's method for: 1. provisioning the ECRF; 2. updating the ECRF (including the frequency of updates); 3. validating data provisioning; 4. performing error logging; 5. performing gap and overlap analysis; and 6. supporting LoST queries from ESRPs, the PSAP CHE, and other authorized hosts within the ESInet. 7. Provide a clear description of the functionality of the ECRF; list features and capabilities; 8. describe the error handling, default mechanisms, and logging; and 9. provide an overview of deployment recommendations to achieve 99.999 percent reliability.	X			

Bidder Response:

ECRF and LVF

The ECRF and LVF are IETF RFC 5222 compliant servers which provide the NENA i3 functional elements of ECRF and LVF specified in NENA-STA-010.2, the second version of the i3 Standard (originally NENA 08-003). In addition to these standards, there are many related RFCs that define how the ECRF and LVF operate, including PIDF-LO, RFC 4119, and its revision RFC 5139. The ECRF and LVF utilize a load balanced, multi-server architecture supporting geographic redundancy with no single point of failure, and physical separation between ECRF and LVF systems and databases. The ECRF and LVF:

- Provide fast, secure, and reliable core network ECRF services for NG9-1-1
- Enable fast geo-spatial 9-1-1 call routing and location based selective transfers
- Provide industry standard i3 location validation
- Include and ad-hoc routing boundary editor
- Include a Network Operations Center (NOC) dashboard, and monitoring and reporting capabilities
- Were tested for interoperability at NENA ICE1-8, and EENA/ETSI Plugtest #1
- Support NG9-1-1 additional data discovery
- Accept NENA i3 standardized Spatial Interface (SI feeds) for ingesting GIS updates
- Accept proprietary GIS data updates from non-NENA standard systems
- Contain a dashboard suitable for display in a NOC
- Support NENA i3 logging, SNMP, as well as raw log data outputs for third party monitoring and logging solutions
- Integrate seamlessly with the proposed GIS Data Hub system

ECRF and LVF Features

The ECRF is an IETF 5222 compliant LoST server system, providing the NENA i3 ECRF functional element as defined in NENA-STA-010.2. General features of the ECRF include:

- IETF RFC 5222 compliant LoST Server
- NENA-STA-010.2 compliant ECRF

- Calculates service URI for 9-1-1 call routing and selective transfer based on a call's location
- Can play multiple roles in LoST hierarchies, including Forest Guides, state level ECRFs, and regional "leaf node" ECRFs
- Administrative dashboard for monitoring real-time statistics, load, query response behavior, and individual query contents, system-wide and per server
- Supports NENA i3 logging mechanisms, includes internal logging, and provides network monitoring system interfaces
- Architected to support a fully redundant, secure, multi-tier load balanced server architecture
- Supports PIDF-LO geodetic location types of point, polygon, circle, ellipse, and arc-band
- Supports PIDF-LO civic location types, including fine grained components handling building, floor, suite, room, and seat
- Facilitates the discovery of additional location data, by complying with the additional data discovery mechanisms described in NENA-STA-010.2. The ECRF supports discovering additional data using all location types defined in RFC 5222 – civic locations (including optional sub-address elements), points, circles, polygons, ellipses, and ArcBands.
- Supports the discovery of agency locator records as defined in NENA-STA-010.2
- Supports multiple provisioning interfaces:
  - A NENA i3 standards-compliant SI for provisioning change-only GIS data updates in near real time, on a scheduled or ad-hoc basis
  - Custom ETL: suitable for interoperating with other proprietary GIS enterprises
  - Bulk update capability for use during initial system provisioning, mass GIS data updates, or in less frequent instances, system upgrades and fault recovery

ECRF Advanced Features

The ECRF also includes many advanced features not commonly available in other vendor ECRF implementations. The ECRF provides secure web-based administration, including on-the-fly, ad-hoc routing boundary changes. Ad-hoc routing boundaries are useful to implement geographic-based routing changes during wide-scale emergency events when call routing needs to be changed quickly. During such events, it may not be practical to request a service boundary change to be implemented by the GIS data management staff and propagated to ECRFs via the agreed upon ECRF GIS data provisioning mechanism.

The ECRF ad-hoc routing boundary feature makes it possible to draw a new temporary routing boundary around an area and designate a PSAP service URI for the temporary polygon. From that point forward, instantly, all 9-1-1 calls originating within that area will route based on the new temporary service URI, which could point to a different PSAP, or a virtual PSAP deployed in the field. As a policy decision, the State may decide to allow or disallow the use of ad-hoc routing boundaries in ECRF.

The ECRF supports additional service types beyond "9-1-1 PSAP" which is commonly used when routing a 9-1-1 call to a PSAP. After a 9-1-1 call has been answered, an authorized NG9-1-1 PSAP CTI application may query the ECRF with the location of a 9-1-1 caller, and a service URN indicating a type of service desired for call transfer, such as particular responder agency. In this manner, the ECRF supports geospatial selective 9-1-1 call transfers, which can reduce the time it takes to transfer a 9-1-1 call and decrease chances of transferring a 9-1-1 call to the correct agency.

The ECRF includes the ability to discover additional data associated with a location. NENA 71-001 NG9-1-1 Additional Data describes several additional data information data structures, such as additional data associated with a call, associated with a caller, and associated with a location. The additional location information data structure is discovered by querying an ECRF additional location data service. The ECRF fully supports the additional data discovery mechanisms defined in NENA-STA-010.2.

This enables <findService> requests for additional data when using the special service URN urn:nena:service:additionalData. When queried in this manner, GeoComm ECRF will search for address points that have a URI to additional data associated with a location document which can describe a myriad of information (see NENA 71-001 – NENA Standard for NG9-1-1 Additional Data). For example, when a commercial property, such as an office building, within the search radius which has additional data about a location details specified, it will return a URL within the <findServiceResponse> message to the location.

ECRF and LVF System Architecture and GIS Data Provisioning

The ECRF and LVF solution is designed for flexibility, consistency, security, and scalability. It consists of four high-level components:

- ECRF and LVF Web Service: the engine that services LoST (Location to Service Translation) queries
- GIS Database: centralized, highly available source of GIS data for servicing LoST queries
- Provisioning: services for loading and updating GIS data from the SI into the GIS database
- Dashboard and Ad-hoc Routing Web Applications: web applications for monitoring system health and creating ad-hoc routing boundaries

GIS Data for is provisioned in one of two ways:

1. Bulk load of a full GIS dataset from the SI, or Data Hub
2. Incremental update provisioning through the NG9-1-1 GIS data management SI Feed

Generally, bulk loads would occur during the initial system set up and incremental update provisioning would occur after cutover. Regardless of the method, provisioning is performed without interruption to the ECRF and LVF Web Services running in the same cluster and is coordinated to ensure data is consistent across clusters.

Error Handling and Logging

The ECRF can capture unhandled exceptions and still return a response to the requestor indicating an internal error occurred. In addition, several other potential error conditions are checked for and reported back to the requestor including:

- Malformed XML or LoST syntax (bad request errors)
- Requested service URN is not supported (service not implemented errors)
- Invalid GML or coordinate values (location invalid errors)
- Unknown location profiles (location profile unrecognized errors)
- Spatial reference problems (SRS invalid errors)
- Revisiting an already queried server (loop errors)
- Recursive time out conditions (server timeout errors)
- Bad response from a recursively queried server (server errors)
- Access denied to recursively queried server (forbidden errors)

The ECRF has several logging mechanisms to facilitate transaction auditing, debugging, and activity monitoring. Diagnostic logs exist for all servers in the system, tracking any internal server errors that occur, which can then be analyzed for configuration and server errors. In addition, all LoST transactions are logged for a complete archive of activity. logging mechanisms also include i3-compliant log event reporting. This means that, within an ESInet, can send ECRF request/response logs to an i3 compliant logging service. Finally, the ECRF includes a browser-based dashboard which shows current activity and server status, generates transaction reports, and views the logs directly.

Query Support

The ECRF is an IETF 5222 compliant LoST Server that provides the NENA i3 functional elements of ECRF as specified in specified in NENA-STA-010.2 There are many related RFCs that define how GeoComm ECRF operates, including PIDF-LO, RFC 4119 and its revision RFC 5139.

The ECRF responds to LoST queries defined in IETF RFC 5222, as specified in NENA-STA-010.2 To discover a service URI for a particular location, the LoST protocol specifies a <findService> request. The ECRF responds to <findService> requests as well as other LoST protocol requests. GeoComm ECRF is provisioned with the aggregated GIS dataset supplied by the GIS Data Hub. Authorized i3 functional elements, such as an NG9-1-1 ESRP, may query the GeoComm ECRF with a geodetic or civic location and a service URN describing the type of service requested, in a LoST <findService> request. ECRF queries the GIS database that has been provisioned to it in order to discover and return a service URI, which is used by the ESRP to send the call to the correct next hop destination.

Default Mechanisms

The ECRF can return a default route URI for requests containing locations that did not properly resolve within the loaded GIS coverage area. This can happen when a location is slightly incorrect, such as an invalid house number. It can also occur when new addresses have not yet been loaded into the ECRF.

The ECRF also implements a "best efforts" scheme in the event a civic location provided in a LosT <findService> request does not completely match GIS data that has been provisioned to the ECRF. In the example provided in the requirement of a civic location containing an unrecognized street name, but valid city and state, the GeoComm ECRF can return a service URI based on a PSAP service area boundary polygon wholly containing the civic location's city. In this case, the <findServiceResponse> returned from the GeoComm ECRF will also contain a <defaultMappingReturned> warning, indicating to the querying function that a default mapping was then determining the route. This "best efforts" feature in the ECRF is a configurable option that may be turned on or off as a matter of policy.

Logging

The ECRF has several logging mechanisms to facilitate transaction auditing, debugging, and activity monitoring. Diagnostic logs exist for all servers in the system, tracking any internal server errors that occur, which can then be analyzed for configuration and server errors. All LoST transactions passing through the ECRF are also logged, for a complete archive of activity.

In addition, the ECRF logging mechanisms include i3 compliant log event reporting, meaning that within an ESInet, the ECRF can send ECRF request/response logs to an i3 compliant logging service. Finally, the ECRF includes a browser-based dashboard that shows current activity and server status, generates transaction reports, and views the logs directly.

High Availability Deployment Architecture

The ECRF's architecture is a load balanced, fault tolerant system of GIS servers, database servers, and web servers deployed using docker containers and Kubernetes, with no single point of failure, and is capable of 99.999% uptime when deployed across multiple data centers. To meet the 99.999% up time requirement the system is designed with N+1 capacity and redundancy on all tiers.

Each data center contains multiple redundant the ECRF containers. In the unlikely event of system failure, three of the six physical machines in the ECRF system could fail and the system would still have the capacity to support the entire State. Geographic load balancing across the four ECRF servers in the two data centers increases the system's ability to spread load during peak capacity events, maintaining very low response times, and to facilitate server maintenance and updating without taking the overall system offline. The ECRF/LVF is also fault tolerant with respect to hardware; the system detects server failures and automatically directs traffic to healthy servers.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 51	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Hierarchical Integration with Other ECRFs** The ESInet will be part of an overall hierarchical plan that includes interconnectivity to other regions and ECRFs. Provide details regarding bidder's vision for how this interconnection will include replicas of ECRF/LVF at different levels of the hierarchy, as well as access/origination networks.	X			

Bidder Response:

Over time, as the State interconnects its ESInet with other ESInets at a state or regional level, a degree of coordination and interaction between ECRFs and LVFs are required. The ECRF, as proposed, will reside within the State's ESInet, and will be authoritative for routing calls which ingress the State ESInet. Other ESInets will maintain their own authoritative ECRFs, responsible for routing calls within their networks. These ECRFs can be related to one another and organized into a hierarchy to form trees, as detailed in RFC 5582 and NENA STA-010.2 section 5.14. It is the interconnection of ESInets and the relationship of ECRFs to one another which allow NG9-1-1, via its i3 architecture, to seamlessly route and transfer emergency calls between ESInets using spatial routing technology.

The fact that networks are interconnected and ECRFs can route calls spatially provides opportunities to add fault tolerance and service continuity options throughout the ESInet hierarchy. The GIS data provisioned to an authoritative ECRF can be shared with other ECRFs, allowing those ECRFs to take over service for an authoritative ECRF if it enters a failed or inoperable state. While under normal operation, only one ECRF can be authoritative for a given geography and service URN. However, in situations of irregular operations such as overload or failure, the failed or degraded ECRF could be relieved of its responsibility by its parent ECRF or one of its sibling ECRFs. The operator of another ECRF could adjust its coverage region so it becomes temporarily authoritative for the geographic region and service URNs supported by the original ECRF. So long as the other ECRF has the same GIS data as the failed ECRF, and its coverage region is modified to reflect the change in authority, the other ECRF can take over the failed ECRF's duties. To help facilitate such an arrangement between the State and its parent/sibling ECRFs, Atos could provision a replica of the State's GIS data to the parent/sibling ECRFs, using the Spatial Interface, to ensure the ECRFs have the GIS data they need to take over in a moment of crisis or need. As a manner of course, the other ECRFs may employ various proprietary processes to physically "swap" or take the role of the State ECRF, as no two ECRFs can claim – at the same time – that they are both authorities for the same geographic region and service URNs.

Access/origination networks (OSPs) have a role to play in the ESInet and ECRF hierarchy as well. An OSP may elect to operate a non-authoritative ECRF replica to direct calls to the State ESInet ingress, using the same GIS data as the State ECRF or a subset of it (such as administrative and service boundaries, as in some cases, an ECRF equivalent may not need road centerlines and site/structure address points to determine the ESInets responsible for handling calls). This would require the origination service providers to separately purchase an ECRF and implement it within their networks, at which point Atos may assist the State in provisioning a replica of the State's ECRF's GIS data (or a subset) to the ECRF(s) operated by the OSP(s), upon request.

When provisioning GIS data to other authoritative ECRFs at the state or regional level, or to non-authoritative ECRFs operated by OSPs, Atos will leverage the Spatial Interface to provision data in serial fashion, one ECRF at a time. While the State ECRF could itself leverage a spatial interface to "push" its data to one or more subscribing ECRFs, Atos does not recommend this approach as it places an unnecessary burden on the State ECRF: once data is provisioned to it, it must then in turn replicate it to other consuming ECRFs, and leveraging a single Spatial Interface to replicate data in serial fashion provides a single place to monitor and manage the data replication activity to all ECRFs.

In the context of this requirement, Atos understands "replica" is speaking to data replication and nothing else.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 52	**Next Generation Core Services Elements (NGCS)** **Emergency Call Routing Function (ECRF)** **Forest Guide** Provide explanations of any tradeoffs between aggregations of data at higher-level ECRFs versus the use of Forest Guides (as defined in NENA-INF-009.1-2014) to refer requests between ECRFs that possess different levels of data. As part of that explanation, provide details on how the appropriate ECRF/LVF data will be managed and provisioned for use in overload and backup routing scenarios in the current environment, and any dependencies that might impact provisioning.	X			
	Bidder Response: As described in the previous response, ECRFs are organized into hierarchies and trees. Because one and only one ECRF/LVF can be authoritative for a given region and service URN, there must be a means to easily discover which ECRF is responsible for answering a query. As it is unlikely in the long term that each ECRF within a tree will contain the coverage regions of all other ECRFs, it is recommended that Forest Guides be employed to help an ECRF client discover the appropriate authoritative ECRF to answer their queries. Forest Guides can, and should, always be present, to help guide requests to the proper authoritative ECRF/LVF for the given geography and service URN. While Atos recognizes there are no operational Forest Guides in existence today, and that interconnection between ECRFs can be achieved by sharing ECRF coverage regions amongst ECRFs in a hierarchy and within the trees, Forest Guides are critical to the success of spatially routing emergency calls using ECRFs in the i3 end state. Forest Guides assist a LoST client in finding the appropriate ECRF to answer their queries, but Forest Guides do not help in cases of irregular operations. Forest Guides do not know when an ECRF below them has failed, becomes inoperable, or is otherwise incapable of answering queries. As stated in the previous response, GIS data replicated to parent or sibling ECRFs could, however, allow a system of interconnected ECRFs to become more resilient by allowing an ECRF to temporarily take over the authoritative routing responsibilities of a failed ECRF. Aggregating or replicating GIS data from an ECRF to its sibling or parent ECRFs can aid in this respect. It is important to note that Forest Guides and replicated / aggregated GIS data are not mutually exclusive concepts; a Forest Guide will always exist in the i3 end state, but there is a tradeoff to employing, or not employing, aggregated / replicated data to improve fault tolerance. Forest Guides facilitate interworking during normal, regular operations, directing traffic to the appropriate LoST server for resolution. Aggregated data, in turn, can enhance system resiliency by allowing a parent or sibling ECRF to "take over" when a sibling or child ECRF fails or can no longer service queries.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 53	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** An LVF is a LoST protocol server where civic location information for every call originating endpoint is validated against the SI-provisioned GIS data Describe how the LVF solution interfaces with other LVF solutions which may interface with bidder's solution. Contractor shall coordinate with other LVF solution providers to ensure interoperability between the respective solutions.	X			
	Bidder Response: The LVF is an IETF 5222 compliant LoST Server that provides the NENA i3 functional elements of ECRF/LVF as specified in NENA TSD 08-003. Features include: ➢ IETF 5222 compliant LoST Server providing NENA i3 LVF ➢ Validates civic locations prior to entry into a LIS using the LVF ➢ Can play multiple roles in LoST hierarchies, including Forest Guides, state level LVFs, and "leaf node" LVFs ➢ Supports PIDF-LO geodetic location types of point, polygon, circle, ellipse, and arc-band ➢ Supports PIDF-LO civic location types, including fine grained components handling building, floor, suite, room, and seat The LVF is designed in accordance with the NENA standards. The LVF will be authoritative based on the GIS data provisioned into the system.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 54	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** **LVF Description** The SI is responsible for provisioning and updating the information used for location validation in the LVF, which shall contain a standardized interface to the SI. Describe how the LVF solution meets the above requirements**.**	X			
	Bidder Response: The GIS Data Hub services is the user interface to supply the GIS data to the system and manage the Spatial Interface. After the data has passed required QC checks, the GIS data is transferred to the NENA required schema then added to the spatial interface. GeoComm ECRF and LVF consume XML GIS changes and confirm changes once applied to the production dataset. Updating the production GIS data does not impact ECRF or LVF availability. Atos also provides a bulk load feed to ensure ECRF and LVF have access to the full GIS data set. This ensures that if a data synchronization issue is detected the whole GIS data set can be loaded without system disruption or for use in fault recovery scenarios.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 55	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** **Location Validation** The LVF shall be available to validate civic locations at the time a wireline device is ordered— e.g., Service Order Interface (SOI) validation—when a nomadic device is connected to the network, and when a PSAP or other authorized entity makes a civic location validation request. The LIS/LDB shall be allowed to periodically revalidate the civic location information against the GIS data contained within the LVF. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The LVF validates civic locations prior to entry into a LIS using the LVF. The application supports nomadic devices (such as VoIP), PIDF-LO civic location types, including fine-grained components including building, floor, suite, room, and seat. In i3 networks, MSAG is replaced with a GIS based LVF. Before civic address locations are entered or updated in a Location Information Service (LIS), the address records must be validated to ensure they are adequate for routing, dispatch. This is accomplished by locating the civic address in the authoritative GIS database for the service area: The highly scalable design allows large batch requests to be made to the LVF to revalidate all records on the LIS/LDB.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 56	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** **High-Availability Design** The LVF shall support all functionality as defined in NENA-STA-010.2-2016, shall be designed with resiliency and redundancy to provide a minimum of 99.999 percent availability, and shall be provisioned with the same data as the ECRF. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The LVF architecture is a load balanced, fault tolerant system of GIS servers, database servers, and web servers deployed using docker containers and Kubernetes, with no single point of failure, and is capable of 99.999% uptime when deployed across multiple data centers. To meet the 99.999% up time requirement the system is designed with N+1 redundancy on all tiers.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 57	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** **Public-Facing LVF** Outline options for a public-facing LVF provisioned for use by service providers outside the ESInet.	X			
	Bidder Response: An LVF is inherently public facing and external to the ESInet. Service providers may query the LVF. Due to the nature of the network connections, the service providers will query LVF "publicly." The LVF components are therefore located in the DMZ of the NGCS.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 58	**Next Generation Core Services Elements (NGCS)** **Location Validation Function (LVF)** **User Interface and Security** Describe the functionality of the proposed LVF solution in sufficient detail to address the requirements outlined in NENA-STA-010.2-2016, with particular attention to: 1. the arrangement of the proposed components; 2. user interface and features; 3. and security aspects.	X			

Bidder Response:

NENA Compliance

The LVF is an IETF 5222 compliant LoST Server that provides the NENA i3 functional elements of ECRF/LVF as specified in NENA-STA-010.2-2016.

Availability

To ensure the LVF proposed remains highly available, the LVF will be deployed in a fully redundant cluster and load balanced across two data centers. The LVF system will be provisioned using the same mechanisms and data as the ECRF which will ensure the system is kept as available and current as possible. As designed, the LVF system is easily expandable, allowing for additional redundancy and capacity as the region requires, by implementing additional hardware to the system.

Supported Interfaces

The LVF supports the LoST interface.

External ECRF supports the LoST interface.

Can be expanded to support the MCS interface and geocode interfaces.

User Interface

The LVF is equipped with an operations portal for monitoring real-time statistics, load, query response behavior, ad hoc routing and individual query contents, system wide and per server.

Documentation

The LVF can be utilized directly by any authorized 9-1-1 entity needing to perform NG9-1-1 i3 location validation in place of or alongside legacy 9-1-1 MSAG style validation. The LVF uses site and/or structure layers and addresses ranged road centerline layers.

In i3 networks, MSAG is replaced with a GIS based LVF. Before civic address locations are entered or updated in a Location Information Service (LIS), the address records must be validated to ensure they are adequate for routing and dispatch. This is accomplished by locating the civic address in the authoritative GIS database for the service area:

LVF queries include a validated Location=true attribute. When this attribute is present and set "true" in the query, the LVF treats the request as a location validation request and returns a LoST <findServiceResponse>, which includes location validation elements stating what parts of the provided civic location passed validation, failed validation or were unchecked.

Features

	➢ IETF 5222 compliant LoST Server providing NENA i3 LVF ➢ Validates civic locations prior to entry into a LIS using the LVF ➢ Can play multiple roles in LoST hierarchies, including Forest Guides, state level LVFs, and "leaf node" LVFs ➢ Supports PIDF-LO geodetic location types of point, polygon, circle, ellipse, and arc-band ➢ Supports PIDF-LO civic location types, including fine grained components handling building, floor, suite, room, and seat ***Security*** The LVF is publicly available web service using https and TLS. Access will be controlled by the network service provider.

Any additional documentation can be inserted here:

NGCS 59	**Next Generation Core Services Elements (NGCS)** **Spatial Interface (SI)** **SI Description** The SI is responsible for provisioning and updating authoritative GIS data to the ECRF, the LVF, the map viewer, the PSAP tactical map display, CAD systems, and similar applications that consume GIS data. GIS data provisioned by the SI shall undergo data-quality and data-integrity checks to ensure that the data complies with all applicable requirements of NENA 02-010, NENA 02-014, and Attachment B of NENA-STA-010.2-2016. Describe how the solution meets or exceeds the above requirements.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: ***Spatial Interface (SI)*** The SI is a NENA compliant spatial interface that allows any subscribed application to make changes to the statewide GIS data set. This could include any application such as the PSAP tactical map display, CAD systems, and similar applications. The system provides a means to ingest, analyze, report, and aggregate GIS data from local, regional, or state government authoritative data sources into a complete statewide GIS dataset suitable for provisioning to the ECRF or LVF and other Functional Elements. As the State looks to incorporate and normalize varying data sources for emergency call routing, the proposed system will provide data insights which will allow the State and local data authorities to make decisions about the data, and continually improve it towards a normalized and more suitable NG9-1-1 dataset. In addition, as a NENA i3 compliant SI, the SI transmits GIS data updates from the authoritative GIS database system and applies them to ECRF and LVF databases.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 60	**Next Generation Core Services Elements (NGCS)** **Spatial Interface (SI)** **Web Feature Service and Updates** The SI shall convert the GIS data into the format (data structure and projection) used by the ECRF and LVF, in real-time or near real-time, using a web feature service. The SI shall be able to provision and perform incremental updates, in near real-time, to the ECRF, LVF, the map viewer service, the PSAP tactical map display and similar applications that consume GIS data. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: Atos will work with the State to establish a mutually agreeable daily schedule for GIS data provisioning, including a daily deadline to submit GIS changes for processing. The State can expect data submitted prior to the daily deadline will undergo QC checks and within 24 hours of the data passing required QC checks, it will undergo a series of transformation measures to convert the data into the format required by the ECRF and LVF. Then, it will be transferred from the SI to the ECRF and LVF. The SI uses a NENA i3 compliant SI provisioning feed to accomplish the transfer. Data not passing validation checks will be returned to the submitting agency for error resolution. After local authorities have resolved data errors, the agency then resubmits their data back into the system for processing, following the same mutually agreeable submission deadline. This ensures the data provisioned to ECRF and LVF is always the most current and accurate data available. Data submitted after the daily deadline is processed after the following day's deadline. Note: GIS data remediation services are outside this scope of work but may be provided for a fee upon request. As an option, for an additional fee, Atos can provide customized GIS extracts of public safety grade GIS data to be ingested into CAD maps or other applications which consume GIS data. The extracts can be provided to the State/local data authorities who are responsible for provisioning to the associated application.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 61	**Next Generation Core Services Elements (NGCS)** **Spatial Interface (SI)** **Data Provisioning and Validation** Describe the functionality of the proposed SI solution in sufficient detail to explain the validation of GIS data and data updates prior to provisioning into the ECRF and LVF, along with the means of real-time or near real-time provisioning of incremental updates to the GIS data provisioned to the ECRF and LVF.	X			

Bidder Response:

GIS data updates from the authoritative GIS database are transmitted and provisioned to the ECRF and LVF via the SI. Assuming updates are being made to the ECRF and LVF, the NENA i3 compliant Spatial Interface provisions change-only or bulk GIS updates in near real time on a scheduled or ad-hoc basis. However, should a different ECRF or LVF be deployed, the proposed SI is compatible with any ECRF or LVF meeting industry standards. In this scenario, the data provisioning methodology may vary from that which would be executed with the ECRF and LVF.

Before GIS data can be used for routing 9-1-1 calls and validating civic locations in an ESInet/NGCS solution, the accuracy and integrity of the data must be validated through a series of data-specific QC procedures. Atos will work with project stakeholders to develop a formal QC plan. The quality control approach, including regular communication of QC results to local GIS entities, will be documented in the plan. The plan will also detail initial on-going quality control processes to be performed on local GIS data submitted to the system and prior to provisioning through the SI.

Upon data upload, the SI scans the submitted data files to ensure they are not corrupted and processes the data through a change detection process to identify features differing from the previous GIS datasets uploaded. These changes are then validated by the system to ensure they can be applied to the master GIS database without negatively impacting 9-1-1 system operation. If no validation failures are detected in the submitted data, the changes are applied to the master GIS dataset.

Once the system is cut over, data passing QC checks in the system will continue processing without interruption. Data will be provisioned within 24 hours after being processed through the QC checks. Datasets not passing validation checks will be returned to the submitting agency for error resolution.

While Atos will provide ongoing QC audits, and data updates failing quality control checks will not be integrated into the prevailing dataset, the quality of the data incorporated into the authoritative dataset is ultimately the responsibility of the local jurisdictions. GIS data remediation services are outside this scope of work, but may be provided, for a fee, upon request.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 62	**Next Generation Core Services Elements (NGCS)** **Spatial Interface (SI)** **Use of the Commission's GIS Data Model** 1. Describe how the bidder's solution will use the Commission's GIS data model (Attachment B) without modification to the schema. 2. Define bidder's processes and methods to receive and incorporate the updated SI datasets. 3. Describe bidder's proposed workflow for receiving GIS updates from regions to allow for a smooth transition. 4. Describe all security and monitoring aspects, and any additional features supported by the proposed SI.	X			

Bidder Response:

GIS Data Hub will provide ongoing GIS data transformation, aggregation, QC, and reporting which will result in the progressive improvement toward a single, seamless statewide NG9-1-1 GIS dataset.

Local jurisdictions would upload their GIS updates to GIS Data Hub on an up-to-daily basis to be processed through multiple QC checks. The default QC checks within the system are based on the NENA data model and additional QC checks will be configured to reflect emerging State data standards relative to the State. The QC checks would be executed prior to any data updates being aggregated into the statewide GIS dataset and ensure only accurate GIS data is included in the NG9-1-1 GIS dataset used in the ECRF and LVF. After the data has been processed through the QC checks, a digital data quality report will be delivered back to the submitting agency. Data passing the QC checks will be transformed and aggregated into the format required for NG9-1-1 operations and processed through another round of QC checks to ensure the aggregated dataset is compliant with NENA and State standards.

Source jurisdiction data not passing the initial QC checks will be referred to the submitting agency for data error resolution, with errors outlined in the digital data quality report delivered by the system. Local jurisdictions will be responsible for correcting the data errors and resubmitting the updated data to the system. Upon request, for an additional fee, Atos may provide services to resolve the errors on behalf of the source agency.

This process would be followed for both initial and ongoing GIS updates, resulting in a continuous feedback loop of GIS data updates from local jurisdictions, GIS data performance measurements and reporting, and data transformation.

Because GIS Data Hub accepts GIS data in its native format, it can accommodate difference schemas should different authoritative sources have varying data schemas. There is no need for participating agencies to change their original GIS data model schema; GIS Data Hub automatically modifies the input data schema to adhere to the required output. This means the process of incorporating data updates and changes will have minimal impact on existing data management operations at a local level.

Monitoring

Atos manages the system and data flow through the GIS platform on behalf of the State. System users will be granted varying levels of access to data and QA/QC reports within the system. This will result in a hierarchy of users which are defined by the State. GIS Data Hub hardware and security will be monitored by the overall solution monitoring methodology.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 63	**Next Generation Core Services Elements (NGCS)** **Location Database (LDB)** Describe how the solution interfaces with other LDB solutions which may participate in or interface with bidder's solution. Contractor shall coordinate with other LDB solution providers to ensure interoperability between the respective solutions. Also explain how the proposed solution would deal with multiple ALI/MSAG databases and the locations where ALI steering may be in place.	X			
	Bidder Response: The proposed LDB solution provides capabilities to interface with other LDB solutions by leveraging industry standard communication mechanisms and protocols. The LDB supports capabilities to exchange location reference data with participating stakeholders at the data provisioning stage prior to processing emergency calls as well as standards-based request mechanisms to obtain emergency caller location information at the emergency call routing stage. In addition, specific operational considerations relative to neighboring entities and associated LDBs will be accounted for as part of the Managed Services model deployed with the ESInet/NGCS solution. This includes location reference data exchange scenarios such as ongoing split rate center management and dual provisioning capabilities.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
	Next Generation Core Services Elements (NGCS) **Location Database (LDB)** **LDB Description** A LDB serves as both a legacy ALI database and as a LIS in an i3-compliant NG911 environment. The LDB retains all of the current information, functionality, and interfaces of today's ALI, but also can utilize the new protocols required in an NG911 deployment. The LDB supports the protocols for legacy ALI query and ALI query service, the protocols required to obtain information for wireless calls by querying the mobile positioning center (MPC) or Gateway Mobile Location Center (GMLC), and the protocols required for i3 location information retrieval and conveyance, such as HTTP-Enabled Location Delivery (HELD) or other proprietary protocols. Describe the functionality of the proposed LDB, including additional features and capabilities, error handling, FoCR capabilities, logging and deployment recommendations in detail to address the requirements outlined, with particular attention to the arrangement of the proposed components, user interface, and features, and security aspects.				
NGCS 64	Bidder Response: Atos partner, 911Datamster's DataBond (our ALI & LDB) facilitates a migration mechanism of both data and business processes, making the transition a flexible, yet controlled, evolution. The proposed LDB solution provides for: ➢ **Error Handling:** DataBond provides automated error notification to the submitting entity in a number of conveyance methods. ➢ **FoCR:** DataBond supports this non-NENA standard format. As part of a migration plan to an NG9-1-1 compliant environment, any non-standard communication methodologies should be replaced with NG9-1-1 compliant capabilities. ➢ **Logging:** DataBond provides extensive auditing and logging capabilities in support of transactions and record management. Specific details for the following requested areas of inquiry are as follows: ➢ DataBond supports relevant sections of NENA 02-010, 02-011, 02-015, 08-501 and 08-502 related to ALI Database Management System (DBMS). 04-005 has been superseded by more current NENA standards requirements. ➢ DataBond can assume the role of a location DBMS in Transition Planning Considerations. ➢ DataBond can dereference a location by reference, as defined in NENA-STA-010.2-2016. ➢ DataBond supports dereference requests for additional information, as defined in NENA-STA-010.2-2016. ➢ DataBond can interface simultaneously with multiple wireless callers. ➢ DataBond can interface simultaneously with multiple remote ALI databases. ➢ DataBond automatically detects, imports, and validates customer records (SOI records). ➢ DataBond can be used simultaneously by both NG911-capable and E911 capable PSAPs.	X			

	➢ DataBond allows different PSAPs to use different ALI formats. ➢ DataBond can utilize LVFs to validate civic addresses. ➢ DataBond supports PIDF-LO location data formatting as defined in NENA-STA-010.2-2016. ➢ DataBond can reevaluate location information using LVF functions within the system. ➢ DataBond can communicate with NG9-1-1 functional elements using the HELD protocol. ➢ DataBond can provide a PIDF-LO based on both the wireless and VoIP E2 response. ➢ DataBond can dereference additional data requests. ➢ DataBond responds to requests within 400 milliseconds (ms). ➢ DataBond supports NENA standards J-036, E2, E2+, non-call-associated signaling (NCAS) and call-associated signaling (CAS). ➢ DataBond provides LIS functionality and interfaces as defined in NENA-STA-010.2-2016. ➢ DataBond can interact with a NENA i3-compliant ECRF, as described in NENA-STA-010.2-2016.				

Any additional documentation can be inserted here:

The LDB shall meet the following requirements:	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
Shall support all relevant sections of NENA 02-010, 02-011, 02-015, 04-005, 08-501 and 08-502 related to ALI Database Management System (DBMS).	X			
Shall be capable of assuming the role of a location DBMS as defined in NENA-INF-008.2-2013, NENA NG9 1-1 Transition Plan Considerations.	X			
Shall support NENA standards J-036, E2, E2+, non-call-associated signaling (NCAS) and call-associated signaling (CAS).	X			
Shall be able to provide LIS functionality and interfaces as defined in NENA-STA-010.2-2016	X			
Shall be able to seamlessly interact with a NENA i3-compliant ECRF, as described in NENA-STA-010.2-2016.	X			
Shall be able to dereference a location by reference, as defined in NENA-STA-010.2-2016.	X			
Shall be able to dereference requests for additional information, as defined in NENA-STA-010.2-2016.	X			
Shall be able to interface simultaneously with multiple wireless callers.	X			
Shall be able to interface simultaneously with multiple remote ALI databases.	X			
Shall automatically detect, import and validate customer records (SOI records).	X			
Shall have the ability to be used simultaneously by both NG911-capable and E911 capable PSAPs.	X			
Shall allow different PSAPs to use different ALI formats based on individual needs.	X			
Shall utilize LVFs to validate civic addresses.	X			
Shall support PIDF-LO location data formatting as defined in NENA-STA-010.2-2016.	X			
Shall periodically reevaluate the location information using LVF functions within the system.	X			
Shall be able to communicate with NG911 functional elements using the SIP and HELD protocols.	X			
Shall be able to provide a PIDF-LO based on both the wireless and VoIP E2 response.	X			

Shall be able to dereference additional data requests.	X			
Shall consistently respond to all requests within 400 milliseconds (ms).	X			

NGCS 65	**Next Generation Core Services Elements (NGCS)** **Location Database (LDB)** **Integration of Multi-Line Telephone System Data** The LDB shall support the Integration of Multi-Line Telephone System (MLTS) databases. As part of this migration, Contractor shall be responsible for migrating records from the current MLTS databases to the LDB. Provide details on the database migration process and the user interface for management of these MLTS data records.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: The proposed solution provides an integrated web-based management tool to create, edit, and manage all aspects of a MLTS database. As part of the migration to the ESInet/NGCS solution, any applicable MLTS data will be transitioned and made available to designated stakeholders via an intuitive web portal that is externally accessible. This includes the ability to view, create, edit, and move location records maintained within the MLTS database. Any changes performed via the web portal will be available to the 9-1-1 call handling solution in minutes. Ongoing management of MLTS data will be governed by the quality control mechanisms present in the LDB solution while providing comprehensive data management control to key stakeholders.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 66	**Next Generation Core Services Elements (NGCS)** **Discrepancy Reporting** 1. Provide details regarding the proposed solution's report functions for notifying PSAPs any time a discrepancy is detected concerning the BCF, ESRP, PRF, ECRF, LVF, and SI. As part of the detail, explain how a report will be sent for the purpose of reporting the discrepancy to multiple responding PSAPs, as determined by the Commission. Discrepancy reporting is outlined in Section 4.7 of NENA-STA-010.2-2016. 2. Describe the functionality of the proposed discrepancy reporting function in sufficient detail to address the requirements outlined, with particular attention to the user interface and features, and the security aspects.			X	

Bidder Response:

Atos is currently developing the Discrepancy Reporting (DR) capabilities in the ESRP, BCF and PSS. This effort includes a stand-alone Discrepancy Reporting web service that will automatically receive the Discrepancy Reports both from the Atos nodes and any third-party nodes (i.e. ECRF, LIS, etc.). It will also be possible to manually enter a discrepancy report via a web interface (access will be provided only to authorized and authenticated persons).

The interface to the DR web service as well as the database layout will be as per the i3 standards. The database will include a list of responsible persons, at least one per functional element, that will be automatically notified by email of any Discrepancy Reports generated. The DR web service will implement a state transition model typical to issue databases, so that the state of a DR will transition from NEW to OPEN to FIXED to CLOSED (with other states) with both the issue owner and reporter being notified of each transition. Notes and attachments can be added to each DR at any point before it is closed.

The user interface will be via a web browser; access control will be implemented to limit the rights of any one user appropriately.

The DR web service will be able to run on a dedicated server, as a virtualized application or in the public cloud. This functionality is planned to be available at the end of the first quarter of 2021.

ECRF & LVF

The ECRF and LVF produce discrepancy reports in alignment to NENA-STA-010.2-2016 including errors produced in processing changes from the SI service. GIS Data Hub publishing the SI feed provides integrated reporting of GIS errors to prevent errors from being allowed into the Spatial Interface data feed.

LDB

The LDB solution components publish discrepancy reports to the DRS through web services across the ESInet. There is no user interface provided by the 911DM solution components as this is a machine-to-machine interface. Security requirements for the communications will be dictated by the implemented infrastructure and communication protocols established.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 67	**Next Generation Core Services Elements (NGCS)** **Event Logging and Management Information System (MIS)** PSAPs may have a variety of logging recorders capable of recording SIP traffic and associated media. PSAPs will use the Emergency Call Tracking System (ECaTS) for call logging and capture event details. The Commission will gather statistical data from PSAPs through ECaTS. Describe how the solution interfaces with logging recorders and ECaTS.	X			
	Bidder Response: In addition to the ECaTS MIS for call data logging, the State acquires the ECaTS i3-compliant event logger, through a separate contract. The ECaTS i3 event logger is capable of capturing i3 events from ESInet/NGCS, a requirement for comprehensive end-to-end reporting. The various functional elements of the Atos ESInet/NGCS solution will generate the i3 LogEvent event types specified by the applicable NENA standard, for consumption by the ECaTS event logger. Our offer includes ECaTS remote data collectors (RDDMs), deployed as redundant pairs at each NGCS data center location. The RDDMs will capture i3 event from the NGCS and upload them to the ECaTS data center. Reporting on i3 events is outside of the scope of this RFP.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 68	**Next Generation Core Services Elements (NGCS)** **Event Logging and Management Information System (MIS)** **Event Logging Description** Extensive logging of NG911related events, transactions, media, and operations is required. All log entries shall be accurately time-stamped. Logging must include all elements in the call flow including logging of NG911related events within ESInets, the NGCS, the PSAP, and related operations, and is a standardized function used throughout ESInets, NG911 functional elements, and PSAPs. Logged events include ingress and egress to an ESInet, ingress, and egress to a PSAP, all steps involved in call processing, and processing of all forms of media. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The i3 Logging Service provides an i3 ready logger interface which aggregates logs from all functional elements within an ESInet and the logs available at a PSAP (ex: CDR, ALI etc. under the current ECaTS deployment in the State) to support event logging and retrieval. The i3 logging service is acquired by the State under a separate contract. The Atos ESInet/NGCS solution will generate i3-compliant events for all call and other media transactions across all functional elements throughout the ESInet and NGCS and provide these events to the data collectors of the ECaTS event logger via a web service SOAP interface. The FEs of the Atos solution will report on all required activities from ingress into the ESInet until egress to a PSAP (handover of calls from PSAP-located BCF to call handling equipment).				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 69	**Next Generation Core Services Elements (NGCS)** **Event Logging and Management Information System (MIS)** **Integration with Call-Handling Equipment** 1. Describe how bidder's event-logging solution may integrate with the each PSAP's call-handling equipment, to provide a complete, end-to-end view of a call. 2. Describe how the Commission can gain access to information in the event-logging solution. 3. Describe the requirements of the PSAP's call-handling equipment, software license agreements, and interfaces required to support integration with the bidder's event-logging solution.	X			
	Bidder Response: In response to question 16 of ADDENDUM SIX FOR QUESTIONS AND ANSWERS, ROUND TWO, the State has clarified the following: "The requirement is only for the delivery of the data to ECaTS. The ESInet/NGCS contractor must coordinate this with ECaTS. For item 'b,' the State works directly with ECaTS for the reports and formatting of the reports, so yes, the ESInet vendor should not account for additional cost to support these reports." As such, there is no requirement for the ESInet/NGCS provider to integrate with the PSAP's CHE. Calls and other types of emergency communications will be delivered to the PSAPs via a BCF. The BCF will generate i3 events from calls and other media delivered to the PSAPs, but any further downstream activity, beyond the demarcation point of the BCF, will need to be provided by the PSAPs' CHE, and is therefore beyond the scope of the ESInet solution. Access to logged event data and reporting are acquired by the State through a separate contract.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 70	**Next Generation Core Services Elements (NGCS)** **Event Logging and Management Information System (MIS)** **Access to Event Logging Data** 1. Describe how the PSAPs and the Commission will gain access via role-based authentication to the event-logging solution data and run statistical and other MIS reports. The PSAP is the custodian of such data for purposes of the Nebraska Public Records Statutes, Neb. Rev. Stat. §§ 84-712 to 84 712.09. The PSAP is responsible for maintaining such data pursuant to the PSAP record-retention schedule applicable to such data as provided in the Nebraska Public Record Statutes, Neb. Rev. Stat. §§ 84 1201 to 84 1229. The state is implementing the ECaTS MIS solution statewide. Upon deployment, the Contractor shall coordinate with ECaTS, the state, and the PSAPs to deliver event logging data to the ECaTS solution. An existing data-sharing agreement (DSA) between the state and the PSAPs governs what data the state may access along with notifications of records requests. This DSA will govern data collected by the NGCS and ESInet provider whether that data is delivered to ECaTS or directly to the state or PSAPs. 2. Describe the reports, MIS tools, and performance metrics made available to each PSAP, the user interface for retrieving or receiving reports, role-based authentication to limit access to data and reports, and the ability to customize reports based on individual PSAP needs. These reports may be used as a basis for changes to bandwidth and capacity. The required reports and metrics will include, but is not limited to: a. Timing b. Call-delivery time c. Call-processing time between elements d. Volumes e. Call volumes by call type f. Alternate-routed calls g. Text-to-911 h. All NGCS element usage volumes i. Bandwidth/trunk utilization j. Calls per trunk k. Trunk utilization l. Circuit utilization	X			
	Bidder Response: Informational only. Not to be provided by Atos. ***ESInet i3 Logger Reports*** The i3 logger supports an i3 compliant web services interface for retrieval and reporting of data. While technically, an ESInet can facilitate call traffic for any call type, only 911 Emergency calls are specified with, dealt, or required by the NENA functional architecture. The implementation of the ESInet itself, and what traffic will be transiting the network will determine the type of reporting available. As it pertains to all data elements required in NGCS-70, ECaTS reports on all data elements provided and supported by the ESInet architecture. It's important to note, ECaTS is constrained by the data elements provided by both the ESInet and the call handling equipment (given the current Statewide solution).				

Provided below is a list of all ESInet i3 Logger Reports provided by Atos:

- ESRP Peak Minute Processing Summary
- PSAP Conference Summary
- NG9-1-1 Call Viewer
- ESRP Call Summary
- ESRP Call Routing Detail
- Location Validation Logging
- ECRF Session Reporting
- PSAP Routing Duration
- BCF Session Reporting
- Concurrent Calls
- ESInet to PSAP Call Delivery
- LNG Session Reporting

ESRP Peak Minute Processing Summary: Provides insights into ESRP peak volume and call processing. The report identifies the "peak minute" detected across user-defined date and time ranges. The "Peak Minute" is the minute that has the highest number of calls being processed concurrently (simultaneously) by the ESRP in question. The report is compatible with both call stateful and non-stateful ESRP implementations.

Average, Minimum, and Maximum ESRP processing times are provided for calls within (as bound by) the peak minute are provided as well.

		PEAK MINUTE ESRP CALL VOLUME			ESRP CALL PROCESSING TIMES (Calls Detected Across Peak Min.)		
Date	PEAK MINUTE	Total Calls	Peak Number Concurrent Calls	Time At Peak	Avg. ESRP Processing Time	Minimum ESRP Processing Time	Maximum ESRP Processing Time
October 2019	10/23/2019 20:26:00	23	17	09.668	38.649	03.564	59.999
November 2019	11/04/2019 22:21:00	33	22	00.389	35.176	03.196	59.999
December 2019	12/05/2019 12:35:00	11	10	12.344	45.826	14.482	59.999
	Averages:	22.33	16.33	07.467	39.884	07.081	59.999

ESRP Peak Minute Processing Summary Report

PSAP Conference Summary: The 'PSAP Conference Summary' report is an NG9-1-1 enhanced version of the standard 'Call Transfer' report. Call transfer chains involving the selected PSAP are constructed using PSAP CPE legacy CDR. Once the chains are constructed, the NENA CallID and IncidentID values, as logged for the call(s) on the NG9-1-1 side, are added to each PSAP transfer leg.

The report interface allows the user to search / filter results by either (or both) a specific NENA CallID or IncidentID. Where no NENA values are specified, all transfer chains involving the selected PSAP are returned.

Total Calls Transferred: 4

Seizure Date /Time	ANI	PSAP / Agency	Agent	Queue Secs	Answer Secs	Talk Secs	Duration	Call ID	Incident ID
03/02/2020 00:23:05	555-555-5555	Alamance County Central Communications	Agent 01	5	5	26	0:31	None Detected	None Detected
03/02/2020 00:23:26	555-555-5555	Burlington PD	Agent 03	2	2	56	0:58	None Detected	None Detected
			Averages:	3.5	3.5	41.0	0:44		

Seizure Date /Time	ANI	PSAP / Agency	Agent	Queue Secs	Answer Secs	Talk Secs	Duration	Call ID	Incident ID
03/02/2020 00:29:00	555-555-5555	Alamance County Central Communications	Agent 01	7	7	95	1:42	None Detected	None Detected
03/02/2020 00:29:33	555-555-5555	Chatham County Emergency Operations	Agent 03	1	2	80	1:22	None Detected	None Detected
			Averages:	4.0	4.5	87.5	1:32		

Seizure Date /Time	ANI	PSAP / Agency	Agent	Queue Secs	Answer Secs	Talk Secs	Duration	Call ID	Incident ID
03/02/2020 02:00:54	911-555-5555	Alamance County Central Communications	Agent 01	8	8	24	0:32	None Detected	None Detected
03/02/2020 02:01:22	911-555-5555	Burlington PD	Agent 03	2	2	212	3:34	None Detected	None Detected
			Averages:	5.0	5.0	118.0	2:03		

Seizure Date /Time	ANI	PSAP / Agency	Agent	Queue Secs	Answer Secs	Talk Secs	Duration	Call ID	Incident ID
03/02/2020 02:10:01	555-555-5555	Alamance County Central Communications	Agent 01	2	3	22	0:25	None Detected	None Detected
03/02/2020 02:10:17	555-555-5555	Burlington PD	Agent 03	3	3	31	0:34	None Detected	None Detected
			Averages:	2.5	3.0	26.5	0:30		

PSAP Conference Summary Report

NG9-1-1 Call Viewer: The NG9-1-1 Call Viewer is a tool that allows users to access specific information for each call logged to the system by the NG9-1-1 network. The main output is a chronological list of calls that provides the start and end of each call, and the Call Identifier for the call-in question.

NG9-1-1 Call Viewer

ESINet: Intrado (AT&T)
Find: Calls active
On: 04/03/2020 from 00:00:00 To: 23:59:59 Eastern Standard Time
Agency: All agencies

Search now

Calls 1 to 76 of 76

Start	End	Call Identifier
04/03/2020 09:34:43.849	04/03/2020 09:41:56.390	urn:nena:uid:callid:158592088391351075482078418124:esrp.west.com
04/03/2020 09:42:06.304	04/03/2020 09:48:02.593	urn:nena:uid:callid:158592132635039240555013325383:esrp.west.com
04/03/2020 09:51:24.889	04/03/2020 09:51:30.966	urn:nena:uid:callid:158592188495450803679962565519:esrp.west.com
04/03/2020 09:57:34.621	04/03/2020 09:59:02.360	urn:nena:uid:callid:158592225468882320983914992117:esrp.west.com
04/03/2020 10:00:29.805	04/03/2020 10:05:40.333	urn:nena:uid:callid:158592242985218244799000920299:esrp.west.com
04/03/2020 10:29:40.370	04/03/2020 10:30:52.449	urn:nena:uid:callid:158592418043340192238651971031:esrp.west.com
04/03/2020 10:56:58.481	04/03/2020 10:57:09.649	urn:nena:uid:callid:158592581854877997315397716387:esrp.west.com
04/03/2020 10:57:41.944	04/03/2020 10:57:54.282	urn:nena:uid:callid:158592586201377539502394431825:esrp.west.com
04/03/2020 11:34:19.842	04/03/2020 11:55:15.475	urn:nena:uid:callid:158592805991055020473392477911:esrp.west.com
04/03/2020 11:35:48.394	04/03/2020 11:53:11.396	urn:nena:uid:callid:158592814845949644394195674746:esrp.west.com
04/03/2020 11:37:32.947	04/03/2020 11:55:02.286	urn:nena:uid:callid:158592825300754215545692311848:esrp.west.com
04/03/2020 11:37:53.728	04/03/2020 11:53:14.035	urn:nena:uid:callid:158592827377674211625993290956:esrp.west.com
04/03/2020 11:38:00.604	04/03/2020 11:54:38.975	urn:nena:uid:callid:158592828067243445201518322042:esrp.west.com
04/03/2020 11:39:21.785	04/03/2020 11:54:30.851	urn:nena:uid:callid:158592836185778856981374138306:esrp.west.com
04/03/2020 11:39:51.315	04/03/2020 11:54:37.351	urn:nena:uid:callid:158592839138088574037307573514:esrp.west.com

The Call ID for each call will present as a hyperlink to a drill down that links to the NG9-1-1 Call Detail. This view extracts, consolidates, and presents all log events detected for the call-in question, in chronological order. This will be a complete view of the call from the NG9-1-1 logging perspective.

NG9-1-1 Call Viewer

ESINet: Intrado (AT&T)
Find: Calls active
On: 04/03/2020 from 00:00:00 To: 23:59:59 Eastern Standard Time
Agency: All agencies

Search now

Calls 1 to 76 of 76

Start	End	Call Identifier
04/03/2020 09:34:43.849	04/03/2020 09:41:56.390	urn:nena:uid:callid:158592088391351075482078418124:esrp.west.com
04/03/2020 09:42:06.304	04/03/2020 09:48:02.593	urn:nena:uid:callid:158592132635039240555013325383:esrp.west.com
04/03/2020 09:51:24.889	[illegible]	[illegible]
04/03/2020 09:57:34.621		
04/03/2020 10:00:29.805		
04/03/2020 10:29:40.370		
04/03/2020 10:56:58.481		
04/03/2020 10:57:41.944		
04/03/2020 11:34:19.842		
04/03/2020 11:35:48.394		
04/03/2020 11:37:32.947		
04/03/2020 11:37:53.728		
04/03/2020 11:38:00.604		
04/03/2020 11:39:21.785		
04/03/2020 11:39:51.315		

NG 9-1-1 Call Detail

Call Identifier: urn:nena:uid:callid:158592088391351075482078418124:esrp.west.com
Incident Identifier: urn:nena:uid:incidentid:158592088391340824518972850688:esrp.west.com
Agencies: intrado.us
First Event: 04/03/2020 13:34:43.849
Last Event: 04/03/2020 13:41:56.390

Timestamp	Element	Agency	Event Type	
04/03/2020 13:34:43.849	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.849	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.908	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.912	brhm2euasa9ber1.we911.esinet.pri	intrado.us	StartCall	View
04/03/2020 13:34:43.912	brhm2euasa9ber1.we911.esinet.pri	intrado.us	CallProcess	View
04/03/2020 13:34:43.912	brhm2euasa9ber1.we911.esinet.pri	intrado.us	StartMedia	View
04/03/2020 13:34:43.912	brhm2euasa9ber1.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:34:43.935	brhm2euasa9ber1.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:34:43.936	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.967	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.967	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:43.996	brhm2euasa9ber2.we911.esinet.pri	intrado.us	LocationQuery	View
04/03/2020 13:34:44.004	brhm2euasa9ber2.we911.esinet.pri	intrado.us	LocationResponse	View
04/03/2020 13:34:44.012	brhm2euasa9rf1.intrado.us	intrado.us	LoSTQuery	View
04/03/2020 13:34:44.015	brhm2euasa9rf1.intrado.us	intrado.us	LoSTResponse	View
04/03/2020 13:34:44.016	brhm2euasa9ber2.we911.esinet.pri	intrado.us	LoSTQuery	View
04/03/2020 13:34:44.019	brhm2euasa9rf2.intrado.us	intrado.us	LoSTQuery	View
04/03/2020 13:34:44.020	brhm2euasa9rf2.intrado.us	intrado.us	LoSTResponse	View
04/03/2020 13:34:44.021	brhm2euasa9ber2.we911.esinet.pri	intrado.us	LoSTResponse	View
04/03/2020 13:34:44.061	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.070	brhm2euasa9ber2.we911.esinet.pri	intrado.us	StartMedia	View
04/03/2020 13:34:44.070	brhm2euasa9ber1.we911.esinet.pri	intrado.us	AdditionalAgency	View
04/03/2020 13:34:44.070	brhm2euasa9ber1.we911.esinet.pri	intrado.us	Route	View
04/03/2020 13:34:44.070	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:34:44.322	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.631	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.631	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:34:44.632	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.641	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.674	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.885	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.900	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:34:44.966	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:38:57.032	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:38:57.044	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:38:57.106	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:39:03.047	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:39:03.059	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:39:03.123	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:41:56.297	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:41:56.297	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:41:56.297	brhm2euasa9ber3.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:41:56.297	brhm2euasa9ber3.we911.esinet.pri	intrado.us	EndMedia	View
04/03/2020 13:41:56.308	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:41:56.357	brhm2euasa9ber2.we911.esinet.pri	intrado.us	CallSignalingMessage	View
04/03/2020 13:41:56.357	brhm2euasa9ber1.we911.esinet.pri	intrado.us	CallStateChange	View
04/03/2020 13:41:56.357	brhm2euasa9ber1.we911.esinet.pri	intrado.us	EndMedia	View
04/03/2020 13:41:56.390	brhm2euasa9ber2.we911.esinet.pri	intrado.us	EndCall	View

The user may then click on any individual log event for the call and view the body / content of the actual log event.

Events 1 to 1000 of 194689

first 1 2 3 4 5 6 7 last, or jump to page 1 go

Timestamp	Element	Agency	Event Type	Call	
04/06/2020 00:00:12.936	sfld2euasa9ber1.we911.esinet.pri	intrado.us	CallSignalingMessage	urn:nena:uid:callid:158614546793730132564082229493:esrp.west.com	View


```
<nena-lex:LogEventMessageRequest
  xmlns:nena-lex="urn:nena:xml:ns:LoggingExchange:2.0"
  xmlns:nena-lgt="urn:nena:xml:ns:LoggingDataTypes:2.0"
  xmlns:nena-cd="urn:nena:xml:ns:CodeList:2.0"
  xmlns:ns2="urn:ietf:params:xml:ns:pidf"
  xmlns:ns3="http://www.opengis.net/gml">
  <nena-lgt:LogEventTimestamp>2020-04-06T04:00:12.936Z</nena-lgt:LogEventTimestamp>
  <nena-lgt:AgencyId>intrado.us</nena-lgt:AgencyId>
  <nena-lgt:ElementId>sfld2euasa9ber1.we911.esinet.pri</nena-lgt:ElementId>
  <nena-lgt:CallIdURN>urn:nena:uid:callid:158614546793730132564082229493:esrp.west.com</nena-lgt:CallIdURN>
  <nena-lgt:IncidentIdURN>urn:nena:uid:incidentid:158614546793763993101089476474:esrp.west.com</nena-lgt:IncidentIdURN>
  <nena-lgt:SIPCallId>261B3AFD@10.87.225.70</nena-lgt:SIPCallId>
  <nena-cd:EventValuesCode>CallSignalingMessage</nena-cd:EventValuesCode>
  <nena-lgt:CallSignalingMessage>
    <nena-lgt:CallSignalingMessageText>
              BYE sip:wlssuser@10.80.97.150:5060;transport=udp;wlsscid=3aa3fc91bef65ae7;sipappsessionid=app-
vlsqi32bc506;wlssfcid=sip-1pr62qjqqyio3 SIP/2.0
              Content-Length: 0
              Allow-Events: message-summary, refer, dialog, line-seize, presence, call-info, as-feature-event
              Allow-Events: calling-name
              CSeq: 628830507 BYE
              P-Charging-Vector: icid-value="4DA31C7B00161989";icid-generated-at=10.87.225.70
              Organization: Metaswitch Networks
              Call-ID: wlss-900a975a-261B3AFD@10.87.225.70
              Max-Forwards: 70
              From: &lt;sip:2524514538@10.87.225.195:5060&gt;;tag=10.87.225.195+1+6cc3c+d502f4cc
              To: &lt;sip:9195110417@10.80.97.129:5060&gt;;tag=9a6747d9
              Via: SIP/2.0/UDP 10.87.225.195:5060;branch=z9hG4bK-6141f3c0c63fb3f6a34da5d6e925c6071-10.87.225.195-1
              Supported: resource-priority, siprec, 100rel
            </nena-lgt:CallSignalingMessageText>
    <nena-cd:DirectionValuesCode>outgoing</nena-cd:DirectionValuesCode>
  </nena-lgt:CallSignalingMessage>
</nena-lex:LogEventMessageRequest>
```


ESInet to PSAP Call Delivery: The purpose of this report is to identify the number of incoming ESInet calls that are "serviceable*," and what percentage of calls that are serviceable are delivered successfully to a PSAP (any PSAP) across a given date range.

Date	Calls Received by ESInet	Unserviceable Calls		Serviceable Calls			
		Abandoned	Other	Servicable Calls	Calls Not Delivered	Calls Delivered	% Delivered
01/10/2016	3,934	32	0	3,902	0	3,902	100.00%
01/11/2016	4,767	68	1	4,698	2	4,696	99.96%
01/12/2016	4,739	68	0	4,671	1	4,670	99.98%
01/13/2016	4,554	65	0	4,489	0	4,489	100.00%
01/14/2016	4,679	92	1	4,586	0	4,586	100.00%
01/15/2016	4,268	58	0	4,268	0	4,268	100.00%
01/16/2016	4,028	43	0	4,028	0	4,028	100.00%
Totals:	**30,969**	**426**	**2**	**30,642**	**3**	**30,639**	**99.99%**

ESInet to PSAP Call Delivery Report

PSAP Routing Duration Report: Provides high-level call delivery summary statistics for all calls delivered to the selected PSAP(s) by the ESInet.

Summary Call Flow							
Answering Call Center	Call Count	LIS Lookup Duration	Routing Duration	Queue Duration	Answer Duration	Total Time Prior to Talk	Total Call Duration
Boston	3,543	0:02	0:04	0:21	0:02	0:29	1:31
Marlboro	3,543	0:02	0:04	0:11	0:02	0:19	1:32
Totals	**7,086**						
Averages		**0:02**	**0:04**	**0:16**	**0:02**	**0:24**	**1:31**

Marlboro							
ANI	Call Type	LIS Lookup Duration	Routing Duration	Queue Duration	Answer Duration	Total Time Prior to Talk	Total Call Duration
508-323-3232	WRLS	0:02	0:04	0:21	0:02	0:29	1:31
508-876-6666	Abandoned - WP2	0:02	0:04	0:21	0:00	0:11	0:00
508-876-6666	SMS	0:02	0:04	0:11	0:02	0:19	1:43
Averages		**0:02**	**0:04**	**0:17**	**0:01**	**0:19**	**1:04**

PSAP Routing Duration Report

***Concurrent Calls*:** Report showing the number of active, simultaneous calls at any given point in time, as selected by the user.

Time Selected					
12/15/2015 12:04:00:00					
Date/Time	Call Identifier	ANI	Call Type	Point In Call	State of Call
12/15/2015 12:01:37:01	_CI_a56e556d871@bcf.state.pa.us	555-555-5555	911	02m 22s 89ms	Hold
12/15/2015 12:02:45:26	_CI_a82p835q275@bcf.state.pa.us	444-444-4444	911	01m 14s 74ms	Talk
12/15/2015 12:03:57:26	_CI_a82p835q275@bcf.state.pa.us	777-777-7777	911	00m 02s 74ms	Ring
Total Concurrent Calls:	3				

Concurrent Calls Report Output

BCF Session Reporting: This report contains a log, per user-selectable BCF, of all calls handled within a given date-range.

BCF Session Reporting
Alleghany County Ingress | bcf.state.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Period Group:	Month
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

Element Identifier bcf.state.pa.us SIP INVITE Received	Call Identifier	Processing Time	Media	ANI	CPN	Carrier	Call Result	SIP Session Duration
12/15/2015 12:01:37.018	_CI_a56e556d871@bcf.state.pa.us	147 ms	Audio	555-555-5555	333-333-3333	Verizon	Successful	03:37
12/15/2015 12:02:48.377	_CI_a72e814c612@bcf.state.pa.us	149 ms	Audio	666-666-6666	666-666-6667	AT&T	Abandoned	00:12
12/15/2015 12:04:59.164	_CI_a67j835q275@bcf.state.pa.us	150 ms	Text	444-444-4444	444-444-4445	TMOB	Successful	01:22
Calls Processed: 3								
Avg BCF Processing Time: 149 ms								

BCF Session Report

ESRP Session Reporting: This report provides a log of all 911 sessions received and processed by the ESRP(s) selected by a user over a specified date range.

ESRP Session Reporting
Alleghany County ESRP 1 | esrp.state.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

Element Identifier esrp.state.tx.us Call Date/Time		Call Identifier	Carrier	ANI	Answering PSAP	SIP Session Duration	Media
12/15/2015 12:01:37.017		_CI_a56e556d871@bcf.state.tx.us	Verizon	555-555-5555	PSAP 2	03:27	Audio
	Time to Route	Route Attempted	Reason	Rule	Element State	Element Response	
	186 ms	psap1.houston.tx.us	Normal	NormalNextHop	Overloaded	600 Busy	
	172 ms	psap2.houston.tx.us	Normal	NormalNextHop	Normal	200 OK	
Routes Processed: 2		Total Time To Route: 00 sec 986 ms					
Call Result: Successful		Average Time per Route: 179 ms					

ESRP Session Report

ESRP Queue State: This report reports on ESRP queue states when and where they are engaged or utilized within a given date/time range selected by the user.

ESRP Queue State

Alleghany County ESRP 1 | esrp.state.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

ESRP		Queue States								
esrp.state.pa.us			Active				Full			
Queue URI	Date	Standby	Spent in State	Instances	Queued	Avg	Spent in State	Max	Inactive	Disabled
<sample 911 queue URI>	1/16/2016	18:42:00	05:15:00	2	674	337	00:03:00	500	00:00:00	00:00:00
	1/17/2016	21:35:04	02:24:56	3	246	82	00:00:00	500	00:00:00	00:00:00

ESRP Queues State Report

ECRF Session Reporting: This report provides a log of all 911 sessions received and processed by each user-selected ECRF over a selected date range

ECRF Session Reporting

Alleghany County ESRP 1 | ecrf.state.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

Element Identifier					SIP Session Duration	Media
ecrf.state.tx.us						
Call Date/Time	**Call Identifier**	**Carrier**	**ANI**	**Answering PSAP**		
12/15/2015 12:01:37.014	_CI_a56e556d871@bcf.state.tx.us	Verizon	555-555-5555	PSAP 2	03:27	Audio
	Element Queried	**Response Time**		**Route Received**	**Response**	
	ecrf1.houston.tx.us	127 ms		Yes	Civic	
Location Queries: 1		**Total Time To Location: 00 sec 356 ms**				
Call Result: Successful		**Avg. Time to Location Response: 127 ms**				

Element Identifier					SIP Session Duration	Media
ecrf.state.tx.us						
Call Date/Time	**Call Identifier**	**Carrier**	**ANI**	**Answering PSAP**		
12/15/2015 12:01:37.015	_CI_a56e556d871@bcf.state.tx.us	Verizon	555-555-5555	PSAP 2	03:27	Audio
	Element Queried	**Response Time**		**Route Received**	**Response**	
	ecrf2.houston.tx.us	127 ms		No	Recursive	
	ecrf3.houston.tx.us	135 ms		Yes	Geodetic	
Location Queries 2		**Total Time To Location: 00 sec 436 ms**				
Call Result: Successful		**Avg. Time to Location Response: 131 ms**				

ESRF Session Report

Location Validation Logging: This report provides a log of location validations to occur over a selected date range.

Location Validation Logging
Alleghany County ECRF 1 | ecrf.alleghany.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

LoST Request Received	Validating Entity	Querying Entity	Call Identifier	Service URN Received	Validation Response			Error Message	Time to Response	Addl LoST Queries
					Valid	Invalid	Unchecked			
12/15/2015 12:01:37.018	lis.state.oh.us	ecrf.state.oh.us	_CI_a56e556d871@bcf.state.pa.us	urn:service:sos.police	5	1	1	None	00:02.149	3
Queries Processed: 1										
Avg Time to Response: 00:02.149										

Location Validation Logging Report Output

LNG Session Reporting: This report provides a log of all SIP INVITES to be generated by a user-selected LNG (or LNGs) over a selected date range. The time for the LNG to determine the initial ESInet "hop" (ESRP route) is included for each session, as well as the overall average for the same across all routes contained in the report. In addition, the ESRP route initially chosen/attempted in the SIP INVITE is included, as well as visual indicators signaling whether or not the initial ESRP accepted the INVITE.

LNG Session Reporting
Alleghany County LNG | lng.state.pa.us

Report Date:	01/19/2016 10:47:15
Report Date From:	12/15/2015
Report Date To:	12/15/2015
Time Block:	00:00 - 23:59
Call Type:	911 Calls
Abandoned Filters:	Include Abandoned

Element Identifier lng.state.pa.us SIP INVITE Sent	Call Identifier	Time to ESInet Route	Time to ESInet Delivery	Initial Route	ANI	CPN	Carrier	Media	Call Result	SIP Session Duration
12/15/2015 12:01:37.018	_CI_a56e556d871@bcf.state.pa.us	441 ms	551 ms	esrp.state.pa.us ✔	555-555-5555	555-555-5555	Verizon	SMS	Successful	01:27
12/15/2015 12:02:48.377	_CI_a72e814c612@bcf.state.pa.us	447 ms	539 ms	esrp1.state.pa.us ✔	444-444-4444	333-333-3333	AT&T	Audio	Abandoned	00:12
12/15/2015 12:04:59.164	_CI_a67j835q275@bcf.state.pa.us	450 ms	600 ms	esrp1.state.pa.us ✖	777-777-7777	777-777-7777	Wireline	Audio	Successful	03:45
Calls Processed: 3										
Avg Time to ESInet Route: 446 ms										

FLNG Session Reporting Output

ECaTS Role-Based Accessibility

ECaTS can add and remove functionality based on a specific role. The reporting functionality is governed by 'roles' and 'PSAP groups' that determine which section(s), subsection(s), data and PSAPs each user may view/report on.

Access to data is determined by the public safety organization responsible for that data and its access. For instance: If the Nebraska Commission would have access to all data that falls under its control based on agreed upon permissions in initial configuration (i.e. Data Sharing Agreement). Notwithstanding, the local organizations will only have access to their data, based on agreed upon permissions without the ability to access neighboring PSAP data.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 71	**Next Generation Core Services Elements (NGCS)** **Event Logging and Management Information System (MIS)** **NENA Standards Compliance** The bidder's proposed logging solution shall meet the requirements set forth in NENA-STA-010.2-2016. **Third-Party Certification Fees** Bidder is responsible for any third-party certification fees. Describe how the solution meets or exceeds these above requirements.	X			
	Bidder Response: The Atos ESInet/NGCS solution complies with the i3 event log recording solution, as set out in NENA-STA-010.2, Sec. 5.13.3. Integration testing between the Atos functional elements and the ECaTS i3 event logger and certification will be arranged by Atos, at no cost to the State.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 72	**Next Generation Core Services Elements (NGCS)** **Network Time Protocol (NTP) and Time Source** Bidder's solution shall sync with existing time sources to maintain consistent time stamps across the network and systems. Describe how bidder's solution complies with this requirement.	X			
	Bidder Response: In compliance with the NENA 04-002 Master Clock standard, the solution will include the Spectracom NetClock Time Servers to provide synchronization to all network accessible devices via NTP. All systems, servers, and appliances included as part of this solution support time synchronization via NTP.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 73	**Next Generation Core Services Elements (NGCS)** **Network Time Protocol (NTP) and Time Source** **Master Clock Description** The bidder shall provide redundant, resilient network-attached Stratum 2 time sources ("master clocks") capable of supplying standard time to all systems, network devices, and functional elements that comprise the ESInet and the NGCS. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The solution will include redundant Spectracom NetClock Time Servers model 9483. This model is built specifically to support emergency communications centers and meets all associated NENA standards. All devices requiring network time synchronization will have access to this device and will directly synchronize system time with the NetClock..				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 74	**Next Generation Core Services Elements (NGCS)** **Network Time Protocol (NTP) and Time Source Accessibility by PSAP Equipment** The master clock time source(s) shall be accessible to the PSAPs for synchronizing call-handling systems and other related systems. All systems, network devices, and functional elements shall support the use of the NTP for maintaining system clock accuracy. Describe how the solution meets or exceeds the above requirements.	X			
	Bidder Response: The Spectracom NetClock GPS Time Servers are the source of NTP-based time synchronization for all devices throughout the solution. There will be Stratum 1 (NetClock) and Stratum 2 time servers deployed across the data centers of the proposed solution. All elements at PSAPs served by the Atos ESInet/NGCS will be able to access Atos time servers. The network security infrastructure will make provisions to allow for NTP transactions between PSAPs and the NGCS time servers.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 75	**Next Generation Core Services Elements (NGCS)** **NG911 Application Integration** Bidder shall describe other NG911 applications, additional data integrations, and personal safety applications that may be integrated with the NGCS solution. The bidder's system must be capable of integration with Additional Data Repositories (ADR), Identity-Searchable Additional Data Repositories (IS-ADR) or commercial third-party LIS, as described in NENA STA-010.2-2016, within two years of the deployment of the first PSAP. Describe how the solution will accomplish integration, information storage, and use/transmission of data to PSAP CHE.	X			
	Bidder Response: Atos can support additional data integrations and integrations of personal safety applications with the NGCS solution being offered. To date, Atos has provided such integrations with partners and vendors such as RapidSOS for ADR, OnStar and VoIP providers such as bandwidth.com. In addition, Atos has experience integrating public safety applications for the hearing impaired.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 76	**Next Generation Core Services Elements (NGCS)** **Message Session Relay Protocol Text (MSRP) Integration** The PSAPs have deployed short messaging service (SMS)-to-911 service. 1. Describe the ability to integrate existing web-based and MSRP-integrated SMS-to-911 and Real-Time Text (RTT) services into the solution. 2. Explain whether the solution supports location-by-reference and/or location-by-value. This requirement is for the integration of text messaging with MSRP and not a requirement for procuring text services.	X			
	Bidder Response: Atos interconnects to Intrado's and Comtech's TCC centers from our NGCS data centers in order to provide access to MSRP and RTT text services from PSAPs served by the Atos ESInet/NGCS solution.Both location-by-reference and location-by-value are supported for MSRP text calls. Moreover, the solution supports full MSRP conferencing, where a 'conference' means that the entire content from the beginning of the conversation is copied to an added conference participant. Finally, call takers will be able to communicate amongst themselves without involving the caller.				

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 77	**Next Generation Core Services Elements (NGCS)** **1. Make-Busy Functionality** Some PSAPs have a physical make-busy switch that can be activated in the event of an emergency evacuation. Bidder's solution shall support this functionality to all PSAPS.	X			
	2. Ringdown Functionality Bidders' solution shall support ringdown functionality, either through the call-handling system or through the NGCS.	X			
	3. Near-Simultaneous Transfer The solution shall support near-simultaneous conference and transfer capability, with up to at least 12 parties in the conference. This feature shall allow transfer or conference buttons to be programmed to automatically establish a conference with multiple parties. For instance, one button at a police department might establish a conference between the police, fire, and EMS PSAPs and the original caller, without having to add each additional party individually. Describe how bidder's solution meets or exceeds these requirements.	X			

Bidder Response:

1. **Make-Busy Functionality:** Each PSAP will be equipped with a physical contact closure device with a connected button that, when pressed, will send a PSAP busy signal to the NGCS. The contact closure interfaces with the ESRP to mark the PSAP out of service. Based on rules contained within the PSS/PRF, 911 calls for that PSAP will be rerouted to the correct backup PSAP.
2. **Ringdown Functionality:** Ring-down functionality is typically managed at the CHE level using gateways or auto-dialers. Routing solutions typically do not manage or route ringdown circuits, yet the Atos ESRP, which is built on the OpenScape Voice SIP switch can provide ring own functionality through the NGCS if required.
3. **Near-Simultaneous Transfer:** Legacy star code transfers are supported by the LSRG in the NGCS solution and we support both near-simultaneous conference and transfer functionality to ensure emergency calls are routed and handled efficiently. Atos' media server functionality can be leveraged within the CHE using shortcut keys to add parties to an existing call and execute transfers of those calls. Each conference / transfer endpoint is designated by a SIP URI so the system can identify it as an "Add Party" request when the ESRP/media server receives an "Add Party" request.

Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 78	**Next Generation Core Services Elements (NGCS)** **PSAP Interfaces and Backroom Equipment Requirements** **Support of PSAP Interfaces** Bidder's solution shall have the ability to support PSAP interfaces specified in NENA STA-010.2-2016, Section 4, including the following: a. SIP calls b. NGCS call delivery c. Web services d. All baseline media and multimedia (as described in NENA STA-010.2-2016, Section 4) e. NTP time services interface, accurate to 1 ms f. Transport layer security g. Discrepancy reporting Describe the functionality of the PSAP interfaces in detail to address the requirements outlined above, with particular attention to the user interface, additional features, and security aspects.	X			

Bidder Response:

Atos will provide the following:

a. **SIP Calls:** The diverse MPLS circuits will be terminated on Cisco routers with Firepower firewall security, the calls will then be handed off to a redundant pair of BCFs before being sent to Regional Call Handling CPE. If legacy gateways are required, Atos will provide AudioCode Gateways for PIF and DigiPort IP to Serial convertors for LIF.

b. **NGCS call delivery**: The diverse MPLS circuits will be terminated on Cisco routers with Firepower firewall security, the calls will then be handed off to a redundant pair of BCFs before being sent to Regional Call Handling CPE. If legacy gateways are required, Atos will provide AudioCode Gateways for PIF and DigiPort IP to Serial convertors for LIF.

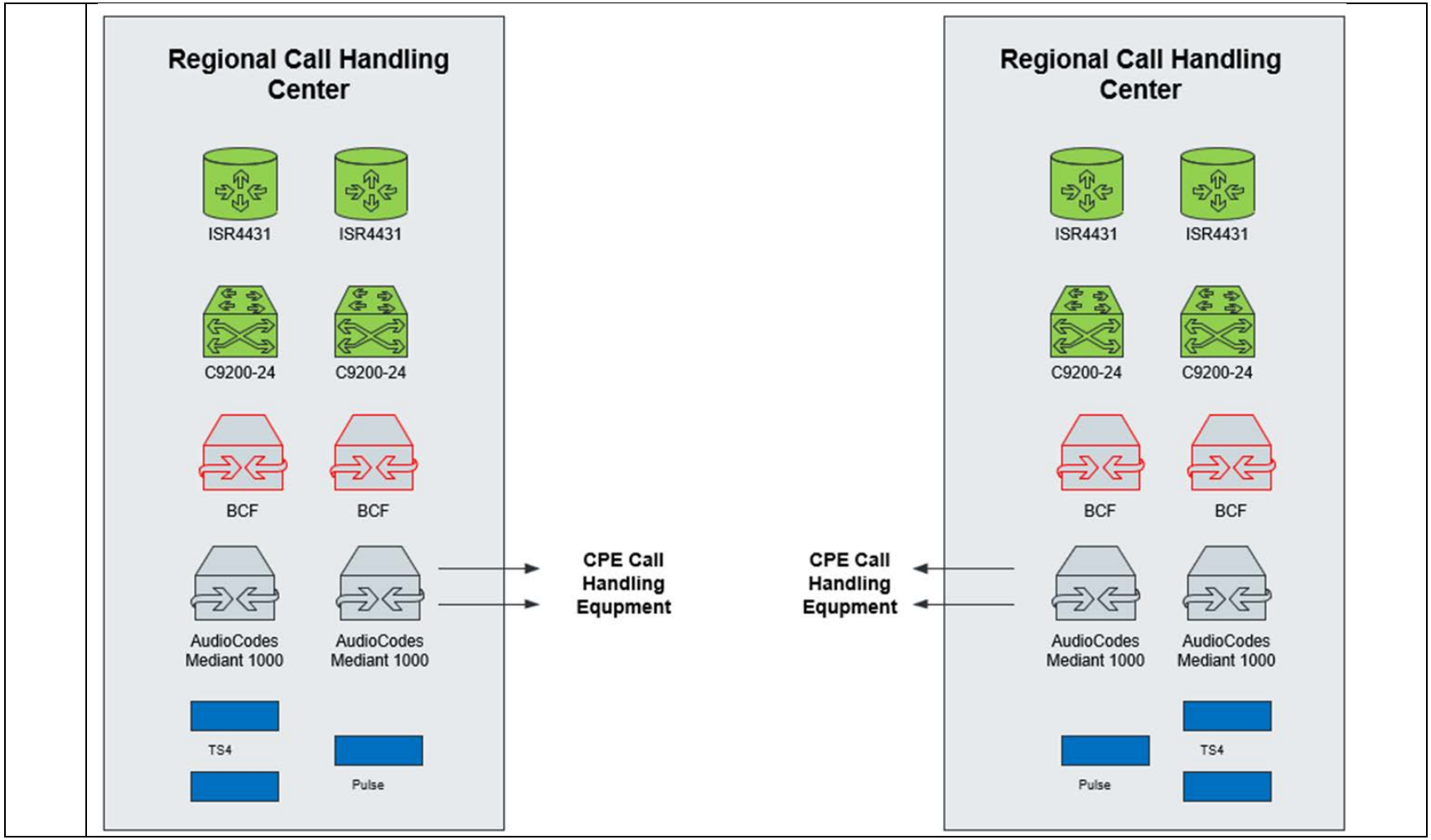
c. **Web services:** The diverse MPLS circuits will be terminated on Cisco routers with Firepower firewall security, the web services will then be delivered to the Regional Call Handling CPE

d. **All baseline media and multimedia**: The diverse MPLS circuits will be terminated on Cisco routers with Firepower firewall security, the calls, text, video and other types of media will then be handed off to a redundant pair of BCFs before being sent to Regional Call Handling CPE. If legacy gateways are required, Atos will provide AudioCode Gateways for PIF and DigiPort IP to Serial convertors for LIF.

e. **NTP time services interface, accurate to 1 ms:** Stratum 0 and Stratum 1 clock sources in the NGCS core which will always be 1 logical network hop away. If, during proof of concept testing, it is discovered that these clock sources are not accurate enough, Atos will deploy Stratum 1 instances on the local servers hosting the BCF.

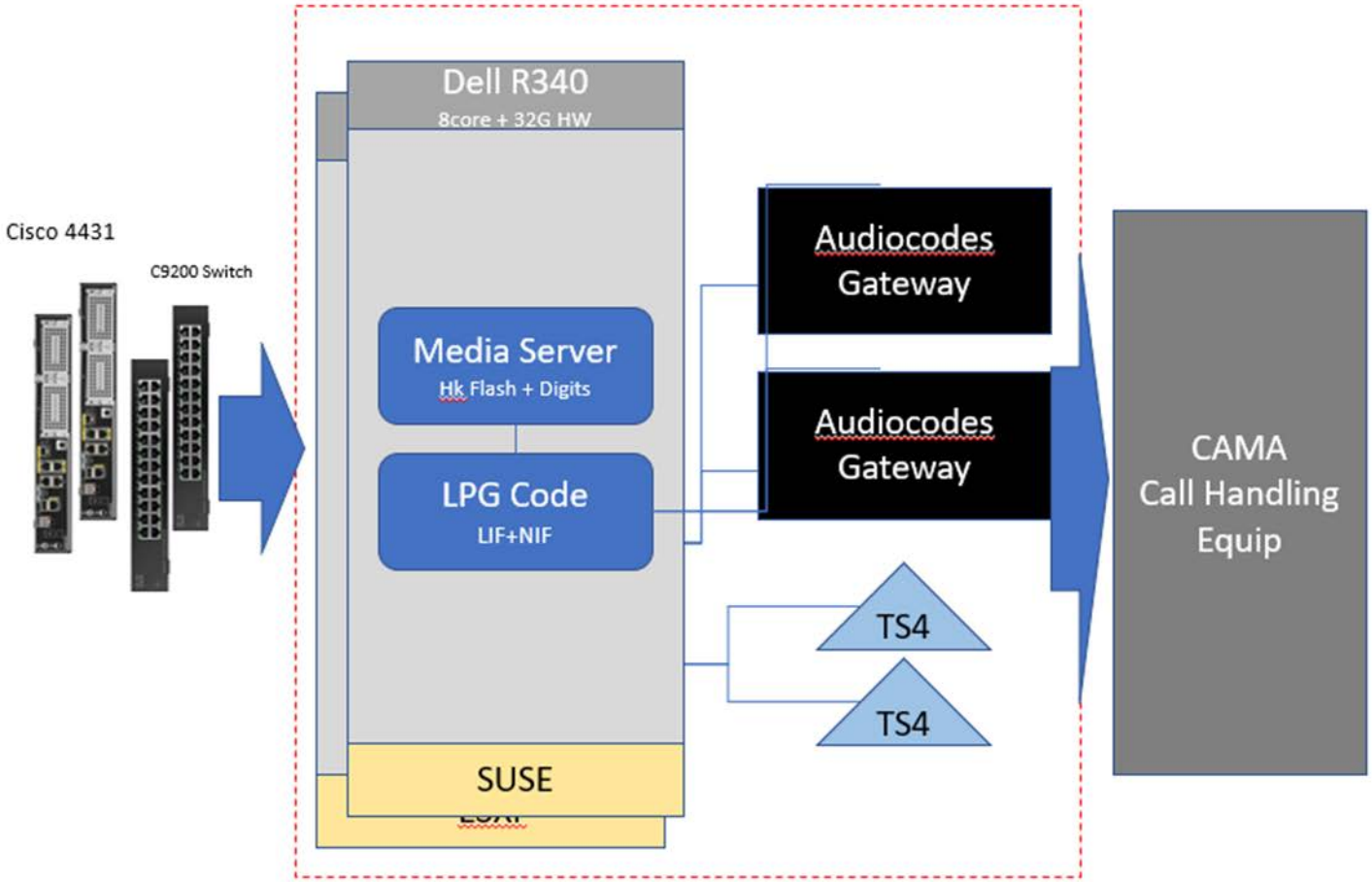
f. **Transport Layer security:** The diverse MPLS circuits will be terminated on Cisco routers with Firepower firewall security, the calls will then be handed off to a redundant pair of BCFs before being sent to Regional Call Handling CPE. All traffic will be transported with TLS encryption to the PSAP BCFs that in turn hands it off to the local CallHandling system via TCP TLS or UDP, as required..

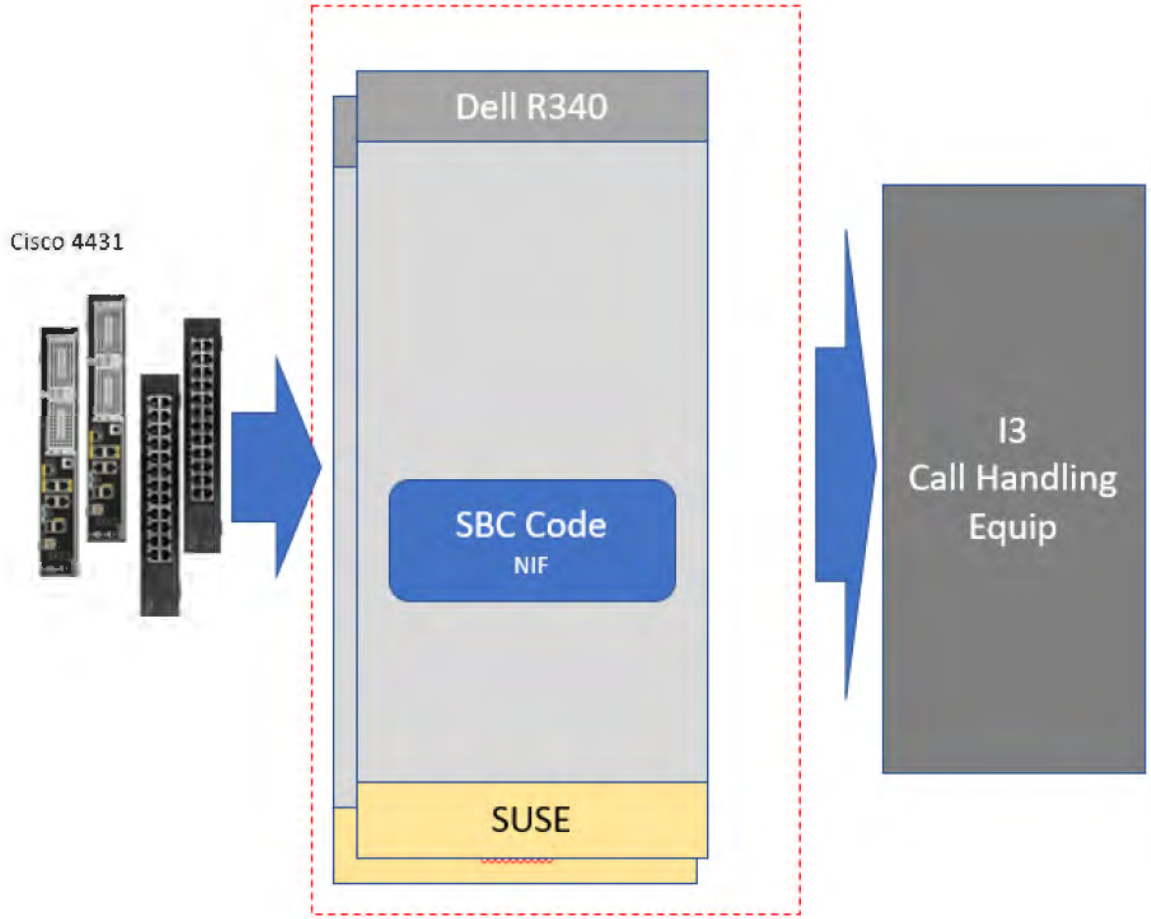
g. **Discrepancy Reporting (Future)**: The Atos ESInet/NGCS provides a standardized Discrepancy Reporting mechanism for the all elements that located at any location of the ESInet and NGCS (OSP aggregation points, NGCS data centers, PSAPs). The DR mechanism is provided as a web service.

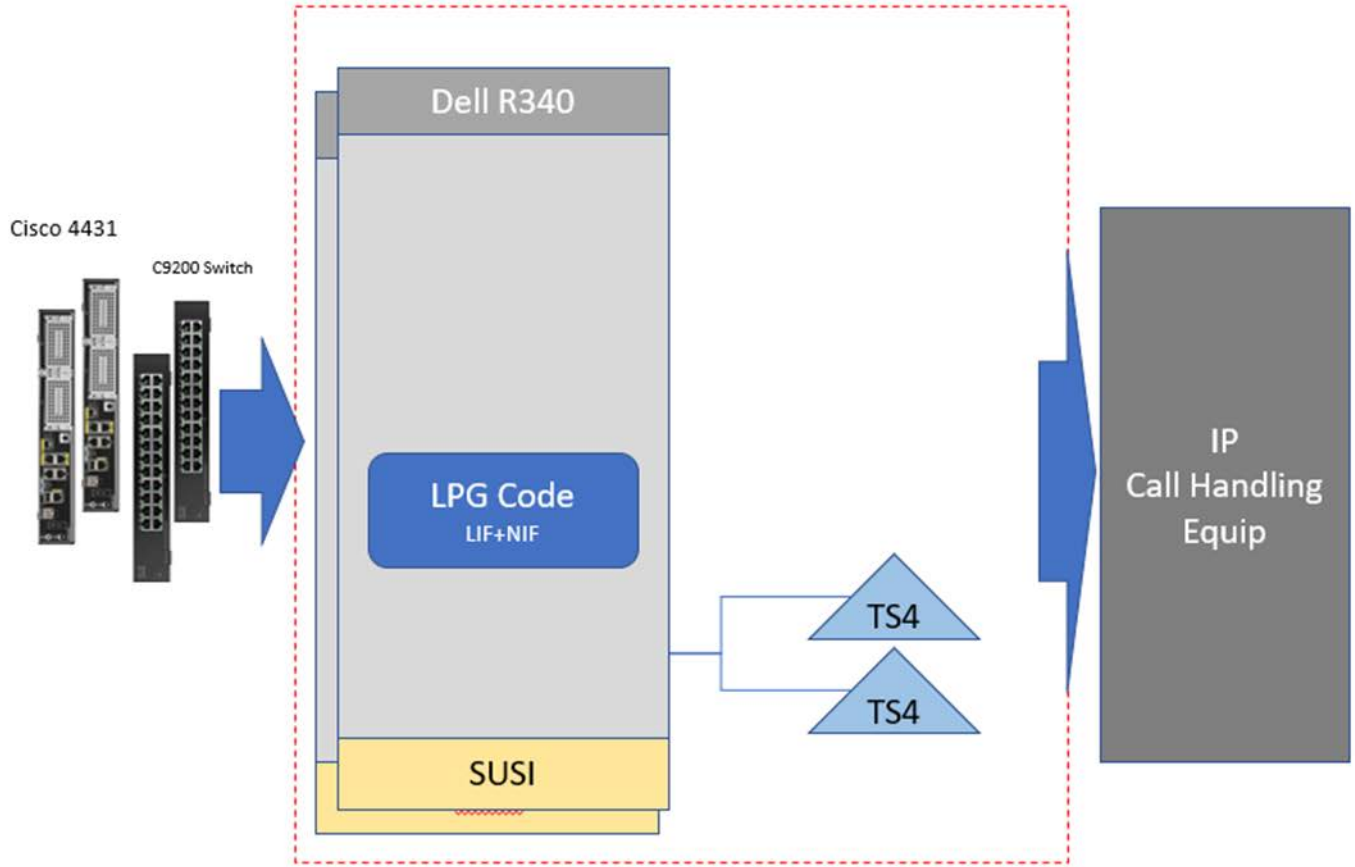


Any additional documentation can be inserted here:

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 79	**Next Generation Core Services Elements (NGCS)** **PSAP Interfaces and Backroom Equipment Requirements** **Support of Call Handling Equipment (CHE) Platforms** 1. Provide a list of CHE platforms for which bidder has successfully implemented the interfaces listed above in a live production environment, noting any interfaces that have not yet been tested with each CHE vendor/model. 2. Where interfaces with CHE vendors/models have yet to be deployed and/or tested, please describe the integration testing process that the bidder will perform prior to acceptance testing of the solution. 3. Describe the physical interface handoff required at the PSAP CHE demarcation point.	X			
	Bidder Response: 1. None available. 2. Atos is engaged in interoperability testing (IOT) with the Intrado VIPER and Motorola VESTA call handling platforms. A comprehensive IOT document governs the testing process (cf. ESInet – i3 PSAP Interface Control Document (ICD) for Interoperability Testing (IOT) Prime Network Service Provider (PNSP)). This document outlines the connectivity between the NGCS and call handling systems, defines call flow use cases, specifies the format of SIP messages and media for voice and text calls, describes the format of the location querying mechanism (including HELD transactions), describes the sequence for call transfers (including LoST transactions), defines state change mechanisms for services, elements and queues, and the format of abandoned call notifications. 3. Atos will provide the following physical handoffs depending upon the legacy or i3 readiness of each CHE Center (a) RJ45 1000Base-T (supports 100Base-T) for Ethernet connectivity to CPE (b) T1 CAS or analog trunks in support of legacy CAMA trunks (c) IP to Serial (RS-232) in support of legacy NENA ALI queries				


Cisco 4431
C9200 Switch
Dell R340
8core + 32G HW
Media Server
Hk Flash + Digits
LPG Code
LIF+NIF
SUSE
Audiocodes Gateway
Audiocodes Gateway
TS4
TS4
CAMA Call Handling Equip


Cisco 4431
Dell R340
SBC Code
NIF
SUSE
I3
Call Handling
Equip



Any additional documentation can be inserted here:

NGCS 80	**Next Generation Core Services Elements (NGCS)** **Transfer to 7/10-Digit Numbers** The bidder's solution shall be capable of transferring 911 calls to 7 or 10-digit numbers with the Calling Party Number (CPN). Describe how the solution meets or exceeds this requirement.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: Atos' media bridge allows the call taker to add a third-party transfer to an existing 9-1-1 call and support 7 or 10-digit numbers. This can be achieved by sending a conference or transfer request via a URI to the Media Bridge so that a three-way conference is set-up to facilitate the transfer.				

Any additional documentation can be inserted here:

SVAL-1	**Service Validation** Throughout the life of the contract, upon request of the Commission, Bidder shall allow for network testing and validation by a third-party entity, to verify that the service(s) and/or solution(s) are in compliance with the contract's scope.	Comply	Partially Comply	Complies with Future Capability	Does Not Comply
		X			
	Bidder Response: Atos will comply with the stated requirement.				

OPTIONAL SERVICE

		Comply	Partially Comply	Complies with Future Capability	Does Not Comply
NGCS 81	**Next Generation Core Services Elements (NGCS)** **OPTIONAL SERVICES** **NG911 Applications and Alarm Integration** **Alarm Integration Description** NG911 provides for the capability to have alarm companies integrate directly with the ESInet and use the NGCS for routing of the alarm and associated data. Describe bidder's experience with integrating alarms, sensors, and other non-interactive call types with bidder's NGCS solution and include separate pricing.			X	
	Bidder Response: The mechanism included in the i3 specification for automated sensor reporting and alarming is documented in section 4.1.10 "Non-Human Initiated Calls". The i3 document explicitly states that the ASAP to PSAP protocol, currently used to relay central station alarms directly to a PSAP, is not supported in an ESInet (last paragraph of section 4.1.10): "There is no mechanism specified to handle an APCO/CSAA 2.101.2-2014 [191] Alarm within the ESInet, although a PSAP could have an interface to such an alarm. Future alarm systems should use the mechanism described in this section. The ASAP to PSAP standards require that an agreement be in place between a PSAP and an alarm company to use this technology; some PSAPs do not agree to this (requiring a person at the alarm company to report alarms via telephone). If these types of alarms were supported on an ESInet then PSAPs might receive alarms that they were not expecting or by policy do not respond to. " The new mechanism specified in section 4.1.10 is the use of the SIP MESSAGE method to convey non-interactive data through an ESInet to a PSAP. The SIP message would have embedded in it a Common Alerting Protocol (CAP) message body. This is an emerging technology and for it to be useful requires not only the ESInet part but PSAPs that can receive and display this data with personnel trained on how to respond. Currently, the Atos ESInet solution does not support the handling of the SIP MESSAGE method. It is on our roadmap and currently planned to be available at the end of March 2021. We do not envision much usage of this mechanism before the middle to end of 2021.				

Any additional documentation can be inserted here:

HIGH LEVEL PROJECT PLAN AND PROJECT APPROACH

Atos Public Safety fully understands the mission critical nature of public safety communications systems. Our project plan and associated activities reflect this understanding. The Atos NG9-1-1 project team begins our project planning and deployment activities from the starting point of "do no harm" to the State's emergency response capability.

In this section, we describe our proposed high-level project plan for the State's migration to the Atos ESInet/NGCS solution from the existing E9-1-1 system. We also describe how our project migration approach will provide for the most cost-effective migration while ensuring the integrity of the State's mission-critical 9-1-1 services.

High-Level Project Plan

Our firm has utilized this project methodology successfully in multiple, large scale communications system implementation projects. We have selected partner firms that also have many years of experience in design and deploying migration strategies in complex public safety communications environments. Our team members include firms that can provide services and solutions for the technical, operational, cost, governance and managed services aspects of the new NG9-1-1 solution.

The Atos' project planning approach will be coordinated so that the plan ensures forward-looking, advance preparation work is integrated into the schedule to meet timeline requirements. Our deployment includes a rigorous testing, verification and validation processes. Combined with our up-front planning, our deployment and testing approach will enable our team to deliver a reliable and functional system on schedule. Finally, as we have experienced with many previous large-scale complicated projects, we will collaborate with all stakeholders, to include the Commission, your NG9-1-1 project team, service providers and other operations personnel in the process.

Planning and deploying "with the end in mind", Atos will deliver the mission critical ESInet/NGCS solution to the State. Our team will immediately highlight any potential disruption to existing operations resulting for any project-related activity. Part of our project plan is to implement a communications plan that will provide project information to all stakeholders on a regular basis, based on approval of the State's NG9-1-1 Project Team. Also, we will assign experienced staff who have the requisite skills and knowledge to do the job to the project, and who are expected to communicate fully with the State project team.

Our project plan will include such activities as:

- Monitoring for any potential disruption to existing operations
- Defining any specific dependencies that Atos has identified for a successful implementation
- Implementing recovery procedures in the event we experience operational issues or encounter any unforeseen conditions
- Monitoring and coordinating various planning, testing, and training activities leading up to the cutover activities. A Go/No-Go decision will be made to provide the State with decision-making information as well as to prioritize resources.
- Pre-migration activities centered on verifying that all migration and fallback procedures are in place and systems are performing normally

- Defining ingress network design, ESInet design, data center build plans, a clear project schedule of activities (including Gantt charts), example test plans, process audits, risk mitigation plans, and staffing plans
- Specific sequence of region migrations, considerations that may influence such sequencing, and if any sequences are mandatory (during the contract finalization period, Atos Public Safety will work with the State to finalize the desired order of Regional migration)
- Steps that the State may take to streamline the migration project, with descriptions of required resources and details regarding what is required
- Rigorous testing, verification and validation

These are just some of the critical activities that will be covered under our project plan. As we progress through our description of the "Project Planning Approach" later in this section, we will detail further activities that will be defined and implemented for a successful migration.

The following provides the high-level project plan and can serve as a baseline for discussions.

Before a project plan can be fully executed, the following phases need to be completed:

- Phase 1: OSP Migrations
- Phase 2: Atos ESInet and NGCS installations
- Phase 3: Call Handling Regional Host equipment installations
- Phase 4: ESInet MPLS Egress network provisioning
- Phase 5: Regional Call Handling Cutovers

Phase 1: OSP Migrations

Points of Interconnects are established within each LATA and the 911 call traffic is migrated to Atos NGCS data centers. Functional testing of the ingress network will be conducted during this phase.

Phase 2: ESInet/NGCS installations

During the Atos NGCS installations we will install and stand up Next Generation Core elements into our two geo-diverse data centers located in Richmond, VA and Phoenix, AZ. These data centers have Tier 3 rating and are secure and hardened. A redundant point-to-point network connection will be established between the Richmond and Phoenix data centers.

Phase 3: Call Handling Host site equipment installations

Atos will utilize Turnkey Telecom, a local Nebraska company, to install local edge routers, switches, BCFs, gateways and associated equipment at each regional call handling host center. Site surveys will be performed at each site to assess floor and rack space and determine network demarcation point. In addition, Atos will also use Turnkey Telecom to install make-busy appliances at each of the PSAPs across the state.

Phase 4: ESInet MPLS Egress network provisioning

Atos will provide a true diverse MPLS network to each call handling host sites and conduct throughput network testing to assure end-to-end continuity of Next Generation 9-1-1 call routing.

Atos will build-out and test our egress ESInet network and install the remote PSAP edge routers and associated equipment.

Phase 5: Regional Call Handling Cutovers

Atos proposes the following draft project plan schedule as part of our submission for the State's review. In concert with the State and your stakeholders, we look forward to reviewing and amending where necessary to solidify a robust and comprehensive project

The proposed regional project plan timeline is depicted below. We propose the following sequence.

- Region 1 - North Central
- Region 2 - South Central
- Region 3 - East Central
- Region 4 - Metro
- Region 5 - Southeast
- Region 6 - West Metro
- Region 7 – Northeast

Task Name	Duration	Start	Finish
State of Nebraska 9-1-1 NG9-1-1 Project	180 days	Tue 9/1/20	Mon 5/10/21
Contract Start Date		Tue 9/1/20	
Project Kickoff	10 days	Mon 9/14/20	Fri 9/25/20
Design, Planning, and Review			
Solution Architecture and Design	**60 days**	**Mon 9/28/20**	**Fri 12/18/20**
Solution Designs and As Builts	45 days	Mon 9/28/20	Fri 11/27/20
OSP Migration/Transition Plan	90 days	Thu 10/1/20	Wed 2/3/21
ESInet & NGCS	**105 days**	**Mon 11/30/2**	**Fri 4/23/21**
Build and Configure	30 days	Mon 11/30/2	Fri 1/8/21
Network	60 days	Mon 11/30/2	Fri 2/19/21
Stage Data Centers	45 days	Mon 1/11/21	Fri 3/12/21
Integration and Test Phase	20 days	Mon 3/15/21	Fri 4/9/21
Execute Formal SAT Testing	10 days	Mon 4/12/21	Fri 4/23/21
Call Handling Host Integration	**217 days**	**Mon 2/1/21**	**Tue 11/30/21**
Site Surveys	30 days	Mon 2/1/21	Fri 3/12/21
Region Cutover - Region # 1	22 days	Mon 5/3/21	Tue 6/1/21
Region Cutover - Region # 2	22 days	Tue 6/1/21	Wed 6/30/21
Region Cutover - Region # 3	22 days	Thu 7/1/21	Fri 7/30/21
Region Cutover - Region # 4	22 days	Mon 8/2/21	Tue 8/31/21
Region Cutover - Region # 5	22 days	Wed 9/1/21	Thu 9/30/21
Region Cutover - Region # 6	22 days	Fri 10/1/21	Mon 11/1/21
Region Cutover - Region # 7	22 days	Mon 11/1/21	Tue 11/30/21
Make Busy Intergation at PSAPs	152 days	Mon 5/3/21	Tue 11/30/21
Operational Day 2 Support	1146 days	Mon 4/12/21	Mon 9/1/25

This project plan will take into consideration many factors of region readiness including current call handling system and application release levels, GIS readiness and operations readiness.

Once all carrier traffic serving a region is migrated into the Atos data centers, the cutover to NGCS call routing can commence.

Our recommendation is to cutover one Region per month in order to minimize disruption and to allow for a smooth transition to the new call handling platform.

After cut-over, each Region will enter the 30-day acceptance test period and project milestones will capture the specific tasks.

In the unlikely event calls are not routing properly, Atos will move traffic back. This activity will be coordinated with your team prior to fallback.

For any future connections into neighboring State ESInets, we will connect to those networks from our aggregation centers with diverse point-to-point connections.

A detailed Gannt chart is provided in the Lifecycle Schedule section of our proposal response.

Our Project Planning Approach

As previously set forth, the Atos' project planning approach will be coordinated so that the plan ensures forward-looking, advance preparation work is integrated into the schedule to meet timeline requirements. Our deployment includes a rigorous testing, verification and validation processes. Combined with our up-front planning, our deployment and testing approach will enable our team to deliver a reliable and functional system on schedule. Finally, as we have experienced with many previous large-scale complicated projects, we will collaborate with all stakeholders, to include the Commission, your NG9-1-1 project team, service providers and other operations personnel in the process.

Cost-Effective Project Approach

Our project approach is to provide the State an NG9-1-1 i3 solution that is cost effective to implement, use and maintain. Using an experienced team in all aspects of the project will provide the basis to get it right the first time, eliminating costly re-working. We will emphasize project communications through the project in order to mitigate and manage identified risks and manage the challenges that always occur when undergoing a complex, mission critical project. And, moving forward, the Atos NG9-1-1 Account Management team will provide post-cutover support to maintain the new systems and network.

Dependency Identification

Atos will identify any specific dependencies impacting the project implementation to the State NG9-1-1 Project Team. Our project schedule will identify key dependencies for each activity and task associated with the project. In addition, we will prepare reports on specific dependencies with an explanation.

Risk Mitigation

Throughout the project, our weekly and monthly project status reporting will identify risks that could impact the progress of the project. The risks will be identified as Red-high level; Yellow-Medium Risk, and Green for resolved risks. We will describe each risk, options for managing and mitigating that risk and its impact on the schedule, budget, etc.

Staffing Plans

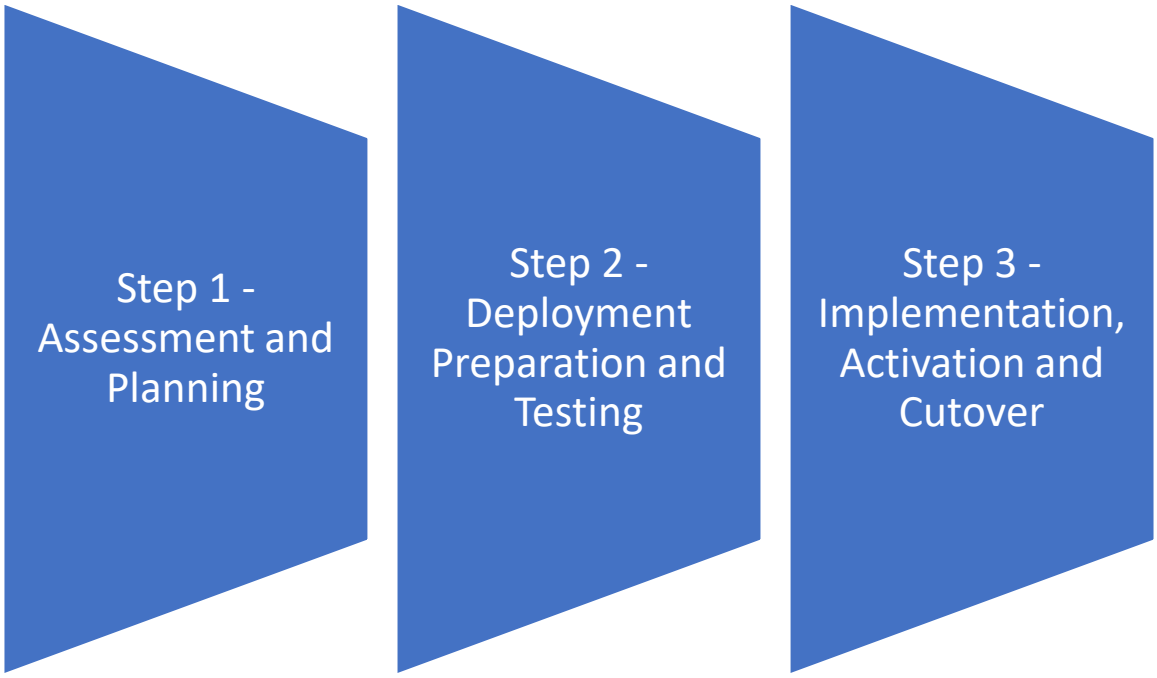
We provide a staffing plan identifying key staff members to include a State NG9-1-1 Project Manager, project managers for several of the key tasks implemented during the project to include Data Center, ESInet design and deployment, Regional Call Handling Center readiness and training.

Project Planning

Migrating the mission critical E9-1-1 system to an ESInet/NGCS i3-compliant solution is not just about technologies, systems or products. This project will require a detailed comprehensive project plan that is developed by a highly experienced team. In particular, the project planning and deployment tasks must be implemented carefully and validated, tested, and re-validated before the actual implementation.

Atos has an established enterprise-level project experience and methodology. We will plan the project by implementing multiple, parallel activities that will ensure not only that we fully test, verify, and prepare for the project, but that our project schedule approach provides time to solve any unforeseen issues or problems in advance of the scheduled project start date.

Our three-step project plan process is depicted in the following graphic.



Project Plan Development Approach

Step 1 – Assessment and Planning

Atos' project plan development approach will start with an evaluation of the existing 9-1-1 legacy domain and network delivery environment. Our team will evaluate the following assets, including but not limited to data center(s); primary, and secondary Call Handling Centers; networks; facilities; and existing systems and infrastructures, such as selective routers and their locations.

We will provide the State NG9-1-1 Project Team with a preliminary schedule for site visits and work with them to finalize the schedule. We will also provide a preliminary data request identifying the systems, facilities, and operations that we will include in our analysis of the current environment to include:

- Regional Call Handling Centers, ESInet Points of Entry (east-west)
- Data Centers
- HVAC systems
- Electrical systems (utility and back-up power)
- Networks
- Selective Routers
- System Maintenance and operations

Our team will document our findings and recommendations. We will include any recommended changes required for implementation to Call Handling Centers or other facilities that are out of scope of the NG9-1-1 project with estimated costs and implementation timelines.

Master Project Plan (MPP) Development

We will start the process by developing the Master Project Plan (MPP) first draft, based on the findings of the site surveys conducted and baseline determination. This plan will be constructed in the same fashion as all Atos program planning efforts, using our regimented methodology tailored to the specific customer environment and operational nuances therein. We will conduct a review and validation of the plan with the key stakeholders, such as our State of Nebraska NG9-1-1 Project team, carriers, and service providers to ensure all aspects of the project is considered and validated.

This project plan will be collaboratively developed with input from stakeholders. Our Project Plan will include testing all elements on the solution in a lab environment. The plan will be continuously updated based on the tests prior to final cutover.

Atos-Client MPP Verification and Plan Signoff

To ensure every critical aspect of the project are considered, evaluated, and incorporated into the plan, it is necessary that we collaborate with all stakeholders throughout the project process.

This verification step provides a forum for reviewing the findings from our initial network assessments and subsequent schedule impact on the draft project plan and project timeline phases. During this verification process we will adjust and incorporate essential inputs and processes, thereby normalizing and validating the plan amongst State and Atos project leadership.

We will hold several validation sessions with stakeholders to discuss the findings. These sessions will be organized by specific stakeholder sub-groups such as carriers, network providers, etc. The use of the subgroups will allow the discussions to be focused and relevant to a set of specific issues. In the case where we have cross-cutting issues, we will work with the State's NG9-1-1 Project Team to schedule a subgroup that includes stakeholders from those respective subgroups. We will facilitate the sessions and keep notes and distribute the results after the meetings.

After validation process is complete, we will finalize the project plan and provide it to the State NG9-1-1 Project Team for final review and approval. After receiving approval to proceed with the plan we will commence our follow-up activities.

Assignment of Migration Project Manager

Execution of our project plan will be led by our Migration Project Manager (MPM). Our MPM will be responsible to the State NG9-1-1 Project Team for reporting on scheduling, resource requirements, status reporting and risk reporting.

Atos will be assigning a dedicated PMP-certified Migration Project Manager, a 9-1-1 industry specialist, who will develop the project plan and to direct the project activities. Our MPM will lead the effort to ensure the collaboration team brings to the forefront all vital migration-related issues and develops a fail-proof migration plan.

The MPM will prepare status reports on a weekly and monthly basis for the State NG9-1-1 Project team. The MPM will also manage the project schedule and report on risks and possible mitigation and management options to the Project team.

Our MPM is supported by a larger team. While the MPM is focused on developing the project plan, Atos will carry out parallel activities related to the technical aspects of the ESInet/NGCS solution.

Atos' MPP will work with the State's Project Manager to adjust, refine and / or align the MPP's milestones throughout the project and based on the testing results.

Milestone-Driven Project Methodology

Our approach to a successful project is to start project preparation well in advance to ensure we can mitigate any risk and be able to adapt to any unforeseen schedule delays. Understanding all the activities and dependencies our NG9-1-1 project team will work within is critical to project success and stakeholder satisfaction.

Baseline domain definition of the actual technical and operational environment is critical to scheduling and resource allocations activities. Understanding that significant challenges could be posed in coordinating carriers and service-providers for transitions, our detailed planning effort will require extensive coordination, collaboration, and agreement with the State, carriers, and service providers. We will develop, validate, test, and re-validate the transformation methodology, sequences, and procedures, to include identifying all coordination points at each step of the project prior to the actual cutovers.

Atos will manage in totality the network access migration process, assuring that existing and new connectivity is provisioned, tested and certified for use when the transition to the new State ESInet and Core Services domain begins. Working hand in hand with our subcontractors, Atos MPM will provide the single point of contact to the State via Atos throughout the circuit ordering and provisioning process. This team's specific focus will be the implementation scope of work, timelines, action items, and goals specifically related to making sure that the network circuits are available to support Regional cutover schedules.

Atos network team will utilize the most proven, effective, and documented methods from order processing through cutover, test, and acceptance from the beginning of the circuit ordering process, through the cutover and implementation of services, to the continuous day-to-day maintenance and support. This expertise in carrier transition and subsequent coordination has been integrated within Atos' overall approach, a core competency that maximizes project efficiency and minimizes risk, themes prevalent in Atos' proposal and operational model.

Prior to installation, testing, and acceptance of each circuit, Atos will coordinate with the State NG9-1-1 Project Team for the approved cutover time in accordance with the project schedule based on a detailed cutover task list to ensure that there is no service impact and the cutovers are transparent to end users.

Cutovers will be scheduled for the least busy time of day and week. The cutover plan will also detail the use of all commercially reasonable efforts to install services and perform the cutovers to the regional network assets from carriers within the time frames set forth in the approved project schedule.

Step 2 – Deployment Preparation and Testing

Project Planning and GIS

As part of the project planning activities, and in consultation with State's NG9-1-1 Project team, Atos will develop and define the specific testing criteria necessary for effective and thorough GIS-centric testing.

Atos will manage this task with GeoComm, our spartner for GIS, ECRF / LVF and location services.

As call delivery in an NG9-1-1 environment is powered through geo-coordinates, ensuring the compatibility of services, functions, and processes is critical. The Atos team of SMEs has direct and relevant experience in the field, which will greatly assist in defining the test cases and related functions necessary for this area. Working with the State, the Atos team will develop and submit to the State the respective Test Cases, Scenarios, Reports for GIS Data, Database and LIS / LDB functions, Data Load Validation, Data Normalization and Load Testing as well as interrelated service dependencies with non-GIS specific functions. Deliverables will include:

- GIS Data Test Plan
- Database, LIS, and LDB Test Plan
- Test Criteria
- Test Cases and Scenarios
- Test Reports

NGCS Data Center Provisioning and Test

Critical to the success of this project is the availability and effective activation of the data centers, the hub of activity and location for NG9-1-1 services. While the test cases will be used for these data centers at the subsystem and services level, the specific activation strategy and testing plan for data centers will be customized to the final design parameters and environment. Atos will develop and submit to State's NG9-1-1 Project Team the requisite Data Center Test Plan which will include Test Criteria, Cases and Scenarios, and Test Reports for each data center. While the physical nature of the two ESInet/NGCS Data Centers may differ (size, colocation of systems, HVAC, etc.), Atos will approach both primary data centers as a single, active-active array to ensure redundancy, failover protection and call path delivery routing logic across the ESInet domain.

Whereas each data center will receive its own test plan, the overall system will account for both locations and the performance requirements therein. Deliverables will include:

- Data Center Test Plan
- Test Criteria
- Test Cases and Scenarios
- Test Reports (Independent and Paired)

Ingress Network Design

Atos' proposal is based on utilizing our carrier grade software switching solution with embedded ESRP. Our switching software with the embedded ESRP is an architecture we have used to power and route voice, data and multimedia traffic for close to a decade for large scale, secure environments. This solution will allow the State to confidently and safely migrate from a legacy TDM domain to an ESInet ecosystem with a VoIP carrier-grade engine serving as the ingress traffic nexus. Connecting the originating networks to the Atos' switching solution will constitute a major task within the project plan.

ESInet Design

The Atos ESInet design will replace the existing TDM, single ILEC-provided telephony network to an i3 standards based ESInet with a Layer 3 network that will serve as the ESInet for the State's project. The design does not tie the State (or region) to a single network core. Instead, Atos has designed a highly scalable solution, providing the access network interconnections with collocation facilities in the region and ready to integrate with neighboring states, aligning all ESInet infrastructure elements from aggregation sites to Regional Cal Handling Centers

From a project planning and deployment perspective, the Atos ESInet design aligns with the State of Nebraska region's strategic objectives to establish an i3 standards based ESInet. By replacing the existing TDM-based E9-1-1 call routing solution, the design will streamline the network cutover process and provide a safe solution protecting the integrity of the emergency communications operations and systems throughout the project. The key elements of the project plan will be based on the Atos design. This project planning and deployment approach will incorporate the following objectives into the ESInet:

- Meet the State's systems availability through provisioning of industry's leading, carrier grade VoIP switching platform
- Provide continuous redundancy and diverse routing to all call handling host locations
- Allow for leveraging existing State regional call handling host to PSAP network assets to reduce cost, improve redundancy and diversity, mitigate risk and maximize scalability for a robust regional network
- Migrate from point-to-point, analog based network to an i3 compliant ESInet with no interruption of service
- Deploy a fully managed, multi-use network ready to deliver NG9-1-1 content through the regional call handling host sites

Asset Utilization Strategy – Existing Investments for Cost-Effective Project

Network redundancy and preserving legacy system availability throughout cutover are critical elements in Atos' ESInet/NGCS project strategy and methodology used. The Atos team will align its project plan to best activate the respective regional domains providing ESInet connectivity. Leveraging the regionally provided network assets, we will have a dual-path and redundant core solution. The network deployment model allows for sequential call handling host site cutover.

Our model allows for cutover not only of the Regional Call Handling Centers but uses the new network links as the means of transition prior to cutting the primary carrier trunks. For example, assuming secondary and / or tertiary assets are in place to each Regional Call Handling Centers today, these Regional Call Handling Centers will first be provisioned and tested on those network assets. Said testing will have calls routed over these assets through the Atos NGCS Data Centers, segregating traffic to turn up said assets with live traffic from the existing E9-1-1 system.

This method allows for existing 9-1-1 circuits to remain in place at the Regional Call Handling Centers, functionally becoming secondary assets themselves as the testing and validation process progresses with alternative fiber and / or cable assets. As the LSRG / LNG is collocated within aggregation sites, preserving legacy connectivity along with new egress network assets ensures ESInet cutovers and burn-in without drawing new circuits and adding unnecessary costs.

Utilizing these assets will optimize risk mitigation, as one of the most complex challenges that this type of project presents is facilitating the carrier transition. The use of the links serving the Regional Call Handling Centers from the NGCS Data Centers provides an alternative network domain that allows Atos to migrate to the ESInet without needing additional circuits. This approach will minimize risk.

Upon acceptance of the NGCS services and egress network assets comprising the new State ESInet/NGCS regions, calls from the carrier will be aggregated to the ESInet/NGCS Data Center while the call handling hosts run in parallel for a minimum 30-day burn-in period. Following the burn-in period and subsequent System Acceptance, legacy trunks will be decommissioned in lieu of the new ESInet serving links.

Atos recognizes that a one-size-fits-all solution will not prevail. Our design and project strategy to transition to the NG9-1-1 environment allows us to meet the State's objectives and, as we work as the State's technology integration and service partner, define and customize the network and provisioning to serve their regional needs.

By completion of the project, Atos will have led this project as the change agent for the State. This level of discipline and project control is what Atos is known for. We intend to earn this same trust and confidence from the State's NG9-1-1 team and agency stakeholders.

Network and Security Operations Center (NOC/SOC)

Integral to the operational success of this project is provisioning a highly effective, robust, and intelligent Network Operations Center (NOC). Atos' NOC/SOC will serve as the primary oversight and management domain for the State ESInet/NGCS, the mission control center for our NG9-1-1 Operations. This NOC/SOC will be E-Bonded with our subcontract partners for secure, and fluid incident viewing and traceability of all activities occurring in the State ESInet/NGCS ecosystem.

Atos has extensive experience in this arena, having developed and activated mission-critical NOCs around the world. We will use this expertise as we develop and submit to the State's NG9-1-1 Project Team our NOC and Monitoring Test Plan, Cases, Scenarios, and Reports. We will coordinate with other vendors to provide the State NG9-1-1 Project Team with one solution. Atos will detail in this effort how our system will automatically generate trouble tickets, provide alarming and alerting functions to staff, Atos personnel, and the subsequently triaged deployment support entities and personnel.

Deliverables to State's NG9-1-1 Project Team as part of this effort include:

- NOC Test Plan
- Monitoring Test Plan
- Test Cases and Test Scenarios
- Test Reports

System Security

One of the single most critical subject areas of any NG9-1-1 initiative is security, a domain that requires real-world expertise to ensure mission-critical system protection. Security system deployment and testing is a key element of our system project planning and implementation. All subsystem elements included in the Atos ESInet/NGCS solution meet the NG-SEC standards, as well as numerous other security standards regulating best practice and information protection.

Atos' solution for system security will allow for adding future applications and network assets through deploying the rigorous security protocols and disciplines Atos brings to this client-partnership. This capability will be included in our detailed project plan. Our team will develop and submit to State's NG9-1-1 Project Team a Security and Test Plan, along with the proven Test Criteria we have used in other mission-critical environments, delivering to the State's NG9-1-1 Project team for collaboration, adjustment and concurrence.

Step 3 – Implementation, Activation and Cutover

As indicated earlier, Atos will deploy a call handling host Deployment team to manage the cutover planning and implementation. The team will be responsible for cutover planning, documentation, and coordinating State Project Team cutover approval for each Regional Call Handling Center and managing the actual cutover process.

As equipment arrives, Atos' call handling host Deployment Team will schedule, inventory and install all routers and switches, verify ESInet link integration, and test servers and GPS timing sources. Once the site is powered up, final configurations will be performed. The deployments will begin with both data centers. Prior to equipment deployment, the team will verify that training is coordinated for all individuals affected by the Regional Call Handling Centers installations.

After the first call handling host has been cutover, the Deployment Team will stage, test, deploy, and cutover Regional Call Handling Centers . The installation plan for the remainder of the Regional Call Handling Centers will be facilitated by the fact that the site preparation and ESInet link will have already been completed. The final tasks of staging and deployment of the equipment used for Regional Call Handling Centers connectivity will be conducted over a period of approximately 1 week following the NGCS Data Center readiness.

System Installation

We will develop a detailed Project Plan following our disciplined project management methodology that will segment installation activities for any subcontracted work in the call handling host sites such as for electrical upgrades. Our detailed approach aligns with the subcontractors Atos has assembled for this initiative and their respective core competencies and areas of subject matter expertise. While our PMP-certified MPM will provide overall project leadership and oversight, the respective Project Managers from each subcontractor will be responsible for task and action item ownership for their areas of technology and / or solution provisioning. Working in concert with these industry-proven experts in their respective core competencies, the Atos MPM will have a team of professionals not only committed to this project for the duration, but who hold decades of 9-1-1 industry experience that bolsters our team's collective resume and expertise in leadership.

In conjunction with the final design and procurement, ESInet/NGCS testing requirements will be implemented. Once all the functional areas have been tested, a system burn-in period will commence, generally 72-hours. After a successful burn-in, the functional acceptance report will be forwarded to the NG9-1-1 engineer for review.

At each call handling host location, the Atos Deployment team will inventory and install all routers, switches, and gateways,. Once the site is powered up, final configurations will be performed. The scheduling for these tasks is based on NGCS Data Center readiness and ESInet cutover sequencing. The next step is to verify ESInet integration and testing. Atos will conduct this testing with existing call handling host specific CPE.

After the successful testing of the Atos data centers, we move into the initial cutover phase. Cutover planning, submission, and approval have been provided from the State NG9-1-1 Project Team for the call handling host Cutover Plans.

Installation Support

The Atos team includes all system engineering and technician resources to cover all service disciplines necessary to design, deploy, and support the NG9-1-1 configuration for the State. In addition to Subject Matter Experts (SME) from each of the OEMs who will be part of this project design and implementations, Atos has numerous certified SME engineers with extensive implementation experience in specialized areas such as E9-1-1 systems, networking, security telecommunications, and data center design and deployment.

ESInet and NGCS Domain Testing

Atos will develop a comprehensive test plan for approval for the system to include each core services functional element, the ESInet and connectivity to each call handling site. The acceptance test procedures will apply to the individual systems as they are installed and prior to any live operation. We will also apply test procedures to the system prior to providing final system acceptance.

The Acceptance Test Plans will be based on the manufacturer's best commercial practices, industry standards, and recommendations provided by the State's NG9-1-1 Project team.

Each Acceptance Test Plan will contain:

- Listing of applicable reference documents and points of contact for the testing program
- Technical description for the system under test
- Test schedule
- Identification of test and measurement equipment to be used
- Test procedures with expected test results that define a passing test
- Discrepancy Reports
- Acceptance Test sign-off document

Atos will develop extensive test cases and scenarios for each component of the solution, end-to-end testing and failover cases. The Atos test acceptance plan will include tasks and activities for test validation and retesting to ensure all aspects of the solution are ready for migration.

Atos will provide the State NG9-1-1 Project team with test results on each component, monitoring element, as well as the performance of the solution overall.

The Acceptance Test Plans (ATP) will include:

- ***Functional Acceptance Test:*** The Acceptance Test Plan (ATP) will include test scenarios. Each scenario may be separated into its own ATP document. For instance, the testing of the Geo-Comm's ECRF / LVF and 911Datamaster's LDB software will test the functionality of these functional elements. Atos will provide the results of each ATP scenario to the State NG9-1-1 Project Team for review and approval.
- ***Throughput Acceptance Test:*** ESInet throughput testing will be conducted using approved State NG9-1-1 Project Team scenarios. The testing typically will require a minimum of twenty-four (24) hours. The testing will include 200% peak traffic load transaction volume of to confirm the capabilities of the ESInet and its subsystems. The test plan will not test for delays caused by external systems as a cause for failure.
- ***Availability Acceptance Test:*** The Acceptance Test Plan (ATP) will test for System Availability. The Availability ATP will conduct tests that will validate the availability of the system based on agree upon parameters.
- ***End-to-End ESInet/NGCS Domain Test:*** Atos will conduct a full system test. Based on the test results, we will provide the State's NG9-1-1 Project Team with the results of the full system staging test. The test report will identify any component failures and clarify what tests the system components passed. The full system staging test documentation will include all the test steps identified in the pre-cutover test portion of the readiness checklist with the addition of pass / fail metrics, measurement criteria used to determine pass / fail metrics, and the results of all system test procedures conducted by Atos during testing. The documentation will include the number of times the system was tested, on what attempt the system passed, and the repairs performed to address test result failures. Based on the results of the full system testing, Atos will provide the State's NG9-1-1 Project Team with the results of testing.

The test report will include the following:

- Test steps / scenarios
- System redundancy
- Functionality and routing performance
- Integration testing between NG9-1-1 functional elements
- The number of times the test was conducted to include pass or fail
- Failure reporting to include description and reasons
- Corrective actions taken to address failures

Any subsystem elements not conforming to the test parameters will be isolated and replaced and where necessary, and issues escalated to the technical support teams of the NGCS technology for resolution.

Cutover Testing

Atos will conduct cutover testing on the planned cutover date. Our test will use the functionality checklist to guide the testing procedures. We will report on test results using the checklist. We will provide the State NG9-1-1 Project Team with results of the testing.

Post-Cutover Testing

After the cutover is completed, a post-cutover test shall be conducted to ensure that all systems and functions are performing based on an agreed upon post-cutover checklist. Atos will document its activities in connection with the checklist, including pass / fail metrics, measurement criteria used to determine pass / fail metrics, and results.

Training

Atos will integrate the training strategy with the regional rollout, delivering to the State's NG9-1-1 Project team a highly detailed Training Plan that will include schedule, training locations in the State, course durations and participant requirements for each course.

We will coordinate with the State's NG9-1-1 Project team to schedule individuals for participating in each of the courses that are required.

Project Management and Ongoing Client Management Services

The State of Nebraska expects a partner that will balance service delivery excellence while building and maintaining a strong relationship. Aided by a strong governance approach and strategy, account management provides the critical day-to-day presence and accountability, complementing and supporting the State's investment in managing its relationship with Atos and other service providers.

To provide the best support to the State, Atos applies governance that encompasses all aspects of our strategic direction, service offerings, technical integration, engagement model, relationship innovation, and market position. Our engagement model has built-in business value mapping, solution design capabilities tied to value, pricing flexibility, governance, and innovative service evolution. Our ability to execute is rooted in our core focus in the IT services market and our years of practical experience in managing complex infrastructures.

The State's support from Atos uses a model based on assigning an Account Management Office (AMO) to be the umbrella management organization for integrating services, communications, and change throughout the contract term. The AMO is responsible for overall management of the engagement, providing a single focal point for all ongoing service delivery and daily senior management presence.

The "Ongoing Client Management Services" section of the proposal provides further description of Atos support to the State for these activities.

LIFECYCLE SCHEDULE

Please see Appendix C Lifecycle Schedule for a draft Gantt chart depicting the lifecycle of the proposed project.

ONGOING CLIENT MANAGEMENT SERVICES

The State of Nebraska expects a partner that will balance service delivery excellence while building and maintaining a strong relationship. Aided by a strong governance approach and strategy, account management provides the critical day-to-day presence and accountability, complementing and supporting the State's investment in managing its relationship with Atos and other service providers.

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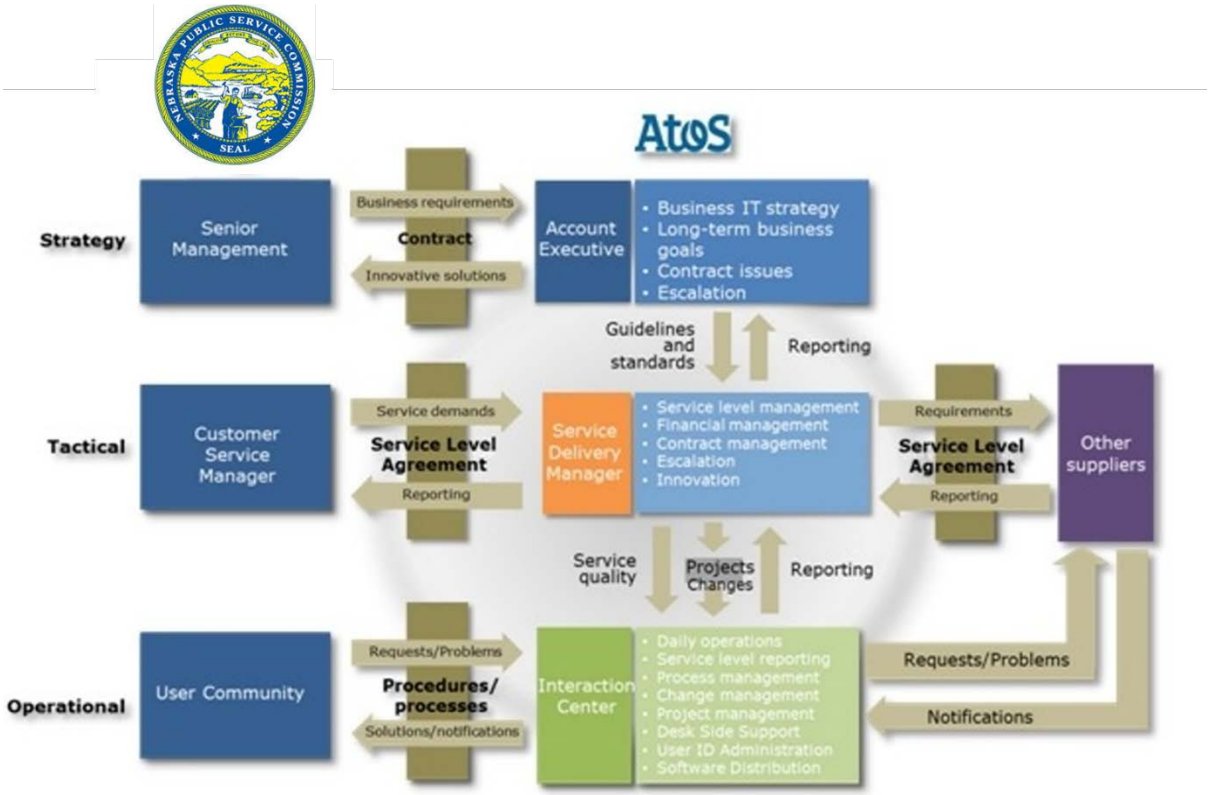
- ***Relationship management*** that provides an interaction model for one-to-one alignment between the State and Atos
- ***Clearly defined escalation*** that will apply intelligent decision-making through a chain of command approach to issue resolution
- ***Regular, open communication*** through scheduled and ad hoc meetings that will keep the State's designated representatives informed and provide transparency to IT delivery activities and performance
- ***ITIL-based process control*** that will ensure consistency of service delivery and measurable results
- ***Bi-Annual Innovation Workshops*** that will present to the State the roadmap of future innovation Atos envisions and will provide specific recommendations for adoption within the State environment.

Relationship Management

The AMO is based on the IT governance principles. The following graphic illustrates the alignment of key functional teams by strategic, tactical, and operational capabilities for the client demand organization and the Atos delivery organization.



Governance Interaction: The recommended model for interaction follows defined levels that will provide frequent and open discussion between the State's staff and Atos' staff.

This framework illustrates the separation of the IT demand and supply functions and contact points for interaction. The essence of this concept is that the State retains responsibility for typical IT demand management tasks such as formulating the IT strategy and the resulting IT demands and for controlling the IT suppliers. The delivery of the agreed IT services, on the supply side, is the full responsibility of Atos and other IT suppliers.

Strategic

The State and its stakeholders can expect the vision, commitment, and behavior of senior management of both companies to contribute to the success of this agreement. Strategic activities are the topic of discussion at the senior management level. Typically, the leaders involved at this level ensure alignment between business objectives and joint initiatives. They establish the vision for the relationship. The framework agreement, which provides the overall process for each of the IT services to be delivered, is defined and monitored against key performance metrics. IT strategy and the consequences for IT demands are also defined at this level.

This layer in the governance model also acts as the highest point of escalation for issues and problems.

Tactical

To ensure a successful management and delivery of services, Atos will establish an AMO for service delivery to oversee and manage the execution of support services and to direct continuous improvement activities related to these services. The AMO will work to improve services through the implementation of established processes, tools, technology, and proven methodologies.

The AMO responsibilities include administering operational services and providing comprehensive reporting and communication. The AMO will focus on the analysis of information collected from the ESInet and NGCS solution. Atos will make judgments regarding the collected data and provide suggestions or change as necessary to help initiate service improvements. It is through this analysis that Atos will determine areas for future innovation opportunities within the State ESInet/NGCS environment, which will become topics for discussion at the Bi-Annual Innovation Workshop discussions.

Financial administration and contract management are important components within the governance of Atos' delivery model. These functions will perform continuous monitoring of service level commitments, human resource management, finance, and contractual issues. Their responsibility is to collect all the information required and provide all Atos contract reporting. This portion of the governance service secures the regular review of contractual and financial terms and conditions to ensure alignment with your specific requirements, even as they may change over the term of the contract.

Operational

This level provides service delivery and the operational contacts with the State's 9-1-1 governance committee, which ensures smooth daily operations. Operational activities are meant to fulfill the 9-1-1 strategy and are grouped into the following two areas:

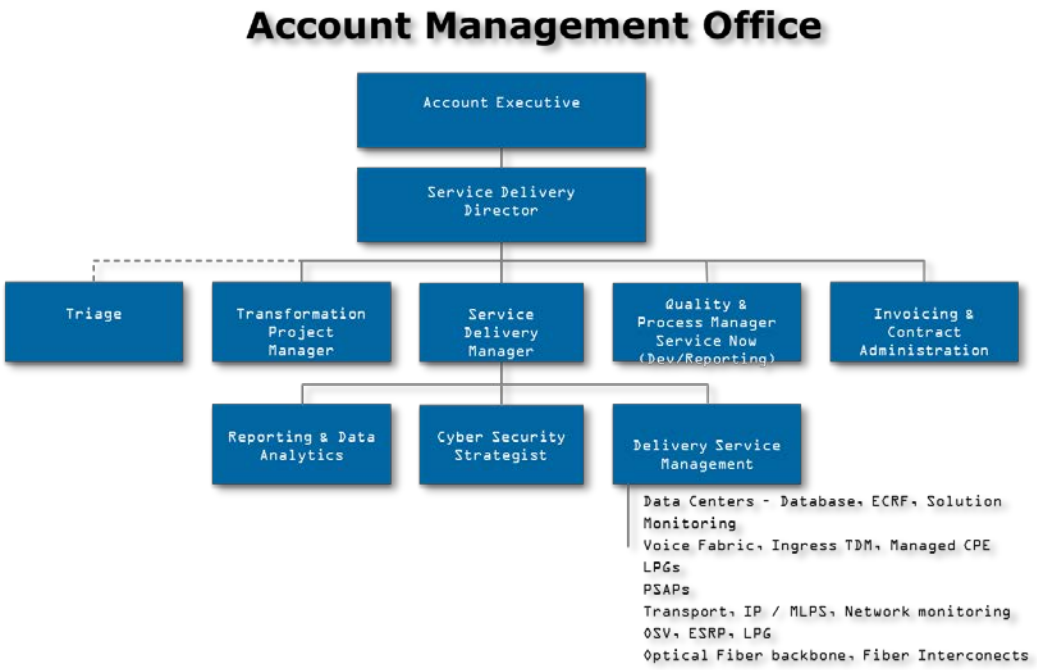
- ***Service Level Management —*** *Meet or exceed service level requirements in the delivery of the current services. Atos' service delivery management will use the agreed upon Service Level Agreements (SLAs) to manage the interface with the 9-1-1 solution suppliers.*
- ***Implement New Projects —*** *The execution of the IT strategy includes the roll-out of new services or improvement of existing ones; these changes are performed by project management professionals trained in the methodologies required for a smooth implementation.*

One of the keys to successful account management is strong governance. The State will have a single point of accountability for the delivery of the contracted services. The account governance model may also rely on Atos functional groups to support technology and business planning in addition to the dedicated team members.

Account Team Structure

The account governance model is not intended to be simply an aggregation of technology functions; rather, it defines a business structure that acts independent of boundaries to take advantage of operational and business synergies within the State and Atos organizations.

The following graphic shows the proposed functional structure of the AMO.



Atos' proposed Account Management Structure: Maintain consistent, reliable support through Atos' account management team with governance focus on the transition and subsequent steady state support services.

The following table lists the key roles and responsibilities for the Atos AMO:

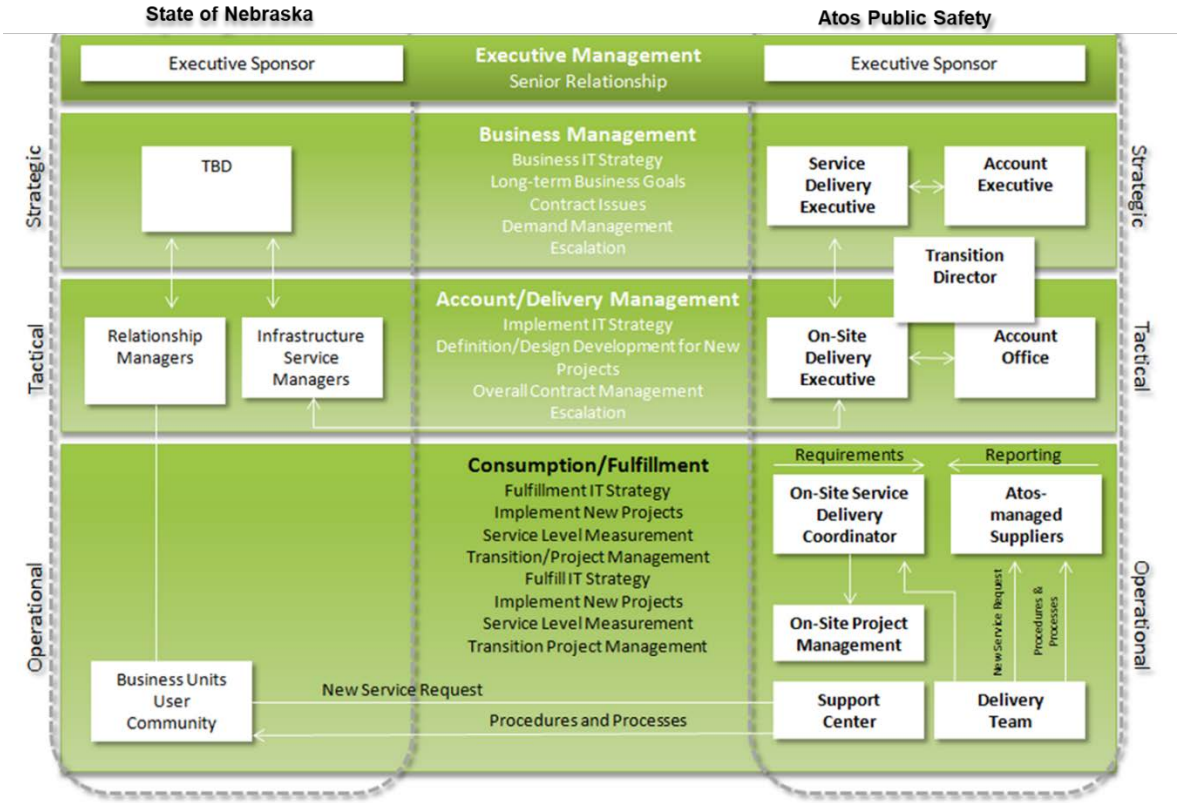
Atos AMO Team	
Service Delivery Director	Carries overall responsibility for the successful delivery of Atos Services. Has the following primary responsibilities, in relation to the provision of services: ➢ Manages service escalations ➢ Manages strategic innovation and interface with Atos' Global Portfolio Delivery structure, ensuring global enhancements are cascaded through the North American region.

Atos AMO Team	
Service Delivery Manager	Runs and operates the day to day management between Atos and its partners with the State. Carries all formal responsibility on behalf of Atos and is the point of contact for the State of Nebraska. Has full authority for implementing decisions across the whole service structure. Has the following primary responsibilities, in relation to the provision of services: ➢ Handles contract management of the contractual and strategic relationship with the State stakeholders ➢ NG9-1-1 System ➢ Presents new services to the State via the Bi-Annual Innovation Workshop team ➢ Manages fulfillment of services, forecasting, and budgeting ➢ Handles partnership management ➢ Monitors service level performance ➢ Handles billing ➢ Provides human resources management of account staff ➢ Manages service escalations ➢ Directs Compliance management
Quality Assurance and Documentation	Responsible for monitoring the consistent execution against established standards. Has the following primary responsibilities: ➢ Maintains Quality Assurance manuals ➢ Obtains / maintains industry-based certifications ➢ Tracks and reports on key performance indicators
Reporting	Responsible for all reporting requirements for the delivery of services for this engagement. ➢ Generates and posts all reporting requirements ➢ SLA ➢ Service Level Objectives (SLO) ➢ Delivers data and documentation for analysis
Contract / SLA and Change Control	Responsible for maintaining the agreed contracts and service level agreements. Owns change management process as defined for the services contracted with the State. Atos will utilize its change management processes as we interface with the State's respective overall IT management of services. Has the following primary responsibilities: ➢ Maintains all contracts and SLAs ➢ Monitors and reports on the status of all change requests ➢ Implements change requests within contracts and SLAs
Transition Manager	Responsible for the transfer and transformation of the services to Atos' delivery organization. Has the following primary responsibilities: ➢ Manages all transition project activities ➢ Manages the staff transfer and relocation, when in scope ➢ Reports on the progress of all projects

Atos' AMO will remain flexible to the State's needs and potential requirements for change.

Clearly Defined Account Interaction

The following graphic defines the account management interaction model. We would envision using this as a starting point to define how we will work together with the State and its other third-party vendors to provide our services to the State.



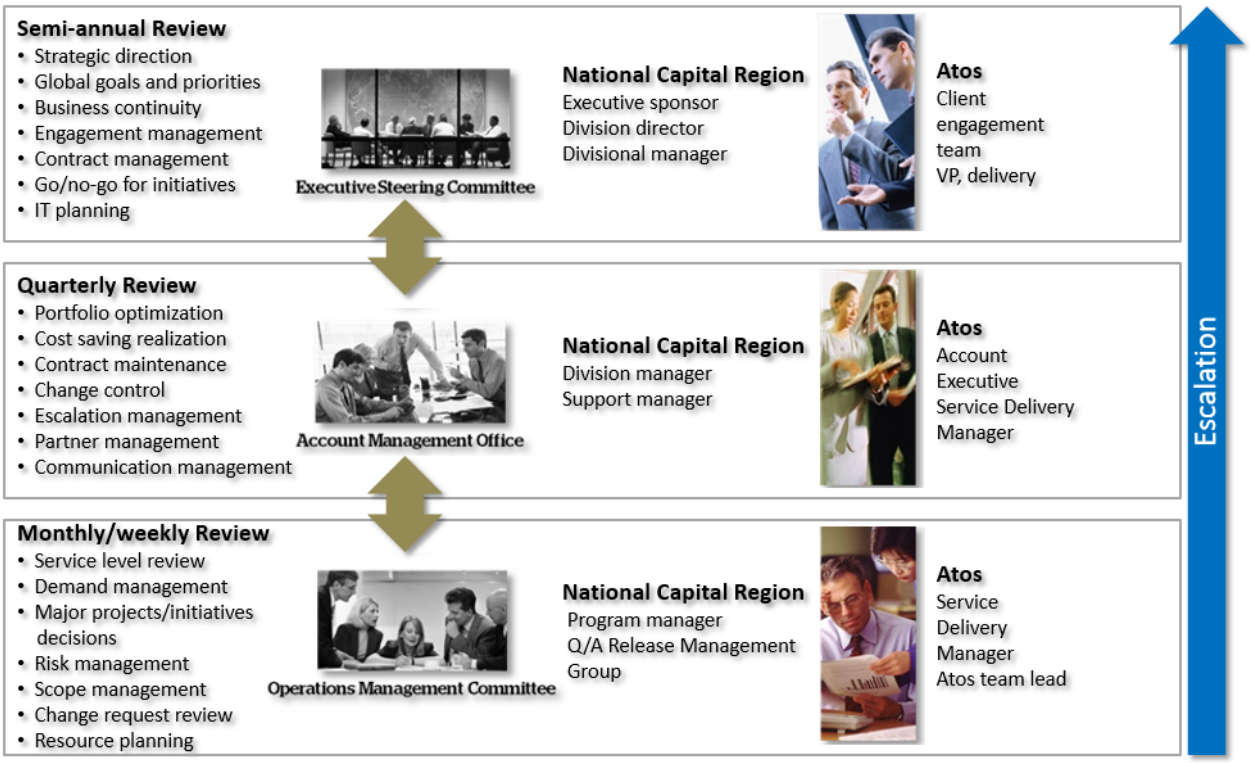
Atos' proposed Account Management – Interaction Model Structure
Maintain an account management structure that is clearly defined for strategic, tactical and operational support.

This focus ensures we have alignment across the State management teams and other third-party vendors.

Clearly Defined Escalation

Escalation of issues follows a chain of command from operational management up through the executive level. To ensure critical issues are raised soon enough to prevent undesirable impacts to the operating environment, the State and Atos will work during transition to identify the triggers and business rules for effective escalation. This activity includes proper identification of escalation timeframes, escalation paths, escalation procedures, and escalation contacts. In supporting the State, this process provides for proper alignment of resources to incidents based on severity and need to correctly drive key organizational performance objectives based on those priorities.

The following graphic provides a representation of the standard escalation path, from the operational management through the executive committee.



Escalation Management: Critical issues will follow a clearly defined chain of command to resolve issues at the most appropriate level.

The following sample escalation alerts will be triggered based on service levels:

- *Open calls within 30 minutes of service level expiration. These alerts are distributed to call allocators, enabling them to take immediate remedial action.*
- *Open calls at service level expiration distributed to the call allocators' team leader*
- *Alerts beyond service level expiration — two hours and four hours — distributed to the service account manager through to the national operations manager, depending on service level time exceeded*

When an issue is not resolved within service level expectations, we initiate proactive steps to achieve resolution through established escalation channels. In our approach to problem management escalation, we take the following actions:

- *Develop a problem management process specific to the State's requirements*
- *Include clearly defined responsibility and accountability*
- *Use management data to perform problem analysis, looking for opportunities to proactively address problem issues and opportunities for improvement*
- *Establish procedures and flow charts that define the processes for which we will be accountable and indicate the following criteria:*
- *What is under our control*
- *How the event will be managed or executed*
- *How escalations will occur*
- *How we will interact with other organizations*

Open Communications

Effective account governance is based on honest, open, and frequent dialog between the Atos Account Executive and his or her counterparts in the State . The following list of activities reflects an example of the topics that may appear on the agenda during the various levels of communication.

- ***Strategic (usually half-yearly)***
  - Follow-up of the agreed action points
  - Benchmark results
  - Proposed updates of service performance and Innovation Workshop recommendations
  - Business developments and planning the State business activities, including expected increase or decrease of the required service volumes
  - Development and planning of the service delivery by Atos
  - Conclusions and improvement actions
- ***Tactical (usually monthly)***
  - Follow-up on agreed action points
  - Service performances concerning the preceding period
  - Change requests and problem reports regarding the service levels
  - Conclusions and improvement actions that must be agreed in the strategic review meeting
  - Proposed updates of service performance
  - Operational (usually weekly or daily)
  - A review of the day-to-day operations
  - Examine only deviations in the service delivery in relation to service levels
  - Regular forecast of demand in terms of service-related deployment plans of the State sites

Additionally, occasional meetings will be held to discuss matters needing direct communication or tuning. Atos will attend and participate in regularly scheduled meetings with the State and any third-party partners as the State team determines.

APPENDICES

Appendix A Company Information (2019 ANNUAL REPORT, BROCHURES)

Appendix B Services Support (COOP, MAINTENANCE PLAN, INCIDENT REPORT)

Appendix C Lifecyle Schedule (GANTT CHART)

2019 Financial Report

Table of content

A. GROUP OVERVIEW 3

A.1 Revenue profile 3

A.2 Business profile 6

B. FINANCIALS 9

B.1 Operational review 9

B.2 2020 objectives 24

B.3 Financial review 24

B.4 Consolidated financial statements 33

C. CONTACTS AND LOCATIONS 103

C.1 Contacts 103

C.2 Locations 105

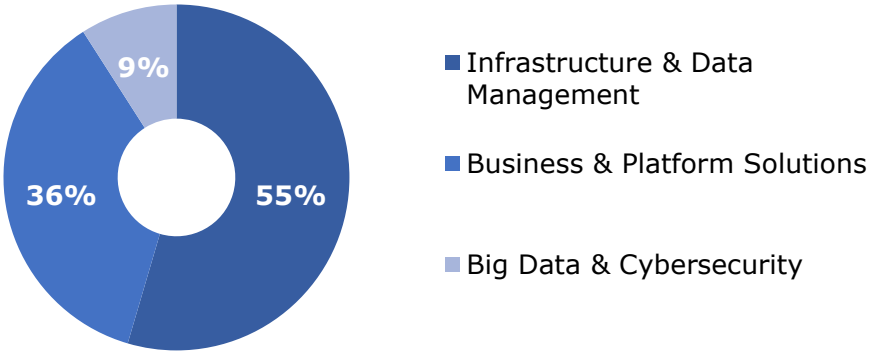
D. FULL INDEX 106

A. Group overview

A.1 Revenue profile

A.1.1 By Division

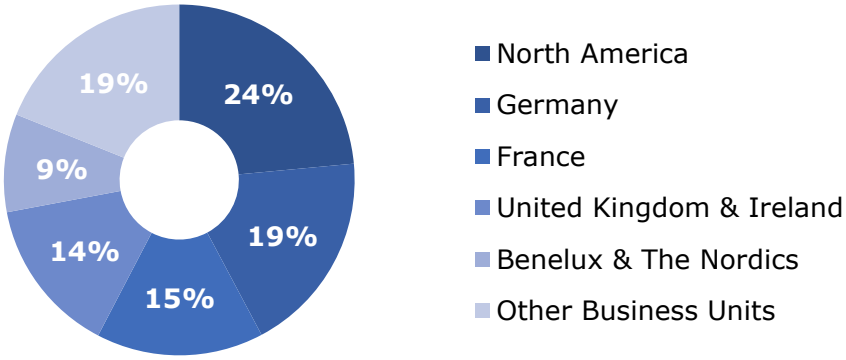
In 2019, 64% of the Group revenue was generated by multi-year contracts, deriving from Infrastructure & Data Management (55% of total revenue), Application Management contracts included in Business & Platform Solutions, and half of Big Data & Cybersecurity (respectively 5% and 5%).



In € million	**2019**
Infrastructure & Data Management	6,321
Business & Platform Solutions	4,216
Big Data & Cybersecurity	1,050
Total	**11,588**

A.1.2 By Business Unit

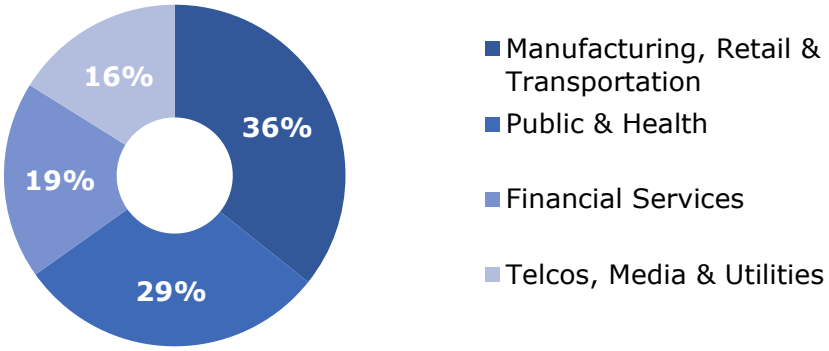
Europe and North America are the Group's main operational bases, generating 93% of total revenue in 2019.



In € million	**2019**
North America	2,725
Germany	2,167
France	1,788
United Kingdom & Ireland	1,669
Benelux & The Nordics	1,047
Other Business Units	2,192
Total	**11,588**

A.1.3 By Market

The Group provides high value-added digital services and solutions to many industry sectors. Customers are addressed through four global markets which are Manufacturing, Retail & Transportation, Financial Services Public & Health, and Telcos, Media & Utilities.



In € million	**2019**
Manufacturing, Retail & Transportation	4,139
Public & Health	3,411
Financial Services	2,169
Telcos, Media & Utilities	1,869
Total	**11,588**

A.2 Business profile

Atos is a global leader in digital transformation with over 100,000 employees in 73 countries and annual revenue of over € 11 billion. European number one in cloud, cybersecurity and High-Performance Computing, the Group provides end-to-end vertical solutions, smart data platforms and infrastructure solutions, leveraging highly innovative technologies in business platforms, customer experience and digital workplace, artificial intelligence and hybrid cloud. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, and Unify. Atos is a SE (Societas Europaea), listed on Euronext Paris and included in the CAC40 stock index.

At Atos, our mission is to help design the future of the information technology space. Our services and expertise, multiculturally delivered, support the advance of knowledge, education and science and contribute to the development of scientific and technological excellence. Across the world, we enable our customers, employees and as many people as possible to live, work and develop sustainably and confidently in the information technology space.

Pursuing this purpose, Atos has built specific know-how and expertise to help its customers meet the challenges related to their digital transformation:

- Digitize their **customer experience** and foster **business reinvention** thinking and implementation;
- Streamline **operational excellence**;
- Guarantee **trust and compliance**.

Atos solutions and services provide agile, scalable and trusted foundations to support customers in their digital journey. They are at the heart of Atos's differentiation:

- **Industry expertise and solutions** to build future-proofed systems fitted to our clients' industries;
- **Smart data platforms and services** to help organizations unlock the value of their data today;
- **Ecosystems of multiple infrastructure solutions** to create the foundations for digital business.

Across all these solutions, platforms and infrastructures, Atos Cybersecurity enables to set up end-to-end, prescriptive security solutions to identify and block threats before they may have a substantial impact.
All these solutions and services leverage innovations from Atos's vast network of partners and from its own R&D programs, notably around eight strategic topics: modern applications and blockchain, immersive experience, artificial intelligence, automation, hybrid cloud, advance computing, edge and Internet of Things (IoT) and cybersecurity.

A.2.1 Atos expertise covers a wide range of specialties to accompany its customers for new opportunities and innovations

Infrastructure & Data Management (IDM): transforming today's IT landscapes to future hybrid IT environments

Atos is at the forefront of transforming its clients' IT infrastructures to the new world of hybrid IT landscapes and ecosystems of multiple infrastructures, from traditional data centers to the hybrid cloud, edge computing and the Internet of Things. This is built on Atos' expertise in delivering IT outsourcing for many years, strengthened by its leading hybrid cloud offering, build in partnership with large public cloud players such as Google, Microsoft, AWS and others. Atos has been recognized several times by independent analysts as a leader in hybrid cloud and as the most visionary workplace services provider in Europe thanks to its Digital Workplace offering leveraging on its unique unified communications capabilities from Unify. Atos is also ranked as a leader in European and Asia-Pacific Datacenter Outsourcing and Infrastructure Utility Services as well as a global leader in outsourcing services. Finally, Atos delivers Business Process Outsourcing (BPO) services in Medical and Financial areas.

Business & Platform Solutions (B&PS): transforming business through innovative business technologies

With its Business & Platform Solution (B&PS) Division, Atos design, build and operate vertical business services and platforms to help its clients win in today's fast-transforming digital world. In order to better answer market innovation needs, Business & Platform Solutions has, in 2018, fundamentally extended the way it conducts its business, particularly with the acquisition of Syntel, a US and Indian Leading Company in Digital and Automation. The organization focuses on global delivery with strengthened management for strategic accounts and offering development to ensure high quality standards, excel in customer satisfaction and drive operational performance.

The Atos Consulting practice is part of the Business & Platform Solutions Division and aims to transform business through innovative business technologies. As such, Atos helps its clients deliver innovation to their customers, reduce costs, and improve effectiveness by leveraging business technologies. Atos Consulting's comprehensive digital transformation solutions enable organizations to connect and collaborate both within and outside the organization much more effectively.

Big Data & Cybersecurity (BDS): a business differentiator empowering digital transformation

The Big Data & Cybersecurity (BDS) Division brings together the Big Data, Security and Mission-Critical Systems solutions and services developed in-house by the Group. This advanced expertise meets the critical challenges that our customers face in processing today's and tomorrow's gigantic volumes of data, connecting people, data and things to create business value, and fully protecting all of them. As such, the Big Data & Cybersecurity Division solidly contributes to make Atos the trusted partner of organizations which intend to leverage the benefits of the new "Economy of Data" that is growing today, notably through the development of "Artificial Intelligence" and the Internet of Things (IoT). The Division relies on R&D teams whose expertise is recognized internationally and strongly contributes to the development of Atos technology portfolio, from infrastructures to smart data platforms and industry solutions.

A.2.2 Atos industry expertise

Atos forges long-term partnerships with both large and multinational groups and small and medium size companies. Its high technological expertise and industry knowledge allow the Group to work with clients in the following sectors:

Manufacturing, Retail & Transportation

Atos helps enterprises accelerate the shift to new products and services for tomorrow's hyperconnected world. In the *manufacturing* sector, Atos helps players streamline production and supply chains, develop new services and accelerate research to create innovative solutions. In *retail, transportation & logistics,* Atos helps customers to meet the challenges presented by the digitally-empowered consumer and deploy the ubiquitous commerce and multimodal transportation solutions of the future. Across the manufacturing, retail & services sectors, Atos offers its entire solution portfolio as a hybrid cloud service and supports mobile users with advanced enterprise mobility services.

Public & Health

Atos is an active partner in improvement and technology for the *Public Sector* - central and local governments – and *defense*, as well as *healthcare and life science.* In a rapidly transforming world, Atos helps its clients invent the public and health digital platforms of the future. As an expert in powerful, secured and mission-critical systems, infrastructures and applications, Atos' products and commercial solutions also help governments and industrial players build the new defense systems and technologies of tomorrow. The Group has been involved in projects as diverse as building the largest European supercomputers for nuclear simulations, countrywide border control, battlefield and warship information systems, mobile tactical communications, intelligence and reconnaissance systems.

Financial Services

Atos supports the world's leading *financial services* organizations globally by offering solutions to improve their operational performance and develop new offerings and business models over the long term. It enables them to manage risks, ensure compliancy with changing regulations across multiple geographies, and leverage the best of Fintech Innovation. In the world of the connected customer, Atos provides the banking and insurance sectors in particular with end-to-end smart solutions to attract and engage customers across multiple channels, leveraging the power of the Internet of Things to understand and serve them more intimately and respond quicker to their needs, thereby building stronger loyalty rate and new monetization models.

Telcos, Media & Utilities

Across the *telecommunications, media, and technology, and energy and utilities* sectors, operators face the challenge of increased competition, deregulation, consolidation and disruptive technologies. Within this context, the pressure is on to establish new business models to maintain leading market positions or increase market share. By using IT to transform its clients' operations and customer relations, Atos helps businesses increase their agility while reducing costs. Atos powers progress for its clients by accelerating and securing the adoption of transformational technologies, such as data-centric approaches and 5G in telecommunications, multi-channel and interactive media delivery, and smart grid systems for energy and utilities.

B. Financials

B.1 Operational review

B.1.1 Statutory to constant scope and exchange rates reconciliation

2019 revenue was € 11,588 million, down -5.5% compared to 2018 reported statutory, -6.4% at constant exchange rates, and +1.4% at constant scope and exchange rates. Operating margin reached € 1,190 million (10.3% of revenue), -5.6% compared to 2018 reported statutory and +5.8% compared to € 1,125 million (9.8% of revenue) in 2018 at constant scope and exchange rates.

In €million	2019	2018	% change
Statutory revenue	11,588	12,258	-5.5%
Exchange rates effect		117	
Revenue at constant exchange rates	**11,588**	**12,375**	**-6.4%**
Scope effect		-982	
Exchange rates effect on acquired/disposed perimeters		37	
Revenue at constant scope and exchange rates	**11,588**	**11,430**	**1.4%**
Statutory operating margin	1,190	1,260	-5.6%
Scope effect		-154	
Exchange rates effect		19	
Operating margin at constant scope and exchange rates	**1,190**	**1,125**	**5.8%**
as % of revenue	*10.3%*	*9.8%*	

The table below presents the effects on 2018 revenue of acquisitions and disposals, internal transfers reflecting the Group's new organization, and change in exchange rates.

	FY 2018 revenue				
In € million	**FY 2018 statutory**	**Scope effects**	**Internal transfers**	**Exchange rates effects***	**FY 2018 at constant scope and exchange rates**
North America	2,022	628		138	2,789
Germany	2,161	-8			2,153
France	1,710	16			1,727
UK & Ireland	1,612	44		13	1,668
Benelux & The Nordics	1,017	-1		-0	1,016
Other Business Units	2,061	13		3	2,077
Worldline	1,674	-1,674			
TOTAL GROUP	**12,258**	**-982**		**154**	**11,430**
Infrastructure & Data Management	6,328	-14	-47	96	6,362
Business & Platform Solutions	3,361	739	30	50	4,180
Big Data & Cybersecurity	895	-32	18	8	888
Worldline	1,674	-1,674			
TOTAL GROUP	**12,258**	**-982**	**0**	**154**	**11,430**

* *At FY 2019 exchange rates*

Scope effects amounted to €-982 million for revenue, of which:

- €-1,674 million related to the restatement of the contribution of Worldline to the Group revenue in FY 2018 following the deconsolidation of Worldline from the Group as of January 1, 2019. As a reminder, after having distributed 23.4% of Worldline's share capital to its shareholders on May 7, 2019, out of the 50.8% owned by the Group, Atos has completed as of October 30, 2019, the sale of c. 14.7 million Worldline shares (c. 8% of Worldline's share capital), for c. 0.8 billion euro, through a placement to qualified investors only by way of accelerated bookbuilding offering. Concurrently, Atos issued bonds due 2024 for an aggregate nominal amount of approximately €500 million, which will be exchangeable into Worldline shares (c. 4% of Worldline's share capital in case of full conversion) at a premium of 35%. In addition, Atos has agreed to transfer to Atos UK 2019 Pension Scheme c. 4.3 million Worldline shares (c. 2% of Worldline's share capital) representing £198 million (c. €230 million). Following these transactions, and in case of exchange in full of the bonds, Atos would retain a direct stake of 13% of Worldline share capital and 22% of voting rights;

- €+65 million corresponding to the revenue realized by Atos' entities with Worldline in FY 2018. This revenue is no more neutralized in the Group consolidation but recognized as Group revenue following the deconsolidation of Worldline as of January 1, 2019;

- The remaining net positive amount of €+627 million was mostly related to the acquisition of Syntel, consolidated as of November 1, 2018 (10 months restated for €+709 million), the acquisition of IDnomic, consolidated as of October 1, 2019 (3 months restated for €+5 million), the disposal of some specific Unified Communication & Collaboration activities as well as former ITO activities in the UK, and the disposal and decommissioning of non-strategic activities within CVC;

- As the closing of the recent acquisition of Maven Wave has taken place earlier in Q1 2020, no restatement is necessary for FY 2018 revenue.

Scope effects amounted to €-154 million for operating margin. Most of the impact came from the restatement of the contribution of Worldline to the Group operating margin in FY 2018 (€-293 million), the acquisition of Syntel (10 months for €+176 million) and the disposal of some specific Unified Communication & Collaboration activities, as well as former ITO activities in the UK and the disposal and decommissioning of non-strategic activities within CVC. As the operating margin realized by Atos' entities with Worldline in FY 2018 was not eliminated from a contributive standpoint, no restatement is necessary.

Internal transfers mostly referred to Healthcare contracts in North America transferred to Syntel, previously reported within Infrastructure & Data Management and now reported within Business & Platform Solutions as of January 1, 2019, as well as Cybersecurity consulting services formerly reported in Business & Platform Solutions and now integrated under Big Data & Cybersecurity.

Currency exchange rates effects mostly came from the US dollar which positively contributed to revenue for €+154 million and to operating margin for €+19 million.

The table below presents the described effects on 2018 operating margin:

	FY 2018 operating margin				
In € million	**FY 2018 statutory**	**Scope effects**	**Internal transfers**	**Exchange rates effects***	**FY 2018 at constant scope and exchange rates**
North America	202	84		15	300
Germany	137	-10			126
France	150	0			151
UK & Ireland	193	4		1	198
Benelux & The Nordics	76	-5		0	71
Other Business Units	275	66		3	344
Global structures**	-66			0	-66
Worldline	293	-293			
TOTAL GROUP	**1,260**	**-154**		**19**	**1,125**
Infrastructure & Data Management	604	-20	-3	9	589
Business & Platform Solutions	300	176	-1	9	483
Big Data & Cybersecurity	138	-17	5	2	127
Corporate costs	-74			-0	-74
Worldline	293	-293			
TOTAL GROUP	**1,260**	**-154**		**19**	**1,125**

** At FY 2019 exchange rates*

*** Global structures include the Global Divisions costs not allocated to the Group Business Units and Corporate costs*

B.1.2 Performance by Division

Revenue was € 11,588 million, +1.4% at constant scope and exchange rates, particularly led by the Cloud performance and Big Data & Cybersecurity.

Operating margin was **€ 1,190 million**, representing **10.3% of revenue**, compared to 9.8% in 2018 at constant scope and exchange rates. Each Division contributed to the operating margin increase, Infrastructure & Data Management benefitting from automation and the RACE program, Business & Platform Solutions from the cost synergies with Syntel, Big Data & Cybersecurity from the topline growth. Finally, corporate central costs were reduced thanks to continued efforts on expense optimization.

	Revenue			Operating margin		Operating margin %	
In €million	**2019**	**2018***	**Organic evolution**	**2019**	**2018***	**2019**	**2018***
Infrastructure & Data Management	6,321	6,362	-0.6%	614	589	9.7%	9.3%
Business & Platform Solutions	4,216	4,180	0.9%	492	483	11.7%	11.6%
Big Data & Cybersecurity	1,050	888	18.3%	149	127	14.2%	14.3%
Corporate costs	-	-		- 65	- 74	-0.6%	-0.7%
Total	**11,588**	**11,430**	**1.4%**	**1,190**	**1,125**	**10.3%**	**9.8%**

** At constant scope and exchange rates*

B.1.2.1 Infrastructure & Data Management

In €million	**2019**	**2018***	**Organic evolution**
Revenue	6,321	6,362	-0.6%
Operating margin	614	589	
Operating margin rate	9.7%	9.3%	

**At constant scope and exchange rates*

Infrastructure & Data Management **revenue** was € 6,321 million, down -0.6% at constant scope and exchange rates. The Division managed to turn back to growth in the third quarter 2019 and continued the positive trend, achieving +0.3% organically during the fourth quarter. In line with the transformation of the business model of the Division, revenue share increased in Digital Workplace, Codex and in projects in Technology Transformation Services. The Division continued the digital transformation of its main clients through automation and artificial intelligence, supporting growth in several geographies, notably in Asia Pacific, Central & Eastern Europe, South America, Iberia and Middle East & Africa, while Germany, the United Kingdom, France and Benelux & The Nordics faced reduced volumes.

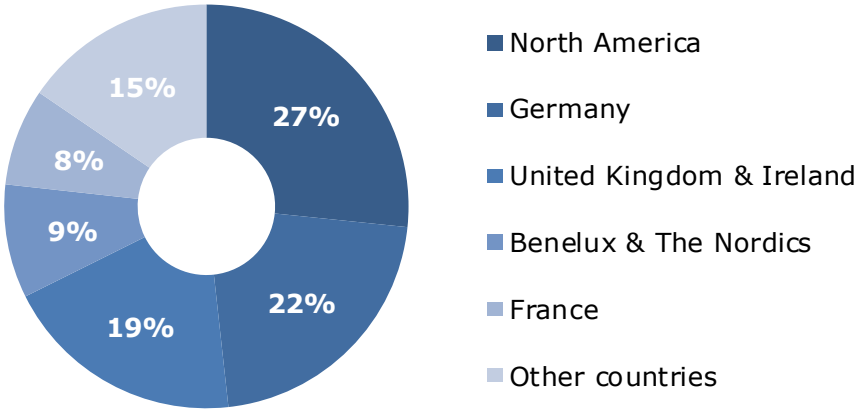
Financial Services posted a double-digit growth, mainly fueled by the ramp-up of the significant contracts in the North America, notably with CNA Financial Corporation, and in United Kingdom & Ireland with Aegon, National Savings & Investments and Aviva, which have more than compensating one large contract not renewed in 2018 in North America.

Telcos, Media & Utilities grew thanks to additional sales achieved with BBC in the United Kingdom, new logos notably with National Grid and Entergy Corporation in North America, as well as the ramp-up of the contracts with Scottish Water in the United Kingdom and with a Spanish mobile telco operator. In France, the activity was challenging with businesses not repeated in Utilities compared to Q4 last year. The Division performed a strong activity in Unified Communication & Collaboration in Benelux & The Nordics and in the Other Business Units while the situation was more challenging in Germany.

Manufacturing, Retail & Transportation slightly stepped back, facing the effects of the non-renewal of a contract with Marriott International in North America in 2018, a strong reduction of activity in Unified Communication & Collaboration in several geographies such as North America and Benelux & The Nordics, as well as volumes reduction and contract ramp downs in Germany. The Industry benefitted from the ramp-up of several contracts signed in North America during the year which partially offset the above effects.

The situation in Public sector remained challenging, in particular in the United Kingdom impacted by the base effect of transitions completed last year with the Ministry of Justice and suffered from lower volumes with a pension, insurance and investment company. North America was also impacted by contract terminations and by scope reduction. This was partially offset by the increased activity in "Other Business Units" and in France.

Infrastructure & Data Management revenue profile by geography



Operating margin in Infrastructure & Data Management was € 614 million, representing 9.7% of revenue. The increase of +40 basis points was mainly driven by strong cost saving actions including the RACE program across geographies as well as the adaptation of the Group workforce in several countries, more particularly in Germany which benefited from the effects of the acceleration of the adaptation plan launched in H1. In the United Kingdom, the operating margin was affected by price constraints in Business Process Outsourcing (BPO).

B.1.2.2 Business & Platform Solutions

In €million	2019	2018*	Organic evolution
Revenue	4,216	4,180	0.9%
Operating margin	492	483	
Operating margin rate	11.7%	11.6%	

**At constant scope and exchange rates*

Business & Platform Solutions **revenue** reached € 4,216 million, +0.9% at constant scope and exchange rates in 2019. The activity was contrasted over the year, with a first semester at +2.3% organic growth while the Division was slightly down at -0.5% over the second semester. Indeed, Business & Platform Solutions faced with tensions in financial services in North America both in Q3 and in Q4. The reduction of the number of low margin contracts implemented in H1 2019 at the time of the transfer of contracts under Syntel management impacted the revenue organic growth both in Q3 and Q4. Finally, towards the end of the year, growth was impacted by a slowdown in the Automotive industry in Germany.

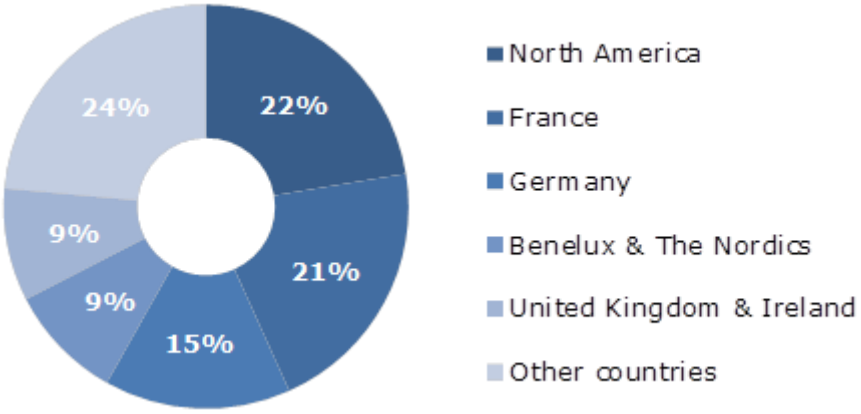
Growth was strong in Manufacturing, Retail & Transportation, which benefitted from good performance in almost all geographies. In particular Germany recorded a solid growth thanks to new application management services contract with Siemens combined with S4HANA engagement in Austria, ramp-up of contracts such as Philips in Benelux & The Nordics, as well as increased volumes in the United Kingdom.

Financial Services slightly grew mainly thanks to a contract with a large insurance company in the United Kingdom as well as cloud business with an insurance company in Benelux & The Nordics and ramp-up of contracts in Germany, while the situation remained challenging in France and in North America impacted by volume reductions.

The Division posted a slight decrease organically in Telcos, Media & Utilities. Germany was impacted by the ramp-down with one large customer in application management while Benelux & The Nordics and North America suffered from lower volumes in application management contracts. This challenging situation could not be compensated by higher volumes with Italian and Spanish utilities while France benefitted from higher activity through Worldgrid contracts and United Kingdom recorded a growth thanks to ramp-up of several contracts.

The situation was more contrasted in Public & Health which performed an increased activity for digital projects in France as well as new contracts in Italy and in Iberia. Conversely, it faced with volume reduction in healthcare in North America due to not repeated migrations delivered last year to hospitals as well as project completions in the United Kingdom.

Business & Platform Solutions revenue profile by geography



Operating margin was € 492 million, representing 11.7% of revenue, an improvement of +10 basis points. Syntel synergies contributed positively to the Division margin improvement at the level expected. Operating margin improvement achieved in the first semester slowed down in the second half, due to the slow-down of the revenue organic growth of the Division, the ramp down in Germany of a high margin application management contract with one large customer, as well as some cost overruns in Atos legacy contracts.

B.1.2.3 Big Data & Cybersecurity

In €million	2019	2018*	Organic evolution
Revenue	1,050	888	18.3%
Operating margin	149	127	
Operating margin rate	14.2%	14.3%	

**At constant scope and exchange rates*

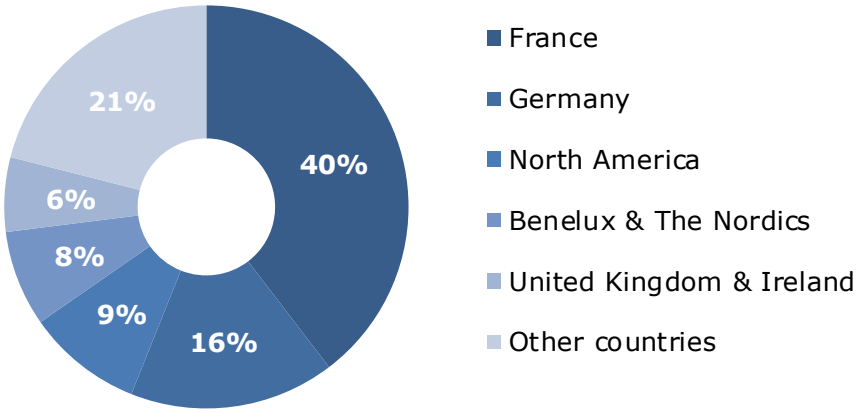
Revenue in Big Data & Cybersecurity was € 1,050 million, up +18.3% organically, maintaining a strong performance all over the year and pursuing the extension of the Division's markets both in terms of industries served and geographies.

In particular, growth was notably sustained by Big Data activity, mainly coming from ramp up of large contracts in France like Météo-France, a French research institute and a French Ministry, in Germany with HRLN Supercomputing Service and Forschungszentrum Jülich, in the United Kingdom with the European Centre for Medium Range Weather Forecast, and in Benelux & the Nordics with notably CSC in Finland. It largely compensated for the non-repeated high level of product sales performed last year in North America.

Cybersecurity activities also posted a positive growth led by new business opportunities in North America combined with good performance in Benelux & the Nordics which largely offset revenue from licenses not repeated this year in the United Kingdom.

The performance was also driven by strong activity of Mission critical systems in Central and Eastern Europe.

Big Data & Cybersecurity revenue profile by geography



Operating margin was € 149 million, representing 14.2% of revenue broadly stable compared to 2018. All in all, the Division generated a solid profitability from operations while continuing to invest in Research & Development and commercial investment on offerings in both Cybersecurity and Big Data solutions. Operating margin was high in growing geographies such as France, Benelux & The Nordics and Other Business Units, while North America benefited from a favorable revenue mix.

B.1.3 Performance by Business Unit

In €million	Revenue 2019	Revenue 2018*	Revenue Organic evolution	Operating margin 2019	Operating margin 2018*	Operating margin % 2019	Operating margin % 2018*
North America	2,725	2,789	-2.3%	343	300	12.6%	10.8%
Germany	2,167	2,153	0.7%	152	126	7.0%	5.9%
France	1,788	1,727	3.5%	164	151	9.2%	8.7%
United Kingdom & Ireland	1,669	1,668	0.0%	165	198	9.9%	11.9%
Benelux & The Nordics	1,047	1,016	3.0%	88	71	8.4%	7.0%
Other Business Units	2,192	2,077	5.6%	319	344	14.6%	16.5%
Global structures**	-	-		- 42	- 66	-0.4%	-0.6%
Total	**11,588**	**11,430**	**1.4%**	**1,190**	**1,125**	**10.3%**	**9.8%**

** At constant scope and exchange rates*

*** Global structures include the IT Services Divisions global costs not allocated to the Business Units and Corporate costs.*

B.1.3.1 North America

In €million	2019	2018*	Organic evolution
Revenue	2,725	2,789	-2.3%
Operating margin	343	300	
Operating margin rate	12.6%	10.8%	

**At constant scope and exchange rates*

Revenue reached € 2,725 million, decreasing by -2.3% organically. After a challenging situation in the first half 2019 when the performance was hampered by the base effect of two contracts terminated in 2018, the business unit managed to turn back to growth, posting a robust +2.7% in the last quarter of 2019.

As a result of the implementation of a sales reorganization and the change or removal of most of the client executives the last eighteen months, Infrastructure & Data Management stabilized revenue organically, fueled by new logo and ramp up of existing contracts which compensated the remaining impact of terminated contracts. Financial Services recorded a good performance driven from the ramp-up of the contract with CNA Financial Corporation, which more than compensated for an important legacy contract not renewed last year. Telcos, Media & Utilities market showed a sustained activity as well, attributable to new logos notably with a large integrated energy company. Public & Health sector benefitted from higher volumes with Texas Department of Information Resource, but was impacted by less revenue further to migrations as well as a ramp-down with a leader in healthcare IT. Within Manufacturing, Retail & Transportation, new business achieved with several new customers of large contracts could not offset the negative effect from the terminated contract with Marriott International in 2018 and lower volumes with some clients.

Business & Platform Solutions decreased compared to last year. The situation remained challenging in Healthcare area due to the end of large software roll out to hospitals, even if the decline was significantly reduced in the last quarter. Financial Services sector was impacted by less volumes and a lower demand as some customers in the banking area reduced expenses in H2. Manufacturing, Retail & Transportation was broadly stable.

Big Data & Cybersecurity reached a good performance in Financial Services and Telcos, Media & Utilities, driven notably by new business opportunities with CNA Financial Corporation. However, this was not sufficient to compensate for the non-repeated high level of product sales performed last year in Public & Health and in Manufacturing, Retail & Transportation, despite new business achieved in Q4.

Operating margin reached € 343 million, representing 12.6% of revenue, increasing by +180 basis points compared to last year. All Divisions reported a double digit level of profitability. In Business & Platform Solutions, the Business Unit increased its operating margin rate thanks to the contribution from Syntel, including the effect of synergies. In addition, Infrastructure & Data Management contributed as well on the improvement of the operating margin rate due to workforce optimization initiatives and strong cost reduction actions. Profitability also increased in Big Data & Cybersecurity, which benefited from new logos in Q4.

B.1.3.2 Germany

In €million	2019	2018*	Organic evolution
Revenue	2,167	2,153	0.7%
Operating margin	152	126	
Operating margin rate	7.0%	5.9%	

**At constant scope and exchange rates*

In 2019, the Business Unit achieved an organic growth of +0.7% compared to the same period last year at constant scope and exchange rates, leading to € 2,167 million **revenue**. Growth derived from the good performance in Big Data & Cybersecurity and Business & Platform Solutions, while the situation of Infrastructure & Data Management remained challenging.

Infrastructure & Data Management decreased organically compared to last year. In this Division, Public & Health market was stable. Manufacturing, Retail & Transportation and Telcos, Media & Utilities were both impacted by one off sales achieved last year and not repeated this year, even though partially offset by increased activities with Karstadt and Bayer within Manufacturing, Retail & Transportation. Financial Services faced with contract terminations also partially compensated by new business with Deutsche Bundesbank.

Business & Platform Solutions revenue increased compared to last year, but slowed down in the second semester after a solid growth reported in the first half. Manufacturing, Retail & Transportation drove the Division growth thanks to a new application management services with Siemens and a new logo wins. Public & Health also grew thanks to new services notably with a government institution in information technologies and Autobahn, which offset scope reduction with Bundesagentur fur Arbeit. Financial Services also recorded a positive performance. This largely compensated for the ramp down of the contract with a large customer in application management which impacted Telcos, Media & Utilities.

Big Data & Cybersecurity achieved a particularly strong growth, accelerating in the second semester, notably benefitted from high performance computing sale with HRLN Supercomputing Service and Forschungszentrum Jülich within Public & Health sector and finally Bullion sales within Telcos, Media & Utilities sector.

Operating margin reached € 152 million, representing 7.0% of revenue, +120 basis points compared to 2018 at constant scope and exchange rates. Profitability improved significantly due to refocusing of Unified Communication activities in Infrastructure & Data Management and to restructuring efforts combined with strong actions on the cost base. This over compensating the performance in Business & Platform Solutions notably caused by ended contract with a telecommunication provider.

B.1.3.3 France

In €million	2019	2018*	Organic evolution
Revenue	1,788	1,727	3.5%
Operating margin	164	151	
Operating margin rate	9.2%	8.7%	

**At constant scope and exchange rates*

At € 1,788 million, **revenue** improved by +3.5% organically. The performance of the Business Unit was driven by Big Data & Cybersecurity thanks to a continued solid performance over the year.

Infrastructure & Data Management decreased organically. Growth was posted mainly in Financial Services notably coming from higher volumes within banking sector through hybrid cloud activities. Public & Health also contributed positively to the growth benefitting from higher volumes and increasing hybrid cloud business, partly offset by several ramp-down contracts. However, this was not enough to compensate for Telcos, Media & Utilities and Manufacturing, Retail & Transportation sectors notably impacted by lower volumes with a global electricity company as well as some contracts which ended.

Business & Platform Solutions revenue grew in 2019 primarily driven by Public & Health with new business notably with a large pension institution coupled with higher volumes with a public institution of labour. Telcos, Media & Utilities showed a sustained activity as well, attributable to the ramp-up of a contract with large Group of energy through Worldgrid activities. Conversely, in Manufacturing, Retail & Transportation sector, the ramp-up contracts with a large Hotel Group in Digital workplace and with a large car manufacturer was not sufficient to compensate for the ending contract in the pharmaceutical segment. The Business Unit was also affected by an underperformance in Financial Services.

Big Data & Cybersecurity achieved double-digit growth benefitting from the strong performance largely concentrated in Public & Health, thanks to new contracts through High Performance Computer with Météo-France and a French research institution, as well as the renewal of software and hardware licenses contract with French institutions. To a lesser extent, Manufacturing, Retail & Transformation also contributed positively to the growth, benefitting from the ramp-up of several High Performance Computer contracts with international clients. Finally, Telcos, Media & Utilities market was affected by the comparison base with High Performance Computer delivery, successfully achieved in 2018 with a large national energy provider last year.

Operating margin reached € 164 million, representing 9.2% of revenue, +50 basis points at constant scope and exchange rates. The improvement of operating margin was largely attributable to Big Data & Cybersecurity, supported by strong revenue growth. Conversely, in Infrastructure & Data Management, actions on costs and on productivity started to result in the second semester but was not sufficient to compensate for the challenging situation faced in the first semester. Business & Platform Solutions operating margin slightly decreased compared with previous year.

B.1.3.4 United Kingdom & Ireland

In €million	2019	2018*	Organic evolution
Revenue	1,669	1,668	0.0%
Operating margin	165	198	
Operating margin rate	9.9%	11.9%	

**At constant scope and exchange rates*

Revenue was € 1,669 million, stable organically. Strong business growth in Big Data & Cybersecurity and dynamism of Business & Platform Solutions were hampered by more challenging situation in Infrastructure & Data Management.

Infrastructure & Data Management decreased compared to last year. Financial Services posted a strong growth, notably thanks to the ramp-up of Aegon contract and increased revenue with National Savings & Investments and Aviva. Telcos, Media & Utilities market was mainly driven by additional sales achieved with BBC and the ramp-up of the hybrid cloud contract with a large water provider. Manufacturing, Retail & Transportation increased slightly, thanks to the hybrid cloud deliveries on contract extension and transformation projects with a UK postal service company. This could not fully offset the decline in Public Sector impacted by the base effect from transition completion of Ministry of Justice and from lower volumes with a pension, insurance and investment company.

Business & Platform Solutions grew organically. In Financial Services, the performance was supported by the ramp-up of Aegon contract signed at the end of previous year and increased business within Clydesdale Bank and Standard Life Investment. Within Manufacturing, Retail & Transportation market, growth was essentially derived from increased projects with Federal Express Corporation, a customer provided by Syntel. Telcos, Media & Utilities benefitted from contracts ramp-up with a large water provider and Northern Ireland Electricity, while Public & Health faced with end of projects.

Revenue in Big Data & Cybersecurity showed a strong momentum, with a very significant organic growth led by new HPC contract with the European Centre for Medium Range Weather Forecast in Public and Health market, despite the base effect of cyber services sales achieved the year before with International Airlines Group.

Operating margin was € 165 million and represented 9.9% of the revenue, or -200 basis points compared to last year at constant scope and exchange rate. While the profitability increased in Business & Platform Solutions benefitting from revenue growth, improved operational efficiency and cost control. It did not compensate Infrastructure & Data Management impacted by revenue decrease.

B.1.3.5 Benelux & The Nordics

In €million	2019	2018*	Organic evolution
Revenue	1,047	1,016	3.0%
Operating margin	88	71	
Operating margin rate	8.4%	7.0%	

**At constant scope and exchange rates*

At € 1,047 million, **revenue** was up by +3.0% organically, driven by a strong activity in Big Data & Cybersecurity.

Infrastructure & Data Management slightly decreased. In Telcos, Media & Utilities, the Division achieved a strong growth through UCC activities and thanks to a new contract signed in 2019 with T-Mobile. Public & Health sector recorded growth thanks to the ramp-up of the contract signed with Dutch University Hospitals. Financial Services benefitted from ramp-up of several contracts partly offset by volume reductions with an Insurance company and Kas Bank. Conversely, Manufacturing, Retail & Transportation sector was affected by the base effect on activities achieved last year within Siemens Windpower in The Nordics, partly compensated by the recently signed extended Philips contract coupled with higher volumes achieved with Philip Morris International.

Business & Platform Solutions showed a growth recovery. In particular, Manufacturing, Retail & Transportation posted a solid growth fueled by the ramp-up contract with Philips and in Financial Services from higher volumes with a Dutch insurer. The situation was more challenging in other sectors: within Public & Health the new business with a Dutch Ministry was not enough to compensate for the decline from an ended contract with another Public Institution while Telcos, Media & Utilities faced with the decline of the contract with KPN.

Big Data & Cybersecurity recorded a strong organic growth, primarily driven by a sustained demand through HPC area with CSC in Finland coupled with the Norway's National Research and Education Network, as well as higher product sales notably with a large IT Group in Belgium. Additionally, the Division benefitted from a good performance in several countries such as Poland, Sweden or Denmark.

Operating margin reached € 88 million, representing 8.4% of revenue, an improvement of +140 basis points compared to last year at constant scope and exchange rates. The profitability increased in Big Data & Cybersecurity and Business & Platform Solutions driven by improved revenue mix combined with increased operational efficiency through continued tight project management and strong actions to optimize the cost base through the RACE project. Infrastructure & Data Management margin decreased but remained at a high level of profitability.

B.1.3.6 Other Business Units

In €million	2019	2018*	Organic evolution
Revenue	2,192	2,077	5.6%
Operating margin	319	344	
Operating margin rate	14.6%	16.5%	

**At constant scope and exchange rates*

Revenue in "Other Business Units" reached € 2,192 million, up +5.6% organically, growing in all Divisions and especially in Infrastructure & Data Management and Business & Platform Solutions.

Infrastructure & Data Management delivered a strong performance. Public Sector posted a double-digit growth, thanks notably to the ramp-up of projects with the Western Australian Department of Health, alongside with the sales achieved in Central & Eastern Europe. Telcos, Media & Utilities expanded as well, driven mainly by a new cloud contract with a Spanish mobile telco operator signed in March and by the ramp-up of a global contract with an international consulting firm in Asia Pacific. Financial Services benefitted from increased business with a large private bank in Morocco and from the ramp-up of a digital Workplace contract with a large insurance company in Italy. The situation was more challenging in Manufacturing, Retail & Transportation.

Business & Platform Solutions grew in all markets. Public & Health was fueled by a new contract with a Public Education Institution in Spain, ramp-up of Olympics Tokyo 2020 and Beijing 2022 as well as increased business with governmental institutions in Central & Eastern Europe. Telcos, Media & Utilities market benefitted from higher volumes, notably with Italian and Austrian clients and new projects in Middle East & Africa. Growth in Manufacturing, Retail & Transportation was essentially driven by the ramp-up of new contracts in Central & Eastern Europe. Finally, new wins in banking sector within Financial Services in South America fully compensated for ramp-downs in Iberia and volume reductions in Italy.

Big Data & Cybersecurity benefitted from HPC deliveries in Asia Pacific and Middle East & Africa, coupled with higher project activity within Cybersecurity services in Central & Eastern Europe.

Operating margin was € 319 million, representing 14.6% of revenue. Infrastructure & Data Management as well as Big Data & Cybersecurity managed to improve their profitability. Conversely, the situation was more challenging for some contracts in India in Business & Platform Solutions.

B.1.3.7 Global structure costs

Global structures costs reached €-42 million, decreasing by € 24 million compared to 2018 at constant scope and exchange rates, primarily driven by the continued efforts on internal costs optimization in most of the support functions as well as on subcontracting costs with third parties. A positive impact came as anticipated from pension as a result of the implementation of the "Loi Pacte" for the Group.

B.1.4 Revenue by Market

In €million	2019	2018*	Organic evolution
Manufacturing, Retail & Transportation	4,139	4,181	-1.0%
Public & Health	3,411	3,387	0.7%
Financial Services	2,169	2,032	6.8%
Telcos, Media & Utilities	1,869	1,831	2.1%
Total	**11,588**	**11,430**	**1.4%**

** At constant scope and exchange rates*

B.1.4.1 Manufacturing, Retail & Transportation

Manufacturing, Retail & Transportation was the largest market segment of the Group (36%) and reached € 4,139 million in 2019, declining by -1.0% compared to 2018 at constant scope and exchange rates. Good performance was recorded in Germany within Business & Platform Solutions Division compensating ramp down on some contracts in North America during the first half of the year for Infrastructure & Data Management Division.

In this market, the top 10 clients (excluding Siemens) represented 20% of revenue with a leading North American logistics company, Conduent, Triple Five, Daimler Group, Bayer, a global leader in Aerospace & Defense, Johnson & Johnson, Rheinmetall, Philips and Volkswagen.

B.1.4.2 Public & Health

Public & Health was the second market of the Group (29%) with total revenue of € 3,411 million, up +0.7% compared to 2018 at constant scope and exchange rates. Revenue increase mainly came from France within Big Data & Cybersecurity Division.

34% of the revenue in this market was realized with 10 main clients: Texas Department of Information Resources, UK Department for Work & Pensions (DWP), European Union Institutions, McLaren Health Care Corporation, a leader in healthcare IT, UK Nuclear Decommissioning Authority, a French research institute, a French Ministry, the UK Ministry of Justice and SNCF (France).

B.1.4.3 Financial Services

Financial Services was the third Market of the Group and represented 19% of the total revenue at € 2,169 million, an increase of +6.8% compared to 2018 at constant scope and exchange rates. A good performance was recorded in the United Kingdom thanks to Aegon, National Savings & Investments and Aviva. The market was also benefiting from contract ramp-up with CNA Financial Corporation in North America.

In this market, 49% of the revenue was generated with the 10 main clients: UK National Savings & Investments, a UK bank based in Hong-Kong, a US financial payment institution, CNA Financial Corporation, State Street Corporation, Deutsche Bank, Aegon, a Dutch Insurance company, Aviva and BNP Paribas.

B.1.4.4 Telcos, Media & Utilities

Telcos, Media & Utilities represented 16% of the Group revenue and reached € 1,869 million, representing an increase of +2.1% compared to 2018 at constant scope and exchange rates. Revenue increase was mainly coming from Other Business Units with a new cloud contract with a Spanish mobile telco operator, the United Kingdom increasing activities with BBC and Scottish Water, and in North America thanks to a large utilities provider.

Main clients were EDF, Orange, BBC, Telefonica/O2, a large US entertainment company, Worldline, Enel, Deutsche Telekom, Telecom Italia and a large Nordic telecommunication provider. The top 10 main clients represented 50% of the total Telcos, Media & Utilities Market revenue.

B.1.5 Portfolio

B.1.5.1 Order entry and book to bill

In 2019, the Group **order entry** totaled **€ 12,245 million**, increasing by 3.9% **year-on-year** excluding Worldline, representing a **book to bill ratio** of **106%** compared to 111% in 2018 (excluding Worldline). Indeed, the performance remained strong in 2019 in a year with much less contracts coming for renewal in the Infrastructure & Data Management Division. During the fourth quarter, the Group reported strong performance with a book to bill at 121%.

Order entry and book to bill by **Division** was as follows:

	Order entry			Book to bill		
In €million	H1 2019	H2 2019	FY 2019	H1 2019	H2 2019	FY 2019
Infrastructure & Data Management	2,867	3,341	6,208	91%	105%	98%
Business & Platform Solutions	2,228	2,446	4,674	104%	117%	111%
Big Data & Cybersecurity	647	716	1,363	137%	124%	130%
Total	**5,742**	**6,503**	**12,245**	**100%**	**111%**	**106%**

Several large new contracts were signed over the period in Infrastructure & Data Management, which contributed to growth in Hybrid Cloud and Digital Workplace. In particular, large order entries were contracted in North America with a leading healthcare company, with National Grid in North America and also in the United Kingdom & Ireland, the NG911 contract with the State of California, and with Entergy. In addition, Germany closed several major deals notably with BASF and Itergo, whereas Benelux & The Nordics concluded a large contract in the Public & Health sector. Business & Platform Solutions signed new contracts notably in Benelux & The Nordics such as Fortum within Manufacturing, Retail & Transportation and a Dutch insurance company within Financial Services. Big Data & Cybersecurity pursued its strong commercial dynamics, fueled by a large win in the United Kingdom with the European Centre for Medium-Range Weather Forecast and in France with Méteo France as well as in Germany with Bayer.

Renewals of the year included several large contracts in Infrastructure & Data Management such as in Manufacturing, Retail & Transport in France with PWC, in Telcos, Media & Utilities in the United Kingdom with BBC and in Financial Services in Benelux & The Nordics with Dutch insurance company and in France with BNP Paribas. In addition, a large deal was renewed with a large UK postal company including offerings of both Infrastructure & Data Management and Big Data & Cybersecurity. Other major wins of the period were concluded within Public sector in France contributing to the order entries in Big Data & Cybersecurity and Business & Platform Solutions, coupled with a deal in Financial Services in the United Kingdom within Business & Platform Solutions.

Order entry and book to bill by **Market** were as follows, with a strong contribution from Manufacturing, Retail & Transport:

	Order entry			Book to bill		
In €million	H1 2019	H2 2019	FY 2019	H1 2019	H2 2019	FY 2019
Manufacturing, Retail & Transportation	2,132	2,554	4,686	103%	123%	113%
Public & Health	1,663	1,918	3,581	99%	111%	105%
Telcos, Media & Utilities	1,068	959	2,027	119%	99%	108%
Financial Services	879	1,072	1,951	80%	100%	90%
Total	**5,742**	**6,503**	**12,245**	**100%**	**111%**	**106%**

B.1.5.2 Full backlog

In line with the positive evolution of Atos commercial activity, the **full backlog** at the end of December 2019 increased by **+2.5%** compared to December 2018 (excluding Worldline contribution in 2018), and amounted to **€ 21.9 billion** representing **1.9 year of revenue**.

B.1.5.3 Full qualified pipeline

The **full qualified pipeline** remained strong at **€ 7.4 billion** at the end of 2019, up **+7.5%** compared to the end of 2018 (excluding Worldline contribution in 2018), representing **8 months of revenue**.

B.1.6 Human Resources

The total headcount was 108,317 at the end of December 2019, compared to 122,110 at the end of December 2018 which included Worldline staff. The evolution was strongly impacted by -11,514 headcounts scope impact mostly related to the deconsolidation of Worldline. Excluding the scope effect, the total decrease amounted to -1.9% mainly in Business & Platform Solutions and Infrastructure & Data Management to anticipate and accompany automation and robotization while the Group continued to recruit profiles to support its client in their digital transformation. In Big Data & Cybersecurity, direct staff increased by +6.4% during the year excluding the scope effect, supporting the strong growth of both in Cybersecurity/Mission Criticals and in Big Data.

In 2019, the Group hired 18,516 staff (94% were direct employees). The hirings were mainly achieved in near and offshore countries (totaling 66% of direct hirings) such as India, Poland, Romania and the Philippines, as well as in the United Kingdom, the United States and France to design and develop to new offerings, to fulfill new contracts and to compensate attrition. 55% of the direct hirings over the period were performed in Business & Platform Solutions where the attrition is above the two other Divisions.

Attrition rate was 15.1% at Group level, stable compared to previous year, of which 20.6% in offshore countries. The number of restructured and dismissed employees over the period amounted to 3,983.

Headcount evolution in 2019 by Business Unit and by Division was the following:

	End of December 2018	Scope	Hiring	Leavers, dismissals & restructuring	End of December 2019
Infrastructure & Data Management	44,530	-93	7,035	-7,834	43,638
Business & Platform Solutions	52,954	41	9,573	-11,948	50,619
Big Data & Cybersecurity	5,186	-28	777	-447	5,489
Functions	156		1	3	160
Worldline	10,452	-10,452	0	0	0
Total Direct	**113,278**	**-10,532**	**17,386**	**-20,226**	**99,906**
Germany	8,503	23	224	-402	8,348
North America	11,127	-10	1,802	-2,966	9,953
France	10,606	51	1,195	-1,360	10,493
United Kingdom & Ireland	8,485	-81	2,175	-1,667	8,912
Benelux & The Nordics	5,235	0	382	-822	4,795
Other Business Units	58,316	-63	11,535	-12,959	56,829
Global structures	554	0	73	-50	577
Worldline	10,452	-10,452	0	0	0
Total Direct	**113,278**	**-10,532**	**17,386**	**-20,226**	**99,906**
Total Indirect	**8,832**	**-982**	**1,130**	**-569**	**8,411**
TOTAL GROUP	**122,110**	**-11,514**	**18,516**	**-20,795**	**108,317**

The number of direct employees at the end of 2019 was 99,906, representing 92.2% of the total Group headcount. Indirect staff representing SG&A was 8,411 end of December 2019.

B.2 2020 objectives

In 2020, the Group targets the following objectives for its 3 key financial criteria:

- **Revenue**: c. +2% organic growth
- **Operating margin rate**: +20bps to +40bps vs 2019
- **Free cash flow**: c. € 700 million

B.3 Financial review

Worldline operations in 2019

Following the decision made on January 29, 2019 by Atos Board of Directors to submit to Annual General Meeting the project to distribute 23.5% of Worldline total shares to Atos shareholders and the approval of the transaction by Atos shareholders at the Annual General Meeting on April 30, 2019, this distribution of Worldline shares took effect on May 7, 2019, the payment date for the stock dividend. Thus, in accordance with IFRS 5, Worldline's results up to April 30, 2019 (instead of May 7, 2019 for practical reasons) have been reclassified to "Net income from discontinued operation". The gain resulting from this transaction was recognized in the consolidated income statement in "Net income from discontinued operation" (see in note 1 – Changes in the scope of consolidation).
Worldline 2018 contributions to the Group income statement and cash flow were restated accordingly.
In addition, Atos has disposed in November 2019 part of its remaining Worldline shares and issued an exchangeable bond as follows:

- Sale of 14.7 million of Worldline shares through an Accelerated Bookbuilding Offering (ABO);
- Transfer of £ 198 million (€ 230 million) of Worldline shares to Atos UK Pension Scheme in exchange of no additional funding in cash of this scheme for the next 15 years, and
- Issuance of a 5-year € 500 million bond which will be exchangeable into Worldline shares (Optional Exchangeable Bond) (OEB).

B.3.1 Income statement

The Group reported a net income from continuing operations (attributable to owners of the parent) of € 414 million for 2019, which represented 3.6% of Group revenue. Net income from continuing operations was impacted by several one-off items such as the Worldline shares transactions in November 2019, adaptation restructuring plan in Germany, and implementation costs to generate Syntel synergies as detailed below.

The normalized net income before unusual, abnormal and infrequent items (net of tax) for the period was € 834 million, representing 7.2% of 2019 Group revenue.

The net income from discontinued operation is resulting from the distribution of Worldline shares in May 2019 as described above.

(In € million)	12 months ended December 31,2019	%	12 months ended December 31,2018*	%
Continuing operations				
Operating margin	**1,190**	**10.3%**	**967**	**9.1%**
Other operating income/(expenses)	-530		-337	
Operating income	**660**	**5.7%**	**630**	**5.9%**
Net financial income/(expenses)	-208		-67	
Tax charge	-82		-1	
Non-controlling interests	-3		-4	
Share of net profit/(loss) of associates	47		2	
Net income from continuing operations – Attributable to owners of the parent	**414**	**3.6%**	**560**	**5.3%**
Normalized net income from continuing operations – Attributable to owners of the parent **	**834**	**7.2%**	**803**	**7.5%**
Discontinued operation				
Net income from discontinued operation – Attributable to owners of the parent	**2,986**		**70**	

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

*** The normalized net income is defined hereafter*

B.3.1.1 Operating margin

Income and expenses are presented in the Consolidated Income Statement by nature to reflect the specificities of the Group's business more accurately. Below the line item presenting revenues, ordinary operating expenses are broken down into staff expenses and other operating expenses.

These two items together are deducted from revenues to obtain operating margin, one of the main Group business performance indicators.

Operating margin represents the underlying operational performance of the on-going business and is analyzed in detail in the operational review.

B.3.1.2 Other operating income and expenses

Other operating income and expenses relate to income and expenses that are unusual, abnormal and infrequent and represented a net expense of € 530 million in 2019. The following table presents this amount by nature:

(In € million)	12 months ended December 31,2019	12 months ended December 31,2018*
Staff reorganization	-100	-76
Rationalization and associated costs	-34	-34
Integration and acquisition costs	-41	-44
Amortization of intangible assets (PPA from acquisitions)	-157	-107
Equity based compensation	-73	-36
Other items	-125	-40
Total	**-530**	**-337**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

The € 100 million **staff reorganization** expense was mainly the consequence of the adaptation of the Group workforce in several countries. The increase in 2019 came mostly from the specific plan in Germany.

The € 34 million **rationalization and associated costs** primarily resulted from the closure of office premises and data centers consolidation, mainly in North America and France.

Integration and acquisition costs at € 41 million mainly relate to the integration costs of Syntel to generate synergies while the other costs relate to the migration and standardization of internal IT platforms from earlier acquisitions.

The 2019 amortization of intangible assets recognized in the **Purchase Price Allocation** (PPA) of € 157 million was mainly composed of:

- € 67 million of Syntel customer relationships and technologies amortized over 12 years starting November 1, 2018;
- € 22 million of SIS customer relationships amortized over 12 years starting July 1, 2011;
- € 20 million of Xerox ITO customer relationships amortized over 6 to 12 years starting July 1, 2015;
- € 17 million of Unify customer relationships and technologies amortized over 2 to 10 years starting February 1, 2016;
- € 16 million of Bull customer relationships and patents amortized over respectively 9 years and 7 to 10 years starting September 1, 2014.

In 2019, the amount of amortization of intangible assets increased from € 107 million to € 157 million, mainly due to the amortization in a full year basis of the Syntel Purchase Price Allocation (€ 67 million in 2019 to be compared with € 11 million over 2 months in 2018).

The **equity-based compensation** expense amounted to € 73 million compared to € 36 million in 2018 which reflected the lower performance and the decrease in the number of shares granted in 2018.

In 2019, **other items** increased significantly from € 40 million to € 125 million including exceptional expenses:

- At the time of the distribution of Worldline shares in May, the remaining Worldline shares were valued at the opening price on May 7, 2019 for € 54.7. Since that date, the Worldline participation was accounted for under equity method. The transactions made in November were at € 53.0 per share leading to a loss in the Group consolidated accounts as follows:
    - **Accelerated Book building Offering of Worldline shares (ABO)**. The Accelerated Book building Offering of Worldline shares on the market led to a net loss on disposal of € 46 million, net of costs, in the consolidated income statement. The transaction generated a net gain in the statutory accounts of Atos SE;
    - **Transfer of £ 198 million (€ 230 million) of Worldline shares to Atos UK Pension Scheme.** Atos has decided to fund its UK Pensions schemes with Worldline shares. This non-cash transaction will prevent Atos from any additional funding in cash for the next 15 years. This transaction led to a net loss on disposal of shares of € 7 million, in the consolidated income statement. The transaction generated a net gain in the statutory accounts of Atos SE.
- Settlement signed over H2 2019 with a large German customer led to the recognition of a one-time charge of € 23 million.

B.3.1.3 Net financial expense

Net financial expense amounted to € 208 million for the period (compared to € 67 million prior year) and was composed of a net cost of financial debt of € 64 million and non-operational financial costs of € 144 million.

Net cost of financial debt was € 64 million (compared to € 30 million in 2018) and resulted from the following elements:

- the average gross borrowing of € 5,413 million compared to € 3,330 million in 2018 bearing an average expense rate of 1.55% compared to 1.25% last year. The average gross borrowing expenses were mainly explained by:
    - the used portion of the syndicated loan combined with the Negotiable European Commercial Papers (NEU CP) and the Negotiable European Medium-Term Note program (NEU MTN) for an average of € 1,478 million (compared to an average of € 1,239 million in 2018) bearing an effective interest rate of 0.21%, benefiting from the attractive remuneration applied to the NEU CP;
    - a € 600 million bond issued in July 2015 bearing a coupon rate of 2.375%;
    - a € 300 million bond issued in October 2016 bearing a coupon rate of 1.444%;
    - a € 700 million bond issued in November 2018 bearing a coupon rate of 0.750%;
    - a € 750 million bond issued in November 2018 bearing a coupon rate of 1.750%;
    - a € 350 million bond issued in November 2018 bearing a coupon rate of 2.500%;

- a $ 1,900 million 3 and 5-year term loan signed in October 2018 drawn in USD and EUR at variable rate, fully repaid on November 2019 bearing an average effective interest rate of 2.59%; Outstanding balances before repayment was $ 1,045 million and € 513 million;
- other sources of financing, including securitization, for an average of € 50 million, bearing an effective interest rate of 3.12%.

- the average gross cash varied from € 1,313 million in 2018 to € 1,441 million in 2019 bearing an average income rate of 1.58% compared to 0.80% in 2018.

Non-operational financial costs amounted to € 144 million compared to € 36 million in 2018 and were mainly composed of:

- variance for € 54 million related to the OEB derivative at fair value driven by the Worldline share price evolution between the issuance in November and December 31, 2019 (as per IFRS 9) while the underlying Worldline shares were accounted for under equity method (as per IAS 28);
- pension related interest (broadly stable compared to € 27 million expense in 2018). The pension financial cost represented the difference between interest costs on pension obligations and interest income on plan assets;
- lease liability interest of € 27 million following IFRS 16;
- net foreign exchange loss (including hedges) of € 4 million versus a net foreign exchange gain (including hedges) of € 4 million in 2018.

B.3.1.4 Corporate tax

The tax charge for 2019 was € 82 million with a profit before tax from continuing operations of € 452 million. The Effective Tax Rate (ETR) was 18.2% compared to 16.2% in 2018 (excluding the recognition of deferred tax assets inherited from Bull acquisition (€ 90 million)). This increase related mostly to the integration in the Group scope of Syntel, which has a higher ETR than average. This effect was similar to the effect that Worldline used to have on Group ETR when it was consolidated as part of the continuing operations. Therefore, the Group ETR remained stable compared to the situation before Worldline deconsolidation and Syntel acquisition.

B.3.1.5 Non-controlling interests

Due to the loss of control of Worldline, non-controlling interests are not significant for the Group anymore amounting € 3 million in continuing operations compared to € 4 million last year.

B.3.1.6 Share of net profit/(loss) of associates

Associates accounted for under equity method amounted to € 47 million in 2019 coming mainly from the contribution of Worldline since May 1, 2019.

B.3.1.7 Normalized net income

The normalized net income attributable to owners of the parent is defined as net income attributable to owners of the parent excluding unusual, abnormal, and infrequent items (attributable to owners of the parent) net of tax based on effective tax rate by country. In 2019, the normalized net income attributable to owners of the parent was € 834 million, representing 7.2% of Group revenue for the period.

(in € million)	12 months ended December 31,2019	12 months ended December 31,2018 *
Net income from continuing operations - Attributable to owners of the parent	**414**	**560**
Other operating income and expenses net of tax from continuing operations	-380	-243
Change loss on derivative instrument net of tax	-40	-
Normalized net income from continuing operations - Attributable to owners of the parent	**834**	**803**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

B.3.1.8 Earnings per share

(In €million and shares)	12 months ended December 31, 2019	% Margin	12 months ended December 31, 2018*	% Margin
Continuing operations				
Net income from continuing operations – Attributable to owners of the parent [a]	**414**	**3.6%**	**560**	**5.3%**
Impact of dilutive instruments	-		-	
Net income from continuing operations restated of dilutive instruments - Attributable to owners of the parent [b]	**414**	**3.6%**	**560**	**5.3%**
Normalized net income from continuing operations – Attributable to owners of the parent [c]	**834**	**7.2%**	**803**	**7.5%**
Impact of dilutive instruments	-		-	
Normalized net income from continuing operations restated of dilutive instruments - Attributable to owners of the parent [d]	**834**	**7.2%**	**803**	**7.5%**
Average number of shares [e]	107,669,930		106,012,480	
Impact of dilutive instruments	4,659		15,254	
Diluted average number of shares [f]	107,674,589		106,027,734	
(In €)				
Basic EPS from continuing operations [a] / [e]	**3.84**		**5.28**	
Diluted EPS from continuing operations [b] / [f]	**3.84**		**5.28**	
Normalized basic EPS from continuing operations [c] / [e]	**7.74**		**7.57**	
Normalized diluted EPS from continuing operations [d] / [f]	**7.74**		**7.57**	
Discontinued operation				
Net income from discontinued operation – Attributable to owners of the parent [a]	**2,986**	**25.8%**	**70**	**0.7%**
Impact of dilutive instruments	-		-	
Net income from discontinued operation restated of dilutive instruments - Attributable to owners of the parent [b]	**2,986**	**25.8%**	**70**	**0.7%**
Average number of shares [e]	107,669,930		106,012,480	
Impact of dilutive instruments	4,659		15,254	
Diluted average number of shares [f]	107,674,589		106,027,734	
(In €)				
Basic EPS from discontinued operation [a] / [e]	**27.74**		**0.67**	
Diluted EPS from discontinued operation [b] / [f]	**27.73**		**0.67**	

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

Potential dilutive instruments comprised vested stock options (equivalent to 4,659 options).

B.3.2 Cash Flow

Free cash flow representing the change in net cash or net debt, excluding net acquisitions/disposals, equity changes, and dividends paid to shareholders, reached € 642 million (includes € 37 million of one-off items related to the OEB) versus € 451 million achieved in 2018.

(in €million)	**12 months ended December 31, 2019**	**12 months ended December 31, 2018***
Operating Margin before Depreciation and Amortization (OMDA)	**1,802**	**1,210**
Capital expenditures	-324	-371
Lease payments	-345	-
Change in working capital requirement	-130	-95
Cash from operation (CFO)	**1,004**	**744**
Tax paid	-99	-80
Net cost of financial debt paid	-64	-30
Reorganization in other operating income	-92	-84
Rationalization & associated costs in other operating income	-40	-22
Integration and acquisition costs	-40	-40
Other changes**	-25	-37
Free Cash Flow (FCF)	**642**	**451**
Net (acquisitions) / disposals	625	-3,138
Capital increase / (decrease)	18	13
Share buy-back	-113	-57
Dividends paid	-58	-72
Change in net cash/(debt)	**1,114**	**-2,803**
Opening net cash/(debt)	**-2,872**	**307**
Net debt from (used in) discontinued operation	35	-309
Opening net cash/(debt) restated	**-2,837**	**-2**
Change in net cash/(debt)	1,115	-2,803
Foreign exchange rate fluctuation on net cash/(debt)	-14	-32
Closing net cash/(debt)	**-1,736**	**-2,837**

** Net debt from items relating to Worldline for 2018 have been reclassified to "Net debt from (used in) discontinued operation", in accordance with IFRS 5.*
*** "Other changes" include other operating income with cash impact (excluding reorganization, rationalization and associated costs, integration and acquisition costs) and other financial items with cash impact, net long term financial investments excluding acquisitions and disposals, and profit sharing amounts payable transferred to debt.*

Cash from Operations (CFO) amounted to € 1,004 million, up significantly from the prior year. This resulted from the change of the thee following components:

- OMDA net of lease (€ +248 million);
- Capital expenditures (€ +47million);
- Change in working capital requirement (€ -35 million).

OMDA of € 1,802 million represented 15.5% of revenue, compared to 11.4% of restated revenue of last year:

(in €million)	**12 months ended December 31, 2019**	**12 months ended December 31, 2018***
Operating margin	**1,190**	**967**
+ Depreciation of fixed assets	334	336
+ Depreciation of right of use	336	-
+ Net book value of assets sold/written off	24	30
+/- Net charge/(release) of pension provisions	-60	-73
+/- Net charge/(release) of provisions	-23	-51
OMDA	**1,802**	**1,210**

** OMDA items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

Capital expenditures amounted to € 324 million or 2.8% of the revenue compared to 3.5% of the revenue 2018, reflecting the evolving business mix of the Group with a significant increase of the B&PS part as a result of Syntel integration, and the increasing of use of cloud compared to classic infrastructure.

The **change in working capital requirement** increased by € -35 million. The DSO ratio reached 47 days compared to 46 days at the end of December 2018 excluding Worldline. The level of trade receivables sold with no recourse to banks with transfer of risks as defined by IFRS 9 remain at the same level than the end of December 31, 2018.

Cash out related to **tax paid** reached € 99 million, up from the prior year, mainly due to Syntel scope.

The **cost of net debt** increased by € 34 million (reaching € 64 million compared to € 30 million in 2018) mainly explained by the financing structure due to Syntel acquisition. This impact was partially reduced thanks to the average rate of 1.58% on the average gross cash compared to 0.80% in 2018.

Reorganization, rationalization and associated costs, and integration and acquisition costs reached € 173 million compared to € 146 million in 2018. The Group objective for the full year was reached at 1% of revenue plus Syntel costs synergies implementation and German transformation plan.

Other changes amounted to € -25 million, compared to € -37 million in 2018. The 2019 figures included positive one-off items of € 37 million related to the issuance of OEB (derivative instrument net of fees). The increase without the positive on-off mainly came from pension and early retirement programs in France and in Germany, break-up fees related to supplier contract terminations as already mentioned in H1, global transformation programs and foreign exchange impacts.

As a result, the **Group Free Cash Flow (FCF)** generated during the year 2019 was € 642 million, included € 37 million of one-off items related to the issuance of OEB.

The net cash impact resulting from **net (acquisitions)/disposals** amounted to € 625 million and originated from mainly the Accelerated Bookbuilding Offering of Worldline shares on the market for € 780 million, reduced by costs of disposal and tax, as well as the costs to distribute and other costs related to the May 2019 distribution. Acquisitions are mainly related to IDnomic and X-Perion.

Capital increase totaled € 18 million in 2019 compared to € 13 million in 2018. This is mainly explained by the Group shareholding program SHARE 2018 for employees which occurred only in the first half of 2019.

Share buy-back reached € 113 million during 2019 compared to € 57 million in 2018. These share buy-back programs are related to managers performance shares delivery and aim at avoiding dilution effect for the shareholders. The increase is due to the fact that Atos had to acquire shares for two plans instead of usually one plan (Free share plan 2016 with 3-year vesting and Free share plan 2015 with 4.5-year vesting)

The Group distributed a **dividend** mostly related to dividend paid to owners of the parent which amounted to € 55 million (€ 1.70 per share) compared to € 68 million in the first half of 2018 (€ 1.70 per share).

Foreign exchange rate fluctuation determined on debt or cash exposure by country represented a decrease in net cash of €-14 million, mainly coming from the exchange rate of British Pound against Euro.

As a result, the **Group net debt position** was € 1,736 million at the end of December 2019, compared to a restated net debt position of € 2,837 million at the end of December 2018.

B.3.3 Financing policy

Atos has implemented a strict financing policy which is reviewed by the Group Audit Committee, with the objective to secure and optimize the Group's liquidity management. Each decision regarding external financing is approved by the Board of Directors. Under this policy, all Group treasury activities, including cash management, short-term investments, hedging and foreign exchange transactions, as well as financial position financing through lease contracts, are centrally managed through the Group Treasury department. Following a cautious short-term financial policy, the Group did not make any short-term cash investment in risky assets.

B.3.3.1 Financing structure

Atos' policy is to fully cover its expected liquidity requirements by long-term committed loans or other appropriate long-term financial instruments. Terms and conditions of these loans include maturity and covenants leaving sufficient flexibility for the Group to finance its operations and expected developments.

On November 14, 2019 Atos has fully repaid the term loans in USD and EUR drew on October 9, 2018 to fund the Syntel acquisition. The outstanding amounts were $ 1,045 million and € 513 million.

On October 30, 2019 Atos has announced the disposal of Worldline share capital (€ 780 million through a private placement by way of Accelerated Book building Offering (ABO)) and the issuance of € 500 million zero coupon bonds exchangeable into Worldline shares with a maturity of 5 years and an exchange premium of 35%. Total gross proceeds for Atos was € 1,280 million for the combined transactions.

On November 5, 2018, Atos announced the successful placement of its € 1.8 billion bond issue. The € 1.8 billion triple tranche bond issue consists of three tranches:

- € 700 million notes with a 3.5-year maturity and 0.75 % coupon
- € 750 million notes with a 6.5-year maturity and 1.75 % coupon
- € 350 million notes with a 10-year maturity and 2.50 % coupon

There are no financial covenants. The rating agency Standard and Poor's has assigned a rating of BBB+ to the three tranches, subsequently to the rating of Atos described here below.

On October 22, 2018, the rating agency Standard and Poor's has assigned a rating of BBB+ to Atos recognizing the strong investment grade profile of the Group.

On October 11, 2018, Atos signed with a number of major financial institutions a five-year € 2.4 billion revolving credit facility (the Facility) maturing in November 2023 with an option for Atos to request the extension until November 2025 in two times. Atos has exercised the option on 2019 to extend the maturity of the Facility until November 2024. Atos still keeps the option to extend the maturity of the Facility for another one year. The Facility is available for general corporate purposes and replaces the existing € 1.8 billion facility signed in November 2014. The Facility includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5 times.

On October 9, 2018, Atos drew a bridge loan of $ 1.9 billion for the acquisition of Syntel. The bridge loan was fully reimbursed on November 9, 2018.

On October 9, 2018, Atos drew a term loan of $ 1.9 billion for the acquisition of Syntel. The term loan was composed of a 3-year $ 1.1 billion loan and a 5-year $ 0.8 billion loan. The term loan issuance by currency was $ 0.6 billion equivalent euros and $ 1.3 billion in USD. On December 14, 2018, Atos reimbursed $ 200 million out of the loan drawn in USD.

The $ 1.9 billion term loan includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5 times.

On May 4, 2018 Atos implemented a Negotiable European Medium-Term Note program (NEU MTN) in order to optimize financial expenses and improve Group liquidity management, for an initial maximum amount of € 600 million.

On June 2, 2017, Atos implemented a Negotiable European Commercial Paper program (NEU CP) in order to optimize financial expenses and improve Group liquidity management, for an initial maximum amount of € 900 million raised to € 1.8 billion in October 2018. On December 10, 2019 the maximum amount of € 1.8 billion was increased to € 2.4 billion.

On September 29, 2016, Atos issued a Euro private placement bond of € 300 million with a seven-year maturity and with a 1.444% fixed interest rate (unrated). There are no financial covenants.

On July 2, 2015 Atos issued a bond of € 600 million with a five-year maturity. The coupon rate is 2.375% (unrated). There are no financial covenants.

Atos securitization program of trade receivables has been renewed for 5 years on May 29, 2018 with a maximum amount of receivables sold of € 500 million and a maximum amount of financing reduced from € 200 million to € 100 million. The program has been restricted to two French participant entities.

The program is still structured with two compartments, called ON and OFF:

- compartment "ON" is similar to the previous program (i.e. the receivables are maintained in the Group statement of financial position) which remains by default the compartment in which the receivables are sold. This compartment was used at its lowest level;
- compartment "OFF" is designed so the credit risk (insolvency and overdue) of the debtors eligible to this compartment of the program is fully transferred to the purchasing entity of a third-party financial institution.

As of December 31, 2019, the Group has sold:

- in the compartment "ON" € 108 million receivables for which € 10 million were received in cash. The sale is with recourse, thus re-consolidated in the statement of financial position;
- in the compartment "OFF" € 37 million receivables which qualify for de-recognition as substantially all risks and rewards associated with the receivables were transferred.

The Atos securitization program includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5.

B.3.3.2 Bank covenants

The Group was well within its borrowing covenant (leverage ratio) applicable to the multi-currency revolving credit facility and the securitization program, with a leverage ratio (net debt divided by OMDA) of 1.19 at the end of December 2019.

According to the credit documentation of the multi-currency revolving credit facility and the securitization program, the leverage ratio is calculated excluding IFRS 16 impacts, at the end of December 31, 2019.

The leverage ratio must not be greater than 2.5 times under the terms of the multi-currency revolving credit facility and the securitization program.

B.3.3.3 Investment policy

Atos has a policy to lease its office space and data processing centers. Some fixed assets such as IT equipment and company cars may be financed through leases. The Group Treasury department evaluates and approves the type of financing for each new investment.

B.3.3.4 Hedging policy

Atos' objective is also to protect the Group against fluctuations in interest rates by swapping to fixed rate a portion of the existing floating-rate financial debt. Authorized derivative instruments used to hedge the debt are swap contracts, entered into with leading financial institutions and centrally managed by the Group Treasury department. The Group has entered into interest rate swaps in 2018.

B.4 Consolidated financial statements

B.4.1 Consolidated income statement

(in €million)	Notes	12 months ended December 31, 2019	12 months ended December 31, 2018*
Revenue	**Note 3.1**	**11,588**	**10,648**
Personnel expenses	Note 4.1	-5,277	-4,862
Operating expenses	Note 4.2	-5,121	-4,819
Operating margin		**1,190**	**967**
% of revenue		**10.3%**	**9.1%**
Other operating income and expenses	Note 5	-530	-337
Operating income		**660**	**630**
% of revenue		**5.7%**	**5.9%**
Net cost of financial debt		-64	-30
Other financial expenses		-162	-75
Other financial income		18	38
Net financial income	Note 6.1	-208	-67
Net income before tax		**452**	**564**
Tax charge	Note 7	-82	-1
Share of net profit/(loss) of associates	Note 10	47	2
Continuing operations			
Net income from continuing operations		**417**	**564**
Of which:			
- attributable to owners of the parent		414	560
- non-controlling interests		3	4
Discontinued operation			
Net income from discontinued operation		**3,075**	**139**
Of which:			
- attributable to owners of the parent		2,986	70
- non-controlling interests		89	69
Total Group			
Net income of consolidated companies		**3,491**	**703**
Of which:			
- attributable to owners of the parent		3,399	630
- non-controlling interests		92	73

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

(In €million and shares)	Notes	12 months ended December 31, 2019	12 months ended December 31, 2018*
Net income from continuing operations - Attributable to owners of the parent	**Note 14**	**414**	**560**
Weighted average number of shares		107,669,930	106,012,480
Basic earnings per share from continuing operations		**3.84**	**5.28**
Diluted weighted average number of shares		107,674,589	106,027,734
Diluted earnings per share from continuing operations		**3.84**	**5.28**
Net income from discontinued operation - Attributable to owners of the parent	**Note 14**	**2,986**	**70**
Weighted average number of shares		107,669,930	106,012,480
Basic earnings per share from discontinued operation		**27.74**	**0.67**
Diluted weighted average number of shares		107,674,589	106,027,734
Diluted earnings per share from discontinued operation		**27.73**	**0.67**
Net income of consolidated companies - Attributable to owners of the parent	**Note 14**	**3,399**	**630**
Weighted average number of shares		107,669,930	106,012,480
Basic earnings per share of consolidated companies		**31.56**	**5.95**
Diluted weighted average number of shares		107,674,589	106,027,734
Diluted earnings per share of consolidated companies		**31.56**	**5.95**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

B.4.2 Consolidated statement of comprehensive income

(in €million)	12 months ended December 31, 2019	12 months ended December 31, 2018
Net income of consolidated companies	**3,491**	**703**
Other comprehensive income		
- to be reclassified subsequently to profit or loss (recyclable):	**132**	**-4**
Cash flow hedging	-3	4
Exchange differences on translation of foreign operations	134	-12
Deferred tax on items recyclable recognized directly on equity	1	4
- not reclassified to profit or loss (non-recyclable):	**-98**	**-28**
Actuarial gains and losses generated in the period on defined benefit plan	-134	-39
Deferred tax on items non-recyclable recognized directly in equity	37	11
Total other comprehensive income	**34**	**-32**
Total comprehensive income for the period	**3,525**	**671**
Of which:		
- attributable to owners of the parent	3,433	609
- non-controlling interests	92	62

B.4.3 Consolidated statement of financial position

(in € million)	Notes	December 31, 2019	December 31, 2018
ASSETS			
Goodwill	Note 8.1	6,037	8,863
Intangible assets	Note 8.2	1,675	2,813
Tangible assets	Note 8.3	552	725
Right-of-use	Note 9	1,084	-
Investments in associates accounted for under the equity method	Note 10	1,727	7
Non-current financial assets	Note 6.3	351	321
Deferred tax assets	Note 7.4	325	459
Total non-current assets		**11,751**	**13,188**
Trade accounts and notes receivable	Note 3.2	2,858	2,965
Current taxes		53	74
Other current assets	Note 4.4	1,568	2,791
Current financial instruments	Note 13	7	12
Cash and cash equivalents	Note 6.2	2,413	2,546
Total current assets		**6,898**	**8,388**
TOTAL ASSETS		**18,649**	**21,576**

(in € million)	Notes	December 31, 2019	December 31, 2018
LIABILITIES AND SHAREHOLDERS' EQUITY			
Common stock		109	107
Additional paid-in capital		1,441	2,862
Consolidated retained earnings		2,278	2,760
Translation adjustments		-152	-285
Net income of consolidated companies attributable to the owners of the parent	Note 14.1	3,399	630
Equity attributable to the owners of the parent	Note 14.2	7,075	6,074
Non-controlling interests	Note 14.3	12	2,027
Total shareholders' equity		**7,087**	**8,101**
Provisions for pensions and similar benefits	Note 11	1,252	1,385
Non-current provisions	Note 12	69	101
Borrowings	Note 6.4	2,651	4,381
Derivative liabilities	Note 6.4	107	-
Deferred tax liabilities	Note 7.4	238	421
Non-current financial instruments	Note 13	2	-
Non current lease liabilities	Note 9	927	-
Other non-current liabilities		3	5
Total non-current liabilities		**5,249**	**6,295**
Trade accounts and notes payables	Note 4.3	2,278	2,462
Current taxes		182	132
Current provisions	Note 12	119	146
Current financial instruments	Note 13	1	2
Current portion of borrowings	Note 6.4	1,498	1,037
Current lease liabilities	Note 9	346	-
Other current liabilities	Note 4.5	1,888	3,400
Total current liabilities		**6,313**	**7,180**
TOTAL LIABILITIES AND SHAREHOLDER'S EQUITY		**18,649**	**21,576**

B.4.4 Consolidated cash flow statement

(in €million)	Notes	12 months ended December 31, 2019	12 months ended December 31, 2018*
Profit before tax from continuing operations		**452**	**564**
Depreciation of assets	Note 4.2	334	336
Depreciation of right-of-use	Note 4.2	336	-
Net charge / (release) to operating provisions		-82	-123
Net charge / (release) to financial provisions		31	17
Net charge / (release) to other operating provisions		19	12
Amortization of intangible assets (PPA from acquisitions)	Note 5	157	107
Losses / (gains) on disposals of fixed assets		76	-3
Net charge for equity-based compensation		67	36
Unrealized losses / (gains) on changes in fair value and other	Note 6.1	107	-3
Net cost of financial debt	Note 6.1	64	30
Interest on lease liability	Note 6.1	27	-
Cash from operating activities before change in working capital requirement, financial interest and taxes		**1,588**	**972**
Tax paid		-99	-80
Change in working capital requirement		-130	-95
Net cash from / (used in) operating activities		**1,360**	**797**
Payment for tangible and intangible assets		-324	-371
Proceeds from disposals of tangible and intangible assets		15	33
Net operating investments		**-309**	**-338**
Amounts paid for acquisitions and long-term investments		-54	-2,972
Cash and cash equivalents of companies purchased during the period		5	-179
Proceeds from disposals of financial investments		670	11
Cash and cash equivalents of companies sold during the period		-1	-
Dividend received from entities consolidated by equity method		-	1
Net long-term investments		**619**	**-3,139**
Net cash from / (used in) investing activities		**310**	**-3,477**
Capital Increase		14	-
Common stock issues on the exercise of equity-based compensation		4	13
Purchase and sale of treasury stock		-113	-57
Dividends paid		-55	-68
Dividends paid to non-controlling interests		-3	-4
Lease payments		-345	-
New borrowings	Note 6.5	591	3,555
Finance lease		-	1
Repayment of current and non-current borrowings	Note 6.5	-1,657	-271
Net cost of financial debt paid		-64	-30
Other flows related to financing activities		4	-
Net cash from / (used in) financing activities		**-1,624**	**3,138**
Increase / (decrease) in net cash and cash equivalents		**46**	**458**
Opening net cash and cash equivalents		**2,378**	**2,182**
Net cash from (used in) discontinued operation		-95	-334
Increase / (decrease) in net cash and cash equivalents	Note 6.5	46	458
Impact of exchange rate fluctuations on cash and cash equivalents		5	-24
Closing net cash and cash equivalents	Note 6.5	**2,334**	**2,282**

** Net cash and cash equivalent flows relating to Worldline for 2018 have been reclassified to "Net cash from (used in) discontinued operation", in accordance with IFRS 5.*

B.4.5 Consolidated statement of changes in shareholders' equity

(in € million)	Number of shares at period-end *(thousands)*	Common Stock	Additional paid-in capital	Consolidated retained earnings	Translation adjustments	Items recognized directly in equity	Net income	Total	Non controlling interests	Total shareholders' equity
At December 31, 2017 restated	**105,444**	**105**	**2,740**	**1,490**	**-282**	**8**	**601**	**4,662**	**564**	**5,226**
▪ Common stock issued	1,442	2	122					123	5	128
▪ Appropriation of prior period net income	-	-	-	601	-	-	-601	-	-	-
▪ Dividends paid				-179				-179	-11	-190
▪ Equity-based compensation				53				53	4	57
▪ Changes in treasury stock				-84				-84	-13	-97
▪ Dilution impact				891				891	1,417	2,308
▪ Acquisition of Non controlling interest without a change in control				1				1	-1	-
▪ Other				-2			-	2	0	-2
Transactions with owners	**1,442**	**2**	**122**	**1,281**	**-**	**-**	**-601**	**803**	**1,400**	**2,204**
▪ Net income							630	630	73	703
▪ Other comprehensive income				-22	-3	3		-22	-11	-32
Total comprehensive income for the period				**-22**	**-3**	**3**	**630**	**609**	**62**	**671**
At December 31, 2018	**106,886**	**107**	**2,862**	**2,748**	**-285**	**11**	**630**	**6,074**	**2,027**	**8,101**
▪ Adjustment on initial application of IFRS 16, net of tax	-	-	-	-	-	-	-	-	-	-
At December 31, 2018, adjusted	**106,886**	**107**	**2,862**	**2,748**	**-285**	**11**	**630**	**6,074**	**2,027**	**8,101**
▪ Common stock issued	2,329	2	140					142		142
▪ Appropriation of prior period net income				630			-630	-0		-0
▪ Dividends paid				-182				-182	-3	-185
▪ Distribution in kind of Worldline shares			-1,561	-783				-2,344		-2,344
▪ Equity-based compensation				67				67		67
▪ Changes in treasury stock				-113				-113		-113
▪ Non controlling interests Worldline								-	-2,107	-2,107
▪ Other					-1			-1	3	2
Transactions with owners	**2,329**	**2**	**-1,421**	**-381**	**-1**	**-**	**-630**	**-2,431**	**-2,107**	**-4,538**
▪ Net income of consolidated companies							3,399	3,399	92	3,491
▪ Other comprehensive income				-98	134	-2		34		34
Total comprehensive income for the period				**-98**	**134**	**-2**	**3,399**	**3,433**	**92**	**3,525**
At December 31, 2019	**109,215**	**109**	**1,441**	**2,269**	**-152**	**9**	**3,399**	**7,075**	**12**	**7,087**

B.4.6 Notes to the consolidated financial statements

B.4.6.1 General information

Atos SE, the Group's parent company, is a société européenne (public limited company) incorporated under French law, whose registered office is located at 80, Quai Voltaire, 95870 Bezons, France. It is registered with the Registry of Commerce and Companies of Pontoise under the reference 323623603. Atos SE shares are traded on the NYSE Euronext Paris market under ISIN code FR0000051732. The shares are not listed on any other stock exchange. The Company is administrated by a Board of Directors.

The consolidated financial statements of the Group for the twelve months ended December 31, 2019 comprise the Group and its subsidiaries (together referred to as the "Group") and the Group's interests in associates and jointly controlled entities.

These consolidated financial statements were approved by the Board of Directors on February 18, 2020. The consolidated financial statements will be submitted to the approval of the General Meeting of Shareholders scheduled to take place on May 14, 2020.

B.4.6.2 Basis of preparation and significant accounting policies

Basis of preparation

Pursuant to European Regulation No. 1606/2002 of July 19, 2002, the consolidated financial statements for the twelve months ended December 31, 2019 have been prepared in accordance with the applicable international accounting standards, as endorsed by the European Union as at December 31, 2019. The international standards comprise the International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB), the International Accounting Standards (IAS), the interpretations of the Standing Interpretations Committee (SIC) and the International Financial Reporting Interpretations Committee (IFRIC). Accounting policies applied by the Group comply with those standards and interpretations.

As of December 31, 2019, the accounting standards and interpretations endorsed by the European Union are similar to the compulsory standards and interpretations published by the International Accounting Standards Board (IASB). Consequently, the Group's consolidated financial statements are prepared in accordance with the IFRS standards and interpretations, as published by the IASB.

Except for the impacts of IFRS 16 first time application separately disclosed, the other new standards, interpretations or amendments whose application was mandatory for the Group effective for the fiscal year beginning January 1, 2019 had no material impact on the consolidated financial statements:

- IFRIC 23 – Uncertainty over Income Tax Treatments.
- Amendments to IFRS 9 - Prepayment Features with Negative Compensation.
- Amendments to IAS 28 – Long Term Interests in Associates and Joint Ventures.
- Amendments to IAS 19 – Plan Amendment – Curtailment and Settlement.
- Annual Improvements to IFRS Standards 2015–2017 Cycle – various standards.

Other standards

The Group does not apply IFRS standards and interpretations that have not been yet approved by the European Union at the closing date. New standards are effective for annual periods beginning after January 1, 2020 and an earlier application is permitted. The Group has not early applied those amended standards in preparing these consolidated statements. The Group does not anticipate any significant impact from the implementation of those new standards:

- Amendments to IFRS 3 – Definition of a business.
- Amendments to IAS 1 and IAS 8 - Definition of Material.
- Amendments to References to Conceptual Framework in IFRS Standards.
- IFRS 17 - Insurance Contracts.

The Group will continue to apply the amendments to IFRS 9/IAS 39, both in terms of timing and the amounts of the underlying cash flows to which it is exposed, until there is more clarity relating to the reform to benchmark interest rates ("IBOR reform"). The Group believes that the situation will be unclear for as long as (i) the existing contracts that refer to these rates are not amended to specify the date on which the benchmark rate will be replaced, and (ii) the impacts related to the use of the new benchmark interest rate and ensuing adjustments to lending margins have not been determined. How the situation evolves will partly depend on the replacement clauses that will need to be added to the contracts concerned and negotiations with lenders and bondholders.

Changes in accounting policies – IFRS 16, *Leases*, first application

IFRS 16, *Leases*, introduces a single on-balance sheet lease accounting model for lessees requiring them to recognize a right-of-use asset representing its right to use the underlying asset and a lease liability representing its obligation to make future lease payments.

IFRS 16, *Leases*, replaces existing IAS 17, Leases, IFRIC 4, *Determining whether an Arrangement contains a Lease*, SIC 15, *Operating Leases-Incentives* and SIC-27, *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*.

The Group applied IFRS 16 as of January 1, 2019 using the modified retrospective approach under which the comparative period is not restated. Instead, the cumulative impact of the application of the new standard is recognized in retained earnings at the transition date. Impact on equity is nil as of January 1, 2019.

Atos as a lessee

At transition date, the Group applied the practical expedient to grandfather the definition of a lease. This means that as at January 1, 2019, the Group applied IFRS 16 to all alive contracts entered before this date and identified as leases in accordance with IAS 17 and IFRIC 4. For contracts entered into after January 1, 2019, the Group assesses whether a contract is or contains a lease based on the new definition of a lease. Under IFRS 16, a contract is, or contains, a lease if the contract conveys a right to control the use of an identified asset for a period in exchange for consideration.

The Group also applies exemptions allowed by IFRS 16.5 to not recognize short term leases (less than 12 months) and leases for which the underlying asset is of a low value. Payments under such contracts are registered in the income statement, on a straight-line basis, over the term of the contract. Future commitments to pay rents are presented as off-balance-sheet commitments.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using a Group's incremental borrowing rate. Those rates have been determined for all currencies of the Group by geographies and by maturity. The incremental borrowing rates are calculated by taking for each currency a reference market index quotation and adding up a spread corresponding to the cost of financing that would be applied by a lender to any subsidiary of Atos Group.

The lease liability is subsequently increased by the interest cost on the lease liability and decreased by lease payments made. It is remeasured when there is a change in the future lease payments arising from a change in an index or rate, a change in estimate of the amount expected to be payable under a residual value guarantee, or changes in the assessment of whether an extension option is reasonably certain to be exercised or a termination option is reasonably certain to be exercised resulting from a decision of the Group.

The Group has applied judgment to determine the lease term for some Real Estate lease contracts in which it is a lessee and that include renewal or early termination options analyzing whether those sites, mainly offices and data centers, were strategic or not. In most cases, the Group retained the earliest date when the Group can go out from its lease commitment without paying or supporting any significant penalty except for French 3/6/9 specific leases where the 9th year has systematically been defined as lease term.

The Group is currently studying latest decisions issued by IFRIC around the definition of the enforceable contractual period of a lease and does not anticipate any major impact of those decisions.

Atos as a lessor

For leases in which Atos is acting as a lessor, IFRS 16 does not trigger any change on the existing accounting treatment under previous standards and interpretations. As part of Infrastructure & Data Management and Big Data & Cybersecurity businesses, the Group may, in some circumstances, provide IT equipments to its customers through a manufacturer or dealer-lessor model. When those leases qualify as finance leases, the revenue corresponding to the sale of the asset is recognized and the corresponding asset is presented as a contract asset. The same accouting treatment used to be applied under IFRIC 4.

Impacts on financial statements

The Group elected to present the lease liability and the right-of-use the assets on dedicated lines of the Statement of financial position. Amortization of the right-of-use is part of the operating margin, interest costs are part of the financial result of the Group. The impact of IFRS 16 implementation on Operating Margin and Group net result is not material as of December 31, 2019. The Group elected to exclude the lease liabilities from the Group net debt definition. Therefore, Free Cash Flow as per Group definition remains comparable with prior years.

The Group elected to account the net deferred taxes resulting from IFRS 16 standard application. At transition date assets and liabilities resulting from IFRS 16 have the same value, therefore no temporary differences are recognized.

Excluding Worldline which is presented as held for distribution as of January 1, 2019, IFRS 16 led to the recognition of an opening lease liability for € 1,202 million. This liability relates mainly to Real Estate, IT equipment's and company cars. Reconciliation of operating lease commitments as of December 31, 2018 and opening lease liability as of January 1, 2019 is as follows:

(In € million)

Operating lease commitment at December 31, 2018 as disclosed in the Group's consolidated financial statements	**1,559**
Worldline held for distribution	-210
Short-term and low value assets leases (IFRS 16 exceptions)	-10
Discounting effect	-144
Finance lease liabilities recognised as at December 31, 2018	12
Other impacts	-5
Lease liabilities recognised at January 1, 2019	**1,202**

The impacts of the first application of IFRS 16 on the opening statement of financial position are the following, excluding Worldline which is presented as held for distribution as of January 1, 2019:

- the accounting of the right-of-use assets for an amount of € 1,206 million, non-current lease liabilities for € 877 million and current lease liabilities for € 325 million (those amounts are considered as net of prepaid leases); the previous amounts include the reclassification of recognized tangible assets and financial debt related to existing finance leases as of December 31, 2018 for an amount of € 12 million to right-of-use and lease liability;
- the reclassification of lease incentive benefits from current and non-current liabilities to reduction of the right-of-use assets for € 23 million; this amount reduces the amount of right-of-use assets indicated hereabove;
- the reclassification of onerous lease provision from non-current liabilities to reduction of the right-of-use assets for an amount of € 7 million; this amount reduces the amount of right-of-use assets indicated hereabove.

Accounting estimates and judgments

The preparation of consolidated financial statements requires management to make judgments, estimates and assumptions that affect the reported amounts of assets and liabilities, income and expense in the financial statements and disclosures of contingent assets and liabilities at the closing date. The estimates, assumptions and judgments that may result in a significant adjustment to the carrying amounts of assets and liabilities are essentially related to:

- Revenue recognition: Estimates of percentage of completion, potential loss to go (Note 3 – Revenue, trade receivables, contract assets and contract costs);
- Acquisition of subsidiaries: Fair value of the consideration transferred (including contingent consideration) and fair value of the assets acquired, and liabilities assumed (Note 1 – Changes in the scope of consolidation)
- Impairment test of intangible assets and Goodwill: key assumptions underlying recoverable amounts (Note 8 – Goodwill & fixed assets);
- Recognition and measurement of deferred tax assets: availability of future taxable profits against which deductible temporary differences and tax losses carried forward can be utilized (Note 7 – Income tax)
- Recognition and measurement of provisions and contingencies: key assumptions about the likelihood and magnitude of outflow of ressources with no counterparty (Note 12 – Provisions)

- Measurement of Defined Benefit Obligations: Key actuarial assumptions (Note 11 - Pensions plans and other long-term benefits).
- Lease liabilities and right-of-use: estimates of the enforceable contractual period of a lease and incremental borrowing rate used (Note 9 – Leases).

Consolidation methods

Subsidiaries are entities controlled directly or indirectly by the Group. Control is defined by the ability to govern the financial and operating policies generally, but not systematically, combined with a shareholding of more than 50 percent of the voting rights. The existence and effect of potential voting rights that are currently exercisable or convertible, the power to appoint the majority of the members of the governing bodies and the existence of veto rights are considered when assessing whether the Group controls another entity. Subsidiaries are fully consolidated from the date on which control is transferred to the Group. They are de-consolidated from the date on which control ceases.

Jointly controlled companies are accounted for under the equity method when they are classified as joint ventures and consolidated based on the percentage share specific to each statement of financial position and income statement item when they are classified as joint operations. Associates over which the Group has significant influence are accounted under equity method.

Financial assets classification and business model

IFRS 9 defines three approaches to classify and measure financial assets based on their initial recognition.

- Amortized cost;
- Fair value though other components of comprehensive income;
- Fair value through income statement.

Financial assets are classified according to these three categories by reference to the business model the Group uses to manage them, and the contractual cash flows they generate.

Loans, receivables and other debt instruments considered "basic lending arrangements" as defined by IFRS 9 (contractual cash flows that are solely payments of principal and interest) are carried at amortized cost when they are managed with the purpose of collecting contractual cash flows, or at fair value through other components of comprehensive income when they are managed with the purpose of collecting contractual cash flows and selling the asset, while debt instruments that are not "basic lending arrangements" or do not correspond to these business models are carried at fair value through income statement. Equity instruments are carried at fair value through income statement or, under an irrevocable option, at fair value through Other components of comprehensive income.

The business model of the Group is to collect its contractual cash flows for its trade receivables.

Trade receivables can be transferred to third parties (banks) with conditions of the transfers meeting IFRS 9 requirements, meaning transfer of contractual cash flows and transfer of substantially all risks and rewards are achieved. Those trade receivables are in that case derecognized, further to the analysis of the actual transfer of risks, the non-materiality of any dilution risk based on experience, and the absence of continuing involvement.

Presentation rules

Current and non-current assets and liabilities

Assets and liabilities classified as current are expected to be realized, used or settled during the normal cycle of operations. All other assets and liabilities are classified as non-current. Current assets and liabilities, excluding the current portion of borrowings, financial receivables and provisions represent the Group's working capital requirement.

Assets and liabilities held for sale/distribution and discontinued operations

Assets and liabilities held for sale/distribution or part of discontinued operations are presented on separate lines in the Group's consolidated statement of financial position, without restatements for previous periods. They are measured at the lower of their carrying amount and fair value less costs to sell/distribute. Non-current assets and liabilities are classified as held for sale if their carrying amount will be recovered principally through a sale transaction rather than through continuing use. This condition is regarded as met only when the sale is highly probable, and the assets and liabilities are available for immediate sale in their present condition at the reporting date.

When these assets and liabilities represent either a complete business line or a business unit, the profit or loss from these activities are presented on a separate line of the income statement and is restated in the cash flow statement and the income statement.

Translation of financial statements denominated in foreign currencies

Statements of Financial Positions of companies based outside the euro zone are translated at closing exchange rates. Income statement items are translated based on average exchange rates for the period. Statement of Financial Position and income statement translation adjustments arising from a change in exchange rates are recognized as a separate component of equity under "Translation adjustments".

Goodwill and fair value adjustments arising on the acquisition of a foreign entity have been treated as assets and liabilities of that foreign entity and translated into euro at the closing date.

The Group does not consolidate any entity operating in a hyperinflationary economy except Argentina. Argentina is a hyperinflationary economy since July 1, 2018. As such, all Profit & Loss items from Argentinian entities have been restated from inflation in accordance with IAS 29.

Translation of transactions denominated in foreign currencies

Foreign currency transactions are translated into the functional currency using the exchange rate prevailing at the dates of the transactions. Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year-end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognized in the income statement under the heading "Other financial income and expenses", except where hedging accounting is applied as explained in the paragraph "Financial assets – Derivative financial instruments".

B.4.6.3 Alternative Performance Measures

Operating margin

Operating margin equals to External Revenues less personnel and operating expenses. It is calculated before Other Operating Income and Expenses as defined below.

Other Operating Income and Expenses

Other operating income and expenses include:

- The amortization and impairment of intangible assets recognized as part of business combinations such as customer relationships, technologies and Goodwill;
- When accounting for business combinations, the Group may record provisions in the opening statement of financial position for a period of 12 months beyond the business combination date. After the 12-month period, unused provisions arising from changes in circumstances are released through the income statement under "Other operating income and expenses";
- The cost of acquiring and integrating newly controlled and consolidated entities, including earn out expenses;
- The net gain or losses on disposals of consolidated companies or businesses;
- The fair value of shares granted to employees including social contributions;
- The restructuring and rationalization expenses relating to business combinations or qualified as unusual, infrequent and abnormal. When a restructuring plan qualifies for Other Operating Income and Expenses, the related real estate rationalization & associated costs regarding premises are presented on the same line;
- The curtailment effects on restructuring costs and the effects of plan amendments on Defined Benefit Obligation resulting from triggering events that are not under control of Atos management;
- The net gain or loss on tangible and intangible assets that are not part of Atos core-business such as Real Estate;
- Other unusual, abnormal and infrequent income or expenses such as major disputes or litigation.

Normalized net income

The normalized net income is the net income (Group Share – excluding net result attributable to Non-Controlling Interests) before Other Operating Income and Expenses and changes in derivative liabilities, net of taxes.

Normalized earnings per share

Normalized earnings per share are calculated by dividing the normalized net income (Group share) by the weighted-average number of common shares outstanding during the period, excluding treasury shares.

Net debt

The net debt comprises total borrowings (bonds, short term and long-term loans, securitization and other borrowings), short-term financial assets and liabilities bearing interest with maturity of less than 12 months, less net cash and cash equivalents. Lease liabilities and derivative liabilities are excluded from the net debt.

Free Cash Flow

The Free Cash Flow represents the change in net cash or net debt, excluding equity changes, share buyback, dividends paid to shareholders and non-controlling interests, net acquisition or disposal of companies or businesses.

B.4.6.4 Financial risk management

The Group's activities expose it to a variety of financial risks including liquidity risk, interest rate risk, credit risk and currency risk. Financial risk management is carried out by the Group Treasury department and involves minimizing potential adverse effects on the Group's financial performance.

Liquidity risk

Liquidity risk management involves maintaining sufficient cash and marketable securities and the availability of funding through an adequate amount of committed credit facilities.

Atos' policy is to cover in full its expected liquidity requirements by long-term committed loans or other appropriate long-term financial instruments. Terms and conditions of these loans include maturity and covenants leaving sufficient flexibility for the Group to finance its operations and expected developments.

Credit facilities are subject to financial covenants that are carefully followed by the Group Treasury department.

An analysis of the maturity of financial liabilities is disclosed in Note 6.4.

Interest rate risk

Interest rate risk arises mainly on borrowings. The management of exposure to interest rate risk encompasses two types:

- a price risk on fixed-rate financial assets and liabilities. For example, by contracting a fixed-rate liability, the Group is exposed to potential opportunity losses should interest rates fall. A change in interest rates would impact the market value of fixed-rate financial assets and liabilities. However, this loss of opportunity would not impact financial income and expenses as reported in the consolidated income statement and, as such, future net income of the Group up to maturity of these assets;
- a risk on floating-rate financial assets and liabilities should interest rates increase.

The main objective of managing overall interest rate risk on the Group's debt is to minimize the cost of debt and to protect the Group against fluctuations in interest rates by swapping to fixed rate a portion of the floating-rate financial debt. Authorized derivative instruments used to hedge the debt are swap contracts entered with leading financial institutions.

Credit risk

The Group has no significant concentrations of credit risk. The client selection process and related credit risk analysis is fully integrated within the global risk assessment project conducted throughout the life cycle of a project. Derivative counterparties and cash transactions are limited to high-credit quality financial institutions.

Currency risk

Atos Group policy promotes natural hedge positions in which costs and revenues are denominated in the same currency.

Nevertheless, the Group's financial performance can be influenced by fluctuations in exchange rate considering a growing portion of the external business involving offshore costs centers based mostly in India and Central Europe.

The Group has established a policy for managing foreign exchange positions resulting from commercial and financial transactions denominated in currencies different from the local currency of the relevant entity. According to this policy, any material exposure must be hedged as soon as it occurs. In order to hedge its foreign exchange rate exposure, the Group uses a variety of financial instruments, mainly forward contracts and foreign currency swaps.

Price risk

The Group has no material exposure to the price of equity securities, nor is it exposed to commodity price risks.

B.4.6.5 Notes to the consolidated financial statements

Note 1 – Changes in the scope of consolidation 46
Note 2 – Segment information 49
Note 3 – Revenue, trade receivables, contract assets and contract costs 51
Note 4 – Operating items 55
Note 5 – Other operating income and expenses 57
Note 6 – Financial assets, liabilities and financial result 62
Note 7 – Income tax 69
Note 8 – Goodwill 72
Note 9 – Leases 78
Note 10 – Investments in associates accounted for under the equity method 79
Note 11 – Pension plans and other long-term benefits 80
Note 12 - Provisions 85
Note 13 – Fair value and characteristics of financial instruments 86
Note 14 – Shareholders' equity 90
Note 15 – Off-balance sheet commitments 92
Note 16 – Related party transactions 93
Note 17 – Main operating entities part of scope of consolidation as of December 31, 2019 95
Note 18 – Subsequent events 101
Note 19 – Auditors' fees 102

Note 1 Changes in the scope of consolidation

Business combination and goodwill

A business combination may involve the purchase of another entity, the purchase of all the net assets of another entity or the purchase of some of the net assets of another entity that together form one or more businesses.

Major services contracts involving staff and asset transfers that enable the Group to develop or significantly improve its competitive position within a business or a geographical sector are accounted for as business combinations when fulfilling the definition of a business under IFRS 3.

Valuation of assets acquired, and liabilities assumed of newly acquired subsidiaries

Business combinations are accounted for according to the acquisition method. The consideration transferred in exchange for control of the acquired entity is measured at fair value. It is calculated as the sum of the acquisition-date fair values of the assets transferred by the Group, liabilities incurred by the Group to the former owners of the acquire and the equity interests issued by the Group in exchange for control of the acquiree.

Direct transaction costs related to a business combination are charged to the income statement when incurred and presented as part of the Other Operating Income and Expenses.

Non-controlling interests may, on the acquisition date, be measured either at fair value or based on their stake in the fair value of the identifiable assets and liabilities of the acquired entity. The choice of measurement methodology is made on a transaction-by-transaction basis.

All the assets, liabilities and contingent liabilities of the acquired subsidiary are measured at their fair value in the opening statement of financial position at acquisition date. The opening statement of financial position is adjusted, when necessary, during the 12 months following the acquisition date.

In step acquisitions, any equity interest held previously by the Group is remeasured at fair value at the acquisition date (i.e. the date when the Group obtains control) and the resulting gain or loss is recognized in Other Operating Income and Expenses.

Purchase of non-controlling interests and sale of interests in a controlled subsidiary

Purchase of non-controlling interests and sale transactions of interests in a controlled subsidiary that do not change the status of control are recorded through shareholders' equity (including direct acquisition costs).

If control in a subsidiary is lost, any gain or loss is recognized in Other Operating Income and Expenses. Furthermore, if an investment in the entity is retained by the Group, it is re-measured to its fair value and any gain or loss is also recognized in Other Operating Income and Expenses.

1.1 Acquisition of Syntel in 2018

Atos acquired 100% of Syntel Inc. which is fully consolidated since November 1, 2018. The purchase price allocation has been revised in the 12 months following the acquisition. Fair value of assets and liabilities acquired have been reviewed based on circumstances existing at acquisition date leading to the recognition of a final Goodwill of € 2,464 million:

Consideration transferred and goodwill

(in € million)	**Goodwill**
Total consideration paid [A]	2,966
USD versus EUR Hedging of the consideration paid [B]	-39
Tax effect on USD versus EUR Hedging of the consideration paid [C]	13
Fair value of identifiable net assets [D]	476
Goodwill [A] + [B] + [C] - [D]	**2,464**

The residual goodwill is attributable to Syntel' highly skilled workforce and some know-how. It also reflects the synergies expected to be achieved from integrating Syntel operations into the Group. The goodwill arising from the acquisition is not tax deductible.

1.2 Acquisitions in 2019

IDnomic

The Group acquired IDnomic, European leader in digital identity management infrastructure to reinforce its global leadership in cybersecurity and expands its offering in the field of digital identity management and PKI (Public Key Infrastructure) solutions. The consideration transferred was € 38 million leading to the recognition of a preliminary goodwill of € 18 million.

1.3 Distribution in kind of Worldline shares

Discontinued operations up to April 30, 2019

Following the decision made on January 29, 2019 by Atos Board of Directors to submit to Annual General Meeting the project to distribute 23.5% of Worldline total shares to Atos shareholders and the approval of the transaction by Atos shareholders at the Annual General Meeting on April 30, 2019, this distribution took effect on May 7, 2019, the payment date for the stock dividend. Thus, in accordance with IFRS 5, Worldline's results up to April 30, 2019 (instead of May 7, 2019 for practical reasons) have been reclassified to "Net income from discontinued operation".

The distribution to Atos shareholders was made based on a ratio of 2 Worldline shares for 5 Atos shares held, in accordance with the terms of the transaction announced by Atos on March 22, 2019 and valued at the opening price on May 7, 2019 of the Worldline share (€ 54.70).

Under IFRS, the distribution in kind of Worldline shares took place in two steps: (i) the first step is the sale of the 50.8% of Worldline shares held by Atos, and (ii) the second step is the acquisition of the 27.3% of Worldline shares retained by Atos.

The net gain resulting from the loss of control of all Worldline shares held by the Group following the distribution was recognized in the consolidated income statement in "Net income from discontinued operation". This gain was presented net of current and deferred taxes and costs to distribute the Worldline shares (after tax). Cash flows relating to Worldline operations up to April 30, 2019 have been reclassified in the consolidated statement of cash flows to "Net cash from (used in) discontinued operation".

Impact on the consolidated income statement

Worldline was not previously classified as held-for-distribution or as a discontinued operation. The comparative condensed consolidated income statement has been restated to show the discontinued operation separately from continuing operations.

The flows relating to the services rendered by the continuing operations to Worldline have been eliminated at the Worldline level. As a result, the external revenue of the Group includes revenues related to such flows.

Detailed income statement of the discontinued operation

(in € million)	From January 1, 2019 to April 30, 2019*	From January 1, 2018 to December 31, 2018
Revenue	**705**	**1,610**
Personnel expenses	-289	-692
Operating expenses	-263	-625
Operating margin	**153**	**293**
% of revenue	**21.7%**	**18.2%**
Other operating income and expenses	-22	-87
Operating income	**131**	**206**
% of revenue	**18.6%**	**12.8%**
Net financial income	71	-20
Net income before tax	**201**	**-186**
Tax charge	-48	-45
Net gain (loss) on disposal of discontinued operation	2,931	-
Other costs related to the distribution of Worldline shares	-8	-
Net income	**3,075**	**139**
Of which:		
- attributable to owners of the parent	**2,986**	**70**
- non-controlling interests	89	69

** Income and expense items relating to Worldline for 2019 have been reclassified until April 30, 2019 to "Net income from discontinued operation", in accordance with IFRS 5. See note 1.*

The deconsolidation of Worldline following the distribution in kind generated a net gain of € 2,931 million in 2019. This amount is net of € 29 million of cost to distribute (after tax).

Investment in Associates from May 1, 2019

Following the distribution, Atos held 27.3% of Worldline's share capital and 35% of voting rights, subject to a six-month lock-up period. Starting May 1, 2019, the Group has no more control on Worldline, but a significant influence on Worldline. As such, the Group investment in Worldline was from that date presented as part of "Investments in associates accounted for under the equity method" in the 2019 consolidated financial statements. A purchase price allocation has been performed for the part of the business which is still held by the Group.

The Group share of Worldline net contributive result since May 1, 2019 is presented in the Group 2019 consolidated income statement in "Share of net profit/(loss) of associates". The new intangible assets generated by the purchase price allocation exercise are amortized on the same line.

1.4 Disposal of part of Worldline shares in November 2019

After having distributed 23.5% of Worldline shares to its Shareholders on May 7, 2019, Atos has completed in November 2019:

- the sale of 14.7 million of Worldline shares through an Accelerated Bookbuilding Offering (ABO);
- the issuance of € 500 million bond which will be exchangeable into Worldline shares;
- the transfer of £ 198 million (€ 230 million) of Worldline shares to Atos UK Pension Scheme in exchange of no additional funding in cash of the scheme for the next 15 years.

After completion of November transactions, Atos voting rights over Worldline amounted to 25.6%. The review of the governance led to the conclusion that Atos still has significant influence over Worldline. As such, the Group continued to consolidate Worldline under Equity method.

Note 2 Segment information

According to IFRS 8, reported operating segments profits are based on internal management reporting information that is regularly reviewed by the chief operating decision maker, and is reconciled to Group profit or loss. The chief operating decision maker assesses segments profit or loss using a measure of operating profit. The chief operating decision maker, who is responsible for allocating resources and assessing performance of the operating segments, has been identified as the company CEOs who makes strategic decisions.

The internal management reporting is built on two axes: Global Business Units and Divisions (Infrastructure & Data Management (IDM), Business & Platform Solutions (B&PS), Big Data & Cybersecurity (BDS). Global Business Units have been determined by the Group as key indicators by the chief operating decision maker. As a result, and for IFRS 8 requirements, the Group discloses Global Business Units as operating segments.

A Business Unit is defined as a geographical area or the aggregation of several geographical areas which contain one or several countries, without taking into consideration the activities exercised within each country. Each Business Unit is managed by a dedicated member of the Executive Committee.

The measurement policies that the Group uses for segmental reporting under IFRS 8 are the same as those used in its financial statements. Corporate entities are not presented as an operating segment. Therefore, their financial statements are used as a reconciling item. Corporate assets which are not directly attributable to the business activities of any operating segments are not allocated to a segment, which primarily applies to the Group's headquarters. Shared assets such as the European mainframe are allocated to the Business Unit where they are physically located even though they are used by several Business Units.

Operating segments	Activities
United Kingdom & Ireland	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Cybersecurity in Ireland and the United Kingdom.
France	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Security in France and Morocco offshore delivery Center.
Germany	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Security in Germany.
North America	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Cybersecurity in Canada, Guatemala, Mexico and the United States of America
Benelux & The Nordics	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Cybersecurity in Belarus, Belgium, Denmark, Estonia, Finland, Lithuania, Luxembourg, Poland, Russia, Sweden and The Netherlands.
Other Business Units	Business & Platform Solutions, Infrastructure & Data Management and Big Data and Cybersecurity in Algeria, Andorra, Argentina, Australia, Austria, Bosnia and Herzegovina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Czech Republic, Egypt, Gabon, Greece, Hungary, Hong-Kong, India, Israel, Italy, Ivory Coast, Japan, Lebanon, Malaysia, Madagascar, Mauritius, Morocco, Namibia, New-Zealand, Philippines, Portugal, Qatar, Romania, Saudi-Arabia, Senegal, Singapore, Serbia, Slovakia, Slovenia, South-Africa, South Korea, Spain, Switzerland, Taiwan, Thailand, Tunisia, Turkey, UAE, Uruguay and also Major Events activities, Global Delivery Centers

Inter-segment transfers or transactions are entered into under the normal commercial terms and conditions that would also be available to unrelated third parties. The revenues from each external contract amounted to less than 10% of the Group's revenue.

The operating segment information for the periods was the following:

(in €million)	United Kingdom and Ireland	France	Germany	North America	Benelux & The Nordics	Other Business Units	Total Operating segments	Global Structures	Elimination	Total Group
12 months ended December 31, 2019										
External revenue by segment	**1,669**	**1,788**	**2,167**	**2,725**	**1,047**	**2,192**	**11,588**			**11,588**
% of Group revenue	14.4%	15.4%	18.7%	23.5%	9.0%	18.9%	100.0%			100.0%
Inter-segment revenue	72	304	193	780	160	970	2,478	326	-2,804	-
Total revenue	1,740	2,091	2,360	3,506	1,206	3,162	14,066	326	-2,804	11,588
Segment operating margin	**165**	**164**	**152**	**343**	**88**	**319**	**1,232**	-42	-	**1,190**
% of margin	9.9%	9.2%	7.0%	12.6%	8.4%	14.6%	10.6%			10.3%
Total segment assets	**1,459**	**2,077**	**1,845**	**4,817**	**932**	**2,380**	**13,510**	**2,348**		**15,858**
Other information on income statement										
Depreciation of assets	-40	-38	-71	-67	-29	-69	-312	-22		-334
Depreciation of right of use	-24	-30	-59	-76	-45	-87	-322	-14		-336
Other informations										
Capital expenditure	26	53	85	49	17	58	289	35		324
Net (debt) / cash	-753	-36	511	1,370	368	1,110	2,571	-4,307		-1,736
Year end headcount	9,538	11,196	9,331	10,698	5,398	60,795	106,955	1,362		108,317

12 months ended December 31, 2018 *										
External revenue by segment	**1,620**	**1,723**	**2,168**	**2,022**	**1,027**	**2,088**	**10,648**			**10,648**
% of Group revenue	15.2%	16.2%	20.4%	19.0%	9.6%	19.6%	100.0%			100%
Inter-segment revenue	225	381	431	264	281	1,753	3,335	301	-3,635	-
Total revenue	1,845	2,104	2,598	2,287	1,308	3,841	13,983	301	-3,635	10,648
Segment operating margin	**193**	**150**	**137**	**202**	**76**	**275**	**1,033**	-66		**967**
% of margin	11.9%	8.7%	6.3%	10.0%	7.4%	13.2%	9.7%			9.1%
Total segment assets	**1,094**	**1,684**	**1,782**	**4,447**	**810**	**2,073**	**11,889**	**475**		**12,364**
Other information on income statement										
Depreciation of assets	-34	-32	-77	-78	-32	-58	-311	-25		-336
Depreciation of right of use	-	-	-	-	-	-	-	-		-
Other informations										
Capital expenditure	33	56	102	54	27	76	348	23		371
Net (debt) /cash	-630	148	471	151	244	930	1,314	-4,151		-2,837
Year end headcount	9,111	11,296	9,526	11,876	5,746	61,704	109,259	1,377		110,636

** Figures presented are restated from Worldline activities, in accordance with IFRS 5.*

The assets detailed above by segment are reconciled to total assets as follows:

(in € million)	December 31, 2019	December 31, 2018
Total segment assets	**15,858**	**12,364**
Total segment assets from Worldline*	-	6,133
Tax Assets	378	533
Cash & Cash Equivalents	2,413	2,546
Total Assets	**18,649**	**21,576**

** Worldline is no more considered as segment.*

The Group revenues from external customers are split into the following divisions:

(in € million)	Infrastructure and data management	Business & Platform solutions	Big Data & cybersecurity	Total Group
12 months ended 31 December, 2019				
External revenue by segment	**6,321**	**4,216**	**1,050**	**11,588**
% of Group revenue	54.6%	36.4%	9.1%	100.0%
12 months ended December 31, 2018*				
External revenue by segment	**6,360**	**3,392**	**896**	**10,648**
% of Group revenue	59.7%	31.9%	8.4%	100.0%

** Figures presented are restated from Worldline activities, in accordance with IFRS 5.*

Note 3 Revenue, trade receivables, contract assets and contract costs

Revenue is recognized if a contract exists between Atos and its customer. A contract exists if collection of consideration is probable, rights to goods or services and payment terms can be identified, and parties are committed to their obligations. Revenue from contracts with customers is recognized either against a contract asset or receivable, before effective payment occurs.

Multiple arrangements services contracts

The Group may enter into multiple-element arrangements, which may include combinations of different goods or services. Revenue is recognized for each distinct good or service which is separately identifiable from other items in the arrangement and if the customer can benefit from it.

Contracts delivered by Infrastructure & Data Management and Business & Platform Solutions Divisions often embed transition and transformation prior to the delivery of recurring services, such as IT support and maintenance.

When transition or transformation activities represent knowledge transfer to set up the recurring service and provide no incremental benefit to the customer and cannot be considered as a separate performance obligation (set up activities), no revenue is recognized in connection with these activities. The costs incurred during these activities are capitalized as contract costs if they create a resource that will be used in satisfying future performance obligations related to the contract and if they are recoverable. They are amortized on a systematic basis over the contractual period. The cash collected for such activities is considered as advance payment, presented as contract liability, and recognized as revenue over the recurring service period. When these activities transfer to the customer the control of a distinct good or service and the customer can benefit from this good or service independently from the recurring services, they are accounted for separately as separate performance obligations and revenues relating to these activities are recognized.

When a single contract contains multiple distinct goods or services, the consideration is allocated between the goods and services based on their stand-alone selling prices. The stand-alone selling prices are determined based on the list prices including usual discounts granted at which the Group sells the goods or services separately. Otherwise, the Group estimates stand-alone selling prices using a cost-plus margin approach.

Principal versus agent

When the Group resells hardware, software and IT services purchased from third-party suppliers, it performs an analysis of the nature of its relationship with its customers to determine if it is acting as principal or as agent in the delivery of the good or service. The Group is a principal if it controls the specified good or service before it is transferred to the customer. In such case, revenue is recognized on a gross basis. If the Group is an agent, revenue is recognized on a net basis (net of supplier's costs), corresponding to any fee or commission to which the Group is entitled. When the Group is providing a significant service of integrating and/or designing the specified good or service, it is acting as a principal in the process of resale. If the specified good or service is distinct from the other services promised to its customer, the Group is acting as a principal notably if it is primarily responsible for the good or service meeting the customer specifications or assumes inventory or delivery risks.

At a point in time versus over time recognition

Revenue is recognized when the Group transfers the control of a good or service to the customer, either at a point in time or over time.

For recurring services, the revenue is recognized over time as the customer simultaneously receives and consumes the benefit provided by the Group's performance as the Group performs. If the Group has a right to invoice a customer at an amount that corresponds directly with its performance to date, the revenue is recognized at that amount. Otherwise, revenue is recognized based on the costs incurred if the entity's efforts are not expensed evenly throughout the period covered by the service.

When the Group builds an asset or provides specific developments, revenue is recognized over time, generally based on costs incurred.

When the Group's performance creates or enhances an asset that the customer controls as the asset is created or enhanced or when the performance does not create an asset with an alternative, use and the Group has an enforceable right to payment for the performance completed to date by the contract and local regulations, revenue is recognized over time, generally based on costs incurred.

Otherwise, revenue is recognized at a point in time.

Customer contracts in a form of a lease

Part of certain service arrangements may qualify as a lease under IFRS 16 if they convey a right to use an asset in return for payments included in the overall contract remuneration. If service arrangements contain a lease, the Group is considered as manufacturer or dealer-lessor regarding its customers. Where the lease transfers the risks and rewards of ownership of the assets to its customers (finance lease), the Group recognizes Revenue representing the selling price of assets held under lease and presents those as contract assets.

Contract costs - Costs to obtain and fulfill a contract

Incremental costs to acquire a multi-year service contracts are capitalized and amortized over the life of the contract.

Transition & Transformation costs that do not represent a separate performance obligation of a contract are capitalized as contract costs if they create a resource that will be used to perform other performance obligations embedded in the contract, are recoverable. Other costs incurred to obtain or fulfill a contract are expensed when incurred.

Statement of Financial Position presentation

Contract assets primarily relate to the Group's rights to consideration for work completed but not yet billed at the reporting date. Invoiced to be issued are presented as part of contract assets. When the rights to consideration are unconditional, they are classified as trade receivables.

Contract liabilities relate to upfront payments received from customers in advance of the performance obligation. Contract costs are presented separately from contract assets. Contract assets and contract liabilities are netted on a contract by contract basis.

Revenue recognition and associated costs on long-term contracts

Total projected contract costs are based on various operational assumptions such as forecast volume or variance in the delivery costs that have a direct influence on the level of revenue and possible forecast losses on completion that are recognized. A provision for onerous contract is booked if the future costs to fulfill a contract are higher than its related benefits.

Financing component

When Atos expects the period between the transfer of goods and services and customer payment to be greater than 12 months, it assesses whether the contract is embedding a financing component granted or received. When significant, interests generated by this financing component are booked separately from revenue.

3.1. Disaggregation of revenue from contracts with customers

Most of revenue generated by IDM & B&PS divisions are recognized over time for fixed price contracts and at a point of time for time & material-based contracts. The Group applies the "cost-to-cost" method to measure progress to completion for fixed price contracts. Most of the BDS Revenue is recognized at a point of time when solutions are delivered except for High Performance Computers solutions when Atos is building a dedicated asset with no alternative use and has right to payment by the contract and local regulation for costs incurred embedding a reasonable margin.

In the following table, revenue from contracts with customers is disaggregated by markets. Disaggregated revenue by Global Business Units and Divisions is disclosed in Group's reportable segments (See Note 2).

(in €million)	Manufacturing, Retail &Transport	Public & Health	Financial Services	Telcos, media & utilities	Total Group
12 months ended 31 December 2019					
External revenue by market	**4,139**	**3,411**	**2,169**	**1,869**	**11,588**
% of Group revenue	35.7%	29.4%	18.7%	16.1%	100.0%
12 months ended 31 December 2018 *					
External revenue by market	**4,009**	**3,225**	**1,605**	**1,809**	**10,648**
% of Group revenue	37.6%	30.3%	15.1%	17.0%	100.0%

** Figures presented are restated from Worldline activities, in accordance with IFRS 5.*

3.2. Trade accounts and notes receivables

(In €million)	December 31, 2019	December 31, 2018
Contract assets	1,517	1,489
Trade receivables	1,301	1,471
Contract costs	106	89
Expected credit losses allowances	-66	-84
Net asset value	**2,858**	**2,965**
Contract liabilities	-680	-776
Net accounts receivable	**2,178**	**2,188**
Number of days' sales outstanding (DSO)	**47**	**43**

The average credit period on sale of services is between 30 and 60 days depending on the countries. Main part of the contract assets should be converted in trade receivables in the 12 coming months except for contract assets corresponding to the transfer of IT equipment under lease model and the grant of multi-years right to use licensees. Most of the contract liabilities should be converted in revenue in the coming months. Excluding Worldline, the DSO ratio moved from 46 days to 47 days at the end of December 2019.

Transfer of trade receivables

Atos securitization program of trade receivables has been renewed for 5 years on May 29, 2018 with a maximum amount of receivables sold of € 500 million and a maximum amount of financing reduced from € 200 million to € 100 million. The Group sold with recourse trade receivables for € 108 million on which € 10 million has been received in cash. These trade receivables have not been derecognized from the statement of financial position, because the Group retains substantially all risks and rewards. The amount received on transfer has been recognized as a secured bank loan. The arrangement with the bank is such that the customer remit cash directly to the Group and the Group transfers the collected amount to the bank.

DSO has been positively impacted by the sale of receivables on large customer contracts by 24 days, stable compared to December 2018. As of December 31, 2019, € 873 million of trade receivables were transferred to third parties with conditions of the transfers meeting IFRS 9 requirements, meaning transfer of contractual cash flows and transfer of substantially all risks and rewards are achieved.

Those trade receivables were therefore derecognized in the statement of financial position as of December 31, 2018. The € 873 million included $ 105 million in the US where Atos only sells 90% of the right to cash flows and then derecognizes 90% of the receivables.

The level of trade receivables sold with no recourse to banks with transfer of risks as defined by IFRS 9 remained at the same level than the end of December 31, 2018.

Ageing of net receivables past due

(In €million)	December 31, 2019	December 31, 2018
1-30 days overdue	90	128
31-60 days overdue	43	42
Beyond 60 days overdue	96	94
Total	**229**	**264**

Movement in expected credit losses allowances

(In €million)	December 31, 2019	December 31, 2018
Balance at beginning of the year	-84	-122
Impairment losses recognized	-28	-12
Amounts written off as uncollectible	12	27
Impairment losses reversed	-2	-3
Impact of business combination	-1	-7
Reclassification and exchange differences	37	32
Balance at end of the year	**-66**	**-84**

Note 4 Operating items

4.1. Personnel expenses

(In € million)	12 months ended December 31,2019	% Revenue	12 months ended December 31,2018*	% Revenue
Wages and salaries	-4,280	36.9%	-3,919	36.8%
Social security charges	-980	8.5%	-981	9.2%
Tax, training, profit-sharing	-77	0.7%	-36	0.3%
Net (charge)/release to provisions for staff expenses	0	0.0%	1	0.0%
Net (charge)/release of pension provisions	60	-0.5%	73	-0.7%
Total	**-5,277**	**45.5%**	**-4,862**	**45.7%**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

4.2. Non-personnel operating expenses

(In €million)	12 months ended December 31,2019	% Revenue	12 months ended December 31,2018*	% Revenue
Subcontracting costs direct	-1,892	16.3%	-1,860	17.5%
Hardware and software purchase	-1,154	10.0%	-982	9.2%
Maintenance costs	-626	5.4%	-606	5.7%
Rent expenses	-29	0.3%	-341	3.2%
Telecom costs	-288	2.5%	-292	2.7%
Travelling expenses	-154	1.3%	-128	1.2%
Professional fees	-202	1.7%	-179	1.7%
Others expenses	-247	2.1%	-236	2.2%
Subtotal expenses	**-4,590**	**39.6%**	**-4,624**	**43.4%**
Depreciation of assets	-334	2.9%	-336	3.2%
Depreciation of right-of-use	-336	2.9%	-	-
Net (charge)/release to provisions	23	-0.2%	49	-0.5%
Gains/(Losses) on disposal of assets	-17	0.1%	-9	0.1%
Trade receivables write-off	-12	0.1%	-22	0.2%
Capitalized production	145	-1.3%	123	-1.2%
Subtotal other expenses	**-531**	**4.6%**	**-195**	**1.8%**
Total	**-5,121**	**44.2%**	**-4,819**	**45.3%**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

4.3. Trade accounts and notes payable

(In €million)	December 31, 2019	December 31, 2018
Trade payables and notes payable	**2,278**	**2,462**
Net advance payments	-31	-37
Prepaid expenses and advanced invoices	-691	-666
Net accounts payable	**1,556**	**1,759**
Number of days' payable outstanding (DPO)	**79**	**97**

4.4. Other current assets

(In €million)	December 31, 2019	December 31, 2018
Inventories	104	133
State - VAT receivables	212	273
Prepaid expenses and advanced invoices	691	666
Other receivables & current assets	529	530
Net advance payments	31	37
Assets linked to intermediation activities	-	1,151
Total	**1,568**	**2,791**

The intermediation activities in 2018 were related to Worldline activities only.

4.5. Other current liabilities

(In € million)	December 31, 2019	December 31, 2018
Employee-related liabilities	355	512
Social security and other employee welfare liabilities	172	206
VAT payables	371	430
Contract liabilities	680	776
Liabilities linked to intermediation activities	-	1,151
Other operating liabilities	310	325
Total	**1,888**	**3,400**

The intermediation activities in 2018 were related to Worldline activities only.

Note 5 Other operating income and expenses

Other Operating Income and Expenses is an Alternative Performance Measure and is defined in section B.4.7.3

Equity-based compensation

Free shares and stock options are granted to management and certain employees at regular intervals. These equity-based compensations are measured at fair value at the grant date using the Black-Scholes model. Changes in the fair value of options after the grant date have no impact on the initial valuation. The fair value of instruments is recognized in "other operating income and expense" on a straight-line basis over the period during which those rights vest, using the straight-line method, with the offsetting credit recognized directly in equity.

In some tax jurisdictions, Group entities receive a tax deduction when stock options are exercised, based on the Group share price at the date of exercise.

In those instances, a deferred tax asset is recorded for the difference between the tax base of the employee services received to date (being the future tax deduction allowed by local tax authorities) and the current carrying amount of this deduction, being nil by definition. Deferred tax assets are estimated based on the Group's share price at each closing date and are recorded in income tax provided that the amount of tax deduction does not exceed the amount of the related cumulative stock option expenses to date. The excess, if any, is recorded directly in the equity.

Employee Share Purchase Plans offer employees the opportunity to invest in Group's shares at a discounted price. Shares are subject to a five-year lock-up period restriction. Fair values of such plans are measured considering:

- the exercise price based on the average opening share prices quoted over the 20 trading days preceding the date of grant;
- the 20 percent discount granted to employees;
- the attribution of free shares for the first subscribed shares according to the matching share plan;
- the consideration of the five-year lock-up restriction to the extent it affects the price that a knowledgeable, willing market participant would pay for that share; and
- the grant date: the date on which the plan and its term and conditions, including the exercise price, is announced to employees.

Fair values of such plans are fully recognized in "Other operating income and expenses" at the end of the subscription period.

The Group has also granted to management and certain employees free share plans. The fair value of those plans corresponds to the value of the shares at the grant date and considers employee turnover during the vesting period as well as the value of the lock-up period restriction when applicable.

Social contributions linked to equity-based compensations are also presented as Other Operating Income and Expenses.

Other operating income and expenses relate to income and expenses that are unusual and infrequent and represented a net expense of € 530 million in 2019. The following table presents this amount by nature:

(In € million)	12 months ended December 31,2019	12 months ended December 31,2018*
Staff reorganization	-100	-76
Rationalization and associated costs	-34	-34
Integration and acquisition costs	-41	-44
Amortization of intangible assets (PPA from acquisitions)	-157	-107
Equity based compensation	-73	-36
Other items	-125	-40
Total	**-530**	**-337**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

The € 100 million **staff reorganization** expense was mainly the consequence of the adaptation of the Group workforce in several countries. The increase in 2019 came mostly from the specific plan in Germany.

The € 34 million **rationalization and associated costs** primarily resulted from the closure of office premises and data centers consolidation, mainly in North America and France.

Integration and acquisition costs at € 41 million mainly relate to the integration costs of Syntel to generate synergies while the other costs relate to the migration and standardization of internal IT platforms from earlier acquisitions.

The 2019 amortization of intangible assets recognized in the **Purchase Price Allocation** (PPA) of € 157 million was mainly composed of:

- € 67 million of Syntel customer relationships and technologies amortized over 12 years starting November 1, 2018;
- € 22 million of SIS customer relationships amortized over 12 years starting July 1, 2011;
- € 20 million of Xerox ITO customer relationships amortized over 6 to 12 years starting July 1, 2015;
- € 17 million of Unify customer relationships and technologies amortized over 2 to 10 years starting February 1, 2016;
- € 16 million of Bull customer relationships and patents amortized over respectively 9 years and 7 to 10 years starting September 1, 2014.

In 2019, the amount of amortization of intangible assets increased from € 107 million to € 157 million, mainly due to the amortization in a full year basis of the Syntel Purchase Price Allocation (€ 67 million in 2019 to be compared with € 11 million over 2 months in 2018).

The **equity-based compensation** expense amounted to € 73 million compared to € 36 million in 2018 which reflected the lower performance and the decrease in the number of shares granted in 2018.

In 2019, **other items** increased significantly from € 40 million to € 125 million including exceptional expenses:

- At the time of the distribution of Worldline shares in May, the remaining Worldline shares were valued at the opening price on May 7, 2019 for € 54.7. Since that date the Worldline participation was accounted for under equity method. The transactions made in November were at € 53.0 per share leading to a loss in the Group consolidated accounts as follows:
  - **Accelerated Book building Offering of Worldline shares (ABO)**. The Accelerated Book building Offering of Worldline shares on the market led to a net loss on disposal of € 46 million, net of costs of disposal. The transaction generated a net gain in the statutory accounts of Atos SE;
  - **Transfer of £ 198 million (€ 230 million) of Worldline shares to Atos UK Pension Scheme.** Atos has decided to fund its UK Pensions schemes with Worldline shares. This non-cash transaction will prevent Atos from any additional funding in cash for the next 15 years. This transaction led to a net loss on disposal of shares of € 7 million. The transaction generated a net gain in the statutory accounts of Atos SE.
- Settlement signed over H2 2019 with a large German customer led to the recognition of a one-time charge of € 23 million.

Equity-based compensation

The € 73 million expense recorded within operating margin relating to equity-based compensation (€ 36 million in 2018) is made up of:

- € 72 million related to free shares plans granted from 2015 until 2019 of which € 6 million of 2019 free shares plans granted;
- € 1 million related to the employee share purchase plan SHARE 2018.

The equity-based compensation plans are detailed by year and by nature as follows:

(In €million)	12 months ended December 31, 2019	12 months ended December 31, 2018*
By years :		
Plans 2019	6	-
Plans 2018	21	2
Plans 2017	29	0
Plan 2016	10	30
Plan 2015	6	6
Plans 2014	-	-2
Total	**73**	**36**
By category of plans :		
Free share plans	72	37
Stock options	0	-1
Employee share purchase plan	1	-
Total	**73**	**36**

** Figures presented are restated from Worldline activities, in accordance with IFRS 5.*

Free shares plans

In 2019, Atos implemented new free shares plans detailed as follows:

Grant Date	**Atos October 23, 2019**	**Atos July 24, 2019**
Number of shares granted	12,000	857,743
Share price at grant date (€)	63.6	69.8
Vesting date	October 23, 2022	July 24, 2022
Expected life (years)	3	3
Expected dividend yield (%)	2.07	2.07
Fair value of the instrument (€)	**59.77**	**65.55**
2019 expense recognized *(in € million)*	0	6

Atos free share plans

Rules governing the free share plans in Group Atos (prior to 2018) are as follows:

- To receive the share, the grantee must generally be an employee or a corporate officer of the Group or a company employee related to Atos;
- Vesting is also conditional on both the continued employment condition and the achievement of performance criteria, financial and non-financial ones;
- The financial performance criteria are the following:
  - Group revenue;
  - Group Operating Margin (OM); and
  - Group Free Cash Flow (FCF).
- The vesting period varies according to the plans rules but never exceeds 4.5 years;
- The lock-up period is 0 to 2 years;
- Atos free shares plans are equity-settled.

Following the announcement of the acquisition of Syntel, the Board of Directors replaced the performance criterion on FCF by a criterion based on earning per share (EPS) in respect of the July 25, 2017 free shares plans.

Rules described above applied to 2018 free shares plans are the same except for the FCF criterion replaced by earning per share (EPS).

The performance criteria for 75% of free shares granted as part of July 25, 2017, March 27, 2018 and July 22, 2018 free shares plans have further been modified by the Board of Directors on October 22, 2018 to align with the revised guidance provided to the market. Based on 2018 Group results, the remaining 25% of free shares of the above plans will not be vested.

Main previous plans impacting 2019 consolidated income statement are detailed as follows:

Grant Date	**Atos March 27, 2018**	**Atos July 22, 2018**
Number of shares granted	8,550	891,175
Share price at grant date (€)	90.0	90.0
Vesting date	March 26, 2021	July 21, 2021
Expected life (years)	3	3
Expected dividend yield (%)	1.2	1.2
Fair value of the instrument (€)	**87.08**	**87.08**
2019 expense recognized *(in € million)*	0	17

Grant Date	**Atos July 28, 2015 Foreign plan**	**Atos July 26, 2016**	**Atos July 24, 2017**	**Atos July 25, 2017**
Number of shares granted	510,000	947,884	38,738	777,910
Share price at grant date (€)	69.70	86.05	123.15	90.00
Vesting date	January 2, 2020	July 26, 2019	July 24, 2020	July 25, 2020
Expected life (years)	4.5	3	3	3
Lock-up period (years)	-	-	-	-
Risk free interest rate (%)	-	-	-	-
Borrowing-lending spread (%)	-	-	-	-
Expected dividend yield (%)	1.2	1.2	1.2	1.2
Fair value of the instrument (€)	**65.89**	**83.00**	**118.80**	**88.12**
2019 expense recognized *(in € million)*	6	10	-2	31

Stock options plans

In 2019, Atos implemented new Stock option plan detailed as follows:

Number of options issued	209,200
Share price at grant date (€)	77.9
Strike price (€)	80.1
Vesting date	July 24, 2022
Expected maturity of the plan (years)	3 years
Risk free interest rate (%)	-0.44
Expected dividend yield (%)	2.07
Fair value of the instument (€)	**6.67**
Expense recognized in 2019 (in € million)	**0**

Outstanding stock options plans

The change in outstanding share options for **Atos SE** during the period was the following:

(In € million)	12 months ended December 31,2019		12 months ended December 31,2018	
	Number of shares	Weighted average strike price (in €)	Number of shares	Weighted average strike price (in €)
Outstanding at the beginning of the year	**25,467**	**52.2**	**406,707**	**34.0**
Granted during the year	209,200	77.9	-	-
Forfeited during the year	-40,300	77.9	-	-
Exercised during the year	-25,467	52.2	-377,204	34.0
Expired during the year	-	-	-4,036	27.2
Outstanding at the end of the year	**168,900**	**77.9**	**25,467**	**52.2**
Exercisable at the end of the year, below year-end stock price	**-**	**-**	**25,467**	**52.2**

(*) Year-end stock price: € 74.32 at December 31, 2019 and € 71.48 at December 31, 2018.

Employee share purchase plan Share 2018

In December 2018, the Group implemented a new employee share option plan called Share detailed as follows:

SHARE 2018 was open to employees throughout the Group. This new plan offered eligible employees the purchase of shares at a 20% discount with a five-year lock-up period restriction and the attribution of free shares for the first 2 subscribed shares.

As a consequence of the plan, the Group issued 263,518 shares at a reference share price of € 74.4 (before the 20% discount application).

The cost related to SHARE 2018 takes into account the effect of the five-year lock-up period restriction calculated based on the following parameters:

	SHARE 2018
Number of shares issued	263,518
Share price at grant date (€)	68.8
Percentage of discount	20%
Lock-up period	5 years
Risk free interest rate (%)	-0.003%
Borrowing-lending spread (%)	5%
Expense recognized in 2019 (in € million)	**1**

Note 6 Financial assets, liabilities and financial result

6.1. Financial result

Net financial expense amounted to € 208 million for the period (compared to € 67 million prior year) and was composed of a net cost of financial debt of € 64 million and non-operational financial costs of € 144 million.

Net cost of financial debt

(In € million)	12 months ended December 31,2019	12 months ended December 31,2018*
Net interest expenses	**-64**	**-30**
Interest on obligations under finance leases	-	-1
Gain/(loss) on disposal of cash equivalents	2	1
Gain/(loss) on interest rate hedges of financial debt	-2	-
Net cost of financial debt	**-64**	**-30**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

Net cost of financial debt was € 64 million (compared to € 30 million in 2018) and resulted from the following elements:

- the average gross borrowing of € 5,413 million compared to € 3,330 million in 2018 bearing an average expense rate of 1.55% compared to 1.25% last year. The average gross borrowing expenses were mainly explained by:
  - the used portion of the syndicated loan combined with the Negotiable European Commercial Papers (NEU CP) and the Negotiable European Medium-Term Note program (NEU MTN) for an average of € 1,478 million (compared to an average of € 1,239 million in 2018) bearing an effective interest rate of 0.21%, benefiting from the attractive remuneration applied to the NEU CP;
  - a € 600 million bond issued in July 2015 bearing a coupon rate of 2.375%;
  - a € 300 million bond issued in October 2016 bearing a coupon rate of 1.444%;
  - a € 700 million bond issued in November 2018 bearing a coupon rate of 0.750%;
  - a € 750 million bond issued in November 2018 bearing a coupon rate of 1.750%;
  - a € 350 million bond issued in November 2018 bearing a coupon rate of 2.500%;
  - a $ 1,900 million 3 and 5-year term loan signed in October 2018 drawn in USD and EUR at variable rate, fully repaid on November 2019 bearing an average effective interest rate of 2.59%; Outstanding balances before repayment was $ 1,045 million and € 513 million;
  - other sources of financing, including securitization, for an average of € 50 million, bearing an effective interest rate of 3.12%.
- the average gross cash varied from € 1,313 million in 2018 to € 1,441 million in 2019 bearing an average income rate of 1.58% compared to 0.80% in 2018.

Other financial income and expenses

(In €million)	12 months ended December 31,2019	12 months ended December 31,2018*
Foreign exchange income/(expenses)	-3	5
Fair value gain/(loss) on forward exchange contracts held for trading	-1	-1
Change gain/(loss) on derivative instrument	-54	-
Interest on lease liability	-27	-
Other income/(expenses)	-59	-41
Other financial income and expenses	**-144**	**-36**
Of which:		
- other financial expenses	-162	-75
- other financial income	18	38

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

Non-operational financial costs amounted to € 144 million compared to € 36 million in 2018 and were mainly composed of:

- variance for € 54 million related to the OEB derivative at fair value driven by the Worldline share price evolution between the issuance in November and December 31, 2019 (as per IFRS 9) while the underlying Worldline shares were accounted for under equity method (as per IAS 28);
- pension related interest (broadly stable compared to € 27 million expense in 2018). The pension financial cost represented the difference between interest costs on pension obligations and interest income on plan assets;
- lease liability interest of € 27 million following IFRS 16;
- net foreign exchange loss (including hedges) of € 4 million versus a net foreign exchange gain (including hedges) of € 4 million in 2018.

6.2. Cash and cash equivalents

Cash and cash equivalents include cash at bank and financial instruments such as money market securities. Such financial instruments are readily convertible to a known amount of cash and are subject to an insignificant risk of change in value. They are held for the purpose of meeting short-term cash commitments and have a short maturity, in general three months or less from the date of acquisition. Some instruments, such as term deposits, that have at inception a longer maturity but provide for early withdrawal and a capital guarantee may also be classified as cash equivalents under certain circumstances. Money market securities are recognized at their fair value. Changes in fair value are recorded in the income statement under "Other financial income and expenses".

Cash and cash equivalents are measured at their fair value through income statement.

For entities having subscribed to the Group cash pooling agreement, the cash/debt statement of financial position positions which are linked to this agreement are mutualized and only the net position is presented in the consolidated statement of financial position.

The cash and cash equivalents are held with bank and financial institutions counterparties, majority of which are rated A- to AA-. Impairment on cash and cash equivalent is calculated based on S&P default probability.

(In €million)	December 31, 2019	December 31, 2018
Cash in hand and short-term bank deposit	2,363	2,506
Money market funds	50	40
Total	**2,413**	**2,546**

Depending on market conditions and short-term cash flow expectations, Atos from time to time invests in money market funds or bank deposits with a maturity period not exceeding three months.

6.3. Non-current financial assets

Investments in non-consolidated companies

The Group holds shares in companies without exercising significant influence or control. Investments in non-consolidated companies are recognized at their fair value. For listed shares, fair value corresponds to the share price at the closing date.

(In €million)		December 31, 2019	December 31, 2018
Pension prepayments	Note 11	231	116
Fair value of non-consolidated investments net of impairment		4	82
Other*		116	123
Total		**351**	**321**

** "Other" includes loans, deposits, guarantees and up-front and underwriting fees related to past acquisitions amortized over the duration of the debt instrument*

Main changes in Fair Value of non-consolidated investments net of impairment are mainly related to the € -78 million change non-consolidated investments resulted from the deconsolidation of Worldline.

6.4. Financial liabilities

Borrowings

Borrowings are recognized initially at fair value, net of debt issuance costs. Borrowings are subsequently measured at amortized cost. The calculation of the effective interest rate considers interest payments and the amortization of the debt issuance costs.

Debt issuance costs are amortized in financial expenses over the life of the loan though the use of amortized cost method. The residual value of issuance costs for loans derecognized is fully expensed on the date of derecognition.

Bank overdrafts are recorded in the current portion of borrowings.

Derivative

Derivative instruments are recognized as financial assets or liabilities at their fair value. Any change in the fair value of these derivatives is recorded in the income statement as a financial income or expense, except when they are eligible for hedge accounting.

The market value of derivative financial instruments was provided by the financial institutions involved in the transactions or calculated using standard valuation methods that factor in market conditions as of the end of the reporting period.

The Group has identified three financial instrument categories based on the two valuation methods used (listed prices and valuation techniques). In accordance with IFRS, this classification is used as a basis for presenting the characteristics of financial instruments recognized in the statement of financial position at fair value through income as of the end of the reporting period:

- Level 1 category: financial instruments quoted on an active market;
- Level 2 category: financial instruments whose fair value is determined using valuation techniques drawing on observable market inputs;
- Level 3 category: financial instruments whose fair value is determined using valuation techniques drawing on non - observable inputs (inputs whose value does not result from the price of observable market transactions for the same instrument or from observable market data available as of the end of the reporting period) or inputs which are only partly observable.

Issuance of a € 500 million bond exchangeable in Worldline shares

Atos issued on November 2019 bonds due in 2024 for an aggregate nominal amount of € 500 million. The bonds will be exchangeable in Worldline shares, at a premium of 35% above the placing price of the Equity placement. The bonds will not bear interest and have a maturity of 5 years (except in case of early redemption). The bonds have been offered at a price of 108.875% of the principal amount and will be redeemed at their principal amount of maturity, corresponding to an annual yield to maturity of -1.7%.

In accordance with IFRS 9, a derivative liability of € 52 million has been booked corresponding to the value of a call option on Worldline shares (Level 2 category). The net change in the fair value of the derivative liability between November and December 31, 2019 of € 54 million has been recorded in income statement as part of financial result leading to a total value in the consolidated statement of financial position of € 107 million.

The call option derivative component value is indexed to Worldline shares price and other criteria. As of December 31, 2019, and at issue date, the reference exchange price of Worldline shares was set at €71.55.

(In €million)	December 31, 2019			December 31, 2018		
	Current	Non-current	Total	Current	Non-current	Total
Bonds	600	2,100	2,700	-	2,700	2,700
Optional exchangeable bond	-	500	500	-	-	-
Banks loans and commercial papers	755	50	805	809	1,556	2,365
Securitization	10	-	10	6	-	6
Finance leases	-	-	-	6	9	15
Other borrowings	133	1	134	216	116	332
Total borrowings	**1,498**	**2,651**	**4,149**	**1,037**	**4,381**	**5,418**

Borrowings in currencies

The carrying amounts of the Group borrowings were denominated in the following currencies:

(In € million)	EUR	Other currencies	Total
December 31, 2019	**3,431**	**718**	**4,149**
December 31, 2018	3,940	1,477	5,418

Value and effective interest rate of financial debt

The fair value of bank loans, which are primarily composed of variable interest rate loans, is considered to be equal to carrying value. For other elements of borrowings, carrying value is considered the best estimate of fair value, the difference between the fair value and the carrying value being not material.

Non-current borrowings maturity

(In €million)	2021	2022	2023	2024	>2024	Total
Bonds	-	700	300	-	1,100	2,100
Optional exchangeable bond	-	-	-	500	-	500
Banks loans and NEU CP	-	-	-	-	50	50
Other borrowings	0	0	0	0	0	1
December 31, 2019	**0**	**700**	**300**	**500**	**1,150**	**2,651**

(In €million)	2020	2021	2022	2023	>2023	Total
Bonds	600	-	700	300	1,100	2,700
Banks loans and commercial papers	79	781	0	696	-	1,556
Finance leases	4	3	1	1	1	9
Other borrowings	115	-	1	1	-	116
December 31, 2018	**798**	**784**	**702**	**997**	**1,101**	**4,381**

Assumptions retained regarding the presentation of the maturity of non-current borrowings

The valuation of financial liabilities has been conducted based on:

- exchange rates prevailing as of December 31, 2019; and
- interest rates presented hereafter.

The effective interest rates in 2019 were as follows:

(In €million)	Carrying value	Fair value	Effective interest rate
Bonds	2,700	2,700	1.80%
Optional exchangeable bond	500	500	0.53%
Banks loans and commercial papers	805	805	1.27%
Securitization and Other borrowings	144	144	-
Total borrowings	**4,149**	**4,149**	**-**
Derivative liabilities	**107**	**107**	**-**

6.5. Change in net debt over the period

(In €million)	December 31, 2019	December 31, 2018
Opening net cash/(debt)	**-2,872**	**307**
Net cash / (debt) discontinued operations	35	-
New borrowings	-77	-1,758
Bonds and optional exchangable bonds	-514	-1,797
Repayment of long and medium-term borrowings	1,657	287
Variance in net cash and cash equivalents	46	222
Long and medium-term debt of companies sold during the period	-	3
Long and medium-term debt of companies acquired during the period	-3	-103
Impact of exchange rate fluctuations on net long and medium-term debt	-14	-34
Profit-sharing amounts payable to French employees transferred to debt	0	1
Other flows related to financing activities	6	0
Closing net cash/(debt)	**-1,736**	**-2,872**

(in €million)	December 31, 2019	December 31, 2018
Cash and cash equivalents	2,413	2,546
Overdrafts	-79	-168
Total net cash and cash equivalents	**2,334**	**2,378**

Variance in net cash and cash equivalents include net long-term investments for € 619 million detailed as follows:

Net long-term investments

(in € million)	12 months ended December 31,2019	12 months ended December 31,2018*
Amounts paid for acquisitions and long-term investments		
Pursuit Healthcare and Healthcare companies	4	-
Syntel	-	-2,927
Air-Lynx	-1	-4
IDnomic	-38	-
X-Perion	-3	-
Upfront and underwritting fees following Syntel acquisition	-	-31
Deposit	-11	-5
Other	-4	-4
Total amounts paid for acquisitions and long-term investments	**-54**	**-2,972**
Cash and cash equivalents of companies purchased during the period		
Siemens Convergence Creators (CVC)	-	10
Syntel	-	-188
Air-Lynx	-	-1
IDnomic	5	-
X-Perion	-	-
Other	-	0
Total cash and cash equivalents of companies purchased during the period	**5**	**-179**
Proceeds from disposals of financial investments		
Sale of Worldline shares	657	-
Alpha Cloud	-	3
Deposit	5	6
Other	8	2
Total proceeds from disposals of financial investments	**670**	**11**
Cash and cash equivalents of companies sold during the period		
Other	-1	-
Total Cash and cash equivalents of companies sold during the period	**-1**	**-**
Dividend received from entities consolidated by equity method	-	1
Total dividend received from entities consolidated by equity method	**-**	**1**
Net long-term investments	**619**	**-3,139**

** Net long-term investments relating to Worldline for 2018 have been restated in accordance with IFRS5.*

6.6. Breakdown of assets and liabilities by financial categories

The book value of financial assets corresponds to their fair value.

As at December 31, 2019 the breakdown of assets was the following:

(In €million)	Loans and receivables at amortized cost	Fair value through other comprehensive income	Fair value through profit and loss	Derivative related assets
Non-current financial instruments	-	-	-	-
Trade accounts and notes receivables	2,858	-	-	-
Other current assets	1,568	-	-	-
Current financial instruments	-	-	1	6
Cash and cash equivalents	2,363	-	50	-
Total	**6,789**	**-**	**51**	**6**

As at December 31, 2018, the breakdown of assets was the following:

(In €million)	Loans and receivables at amortized cost	Fair value through other comprehensive income	Fair value through profit and loss	Derivative related assets
Non-current financial instruments	-	-	-	-
Trade accounts and notes receivables	2,965	-	-	-
Other current assets	2,791	-	-	-
Current financial instruments	-	-	2	10
Cash and cash equivalents	2,506	-	40	-
Total	**8,261**	**-**	**42**	**10**

As at December 31, 2019 the breakdown of liabilities was the following:

(In €million)	Liabilities designated at fair value through profit or loss	Financial Liabilities – Measurement at amortized cost	Derivative related liabilities	Other
Borrowings	-	2,651	-	-
Derivative liabilities		-	107	-
Non-current financial instruments	-	-	2	-
Trade accounts and notes payables	-	2,278	-	-
Current portion of borrowings	-	1,498	-	-
Current financial instruments	-	-	1	-
Total	**-**	**6,427**	**110**	**-**

As at December 31, 2018 the breakdown of liabilities was the following:

(In €million)	Financial Liabilities designated at fair value through profit or loss	Financial Liabilities – Measurement at amortized cost	Derivative related liabilities	Other
Borrowings	-	4,381	-	-
Non-current financial instruments	-	-	3	-
Trade accounts and notes payables	-	2,462	-	-
Current portion of borrowings	-	1,037	-	-
Current financial instruments	-	-	2	-
Total		**7,880**	**5**	**-**

Note 7 Income tax

The income tax charge includes current and deferred tax expenses. Deferred tax is calculated wherever temporary differences occur between the tax base and the consolidated base of assets and liabilities, using the liability method. Deferred tax is valued using the enacted tax rate at the closing date that will be in force when the temporary differences reverse.

In case of a change in tax rate, the deferred tax assets and liabilities are adjusted through the income statement except if those changes relate to items recognized in other comprehensive income or in equity.

Deferred tax assets and liabilities are netted off at the taxable entity level, when there is a legal right to offset. Deferred tax assets corresponding to temporary differences and tax losses carried forward are recognized when they are considered to be recoverable during their validity period, based on historical and forecast information.

Deferred tax liabilities for taxable temporary differences relating to goodwill are recognized to the extent they do not arise from the initial recognition of goodwill.

Deferred tax assets are tested for impairment at least annually at the closing date based on December actuals, business plans and impairment test data.

Measurement of recognized tax loss carry-forwards

Deferred tax assets are recognized on tax loss carry-forwards when it is probable that taxable profit will be available against which the tax loss carry-forwards can be utilized. Estimates of taxable profits and utilizations of tax loss carry-forwards were prepared on the basis of profit and loss forecasts as included in the 3-year business plans (other durations may apply due to local specificities).

7.1. Current and deferred taxes expense

(In €million)	12 months ended 31 December 2019	12 months ended 31 December 2018*
Current tax	-122	-97
Deferred tax	40	95
Total	**-82**	**-1**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

7.2. Effective tax rate

The difference between the French standard tax rate and the Effective Tax Rate (ETR) is explained as follows:

(In €million)	12 months ended 31 December 2019	12 months ended 31 December 2018*
Profit before tax	452	564
French standard tax rate	34.4%	34.4%
Theoretical tax charge at French standard rate	**-156**	**-194**
Impact of permanent differences	7	23
Differences in foreign tax rates	39	41
Movement on recognition of deferred tax assets	36	111
Equity-based compensation	-24	-18
Change in deferred tax rates	2	-1
Taxes not based on taxable income (mainly CVAE, IRAP, US State income Tax)	-1	7
Withholding taxes	-2	-4
French Tax credit	12	18
Other	3	14
Group tax expense	**-82**	**-1**
Effective tax rate	**18.2%**	**0.2%**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

The tax charge for 2019 was € 82 million with a profit before tax from continuing operations of € 452 million. The Effective Tax Rate (ETR) was 18.2% compared to 16.2% in 2018 (excluding the recognition of deferred tax assets inherited from Bull acquisition (€ 90 million)). This increase related mostly to the integration in the Group scope of Syntel, which has a higher ETR than average. This effect was similar to the effect that Worldline used to have on Group ETR when it was consolidated as part of the continuing operations. Therefore, the Group ETR remained stable compared to the situation before Worldline deconsolidation and Syntel acquisition.

7.3. Restated effective tax rate

After restating the unusual items, the restated profit before tax was € 1,036 million, restated tax charge of € 246 million and the restated effective tax rate was 23.7%.

(in € million)	12 months ended 31 December 2019	12 months ended 31 December 2018*
Profit before tax	**452**	**564**
Other operating income and expenses	-530	-337
Change loss on derivative instrument	-54	-
Profit before tax excluding unusual items	**1,036**	**900**
Tax impact on unusual items	164	94
Group tax expense	-82	-1
Total of tax excluding unusual items	**-246**	**-95**
Restated effective tax rate	**23.7%**	**10.6%**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

7.4. Deferred taxes assets and liabilities

(In € million)	December 31, 2019	December 31, 2018
Deferred tax assets	325	459
Deferred tax liabilities	238	421
Net deferred tax	**87**	**38**

7.5. Breakdown of deferred tax assets and liabilities by nature

(In € million)	Tax losses carry forward	Intangible assets recognized as part of PPA	Fixed assets	Pensions	Other	Total
December 31, 2017	**287**	**-139**	**-12**	**245**	**-119**	**262**
Charge to profit or loss for the year	90	32	-17	6	-5	106
Change of scope	2	-379	-2	12	27	-340
Charge to equity	-	-	-	11	4	15
Reclassification	-	-	1	-1	-	-
Exchange differences	-3	-	-1	-	-1	-5
December 31, 2018	**376**	**-486**	**-31**	**273**	**-94**	**38**
Assets held for distribution	-34	185	49	-39	-21	141
Charge to profit or loss for the year	-48	38	-2	-42	94	40
Change of scope	0	-9	-1	-2	-157	-169
Charge to equity	-	-	-	37	2	40
Reclassification	-	9	-5	-3	-	0
Exchange differences	0	-6	3	0	1	-2
December 31, 2019	**294**	**-269**	**13**	**225**	**-175**	**87**

7.6. Tax losses carry forward schedule (basis)

(In € million)	December 31, 2019			December 31, 2018		
	Recog-nized	Unrecog-nized	Total	Recog-nized	Unrecog-nized	Total
2019	-	-	-	3	17	20
2020	2	47	49	7	26	33
2021	3	49	52	2	62	64
2022	1	99	100	2	102	104
2023	2	11	13			
Tax losses available for carry forward for 5 years and more	15	112	127	22	115	137
Ordinary tax losses carry forward	**23**	**318**	**341**	**36**	**322**	**358**
Evergreen tax losses carry forward	**1,053**	**2,196**	**3,249**	**1,207**	**2,542**	**3,749**
Total tax losses carry forward	**1,076**	**2,514**	**3,590**	**1,243**	**2,864**	**4,107**

The countries with the largest tax losses available for carry forward were France (€ 1,550 million), Germany (€ 992 million), The Netherlands (€ 280 million), the United Kingdom (€ 238 million), Brazil (€ 117 million), The United States (€ 107 million), Spain (€ 58 million) and Austria (€ 39 million).

7.7. Deferred tax assets not recognized by the Group

(In € million)	December 31, 2019	December 31, 2018
Tax losses carry forward	665	746
Temporary differences	181	182
Total	**846**	**928**

Note 8 Goodwill and fixed assets

8.1. Goodwill

Goodwill is measured as the excess of the sum of the consideration transferred, the amount of any non-controlling interests in the acquiree, and the fair value of the acquirer's previously held equity interest in the acquiree (if any) over the net of the acquisition-date amounts of the identifiable assets acquired and the liabilities assumed. If, after reassessment, the net of the acquisition-date amounts of the identifiable assets acquired and liabilities assumed exceeds the sum of the consideration transferred, of the amount of any non-controlling interests in the acquiree and of the fair value of the acquirer's previously held interest in the acquiree (if any), the excess is recognized immediately in profit or loss as a bargain purchase gain.

Goodwill is allocated to Cash Generating Units (CGU) for the purpose of impairment testing. Goodwill is allocated to those CGUs that are expected to benefit from synergies of the related business combination and represent the lowest level within the Group at which management monitors goodwill.

A CGU is defined as the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflows from other assets or group of assets. CGUs correspond to geographical areas where the Group has operations.

The recoverable value of a CGU is based on the higher of its fair value less costs to sell and its value in use determined using the discounted cash-flows method. When this value is less than its carrying amount, an impairment loss is recognized in the operating income.

The impairment loss is first recorded as an adjustment of the carrying amount of the goodwill allocated to the CGU and the remainder of the loss, if any, is allocated pro rata to the other long-term assets of the unit.

The Cash Generating Units used for the impairment test are not larger than operating segments determined in accordance with IFRS 8 Operating segments.

Goodwill is not amortized and is subject to an impairment test performed at least annually by comparing its carrying amount to its recoverable amount at the closing date based on December actuals and latest 3 year plan, or more often whenever events or circumstances indicate that the carrying amount could not be recoverable. Such events and circumstances include but are not limited to:

- significant deviance of economic performance of the asset when compared with budget;
- significant worsening of the asset's economic environment;
- loss of a major client;
- significant increase in interest rates.

Impairment tests

The Group tests at least annually whether goodwill has suffered any impairment, in accordance with the accounting policies stated below. The recoverable amounts of cash generating units are determined based on value-in-use calculations or on their fair value reduced by the costs of sales. These calculations require the use of estimates.

Further to the first application of IFRS 16, the Group elected for the transitional approach still including the rent expenses outflow in the expected cash flows of the CGUs, netting lease liabilities with other assets' net book values and using the same WACC parameters than in previous periods. The Group will change this approach for 2020 impairment test to fully comply with IAS 36 requirements.

(In €million)	December 31, 2018	Assets held for distribution	Impact of business combi-nation	Exchange differences and other	December 31, 2019
Gross value	9,431	-3,050	115	122	6,617
Impairment loss	-567	1	-	-13	-580
Carrying amount	**8,863**	**-3,049**	**115**	**109**	**6,037**

(In €million)	December 31, 2017	Assets held for distribution	Impact of business combi-nation	Exchange differences and other	December 31, 2018
Gross value	4,956	-	4,488	-13	9,431
Impairment loss	-572	-	-	5	-567
Carrying amount	**4,384**	**-**	**4,488**	**-9**	**8,863**

The impact of business combination in 2019 was related to the acquisition of IDnomic and X-Perion, as well as opening statement of financial position adjustments on Syntel acquisition, mainly related to tax items.

Goodwill is allocated to Cash Generating Units (CGUs) that are then part of one of the operating segments disclosed in Note 2 Segment information as per IFRS 8 requirements. Changes in internal management reporting are applied retrospectively and comparative figures are restated.

A summary of the carrying values of goodwill allocated by CGUs or grouping of CGUs is presented hereafter. Overall, goodwill decreased from € 8,863 million in 2018 to € 6,037 million in 2019 mainly due to the Worldline disposal following the loss of control and to the acquisitions of the year as detailed in Note 1 Changes in the scope of consolidation.

(In € million)	December 31, 2019	December 31, 2018
United Kingdom and Ireland	531	508
France	540	519
Germany	787	785
North America	3,091	2,967
Benelux & The Nordics	439	439
Other countries	649	596
Worldline	-	3,049
Total	**6,037**	**8,863**

The recoverable amount of a CGU is determined based on value-in-use calculations. These calculations use cash flow projections based on financial business plans approved by management, covering a three-year period. They are also based on the following assumptions:

- terminal value is calculated after the three-year period, using an estimated perpetuity growth rate of 2.0% (aligned with 2018). Although sometimes exceeding the long-term average growth rate for the countries in which the Group operates, this rate reflects specifics perspectives of the IT sector; and
- discount rates are applied by CGU based on the Group's weighted average cost of capital and adjusted to consider specific tax rates and country risks relating to each geographical area.

The discount rates used by CGU are presented below:

	2019, Discount rate	2018, Discount rate
United Kingdom and Ireland	8.0%	8.4%
France	8.0%	8.3%
Germany	8.0%	8.3%
North America	8.0%	8.4%
Benelux & The Nordics	8.0%	8.3%
Other countries	between 8% and 9.8%	between 8.3% and 10.9%

Based on the 2019 goodwill impairment test, which was carried out at year-end, no impairment losses were recognized as at December 31, 2019.

An analysis of the calculation's sensitivity to a combined change in the key parameters (operating margin, discount rate and perpetuity growth rate) based on reasonably probable assumptions of variations of +/- 50 bp for each of these parameters was performed and did not identify any probable scenario where the CGU's recoverable amount would fall below its carrying amount.

8.2. Intangible assets

Intangible assets other than goodwill

Intangible assets other than goodwill consist primarily of software and user rights acquired directly by the Group, software, customer relationships and technologies acquired as part of a business combination as well as internally developed IT solutions.

To assess whether an internally generated intangible asset meets the criteria for recognition, the Group classifies the generation of the asset into a research phase and a development phase.

Under IAS 38, no intangible asset arising from research (or from the research phase of an internal project) shall be recognized. Such expenditure is therefore recognized as an expense when it is incurred.

An intangible asset arising from development (or from the development phase of an internal project) shall be recognized if, and only if, an entity can demonstrate all of the following:

- the technical feasibility of completing the intangible asset so that it will be available for use or sale;
- its intention to complete the intangible asset and to use or sell it;
- its ability to use or sell the intangible asset;
- how the intangible asset will generate probable future economic benefits;
- the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and its ability to measure reliably the expenditure attributable to the intangible asset during its development.

Development expenditure refers to IT solutions developed for the group's own use, to specific implementation projects for specific customers or innovative technical solutions made available to a group of customers. Development projects are analyzed on a case-by-case basis and the only costs which are capitalized are those attributable to the creation, production and preparation of the asset to be capable of operating in the manner intended by management.

Capitalized development expenditure is accounted for at cost less accumulated depreciation and any impairment losses. It is amortized on a straight-line basis over a useful life between 3 and 12 years, for which two categories can be identified:

- for internal software development with fast technology serving activities with a shorter business cycle and contract duration, the period of amortization will be between 3 and 7 years, the standard scenario being set at 5 years in line with the standard contract duration;
- for internal software development with slow technology obsolescence serving activities with a long business cycle and contract duration, the period of amortization will be between 5 and 12 years with a standard scenario of 7 years. It is typically the case for large mutualized payment platforms.

An intangible asset related to the customer relationships and backlog brought during a business combination is recognized as customer relationships. The value of this asset is based on assumptions of renewal conditions of contract and on the discounted flows of these contracts. This asset is amortized on an estimation of its average life.

The value of the developed technology acquired is derived from an income approach based on the relief from royalty method. This method relies on (i) assumptions on the obsolescence curve of the technology and (ii) the theoretical royalty rate applicable to similar technologies, to determine the discounted cash flows expected to be generated by this technology over their expected remaining useful life. The developed technology is amortized on an estimation of its average life. The cost approach may also be implemented as a secondary approach to derive an indicative value for consistency purposes. This method relies on assumptions of the costs that should be engaged to reproduce a similar new item having the nearest equivalent utility as the asset being valued. On the contrary, if technology is believed to be the most important driver for the business, an Excess Earning method could also be implemented.

Intangible assets are amortized on a straight-line basis over their expected useful life, generally not exceeding 5 to 7 years for internally developed IT solutions in operating margin. Customer relationships, patents, technologies and trademarks acquired as part of a business combination are amortized on a straight-line basis over their expected useful life, generally not exceeding 19 years; any related depreciation is recorded in other operating expenses.

(In €million)	Customer relationships	Trademarks, Software and licences	Other intangible assets	Total
Gross value				
December 31, 2018	**1,898**	**854**	**1,309**	**4,061**
Assets held for distribution	-585	-177	-827	-1,590
Additions	-	110	8	118
Impact of business combinations	-	-	11	11
Intangible assets recognized as part of a Purchase Price Allocation	10	-	-	10
Capitalized costs	-	-	84	84
Disposals	-3	-28	-21	-52
Exchange differences and others	39	37	-30	46
December 31, 2019	**1,358**	**796**	**534**	**2,689**
Accumulated depreciation				
December 31, 2018	**-475**	**-396**	**-377**	**-1,248**
Assets held for distribution	40	153	304	496
Amortization charge for the year	-	-12	-36	-47
recognized as part of a Purchase Price Allocation	-120	-34	-2	-157
Amortization of capitalized costs	-	-	-56	-56
Disposals	1	18	14	34
Exchange differences and others	-15	-28	6	-36
December 31, 2019	**-568**	**-299**	**-146**	**-1,013**
Net value				
December 31, 2018	**1,422**	**458**	**933**	**2,813**
December 31, 2019	**790**	**497**	**388**	**1,675**

(In €million)	Customer relationships	Trademarks, Software and licences	Other intangible assets	Total
Gross value				
December 31, 2017	**893**	**759**	**648**	**2,300**
Additions	-	101	5	106
Impact of business combinations	-	-	14	14
Intangible assets recognized as part of a Purchase Price Allocation	980	7	557	1,544
Capitalized costs	-	-	117	117
Disposals	-	-21	-12	-34
Exchange differences and others	24	9	-19	14
December 31, 2018	**1,898**	**854**	**1,309**	**4,061**
Accumulated depreciation				
December 31, 2017	**-354**	**-347**	**-289**	**-991**
Amortization charge for the year	-24	-28	-23	-74
Amortization of intangible assets recognized as part of a Purchase Price Allocation	-89	-36	-4	-128
Amortization of capitalized costs	-	-	-81	-81
Disposals	1	17	14	32
Exchange differences and others	-9	-2	6	-5
December 31, 2018	**-475**	**-396**	**-377**	**-1,248**
Net value				
December 31, 2017	**539**	**412**	**359**	**1,309**
December 31, 2018	**1,422**	**458**	**933**	**2,813**

Following the distribution in kind of Worldline shares on May 7, 2019, the Group has no more control on Worldline, but a significant influence on Worldline. A purchase price allocation has been performed for the part of the business which is still held by the Group and former purchase price allocation reversed have been presented in "Assets held for distribution" due to Worldline deconsolidation.

The Group share of Worldline net contributive result since May 1, 2019 is presented in the Group 2019 consolidated income statement in "Share of net profit/(loss) of associates". The new intangible assets generated by the purchase price allocation exercise are amortized on the same line.

The 2019 amortization of intangible assets recognized in the **Purchase Price Allocation** (PPA) of € 157 million was mainly composed of:

- € 67 million of Syntel customer relationships and technologies amortized over 12 years starting November 1, 2018;
- € 22 million of SIS customer relationships amortized over 12 years starting July 1, 2011;
- € 20 million of Xerox ITO customer relationships amortized over 6 to 12 years starting July 1, 2015;
- € 17 million of Unify customer relationships and technologies amortized over 2 to 10 years starting February 1, 2016;
- € 16 million of Bull customer relationships and patents amortized over respectively 9 years and 7 to 10 years starting September 1, 2014;

In 2019, the amount of amortization of intangible assets recognized in the **Purchase Price Allocation** (PPA) increased from € 128 million to € 157 million, mainly due to the amortization in a full year basis of the Syntel Purchase Price Allocation (€ 67 million in 2019 to be compared with € 11 million over 2 months in 2018).

The gross book value of customer relationship for € 1,358 million as at December 31, 2019 presented above, included mainly:

- € 544 million relative to the Syntel acquisition in 2018;
- € 357 million relative to the Siemens IT Solutions and Services acquisition in 2011;
- € 151 million relative to the Xerox ITO acquisition in 2015;
- € 109 million relative to the Anthelio acquisition in 2016;
- € 104 million relative to the Unify acquisition in 2016.

8.3. Tangible assets

Tangible assets are recorded at acquisition cost. They are depreciated on a straight-line basis over the following expected useful lives:

- buildings 20 years;
- fixtures and fittings 5 to 10 years;
- computer hardware 3 to 5 years;
- office furniture and equipment 5 to 10 years.

Any gain or loss on disposal of an item of property, plant and equipment is recognized in the income statement.

Impairment of assets

Assets that are subject to amortization are tested for impairment whenever events or circumstances indicate that the carrying amount may not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying value exceeds its recoverable value.

(In €million)	Land and buildings	IT equipments	Other tangible assets	Total
Gross value				
December 31, 2018	**465**	**970**	**205**	**1,639**
Assets held for distribution	-68	-411	-52	-531
Additions	32	149	65	246
Impact of business combination	1	1	2	4
Disposals	-113	-173	-30	-316
Exchange differences and others	16	-38	-41	-63
December 31, 2019	**332**	**499**	**149**	**980**
Accumulated depreciation				
December 31, 2018	**-286**	**-548**	**-80**	**-914**
Assets held for distribution	51	306	30	387
Depreciation charge for the year	-29	-146	-14	-190
Eliminated on disposal	98	169	25	291
Exchange differences and others	-5	2	0	-3
December 31, 2019	**-171**	**-217**	**-40**	**-428**
Net value				
December 31, 2018	**179**	**422**	**125**	**725**
December 31, 2019	**162**	**282**	**108**	**552**

(In €million)	Land and buildings	IT equipments	Other tangible assets	Total
Gross value				
December 31, 2017	**438**	**1,041**	**171**	**1,650**
Additions	38	247	51	335
Impact of business combination	34	25	44	102
Disposals	-45	-265	-29	-339
Exchange differences and others	1	-77	-33	-109
December 31, 2018	**465**	**970**	**205**	**1,639**
Accumulated depreciation				
December 31, 2017	**-277**	**-592**	**-88**	**-957**
Depreciation charge for the year	-37	-212	-14	-263
Eliminated on disposal	24	210	24	258
Exchange differences and others	4	46	-1	49
December 31, 2018	**-286**	**-548**	**-80**	**-914**
Net value				
December 31, 2017	**161**	**449**	**83**	**693**
December 31, 2018	**179**	**422**	**125**	**725**

The tangible assets of the Group include mainly IT equipment used in production centers, in particular datacenters and software factories. Moreover, Atos policy is to rent its premises. Therefore, the land and building assets include mainly the technical infrastructure of Group datacenters.

Note 9 Leases

Existence of a lease

At inception of a contract, the Group assesses whether a contract is, or countains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period in exchange of consideration. Lease Liabilities and Right-of-use are recognized at the lease commencement date.

The Group does not recognize short term leases (less than 12 months) and leases for which the underlying asset is of a low value except when those assets are subleased to end customers. Payments under such contracts are registered in the income statement, on a straight-line basis, over the duration of the contract. Future commitments to pay rents are presented as off-balance-sheet commitments.

Lease Liability

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using a Group's incremental borrowing. Those rates have been determined for all currencies of the Group by geography and by maturity. The incremental borrowing rates are calculated by taking for each currency a reference market index quotation and adding up a spread corresponding to the cost of financing that would be applied by a lender to any subsidiary of Atos Group.

The lease liability is subsequently increased by the interest cost on the lease liability and decreased by lease payments made. It is remeasured when there is a change in the future lease payments arising from a change in an index or rate, a change in estimate of the amount expected to be payable under a residual value guarantee, or changes in the assessment of whether an extension option is reasonably certain to be exercised or a termination option is reasonably certain to be exercised, resulting from a decision of the Group.

Lease right-of-use

The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred, less any lease incentive received.

Real Estate Leases

The Group leases most of its offices and strategic production sites such as Data Centers. Terms and condition can be very heterogeneous based on nature of the sites and local regulations. Those leases have terms between 2 to 20 years.

The Group is applying judgment to determine the lease term for some Real Estate lease contracts in which it is a lessee and that include renewal or early termination options analyzing whether those sites, mainly offices and data centers, are strategic or not. In most cases, the Group retains the earliest date when the Group can go out from its lease commitment without paying any significant penalty except for French 3/6/9 specific leases where the 9th year is systematically defined as lease term.

IT equipment's and company cars

The Group leases IT equipment's for its own use or to deliver its services to end customers (computers, servers). Those leases are entered for terms between 3 to 5 years.

Deferred tax treatment

Deferred tax is applied to IFRS 16 entries based on local applicable tax rates.

(In € million)	Land and buildings	IT equipments	Cars and others	Total
Gross value				
January 1, 2019	**912**	**223**	**71**	**1,206**
Additions	66	167	20	253
Disposals	-15	-44	-2	-61
Exchange differences and others	-20	3	-	-17
December 31, 2019	**943**	**349**	**89**	**1,381**
Accumulated depreciation				
January 1, 2019				
Depreciation charge for the year	-189	-115	-32	-336
Eliminated on disposal	16	24	3	42
Exchange differences and others	-1	-2	-	-3
December 31, 2019	**-174**	**-94**	**-29**	**-297**
Net value				
January 1, 2019	**912**	**223**	**71**	**1,206**
December 31, 2019	**768**	**256**	**60**	**1,084**

In 2019, the "Exchange differences and others" mainly corresponded to the recognition of a sublease receivable related to offices occupied by third parties, reclassified in Non-current financial assets (Note 6.3).

Note 10 Investments in associates accounted for under the equity method

Investments in associates over whose management the parent company directly or indirectly exercises significant influence, without however exercising full or joint control, are accounted for under the equity method. This method consists of recording the Group's share in profit for the year of the associate in the Consolidated Income Statement in "Share of net profit/(loss) of associates".

The Group's share in net assets of the associate is recorded under "Investments in associates accounted for under the equity method" in the Consolidated Statement of Financial Position.

The Group decided to classify all gain or loss on disposal of Investments in associates in Other operating income and expenses.

(In € million)	December 31, 2018	Business combination	Disposal	Net results	Exchange differences and other	December 31, 2019
Worldline	-	2,732	-1,053	45	-	1,724
Other	7	-	-	2	-6	3
Total	**7**	**2,732**	**-1,053**	**47**	**-6**	**1,727**

Following the distribution in kind of Worldline's shares, Atos held 27.3% of Worldline's share capital and 35% of voting rights, subject to a six-month lock-up period. Starting May 1, 2019, the Group has no more control on Worldline, but a significant influence on Worldline. As such, the Group investment in Worldline was from that date presented as part of "Investments in associates accounted for under the equity method" in the 2019 consolidated financial statements.

The amount of € 2,732 million in "business combination" corresponded to the remaining Worldline shares owned by Atos SE, valued at the opening price on May 7, 2019 for a value of € 54.7 per share.
After having distributed 23.5% of Worldline shares to its Shareholders on May 7, 2019, Atos has completed in November 2019:

- the sale of 14.7 million of Worldline shares through an Accelerated Book building Offering (ABO);
- the transfer of £ 198 million (€ 230 million) of Worldline shares to Atos UK Pension Scheme;
- the issuance of € 500 million bond which will be exchangeable into Worldline shares.

These two first transactions led to a net book value of € 1,053 million in November 2019.

After completion of November transactions, Atos voting rights over Worldline amounted to 25.6% and 16.9% of interest percentage. The review of the governance led to the conclusion that Atos still has significant influence over Worldline. As such, the Group continued to consolidate Worldline under Equity method.

Note 11 Pension plans and other long-term benefits

The Group uses actuarial assumptions and methods to measure pension costs and provisions. The value of plan assets is determined based on valuations provided by the external custodians of pension funds and following complementary investigations carried-out when appropriate. The estimation of pension liabilities, as well as valuations of plan assets requires the use of estimates and assumptions.

Employee benefits are granted by the Group through defined contribution and defined benefit plans. Costs relating to defined contribution costs are recognized in the income statement based on contributions paid or due in respect of the accounting period when the related services have been provided by beneficiaries.

The valuation of Group defined benefit obligations is based on a single actuarial method known as the "projected unit credit method". This method relies in particular on projections of future benefits to be paid to Group employees, by anticipating the effects of future salary increases. Its implementation further includes the formulation of specific assumptions which are periodically updated, in close liaison with external actuaries used by the Group.

Plan assets usually held in separate legal entities are measured at their fair value, determined at closing.

From one accounting period to the other, any difference between the projected and actual pension plan obligation and their related assets is combined at each benefit plan's level to form actuarial differences. These actuarial differences may result either from changes in actuarial assumptions used, or from experience adjustments generated by actual developments differing, in the accounting period, from assumptions determined at the end of the previous accounting period. All actuarial gains and losses on post-employment benefit plans generated in the period are recognized in "other comprehensive income".

Benefit plan costs are recognized in the Group's operating income, except for interest costs on obligations, net of expected returns on plans assets, which are recognized in "other financial income and expenses".

The total amount recognized in the Group statement of financial position in respect of pension plans was € 972 million at December 31, 2019 (excluding Worldline) compared to € 1,197 million at December 31, 2018 (including € 110 million for Worldline). The total amount recognized for other longer-term employee benefits was € 50 million (excluding Worldline) compared to € 71 million at December 31, 2018 (including € 7 million for Worldline).

(In € million)	**December 31, 2019**	**December 31, 2018**
Amounts recognized in financial statements consist of :		
Prepaid pension asset	231	116
Accrued liability – pension plans [a]	-1,203	-1,314
Total Pension plan	**-972**	**-1,197**
Accrued liability – other long-term employee benefits [b]	-50	-71
Total accrued liability [a] + [b]	**-1,252**	**-1,385**

Pension plans

The Group's pension obligations are located predominantly in the United Kingdom (52% of Group total obligations), Germany (30%), US (6%), France (5%) and Switzerland (5%).

Characteristics of significant plans and associated risks

In the United Kingdom, these obligations are generated by legacy defined benefit plans, the majority of which have been closed to further accrual or new entrants. The plans are final pay plans and are subject to the UK regulatory framework where funding requirements are determined by an independent actuary based on a discount rate reflecting the plan's expected return on investments. Recovery periods are agreed between the plans' trustees and the sponsoring companies and may run up to 20 years if appropriate securities are provided by sponsors. The majority of plans are governed by a sole independent trustee.

The current asset allocation across United Kingdom plans is 78% fixed income, 22% equities and other assets and may vary depending on the particular profile of each plan. The interest rate and inflation exposures are cautiously managed through investment in Gilts, Indexed-Linked and interest rate swaps. The fixed income allocation comprises a significant exposure to investment grade credits and the equity allocation is well diversified geographically.

The plans do not expose the Group to any specific risks that are unusual for these types of benefit plans. Typical risks include, increase in inflation, longevity and a decrease in discount rates and adverse investment returns.

In Germany the majority of the liabilities relate to pension entitlements that transferred to the Group with the acquisition of SIS in 2011 and Unify in 2016. The plans cover multiple legal entities in Germany and are subject to the German regulatory framework, which has no funding requirements, but does include compulsory insolvency insurance (PSV). The plans are partially funded however, using a Contractual Trust Agreement (CTA). The CTA is governed by a professional independent third party. The investment strategy is set by the Investment Committee composed of employer representatives. The asset allocation related to the largest German schemes is 65% fixed income, 24% return seeking assets and other assets and 11% property. The asset allocation related to the other scheme is more in line with the lower interest rate sensitivities of the schemes and are predominantly invested in investment grade credits and, to a lesser extent, in balanced funds and European high yield.

In Switzerland, the obligations are generated by legacy defined benefit plans, exceeding the minimum benefit requirements under Swiss law (BVG). Pension contributions are paid by both the employees and the employer and are calculated as a percentage of the covered salary. The rate of contribution depends on the age of the employee. At retirement, the employees' individual savings capital is multiplied by the conversion rate, as defined by the pension fund regulations, and can be paid out as either a lifetime annuity or a lump-sum payment. In the event of disability, the pension plan pays a disability pension until ordinary retirement age.

The Group obligations are also generated by Qualified and Unqualifed Pension plans in the USA and, to a lesser extent, by legal or collectively bargained end of service or end of career benefit plans. The Group obligations with respect to post-employment healthcare benefits are not significant.

Atos recognized all actuarial gains and losses and asset ceiling effects generated in the period in "Other comprehensive income".

Events in 2019

Since the distribution of Worldline shares by Atos in 2019, Worldline has been consolidated under Equity method in Atos consolidated financial statement. That led to a decrease in the net pension liabilities of € 110 million as at January 1, 2019 (a decrease in the pension obligations of € 536 million and a decrease in plan assets of € 426 million).

In November 2019, Atos merged three Defined Benefit pension schemes together, with transfer of assets and liabilities into a newly Scheme (the Atos UK 2019 Pension Scheme). Members of those plans are either deferred or pensioner members. The deficit at the date of the merger is expected to be around £ 265 million. An agreement has been reached with the Trustee of the new Scheme to arrange a one-off contribution of £ 198 million (€ 230 million) through the distribution of Worldline share. This non-cash transaction will prevent Atos from any additional funding in cash for the next 15 years, subject to ensuring compliance with UK pension funding regulations.

Twice this year, Atos UK Ltd offered to some of the current active members of the Atos 2011 Pension Scheme, a Bridging Pension Option (BPO). This option gives members the opportunity to give up some of their pension rights to be received after State Pension Age (SPA) as a counterpart of temporary pension uplift when retiring from the scheme up to their SPA. This led to a reduction in obligation and operating expenses of € 10 million, including actuarial, legal and other project costs.

In France, the Occupational Pension plan offered to Executive Committee members has been frozen as a result of the "Loi PACTE" act, implementing in the French regulation parts of the EU directive related to pension accrual portability. The French government clarified via the Ordinance of July 3, 2019 how those new rules apply. Defined Benefit Pension plans are closed to new entrants starting July 4, and no additional benefit accruals are allowed from January 1, 2020 onwards. As a consequence of this new legal framework, upon recommendation of the Nomination and Remuneration Committee, the Board of Directors decided on December 16, 2019 that the new CEO will no longer be eligible to the Occupational Pension plan offered to Executive Committee members. Besides, former Chairman and CEO thierry Breton, who left Atos on October 31, 2019, and settled his Defined Benefit pension accrued rights, waived his pension supplement that he could be entitled to, during his mandate period at the European Commission. All these impacts are treated as plan amendment under IAS19. The positive impact of it has been recognized as part of operating margin in the second half of the year for € 12 million.

(In € million)	**December 31, 2019**	**December 31, 2018**
Amounts recognized in financial statements consist of :		
Prepaid pension asset	231	116
Accrued liability – pension plans	-1,203	-1,314
Net amounts recognized – Total	**-972**	**-1,197**
Components of net periodic cost		
Service cost (net of employees contributions)	51	57
Past service cost, settlements	-46	-41
Administration costs	2	4
Operating expense	**8**	**20**
Interest cost	104	103
Interest income	-74	-79
Financial expense	**30**	**24**
Net periodic pension cost – Total expense/(profit)	**37**	**44**
Change in defined benefit obligation		
Total Defined Benefit Obligation at January 1st	**4,901**	**4,735**
Assets held for distribution	-536	14
Exchange rate impact	138	-14
Service cost (net of employees contributions)	51	57
Interest cost	104	103
Past service cost, Settlements	-51	-42
Business combinations/(disposals)	-	330
Employees contributions	7	9
Benefits paid	-183	-184
Actuarial (gain)/loss - change in financial assumptions	454	-124
Actuarial (gain)/loss - change in demographic assumptions	-45	-12
Actuarial (gain)/loss - experience results	16	29
Reclassification	0	-
Defined benefit obligation at December 31st	**4,855**	**4,901**

The weighted average duration of the liability is about 16 years.

(In € million)	December 31, 2019	December 31, 2018
Change in plan assets		
Fair value of plan assets at January 1st	**3,704**	**3,557**
Assets held for distribution	-426	-7
Exchange rate impact	131	-15
Actual return on plan assets	364	-56
Employer contributions	33	46
Benefits paid by the funds	-151	-146
Settlements	-5	-2
Business combinations/(disposals)	-	322
Employees contributions	7	9
Administration costs	-3	-4
Transfer of Worldline shares to Atos UK Pension Scheme	230	-
Fair value of plan assets at December 31st	**3,883**	**3,704**
Reconciliation of prepaid/(accrued) Benefit cost		
Funded status	-972	-1,197
Any other amount not recognized (asset ceiling limitation)	-	-1
Prepaid/(accrued) pension cost	**-972**	**-1,197**
Reconciliation of net amount recognized (all plans)		
Net amount recognized at beginning of year	**-1,197**	**-1,179**
Assets held for distribution	110	-11
Net periodic pension cost	-37	-44
Benefits paid by employer	32	39
Employer contributions	33	46
Business combinations/(disposals)	-	-6
Amounts recognized in Other Comprehensive Income	-134	-39
Other (exchange rate)	-7	-1
Transfer of Worldline shares to Atos UK Pension Scheme	230	-
Reclassification	-1	-2
Net amount recognized at end of year	**-972**	**-1,197**

The development in the main countries was as follows:

(In € million)	UK schemes	German schemes	Other schemes
Reconciliation of net amount recognized in main plans:			
Net amount recognized at beginning of year	**-60**	**-719**	**-418**
Assets held for distribution	6	60	44
Net periodic pension cost	-5	-15	-17
Benefits paid by employer & employer contributions	25	14	26
Business combinations / disposals	-	-	-
Amounts recognized in Other Comprehensive Income	-43	-70	-21
Transfer of Worldline shares to Atos UK Pension Scheme	230		
Other (exchange rate and reclassification)	-3	0.33	-5
Net amount recognized at end of year	**151**	**-730**	**-393**
Defined benefit obligation at December 31st	-2,472	-1,444	-940
Fair value of plan assets at December 31st	2,622	714	547
Asset ceiling limitation at December 31st	-	-	-
Net amount recognized at end of year	**151**	**-730**	**-393**

Actuarial assumptions

Group obligations are valued by independent actuaries, based on assumptions that are periodically updated.

These assumptions are set out in the table below:

	United Kingdom		Eurozone		Switzerland		USA	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Discount rate	2.10%	2.90%	0,8% ~ 1,3%	1.6% ~ 2.05%	0.25%	0.75% ~ 0.8%	3.00%	4.00%
Inflation assumption	RPI: 2.95% CPI: 1.95%	RPI: 3.20% CPI: 2.20%	1.45%	1.45%	na	na	na	na

The inflation assumption is used for estimating the impact of indexation of pensions in payment or salary inflation based on the various rules of each plan.

Sensitivity of the defined benefit obligations of the significant plans to the discount rate and inflation rate assumptions is as follows:

	Discount rate +25bp	Inflation rate +25bp
United Kingdom main pension plans	-4.7%	+3.6%
German main pension plans	-3.7%	+2.5%

These sensitivities are based on calculations made by independent actuaries and do not include cross effects of the various assumptions, they do however include effects that the inflation assumption would have on salary increase assumptions for the United Kingdom.

Plan assets

Plan assets were invested as follows:

	December 31, 2019	December 31, 2018
Equity	15%	16%
Bonds/Interest Rate Swaps	66%	64%
Real Estate	7%	8%
Cash and Cash equivalent	2%	3%
Other	10%	9%

Of these assets, 88% is valued on market value, 10% relates to property, private equity and infrastructure investments where valuations are based on the information provided by the investment managers and 2% relates to insurance contracts.

A significant part of the Bonds and Interest Rate Swaps are part of the interest rate hedging program operated by the Atos United Kingdom pension plans, which aims to hedge a significant portion of funding liabilities. None of the plans are hedged for longevity risks.

Atos securities or assets used by the Group are not material.

Situation of the United Kingdom pension funds and impact on contribution for 2020

The Group expects to contribute € 8 million to its United Kingdom schemes next year versus € 25 million in 2019, as a result of the good level of funding of the two main schemes at the end of 2019.

Prepaid pension situations on statement of financial position

The net asset of € 231 million mostly relates to two schemes in the United Kingdom and is supported by appropriate refund expectations according to IFRIC 14.

Summary net pension impacts on income statement

The net impact of defined benefit pension plans on Group financial statements can be summarized as follows:

(In €million)	12 months ended 31 December 2019	12 months ended 31 December 2018*
Operating margin	-9	-18
Other operating income and expenses	1	-2
Financial result	-30	-24
Total (expense)/profit	**-37**	**-44**

Other long-term employee benefits

The net liabilities related to other long-term employee benefits were € 64 million per December 31, 2018 (excluding Worldline). They decreased to € 50 million per December 31, 2019 via benefit payments and employer contributions (€ 34 million) net of expenses recorded in P&L (€ 25 million).

Note 12 Provisions

Provisions are determined by discounting the excepted future cash flows to estinguish the liability. Provisions are recognized when:

- the Group has a present legal, regulatory, contractual or constructive obligation as a result of past events and;
- it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and;
- the amount has been reliably quantified

(In €million)	December 31, 2018	Assets held for distribution	Charge	Release used	Release unused	Other (*)	December 31, 2019	Current	Non-current
Reorganization	70	-5	50	-36	-6	1	74	69	5
Rationalization	18	0	1	-6	-7	3	9	7	2
Project commitments	37	-3	14	-12	-5	-1	30	26	4
Litigations and contingencies	121	-31	17	-4	-12	-17	75	17	58
Total provisions	**247**	**-38**	**82**	**-58**	**-30**	**-14**	**188**	**119**	**69**

(*) Other movements mainly consist of the currency translation adjustments

(In €million)	December 31, 2017	Charge	Release used	Release unused	Business Combi-nation	Other (*)	December 31, 2018	Current	Non-current
Reorganization	77	41	-67	-5	24	0	70	68	2
Rationalization	25	4	-6	-3	1	-2	18	6	12
Project commitments	46	14	-19	-20	17	0	37	30	7
Litigations and contingencies	138	11	-17	-23	16	-4	121	41	80
Total provisions	**286**	**69**	**-108**	**-51**	**58**	**-7**	**247**	**146**	**101**

(*) Other movements mainly consist of the currency translation adjustments

Reorganization

New reorganization provisions were posted for € 50 million over the year mainly in Germany, France and Benelux and The Nordics driven by new plans aimed at improving Group efficiency and productivity.

The € 36 million consumptions primarily corresponded to workforce optimization in Germany, Central Eastern Europe and Benelux and The Nordics.

Rationalization

The new provisions of € 1 million mainly relate to office premises rationalization in Germany.

The € 6 million rationalization provisions were used against office premises rationalization costs in Germany, in United Kingdom, in Benelux and The Nordics and in the United States.

Project commitments

The € 14 million charge was mainly incurred in Central Eastern Europe, in Germany in Benelux and The Nordics and in India.

Project commitments provisions released for € 12 million primarily related to losses incurred in Central Eastern Europe, Germany, and France.

Litigation and contingencies

The closing position of contingency provisions of € 75 million was composed of a number of long-term litigation issues, such as tax contingencies and social disputes, guarantees given on disposals and other disputes with clients and suppliers.

The legal department monitors these situations closely with a view to minimizing the ultimate liability.

Note 13 Fair value and characteristics of financial instruments

Derivative financial instruments

Derivative instruments are recognized as financial assets or liabilities at their fair value. Any change in the fair value of these derivatives is recorded in the income statement as a financial income or expense, except when they are eligible for hedge accounting, whereupon:

- for fair value hedging of existing assets or liabilities, the hedged portion of an instrument is measured on the statement of financial position at its fair value. Any change in fair value is recorded as a corresponding entry in the income statement, where it is offset simultaneously against changes in the fair value of the designated hedging elements except for any ineffectiveness;
- for cash flow hedging, the effective portion of the change in fair value of the hedging instrument is directly recognized in shareholders' equity as "items recognized directly in equity". The change in value of the ineffective portion is recognized in "Other financial income and expenses". Amounts deferred in equity are taken to the income statement at the same time as the related hedged cash flow.

The Group uses forward foreign exchange contracts to hedge the variability in cash flows arising from changes in foreign exchanges rates relating to foreign currency sales and purchases. The Group designates only the spot element of the forward exchange contract as the hedging instrument in cash flow hedging relationships for highly probable transactions. Under IFRS 9, the Group has elected to separately account for the forward points as a cost of hedging. Consequently, the changes in forward points will be recognized in other comprehensive income and accumulated in a cost of hedging reserve as a separate component within equity and accounted for subsequently as gain and losses accumulated in the cash flow hedge reserve as part of the underlying covered transaction.

(In € million)	December 31, 2019		December 31, 2018	
	Assets	Liabilities	Assets	Liabilities
Forward foreign exchange contracts	7	-1	12	-2
Forward interest rate contracts	-	-2	-	-3
Analysed as :				
. Non-current	-	-2	-	-3
. Current	7	-1	12	-2

The fair value of financial instruments is provided by independent counterparties.

Interest rate risk

In 2018, bank loans and commercial papers of € 880 million, and in 2019 bank loans and Commercial Papers of € 755 million are arranged at floating rates, thus exposing the Group to cash flow interest rate risk.
The Group may mitigate its interest rate exposure using interest rates swap contracts with financial institutions in order to fix the rate of a portion of the floating-rate financial debt. The fair value of the financial instruments used to hedge the floating-rate financial qualifies for cash flow hedge accounting.

Exposure to interest rate risk

The table below presents the interest rate risk exposure of the Group based on future debt commitments. The exposure at floating rate after hedging risk management is approximately € 2,059 million as at December 31, 2019. A 1.0% decrease in 1-month Euribor would reduce income from interest by € 20.6 million in theory assuming the structure (cash/floating debt/hedges) remains stable for the full period of the year.

(In € million)	Notes	Exposure		Total
		Less than 1 year	More than 1 year	
Bank loans & NEU CP		-755	-	-755
Securitization	Note 6.4.1	-10	-	-10
Other		-54	-1	-55
Total liabilities		**-819**	**-1**	**-820**
Cash and cash equivalents	Note 6.2	2,413	-	2,413
Overdrafts		-79	-	-79
Total net cash and cash equivalents (*)		**2,334**	**-**	**2,334**
Net position before risk management		1,515	-1	1,514
Hedging instruments		45	500	545
Net position after risk management		**1,560**	**499**	**2,059**
Bonds	Note 6.4.1	-600	-2,100	-2,700
Optional exchangeable bond	Note 6.4.1	-	-500	-500
NEU MTN at fixed rate		-	-50	-50
Total net debt/cash after risk management		**-600**	**-2,650**	**-1,191**

(*) Overnight deposits (deposit certificate) and money market securities and overdrafts

Liquidity risk

On November 14, 2019 Atos has fully repaid the term loans in USD and EUR drew on October 9, 2018 to fund the Syntel acquisition. The outstanding amounts were $ 1,045 million and € 513 million.

On October 30, 2019 Atos has announced the disposal of Worldline share capital (€ 780 million through a private placement by way of Accelerated Book building Offering (ABO) and the issuance of € 500 million zero coupon bonds exchangeable into Worldline shares with a maturity of 5 years and an exchange premium of 35%. Total gross proceeds for Atos was € 1,280 million for the combined transactions.

On November 5, 2018, Atos announced the successful placement of its € 1.8 billion bond issue. The € 1.8 billion triple tranche bond issue consists of three tranches:

- € 700 million notes with a 3.5-year maturity and 0.75 % coupon
- € 750 million notes with a 6.5-year maturity and 1.75 % coupon
- € 350 million notes with a 10-year maturity and 2.50 % coupon

There are no financial covenants. The rating agency Standard and Poor's has assigned a rating of BBB+ to the three tranches, subsequently to the rating of Atos described here below.

On October 22, 2018, the rating agency Standard and Poor's has assigned a rating of BBB+ to Atos recognizing the strong investment grade profile of the Group.

On October 11, 2018, Atos signed with a number of major financial institutions a five-year € 2.4 billion revolving credit facility (the Facility) maturing in November 2023 with an option for Atos to request the extension until November 2025 in two times. Atos has exercised the option on 2019 to extend the maturity of the Facility until November 2024. Atos still keeps the option to extend the maturity of the Facility for another one year. The Facility is available for general corporate purposes and replaces the existing € 1.8 billion facility signed in November 2014. The Facility includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5 times.

On October 9, 2018, Atos drew a bridge loan of $ 1.9 billion for the acquisition of Syntel. The bridge loan was fully reimbursed on November 9, 2018.

On October 9, 2018, Atos drew a term loan of $ 1.9 billion for the acquisition of Syntel. The term loan was composed of a 3-year $ 1.1 billion loan and a 5-year $ 0.8 billion loan. The term loan issuance by currency was $ 0.6 billion equivalent euros and $ 1.3 billion in USD. On December 14, 2018, Atos reimbursed $ 200 million out of the loan drawn in USD.

The $ 1.9 billion term loan includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5 times.

On May 4, 2018 Atos implemented a Negotiable European Medium-Term Note program (NEU MTN) in order to optimize financial expenses and improve Group liquidity management, for an initial maximum amount of € 600 million.

On June 2, 2017, Atos implemented a Negotiable European Commercial Paper program (NEU CP) in order to optimize financial expenses and improve Group liquidity management, for an initial maximum amount of € 900 million raised to € 1.8 billion in October 2018. On December 10th, 2019 the maximum amount of € 1.8 billion was increased to € 2.4 billion.

On September 29, 2016, Atos issued a Euro private placement bond of € 300 million with a seven-year maturity and with a 1.444% fixed interest rate (unrated). There are no financial covenants.

On July 2, 2015 Atos issued a bond of € 600 million with a five-year maturity. The coupon rate is 2.375% (unrated). There are no financial covenants.

Atos securitization program of trade receivables has been renewed for 5 years on May 29, 2018 with a maximum amount of receivables sold of € 500 million and a maximum amount of financing reduced from € 200 million to € 100 million. The program has been restricted to two French participant entities.

The program is still structured with two compartments, called ON and OFF:

- compartment "ON" is similar to the previous program (i.e. the receivables are maintained in the Group statement of financial position) which remains by default the compartment in which the receivables are sold. This compartment was used at its lowest level;
- compartment "OFF" is designed so the credit risk (insolvency and overdue) of the debtors eligible to this compartment of the program is fully transferred to the purchasing entity of a third-party financial institution.

As of December 31, 2019, the Group has sold:

- in the compartment "ON" € 108 million receivables for which € 10 million were received in cash. The sale is with recourse, thus re-consolidated in the statement of financial position;
- in the compartment "OFF" € 37 million receivables which qualify for de-recognition as substantially all risks and rewards associated with the receivables were transferred.

The Atos securitization program includes one financial covenant which is the leverage ratio (net debt divided by Operating Margin before Depreciation and Amortization) which may not be greater than 2.5.

The calculation of the below-mentioned ratios as of December 31, 2019 is provided below in respect of the credit documentation of the multi-currency revolving credit facility and the securitization program, that excluded IFRS 16 impacts.

Nature of ratios subject to covenants	Covenants	12 months ended December 31, 2019	12 months ended December 31, 2018
Leverage ratio (net debt/OMDA)*	not greater than 2.5	1.19	1.54

(*) OMDA : Operating margin before non cash items

Currency exchange risk

Atos operates in 73 countries. However, in most cases, Atos invoices in the country where the Group renders the service, thus limiting the foreign exchange risk. Where this is not the case, the Group generally uses hedging instruments such as forward contracts or foreign currency swaps to minimize the risk.

The carrying amount of the Group's foreign currency denominated monetary assets and monetary liabilities at the reporting date are as follows:

(In €million)	2019	2018	2019	2018	2019	2018
	EUR		GBP		USD	
Assets	189	107	38	17	214	180
Liabilities	44	34	3	3	145	30
Foreign exchange exposure before hedging	145	73	35	14	70	150
Hedged amounts	-328	-347	-80	-85	-119	-78
Foreign exchange impact after hedging	**-183**	**-274**	**-45**	**-72**	**-49**	**72**

Foreign currency sensitivity analysis

The entities with functional currencies in EUR, GBP and USD are mainly exposed to Foreign Exchange risk.

The following table details the Group sensitivity to a 5% increase and decrease of the sensitive currency against the relevant functional currency of each subsidiary. The sensitivity analysis includes only outstanding foreign currency denominated monetary items and adjusts their translation at the period end for a 5% increase in foreign currency rates.

(In € million)	2019	2018	2019	2018	2019	2018
	EUR		GBP		USD	
Income Statement	-9	-14	-2	-4	-2	4

Hedge accounting

There is no material deviation between the maturity of the financial instruments and the period in which the cash flows are expected to occur.

As at December 2019, derivatives were all allocated to the hedging of transactional risks (foreign exchange currency risks). From an accounting point of view, most of the derivatives were considered as cash flow hedge instruments.

The breakdown of the designation of the instruments by currency is as follows:

(In € million)	December 31, 2019		December 31, 2018	
Instruments	Fair value	Notional	Fair value	Notional
Cash flow hedge				
Interest rate				
SWAP	-2	545	-3	545
Foreign exchange				
Forward contracts USD	0	31	0	88
Forward contracts GBP	-	-	0	4
Forward contracts INR	2	161	7	142
Forward contracts MXN	1	26	-1	25
Forward contracts PLN	1	108	0	118
Forward contracts PHP	0	27	1	24
Forward contracts RON	0	43	1	44
Forward contracts RUB	0	9	0	6
Forward contracts MAD	0	13	1	20
Forward contracts CNY	0	2	0	2
Forward contracts CHF	0	10	0	-8
Forward contracts TRY	-	-	0	-
Trading and fair value hedge				
Foreign exchange				
Forward contracts USD	0	61	0	19
Forward contracts GBP	0	-14	-	-13
Forward contracts INR	0	12	0	8
Forward contracts MAD	0	7	0	3
Forward contracts CNY	0	1	-	-
Forward contracts RON	0	5	0	7
Forward contracts PLN	0	18	0	24
Forward contracts PHP	0	3	0	4
Forward contracts MXN	0	3	-	-

The net amount of cash flow hedge reserve at December 31, 2019 was €+4 million (net of tax), with a variation of €-2 million (net of tax) over the year.

Note 14 Shareholders' equity

14.1. Earnings per share

Basic earnings per share is calculated by dividing the net income (attributable to owners of the parent) by the weighted average number of ordinary shares outstanding during the period. Treasury shares deducted from consolidated equity are not considered in the calculation of basic or diluted earnings per share.

Diluted earnings per share is calculated by dividing the net income attributable to owners of the parent, adjusted for the financial cost net of tax of dilutive debt instruments, by the weighted average number of ordinary shares outstanding during the period, plus the average number of shares which, according to the share buyback method, would have been outstanding had all the issued dilutive instruments been converted (stock options and convertible debt).

The dilutive impact of each convertible instrument is determined in order to maximize the dilution of basic earnings per share. The dilutive impact of stock options is assessed based on the average price of Atos shares over the period.

Potential dilutive instruments comprised stock options (4.659 employee stock options) and did not generate a restatement of net income used for the diluted EPS calculation.

(In €million and shares)	**12 months ended December 31, 2019**	**12 months ended December 31, 2018***
Net income from continuing operations– Attributable to owners of the parent [a]	**414**	**560**
Impact of dilutive instruments	-	-
Net income from continuing operations restated of dilutive instruments - Attributable to owners of the parent [b]	**414**	**560**
Average number of shares outstanding [c]	107,669,930	106,012,480
Impact of dilutive instruments [d]	4,659	15,254
Diluted average number of shares [e]=[c]+[d]	107,674,589	106,027,734
(In €)		
Basic EPS from continuing operations [a] / [c]	**3.84**	**5.28**
Diluted EPS from continuing operations [b] / [e]	**3.84**	**5.28**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

(In €million and shares)	**12 months ended December 31, 2019**	**12 months ended December 31, 2018***
Net income from discontinued operation - Attributable to owners of the parent [a]	**2,986**	**70**
Impact of dilutive instruments	-	-
Net income from discontinued operation restated of dilutive instruments - Attributable to owners of the parent [b]	**2,986**	**70**
Average number of shares outstanding [c]	107,669,930	106,012,480
Impact of dilutive instruments [d]	4,659	15,254
Diluted average number of shares [e]=[c]+[d]	107,674,589	106,027,734
(In €)		
Basic EPS from discontinued operation [a] / [c]	**27.74**	**0.67**
Diluted EPS from discontinued operation [b] / [e]	**27.73**	**0.67**

** Income and expense items relating to Worldline for 2018 have been reclassified to "Net income from discontinued operation", in accordance with IFRS 5.*

No significant share transactions occurred subsequently to the 2019 closing that could have a dilutive impact on earnings per share calculation.

14.2. Equity attributable to the owners of the parent

Treasury shares

Atos shares held by the parent company are recorded at their acquired cost as a deduction from consolidated shareholders' equity. In the event of a disposal, the gain or loss and the related tax impacts are recorded as a change in consolidated shareholders' equity.

Capital increase

In 2019, Atos SE increased its share capital by incorporating additional paid-in-capital and common stock for € 142 million related to the issuance of 2,328,695 new common stocks split as follows:

- 2,039,710 new shares,
- Exercise of 25,467 stock options in 2019,
- Employee share option plan for 263,518.

As at December 31, 2019, Atos SE issued share capital amounted to € 109 million, divided into 109,214,914 fully paid-up common stock of € 1.00 par value each.

Distribution in kind - Worldline

Following the decision made on January 29, 2019 by Atos Board of Directors to submit to Annual General Meeting the project to distribute 23.5% of Worldline total shares to Atos shareholders and the approval of the transaction by Atos shareholders at the Annual General Meeting on April 30, 2019, this distribution of Worldline shares took effect on May 7, 2019, the payment date for the stock dividend, for a total amount of € 2,344 million, corresponding to a distribution of 42,852,724 Worldline shares valued at € 54.7 per share.

14.3. Non-controlling Interests

Non-controlling interests purchase commitments

The Group can take commitments to repurchase the non-controlling interests of shareholders of certain subsidiaries. The strike price of these put options may be set or determined according to a predefined calculation formula, and the options may be exercised at any time or on a specific date.

The Group records a financial liability at the present value of the strike price in respect of the put options granted to holders of non-controlling interests in the entities concerned. The offsetting entry for this financial liability differs depending on whether the non-controlling shareholders have maintained present access to the economic benefits of the entity. In the case of present access to the entity's economic benefits, non-controlling interests are maintained in the statement of financial position and the liability is recognized against equity attributable to owners of the parent. Where access to the entity's economic benefits is no longer available by virtue of the put option, the corresponding non-controlling interests are derecognized.

The difference between the liability representing the commitment to repurchase the non-controlling interests and the carrying amount of derecognized non-controlling interests is recorded as a deduction from equity attributable to owners of the parent. Subsequent changes in the value of the commitment are recorded by an adjustment to equity attributable to owners of the parent.

(In €million)	December 31, 2018	2019 Income	Assets Held for distribution	Dividends	Scope Changes	Capital Increase	December 31, 2019
Worldline	2,019	89	-2,107	-	-	-	-
Other	9	3	-	-3	-	3	12
Total	**2,027**	**92**	**-2,107**	**-3**	**-**	**3**	**12**

(In €million)	December 31, 2017	2018 Income	Capital Increase	Dividends	Scope Changes	Others	December 31, 2018
Worldline	555	69	1,140	-7	282	-20	2,019
Other	10	4	-	-4	-1	-	9
Total	**564**	**73**	**1,140**	**-11**	**281**	**-20**	**2,027**

In 2019, the significant decrease of the non-controlling interest was due to the loss of control of Worldline, following the distribution in kind of Worldline shares on May 2019, from now accounted for under equity method.

Non-controlling interests are not significant for the Group anymore.

Note 15 Off-balance sheet commitments

Contractual commitments

The table below illustrates the minimum future payments for firm obligations and commitments over the coming years. Amounts indicated under the long-term borrowings are posted on the Group consolidated statement of financial position.

(In €million)	December 31, 2019	Maturing			December 31, 2018
		Up to 1 year	1 to 5 years	Over 5 years	
Bonds	2,700	600	1,750	350	2,700
Optional exchangeable bond	500	-	500	-	-
Bank loans & commercial papers	805	755	-	50	2,365
Finance leases	-	-	-	-	15
Recorded on the balance sheet	**4,005**	**1,355**	**2,250**	**400**	**5,080**
Operating leases: land, buildings, fittings *	-	-	-	-	1,220
Operating leases: IT equipment *	-	-	-	-	264
Operating leases: other fixed assets *	-	-	-	-	75
Leases as low value and short term lease	19	7	12	-	-
Non-cancellable purchase obligations (> 5 years)	101	-	101	-	366
Commitments	**120**	**7**	**113**	**-**	**1,924**
Total	**4,125**	**1,362**	**2,363**	**400**	**7,004**
Financial commitments received (Syndicated Loan)	2,320	-	2,320	-	2,320
Total received	**2,320**	**-**	**2,320**	**-**	**2,320**

** Commitments are recognized as lease liability starting January 1, 2019*

The received financial commitment refers exclusively to the non-utilized part of the € 2.4 billion revolving facility.

Commercial commitments

(In €million)	December 31, 2019	December 31, 2018
Bank guarantees	**347**	**398**
- Operational - Performance	253	207
- Operational - Bid	14	14
- Operational - Advance Payment	68	97
- Financial or Other	12	79
Parental guarantees	**3,343**	**4,751**
- Operational - Performance	3,168	3,828
- Financial or Other	175	923
Pledges	**7**	**9**
Total	**3,697**	**5,157**

For various large long-term contracts, the Group provides performance guarantees to its clients. These guarantees amount to € 3,168 million as of December 31, 2019, compared with € 3,828 million at the end of December 2018. This decrease of € 660 million compared to last year is mainly due to the expiration of some guarantees provided to the benefit of the US, UK and Benelux & the Nordics customers.

In relation to the multi-currency revolving facility amended in October 2018, Atos SE issued a parental guarantee to the benefit of the consortium of banks represented by BNP Paribas, in order to cover up to € 660 million (unchanged amount) the obligations of its subsidiaries: Atos Telco Services B.V. and Atos International B.V..

Atos SE has given a € 102 million guarantee to Ester Finance in relation to a securitization program involving certain of its subsidiaries. Guarantee amount decreased due to the restructuration of the securitization program in May 2018.

As part of the general agreement with Siemens in respect of the transfer of SIS UK pension liabilities, the Board of Atos SE, during its March 29, 2011 meeting, agreed to provide a 20-year guarantee to the Atos 2011 Pension Trust set up to accommodate the transfer. The maximum amount of the guarantee is £ 200 million (€ 233 million).

In the framework of the Atos pension Schemes rationalization in the UK, for a more efficient structure, the Board of Directors of Atos SE, during its July 22, 2018 meeting, agreed to provide one parental guarantee (replacing three existing) to the Atos Pension Schemes Limited as trustee of the new Atos UK 2019 Pension Scheme set up on November 1, 2019. Under the said guarantee, Atos SE will guarantee the obligations of the sponsoring employers. The total estimated amount of the new guarantee is £ 587 million (€ 685 million).

Note 16 Related party transactions

Related parties are defined as follows:

- entities which are controlled directly by the Group, either solely or jointly, or indirectly through one or more intermediary controls. Entities which offer post-employment benefits in favor of employees of the Group, or entities which are controlled or jointly owned by a member of the key management personnel of the Group as defined hereafter; and
- key management personnel of the Group defined as persons who have the authority and responsibility for planning, directing and controlling the activity of the Group, namely members of the Board of Directors as well as Senior Executive Vice-Presidents.

Transactions between Atos and its subsidiaries, which are related parties of the Group, have been eliminated in consolidation and are not disclosed in this note.

Transactions between the related parties

The main transactions between the related entities are composed of:

- The reinvoicing of the premises;
- The invoicing of delivery services such as personnel costs or use of delivery infrastructure;
- The invoicing of administrative services; and
- The interest expenses related to the financial items.

These transactions are entered into at market conditions.

Related party transactions are detailed as follows:

(in €million)	8 months ended December 31, 2019
Continuing operations	
Revenue	58
Operating income/expenses	-59
Discontinued operation	
Costs to distribute	-16

The receivables and liabilities included in the statement of financial position linked to the related parties are detailed as follows:

(in €million)	December 31, 2019
Trade accounts and notes receivables	23
Trade accounts and notes payables	26

Compensation of members of the Board of Directors as well as Senior Executive Vice-President

The remuneration of the key members of Management during the year is set out below:

(In €million)	**12 months ended 31 December 2019**	**12 months ended 31 December 2018**
Short-term benefits	6	6
Employer contributions & other taxes	3	2
Post-employment benefits	1	3
Equity-based compensation: stock options & free share plans	7	5
Total	**18**	**16**

Short-term benefits include salaries, bonuses and fringe benefits. Bonuses correspond to the total charge reflected in the income statement including the bonuses actually paid during the year, the accruals relating to current year and the release of accruals relating to prior year.

The Chairman and Chief Executive Officer ("CEO") resigned from his offices on October 31, 2019 and claim his mandatory retirement benefits. He benefited from the supplementary pension plan reserved for members of the Group's Executive Committee ending their career at Atos SE or Atos International SAS governed by article L. 137-11 of the French Social Security Code. The gross amount of this pension amounts to € 627,586. Pensions are paid by an insurer and Atos funds its commitments when beneficiaries retire. The Chairman and CEO has informed that he waived this pension supplement that he could be entitled during his mandate period at the European Commission, which runs until end of 2024.

The Chairman and CEO did not have an employment contract and is not entitled to severance payment at the end of his mandate. Besides, the Chairman and CEO has stated to the Board of Directors that he wishes to waive any due or potential variable compensation for the year 2019 as well as all his equity instruments rights (performance shares and stock-options) that were not vested yet.

Note 17 Main operating entities part of scope of consolidation as of December 31, 2019

	% of Interest	Consolidation method	% of Control	Adress
HOLDING				
Atos SE	Consolidation Parent Company			80, quai Voltaire - 95870 Bezons
Atos International B.V.	100	FC	100	Burgemeester Rijnderslaan 30, 1185 MC Amstelveen, The Netherlands
Saint Louis Ré	100	FC	100	74, rue de Merl - L2146 Luxembourg
Atos International SAS	100	FC	100	80, quai Voltaire - 95870 Bezons
Bull SA	100	FC	100	Rue Jean Jaurès - 78340 Les Clayes-sous-Bois
FRANCE				
Worldline SA	16.9	EM	25.6	80, quai Voltaire - 95870 Bezons
Atos Integration SAS	100	FC	100	80, quai Voltaire - 95870 Bezons
Atos Infogérance SAS	100	FC	100	80, quai Voltaire - 95870 Bezons
Atos Consulting SAS	100	FC	100	80, quai Voltaire - 95870 Bezons
Atos Worldgrid SAS	100	FC	100	80, quai Voltaire - 95870 Bezons
Yunano	100	FC	100	80, quai Voltaire - 95870 Bezons
Bull SAS	100	FC	100	Rue Jean Jaurès - 78340 Les Clayes-sous-Bois
Keynectis SA	100	FC	100	175, rue Jean Jacques Rousseau - 92130 Issy les Moulineaux
Agarik SAS	100	FC	100	20, Rue Dieumegard 93400 Saint-Ouen
Avantix SAS	100	FC	100	655, avenue Galilée - 13794 Aix en Provence
Evidian SA	100	FC	100	Rue Jean Jaurès - 78340 Les Clayes-sous-Bois
Air Lynx	100	FC	100	1, avenue de l'Atlantique, Immeuble Everest – 91940 Les Ulis
GERMANY				
X PERION Consulting AG	100	FC	100	Nikolaus-Otto-Strasse 1, 22946 Trittau - Germany
Atos Information Technology GmbH	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
CHG Communications Holding GmbH	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Unify Funding GmbH	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Atos IT Dienstleistung und Beratung Gmbh	100	FC	100	Bruchstrasse, 5 - 45883 Gelsenkirchen - Germany
Atos International Germany Gmbh	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Applied International Informatics GmbH	100	FC	100	Torstraße, 49 - 10119 Berlin - Germany
Bull GmbH	100	FC	100	Von-der-wettern-straße, 27 - 51149 Cologne - Germany
Science + computing AG	100	FC	100	Hagellocher Weg, 73 - 72070 Tübingen - Germany
Energy4u GmbH	100	FC	100	Albert-Nestler Straße, 17 - 76131 Karlsruhe - Germany
Wivertis Gmbh	50,1	FC	50,1	Konrad-Adenauer-Ring, 60D - 65187 Wiesbaden - Germany
Atos Support GmbH	100	FC	100	The Squaire, Am Flughafen 14 - 60549 Frankfurt am Main - Germany
Atos IT Services GmbH	100	FC	100	Stinnes-Platz, 1 - 45 472 Mülheim an der Ruhr Germany
Unify Communications and Collaboration GmbH & Co. KG (*)	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Atos Systems Business Services GmbH	100	FC	100	Am seestem, 1 - 40547 Dusseldorf - Germany
Cycos AG	95.1	FC	100	Joseph-von-Frauenhofer-Straße, 5 - 52477 Alsdorf Germany
FastvViewer GmbH	100	FC	100	Schwesterhausgasse, 11 - 92318 Neumarkt - Germany
Unify Software and Solutions GmbH & Co. KG (*)	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Unify GmbH & Co. KG (*)	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Unify Beteiligungsverwaltung GmbH & Co. KG (*)	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Unify Deutschland Holding GmbH	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany
Unify Patente GmbH & Co. KG (*)	100	FC	100	Otto-Hahn-Ring, 6 - 81739 Munich - Germany

	% of Interest	Consolidation method	% of Control	Adress
THE NETHERLANDS				
Atos Nederland B.V.	100	FC	100	Burgemeester Rijnderslaan 30 - 1185 MC Amstelveen - The Netherlands
Atos Telco Services B.V.	100	FC	100	Burgemeester Rijnderslaan 30 - 1185 MC Amstelveen - The Netherlands
OTHER EUROPE - MIDDLE EAST - AFRICA				
Algeria				
Bull Algerie	100	FC	100	16, rue Yehia El-Mazouni, El Biar - Algiers - Algeria
Austria				
Atos IT GmbH	100	FC	100	Siemensstraße 92 - 1210 Vienna - Austria
Atos IT Solutions and Services GmbH	100	FC	100	Siemensstraße 92 - 1210 Vienna - Austria
TSG EDV-Terminal Service GmbH	99	FC	100	Modecenterstraße 1 - 1030 Vienna - Austria
Belgium				
Atos Belgium SA/NV	100	FC	100	Da Vincilaan, 5 - 1930 Zaventem - Belgium
Unify Communications N.V.	100	FC	100	Demeurslaan, 132 - 1654 Beersel - Belgium
Bielorussia				
LLC ATOS IT Solutions and Services	100	FC	100	Ul Leonid BEDI, 11 - BuildING 1 - 220040 Minsk - Biélorussia
Bulgaria				
Atos IT Solutions and Services EOOD	100	FC	100	Mladost 4 Region - Business Park Sofia Str, 4 - 1766 Sofia - Bulgaria
Ivory Coast				
Bull Cote d'Ivoire	100	FC	100	31 avenue Noguès - 01 BP 1580 Abidjan 01 - Ivory Coast
Denmark				
Atos IT Solutions and Services A/S	100	FC	100	Dybendalsvaenget 3 - 2630 Taastrup - Denmark
Croatia				
Atos IT Solutions and Services d.o.o	100	FC	100	Heinzelova 69 - 10000 Zagreb - Croatia
Czech Republic				
Atos IT Solutions and Services s.r.o.	100	FC	100	14000 Praha 4 - Doudlebská 1699/5 - Czech Republic
Gabon				
Bull Gabon	100	FC	100	Immeuble Abiali - ZI d'Oloumi - BP 2260 Libreville - Gabon
Greece				
Atos Greece SA	100	FC	100	Irakleio Avenue 455, N. Iraklio 14122 Athens Greece
Finland				
Atos IT Solutions and Services oy	100	FC	100	Kalkkipellontie 6 - 026050 Espoo - Finland
Hungary				
Atos Magyarország Kft	100	FC	100	1138 Budapest, Vaci ut 121-127. Vaci greens D Building, 4th floor - Hungary
Ireland				
Atos IT Solutions and Services Limited	100	FC	100	Fitzwilliam Court - Leeson Close - 2 Dublin - Ireland
Italy				
Atos Italia S.p.A.	100	FC	100	Via Caldera no. 21 - 20158 - Milan - Italy
Lebanon				
Bull SAL	100	FC	100	69 Rue Jal el Dib - Secteur 1 – BP 60208 - Beyrouth Lebanon
Lithuania				
UAB "Bull Baltija"	100	FC	100	40 Gostauto Street - 01112 Vilnius - Lithuania
Luxembourg				
Atos Luxembourg PSF S.A.	100	FC	100	1, rue Edmond Reuter Contern - 5326 - Luxembourg
Madagascar				
Bull Madagascar SA	100	FC	100	12, rue Indira Gandhi - Tsaralalana BP 252 - Antananarivo Madagascar

	% of Interest	Consolidation method	% of Control	Adress
Morocco				
Atos IT Services SARL	100	FC	100	Espace les Palmiers - angle Avenues Mehdi Benbaraka et Annakhil- Hayryad Rabat - Morocco
Atos ITS Nearshore Center Maroc SARL	100	FC	100	Casablanca - shore 7 - 1100, Boulevard Al Qods Quartier Sidi Maarouf - Casablanca - Morocco
Bull Maroc	100	FC	100	Casanearshore - 1100, Boulevard Al Qods - Quartier Sidi Maarouf - Casablanca - Morocco
Namibia				
Bull Information Technology Namibia Pty. Ltd.	100	FC	100	C/o Deloitte & Touche - Namdeb Center, 10 Bulow street - PO Box 47 - Windhoek - Namibia
Poland				
Atos Polska SA	100	FC	100	Krolewska, 16 - 00-103 Warsaw - Poland
Atos Poland Global Services Sp Zoo	100	FC	100	ul. Krolewska 16, 00-103 Warszawa , Poland
Portugal				
Atos Soluções e Serviços para Tecnologias de Informação, Unipessoal, Ltda	100	FC	100	Avenida José Malhoa 16 - Piso sétimo B2 - Edificio Europa. Distrito : Lisboa, Concelho : Lisboa, freguesia : Campolide 1070 159 Lisbon - Portugal
Romania				
Atos IT Solutions and Services s.r.l.	100	FC	100	Calea Floreasca 169A - Sector 1 - 014459 Bucharest - Romania
Atos IT Solutions Romania SRL	100	FC	100	Calea Floreasca 169A - Sector 1 - 014459 Bucharest - Romania
Atos Convergence Creators GmbH S.R.L	100	FC	100	Municipiul Braşov, Strada MIHAIL KOGĂLNICEANU, Nr. 21, Bloc C6, Judet Braşov, Romania
Russia				
Atos IT Solutions and Services LLC	100	FC	100	1st Kozhevnicheski per. 6, bld. 1 115114 Moscow - Russia
Senegal				
Bull Senegal	100	FC	100	Cité Keur Gorgui, Immeuble Khadimou Rassoul - BP 3183 Dakar - Senegal
Serbia				
Atos IT Solutions and Services d.o.o.	100	FC	100	Danila Lekica Spanca 31 - 11070 Beograd - Serbia
South Africa				
Atos (PTY) Ltd	74	FC	100	Woodlands Office Park, Ground Floor Building 32, 2144 Woodlands South Africa
Spain				
Atos Consulting Canarias, SA	100	FC	100	Calle Subida al Mayorazgo 24b - 38110 Santa Cruz de Tenerife Spain
Atos Spain SA	100	FC	100	Albarracin 25 - 28037 Madrid - Spain
Atos IT Solutions and Services Iberia SL	100	FC	100	Ronda de Europa 5 - 28760 Madrid - Spain
Atos Worldgrid SL	100	FC	100	Calle Isabel Torres, 19 Edificio Cisga - 39011 Santander - Spain
MSL Technology SL	100	FC	100	C/ Marques de Ahumada 7 - 28028 Madrid - Spain
Slovakia				
Atos IT Solutions and Services s.r.o.	100	FC	100	Pribinova 19/7828 - 811 09 Bratislava - Slovakia
Sweden				
Atos IT Solutions and Services AB	100	FC	100	Johanneslundsvägen 12-14 - 194 87 Upplands Väsby - Sweden
Switzerland				
Atos AG	100	FC	100	Freilagerstrasse 28 - 8047 Zürich - Switzerland
Turkey				
Atos Bilisim Danismanlik ve Musteri Hizmetleri Sanayi ve Ticaret A/S	99.92	FC	100	Yakacık Caddesi No 111 – 18 - 34870, Kartal, Istanbul - Turkey
United Arab Emirats - Dubai				
Atos Origin FZ LLC	100	FC	100	Office G20 - Building DIC-9 Dubai Internet City - PO Box.500437 United Arab Emirats - Dubai
ATOS FZ LLC Dubai Branch	100	FC	100	The Galleries Building - No2 Level 2 - Downtown Jebel 500437 United Arab Emirats - Dubai

	% of Interest	Consolidation method	% of Control	Adress
Saudi Arabia				
Atos Saudi LLC	49	PC	49	P. O. Box # 8772 - Riyadh-11492 Saudi Arabia
Qatar				
ATOS QATAR Llc	100	FC	100	Sheikh Suhaim bin Hamad Street - No.89858 - Doha - Qatar
Egypt				
Atos IT SAE	100	FC	100	50 Rue Abbass El Akkad - Nasr city- La Caire - Egypt
THE UNITED KINGDOM				
Atos Consulting Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos IT Services Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos IT Services UK Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos UK IT Holdings Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos Esprit Limited	95	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Shere Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos BPS Ltd	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos UK Holdings Ltd	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos International IT Holdings Ltd	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
Atos Restaurant Technology Services UK Limited	100	FC	100	4 Triton Square - Regent's Place - London, NW1 3HG United Kingdom
Unify Enterprise Communications Limited	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
ENGAGE ESM HOLDING LTD	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
ENGAGE ESM LTD	100	FC	100	Second Floor - Mid City Place - 71 High holborn - London, WC1V6EA - United Kingdom
ASIA PACIFIC				
Australia				
Atos (Australia) Pty. Ltd	100	FC	100	885 Mountain Highway 3153 Bayswater - Victoria Australia
China				
Atos Information Technology (Nanjing) Co., Ltd	100	FC	100	Floor 12 - Building 1B Powerise accelerator - High Tech zone Software park - Nanjing - Jiangsu Province - China
Atos Information Technology (China) Co. Ltd	100	FC	100	Room 05.161 - Floor 5 - Building E - No.7 - Zhonghuan Nanlu Wangjing - Chaoyang District - Beijing - China
Atos Worldgrid Information Technology (Beijing) Co Ltd	100	FC	100	Room 05.162 - Floor 5 - Building E - No.7 - Zhonghuan Nanlu Wangjing - Chaoyang District - Beijing - China
RTS Information Consulting (Chengdu) Co. Ltd	100	FC	100	Room 108-109 - 1st floor, Building B2 - Tianfu Software Park - High Tech Zone - Chengdu - Sichuan Province - China
Hong Kong				
Atos Information Technology HK Ltd	100	FC	100	8/F Octa Tower - 8 Lam Chak Street - Kowloon Bay - Kowloon Hong Kong
Bull Information Systems (Hong Kong) Limited	100	FC	100	RM 1401 - Hutchison House - 10, Harcourt Road Hong Kong
India				
Atos India Private Limited	100	FC	100	Godrej & Boyce Complex - Plant 5 - Pirojshanagar - LBS Marg Vikhroli(W) - Mumbai - 400079 - India
Atos IT Services Private Limited	99.99	FC	100	Innovator Building - International Tech Park - Whitefield Road - 560066 Bangalore - Karnataka - India

	% of Interest	Consolidation method	% of Control	Adress
Anthelio Business Technologies Private Limited	99.99	FC	100	Level 1, Part A of Tower1,Phase 2, SY.NO 115 (Part) Waverock, APIIC IT\ITES SEZ, Nanakramguda Serilingampally Mandal Hyderabad Telangana 500008 - India
Syntel Pvt Ltd.	100	FC	100	Unit No,112, SDF IV, SEEPZ Andheri (East) Mumbai 400 096 Maharashtra- India
State street Syntel Services Pvt Ltd (**)	100	FC	100	4/5th floor, Building No.4,Mindspace –Navi Mumbai,Thane-Belapur road,Airoli-400708, India
Syntel Global Pvt Ltd	100	FC	100	Ground floor,E-Tech Software Technology Park,Dhokali Naka,Kolshet road,Thane(West)-400607, India
Japan				
Atos KK	100	FC	100	6 F, Daisan Toranomon Denki Building - 1-2-20 Minato-ku Tokyo - Japan
Evidian-Bull Japan KK	100	FC	100	6 F, Daisan Toranomon Denki Building - 1-2-20 Minato-ku Tokyo - Japan
Malaysia				
Atos Services (Malaysia) SDN BHD	100	FC	100	16-A (1st Floor) Jalan Tun Sambanthan - 3 Brickfields - 50470 Kuala Lumpur - Malaysia
Mauritius				
State street Syntel Services Mauritus Ltd (**)	100	FC	100	C/o SGG Corporate Services (Mauritius) Ltd 33, Edith Cavell Street - Port Louis, 11324 Mauritius
Philippines				
Atos Information Technology Inc.	99.94	FC	100	23/F Cyber One Building - Eastwood City - Cyberpark - 1110 Libis, Quezon City - Philippines
Atos Global Delivery Center Philippines, Inc.	100	FC	100	8th Floor, Two E-Com Center, Palm Coast Ave., Mall of Asia Complex, 1110 Pasay City - Philippines
Singapore				
Atos Information Technology (Singapore) Ptd Ltd	100	FC	100	Blk 988 Toa Payoh North #08-01 - 319002 Singapore
Taïwan				
Atos (Taiwan) Ltd	100	FC	100	5F, No 100 Sec 3, Min Sheng E. Road - Taipei -Taïwan
Thaïland				
Atos IT Solutions and Services Ltd	100	FC	100	2922/339 Charn Issara Tower II - 36th Floor - New Petchburi Road - Bangkapi - Huay Kwang - 10310 Bangkok - Thaïland
AMERICAS				
Argentina				
Atos Argentina SA	100	FC	100	Cnel. Manuel Arias 3751, piso 18, PB, C.A.B.A.- C1430DAL Buenos aires - Argentina
Bull Argentina SA	100	FC	100	Manuela Saenz 323 5to. Piso Of. 506 - C 1107 bpa Buenos aires - Argentina
Brazil				
Atos Brasil Ltda	100	FC	100	Rua Werner Von Siemens, 111 – Prédio 6 – Lapa - São Paulo -SP - CEP 05069-900 - Brazil
Atos Serviços de Tecnologia da Informação do Brasil Ltda	100	FC	100	Rua Werner Von Siemens, 111 – Prédio 6 – Lapa - São Paulo -SP - CEP 05069-900 - Brazil
Bull Ltda.	100	FC	100	Rua Werner Von Siemens, 111 – Prédio 6 – Lapa - São Paulo -SP - CEP 05069-900 - Brazil
Canada				
Atos Inc.	100	FC	100	6375 Shawson Drive - L5T 1S7 Mississauga - Ontario - Canada
Amesys Canada Inc.	100	FC	100	206-137 rue Saint Pierre - H2Y3T5 Montreal, Quebec - Canada
Colombia				
Atos IT Solutions and Services S.A.S	100	FC	100	Autopista Norte Carrera 45 N° 108-27 Torre 2 oficina 1505 - Bogotá - Colombia
Mexico				
Atos Global Delivery Center México, S. de R.L. de C.V.	99.90	FC	100	Sevilla No. 40 Piso 3 - Colonia Juarez delgation Cuauhtemoc - 06600 Ciudad de Mexico - Mexico

	% of Interest	Consolidation method	% of Control	Adress
The United States of America				
Atos IT Outsourcing Services, LLC	100	FC	100	the 4851 Regent Boulevard – Irving, TX 75063 – United States of America
Atos Governmental IT Outsourcing Services, LLC	100	FC	100	the 4851 Regent Boulevard – Irving, TX 75063 – United States of America
Atos Healthcare Services, LLC	100	FC	100	the 4851 Regent Boulevard – Irving, TX 75063 – USA - United States of America
Atos Syntel Inc.	100	FC	100	525 E. Big Beaver Road,Suite 300, Troy, MI 48083 - United States of America
Anthelio Global Inc.	100	FC	100	One Lincoln Centre, Suite 200 - 5400 LBJ Freeway TX 75240 Dallas - United States of America
Atos Digital Health Solutions	100	FC	100	2500 Weschester Ave - 3rd Floor - Purchase New York 10577 - United States of America
Pyramid Healthcare Solutions Inc.	100	FC	100	One Lincoln Centre, Suite 200 - 5400 LBJ Freeway TX 75240 Dallas - United States of America
Evidian Systems Inc.	100	FC	100	285 Billerica Road, Suite 200 - Chelmsford, MA 01824-4174 United States of America
Unify Inc	100	FC	100	1630 Corporate Court - Irving - Texas 75038 - United States of America
Green Finco Inc.	100	FC	100	C/O The Corporation Trust Company, 1209 Orange Street, Wilmington, DE 19801 - United States of America
Engage ESM Inc.	100	FC	100	4851 Regent Boulevard - Floors 1, 3 & 4 Irving, TX 75063 - United States of America
Uruguay				
Bull Uruguay SA	100	FC	100	Av. Dr Luis A. de Herrera, 2802 - 1160 Montevideo - Uruguay

(*) The Group has an interest in five German companies, which are fully consolidated into these Group financial statements. The companies have made use of the stipulations available under § 264b of the German Commercial Code (HGB). It exempts these legal entities from the requirement to disclose separate audited financial statements as of 31 December 2019, since they are included in the Consolidated Financial Statements of the ultimate parent company (Atos S.E.) and such Consolidated Financial Statements for the full year of 2019 are registered with the trade register of the particular entity.

(**) Atos owns 49% of the shares of State Street Syntel Services (Mauritius). The joint arrangement between Atos Group and Atos Syntel Inc. has been qualified as joint operation under IFRS 11. Under IFRS 11.21, a joint operator shall account for the assets, liabilities, revenues and expenses relating to its interest in a joint operation in accordance with the IFRSs applicable to the assets, liabilities, revenues and expenses. The rights and obligations of the two Joint operators are defined in the Master Service Agreement signed between both parties and the shareholders agreement. JVs set up with State Street bank and Atos Group are committed to deliver IT services to State Street Inc. as per the Master Service Agreement. Syntel is entitled to 100% of the financial outcome of the contract and has to bear all liabilities. Therefore, Atos obligations are to ensure the settlement of JVs liabilities, ensure that state street receives the promised services. Atos Group is entitled in counterpart to receive revenues related to the services rendered to State Street to be accounted for in accordance with IFRS 15.

Note 18 Subsequent events

Atos has completed as of February 4, 2020 the sale of ca. 23.9 million Worldline shares, for ca. € 1.5 billion, through a placement to qualified investors by way of an accelerated bookbuilt offering (the "Placement").

The sale price of the Placement was set at € 61.5 per Worldline share. The Placement is a further milestone in the creation of two pure play global leaders in their respective industries. However, the relationship between the two groups will remain strong with the existing and unchanged industrial and commercial partnership created through the Atos-Worldline Alliance announced in January 2019. Atos plans to use the proceeds of the Placement to repay existing debt and for general corporate purposes. Following the Placement, Atos holds ca. 7 million Worldline shares, representing ca. 3.8% of the Worldline share capital, which are underlying the Bonds.

Note 19 Auditors' fees

(In € thousand and %)	Grant Thornton				Deloitte			
	Grant Thornton		*Other Grant Thornton*		*Deloitte & Associés*		*Other Deloitte members firms*	
	Fees	%	Fees	%	Fees	%	Fees	%
Audit and limited review of individual and consolidated financial statements								
Parent company	1,076	70%	-	-	1,328	63%	-	-
Subsidiaries	460	30%	3,369	78%	614	29%	2,093	76%
Sub-total Audit	**1,536**	**99%**	**3,369**	**78%**	**1,942**	**92%**	**2,093**	**76%**
Non audit services*								
Parent company	-	-	-	-	109	5%	-	-
Subsidiaries	8	1%	954	22%	70	3%	658	24%
Sub-total Non Audit	**8**	**1%**	**954**	**22%**	**179**	**8%**	**658**	**24%**
Total fees 2019	**1,544**	**100%**	**4,323**	**100%**	**2,121**	**100%**	**2,751**	**100%**

** In 2019, non audit services related to services provided at the Company's request and notably correspond to (i) certificates and reports issued as independent third party on the human resources, environmental and social information pursuant to article of the French Commercial Code, (ii) due diligence, and (iii) tax services, authorized by local legislation, in some foreign subsidiaries*

(In € thousand and %)	Grant Thornton				Deloitte			
	Grant Thornton		*Other Grant Thornton*		*Deloitte & Associés*		*Other Deloitte members firms*	
	Fees	%	Fees	%	Fees	%	Fees	%
Audit and limited review of individual and consolidated financial statements								
Parent company	1,120	53%	-	-	1,173	46%	-	-
Subsidiaries	824	39%	3,558	98%	812	32%	2,550	83%
Sub-total Audit	**1,944**	**92%**	**3,558**	**98%**	**1,985**	**77%**	**2,550**	**83%**
Non audit services*								
Parent company	15	1%	-	-	133	-	-	-
Subsidiaries	159	7%	56	2%	448	17%	521	17%
Sub-total Non Audit	**174**	**8%**	**56**	**2%**	**580**	**23%**	**521**	**17%**
Total fees 2018	**2,118**	**100%**	**3,614**	**100%**	**2,565**	**100%**	**3,071**	**100%**

** In 2018, non audit services related to services provided at the Company's request and notably correspond to (i) certificates and reports issued as independent third party on the human resources, environmental and social information pursuant to article of the French Commercial Code, (ii) due diligence, and (iii) tax services, authorized by local legislation, in some foreign subsidiaries*

C. Contacts and locations

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C.1.1 Global Headquarters

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C.2 Locations

Atos is present in main cities to support customers. The addresses and phone numbers of the Group main offices can be found on the Locations page on website atos.net. Details of current job opportunities can be found in Careers pages. An email address for general questions and comments about the Atos' Internet site can be found at the bottom of the page.

Global Headquarters
River Ouest
80 Quai Voltaire
95870 Bezons – France
+33 1 73 26 00 00

Europe
Andorra
Austria
Belarus
Belgium
Bosnia
Bulgaria
Croatia
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Italy
Ireland
Lithuania
Luxembourg
Poland
Portugal
Romania
Russia
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
The Netherlands
United Kingdom

Americas
Argentina
Brazil
Canada
Chile
Colombia
Guatemala
Mexico
Peru
Uruguay
USA

Asia Pacific
Australia
China
Hong Kong
Indonesia
Japan
Malaysia
New-Zealand
Philippines
Singapore
South Korea
Taiwan
Thailand

India, Middle-East & Africa
Algeria
Benin
Burkina Faso
Egypt
Gabon
India
Israel
Ivory-coast
Lebanon
Madagascar
Mali
Mauritius
Morocco
Qatar
Saudi Arabia
Senegal
South Africa
Tunisia
Turkey
United Arab Emirates

D. Full index

TABLE OF CONTENT **2**

A. GROUP OVERVIEW **3**

A.1 Revenue profile **3**
A.1.1 By Division 3
A.1.2 By Business Unit 4
A.1.3 By Market 5

A.2 Business profile **6**
A.2.1 Atos expertise covers a wide range of specialties to accompany its customers for new opportunities and innovations 7
A.2.2 Atos industry expertise 8

B. FINANCIALS **9**

B.1 Operational review **9**
B.1.1 Statutory to constant scope and exchange rates reconciliation 9
B.1.2 Performance by Division 11
B.1.3 Performance by Business Unit 15
B.1.4 Revenue by Market 21
B.1.5 Portfolio 22
B.1.6 Human Resources 23

B.2 2020 objectives **24**

B.3 Financial review **24**
B.3.1 Income statement 24
B.3.2 Cash Flow 29
B.3.3 Financing policy 31

B.4 Consolidated financial statements **33**
B.4.1 Consolidated income statement 33
B.4.2 Consolidated statement of comprehensive income 34
B.4.3 Consolidated statement of financial position 35
B.4.4 Consolidated cash flow statement 36
B.4.5 Consolidated statement of changes in shareholders' equity 37
B.4.6 Notes to the consolidated financial statements 38
Note 1 Changes in the scope of consolidation 46
Note 2 Segment information 49
Note 3 Revenue, trade receivables, contract assets and contract costs 51
Note 4 Operating items 55
Note 5 Other operating income and expenses 57
Note 6 Financial assets, liabilities and financial result 62
Note 7 Income tax 69
Note 8 Goodwill and fixed assets 72
Note 9 Leases 78
Note 10 Investments in associates accounted for under the equity method 79
Note 11 Pension plans and other long-term benefits 80
Note 12 Provisions 85
Note 13 Fair value and characteristics of financial instruments 86
Note 14 Shareholders' equity 90
Note 15 Off-balance sheet commitments 92
Note 16 Related party transactions 93
Note 17 Main operating entities part of scope of consolidation as of December 31, 2019 95
Note 18 Subsequent events 101
Note 19 Auditors' fees 102

C. CONTACTS AND LOCATIONS **103**

C.1 Contacts **103**
C.1.1 Global Headquarters 103
C.1.2 Corporate functions 103
C.1.3 Global organization 103
C.1.4 Investor Relations 104

C.2 Locations **105**

D. FULL INDEX **106**

White paper

Building a Business Case for NG9-1-1

How to challenge norms and change mindsets to create an NGSmart ESInet domain

Trusted partner for your **Digital Journey**

The next generation of emergency response capabilities is long overdue in the United States. This white paper provides tips on transition strategy while explaining how to build a business case that challenges the status quo to fund the transition to an NG9-1-1 end state. It includes detailed analysis based on an actual region in the southwest United States. Following our methodology saves this region millions of dollars annually — and the end of the project only opens the door to public sector modernization and smart cities.

Contents

- An Overhaul of Historic Proportions 3
- Strategy with a Vision 3
- Business Case 5
- Data on Cost Reductions and Transference 6
- Going Forward 9

An Overhaul of Historic Proportion

The three most important digits one can ever dial: 9-1-1. Just as the American public relies upon and trusts our 9-1-1 system, first responders also rely upon the immediate and accurate delivery of each call. However, we live in a multimedia (voice, video, text, voice over instant message) world, and the system we all trust to manage and serve us when we "call" for help was not built to support the multichannel communication paths used by most people — from social to text to video.

In response, the U.S. public safety communications system is undergoing one of the single largest infrastructure overhauls in the country's history, transitioning from a telephone-driven voice system to a voice over IP (VoIP) multimedia-enabled software domain.

The systems that serve our emergency needs must have the same capabilities and operational enhancements as other technologies shaping our lives. To that end, the technology and systems migrations that will enable next-generation 9-1-1 (NG9-1-1) are happening throughout the United States right now. Early adopters are sharing their lessons learned, setting benchmarks that will help the fast followers transform their infrastructures as well or better.

Responding to Voiceless Calls for Help

While initiating a voice call is and will always be the fastest way to request help, it's not always possible or convenient to use your voice during an emergency. It's a puzzle: A caller must have a voice without speaking. And first responders must be able to not only hear that call for help, as if from the ether, but also efficiently manage and process the response.

The simple answer is software. Hardware-based emergency response systems used by most public safety answering points (PSAPs) were not designed to provide seamlessly integrated communications across disparate subsystems in a configurable and scalable enterprise model to first responders and those who need help.

The systems that serve our emergency needs must have the same capabilities and operational enhancements as other technologies shaping our lives.

Strategy with a Vision

NG9-1-1 is a collaboration of services and multimedia sources that must be managed as a unified call flow, not as separate product silos within a PSAP. Atos' vision for NG9-1-1 breaks down silos of independent systems to unify a communications ecosystem driven by network convergence. Voice will always dominate public safety contacts. What needs to change is way voice and the data that accompanies it are delivered. They must be driven by a robust network engine.

One of the first things to understand for your strategy is that moving from a Tandem Office construct directly to an end-to-end geo-spatially powered NENA i3 ESInet domain is quite a leap. Our team of industry experts has learned firsthand that having a highly robust network migration strategy is critical to achieving a pure i3 end state. Phase the transition first to an all-IP managed network domain through a systematic clustered cutover process. Then, upon full migration to the multicore, layer-3 emergency services IP network (ESInet) domain, geospatial routing features can be turned up seamlessly in the same clustered approach as regional stakeholders are ready for them.

Network Topology and the Myth of the ILEC Provider

When it comes to ESInet migrations, there is no mandate as to which access is used for your network domain. Success for any NG9-1-1 modernization effort depends on knowing what options exist, which obstacles to overcome, and what strategies to use when designing the network topology. One widely believed myth is that an agency or PSAP must use services from the Incumbent Local Exchange (ILEC) provider of 9-1-1 services for all 9-1-1 services.

This is simply incorrect. Even further, it's the antithesis of what NG9-1-1 is intended to achieve. Elimination of single-threaded reliance on voice-only regulated service domains is core to a reliable and redundant ESInet that's also cost-effective and scalable. So, understand your options, challenge the status quo and focus on the future. Your strategy must answer the questions, "What will our public safety ecosystem look like in 10 years, and how should we design it today to meet that future state?"

The NG9-1-1 Link to Smart Cities

NG9-1-1 is an initiative to empower the masses and better inform first responders by overhauling a 40-year-old telephony network that only transmits voice. Similarly, smart city initiatives are designed to empower the masses via the Internet of Things by creating a meshed network that allows for physical connectivity to endless information hubs.

These initiatives live on opposite ends of the spectrum. However, the objectives and design philosophies they share have set their trajectory to converge in a single intelligent framework. Both require networks that enable people and devices to send communications, as we see with machine-to-machine data delivery systems in which people are the recipients of information that make their jobs more efficient, informed, proactive and safe.

If the future is an integrated, collaborative government services ecosystem where data not only powers decisions but also empowers agencies tasked with serving the public then one common ingredient determines its success: aligning NG9-1-1 with smart city solutions.

Atos uses a highly unique, customer-centric ESInet design strategy that addresses the needs of public safety as well as government services stakeholders in the deployment region. Rather than looking only at the serving locations and PSAPs, Atos sees NG9-1-1 as a means to modernize broader public services, using the ESInet and NG9-1-1 architecture and standards as a logical blueprint for modernizing the way cities, counties, regions and states serve the public.

Funding a Network in Decline

No more important network exists in the United States than the one we all rely upon in times of crisis, yet this network was rendered obsolete years ago when we began communicating with data. It's quickly degrading, relies upon antiquated infrastructure, is increasingly vulnerable to cyberattacks — and it's limited due to regulatory stipulations that restrict its resiliency while hoarding the lion's share of 9-1-1 surcharge fees we all pay to keep this antiquated system functional.

ESInet domains require broadband data circuits, but the existing 9-1-1 networks are restricting the ability of public safety agencies to move to NG9-1-1 because of funding inequality. 90% of the funds collected (hundreds of millions of dollars) are being used to pay for a network that consists of circuits that could have been phased out and removed years ago. Regulated voice-only circuits, which cost as much as $500 per month, per line, are sucking the funds we all pay into a chasm of waste and ineffective network service. Why pay for that?

An NG-Smarter Mandate

Our mandate is to reduce this waste, improve network resiliency and capability, afford public safety and public sector agencies a choice to use assets that already serve their areas, and allow for the savings to be reallocated to 1) construct the network of the future and 2) provide for broadband communications to all service agencies.

As your network infrastructure transition partner, Atos can not only create your ESInet and power your NG9-1-1 ecosystem but also make this domain your region's smart city solution without changing a single roadmap. The means to this future state exist in our NGSmart solution, Atos' industry-leading model for modernizing public sector infrastructure using NG9-1-1 as the building block catalyst.

Atos sees NG9-1-1 as a means to modernize broader public services, using the ESInet and NG9-1-1 architecture and standards as a logical blueprint for modernizing the way cities, counties, regions and states serve the public.

Business Case for NG9-1-1

Atos' model for all clients is to leverage their existing investments, offer flexible deployment options and focus on our expertise in technology transformation to help them do more with less. We'll do the same for your transformation from a voice-only TDM telephony system to a multimedia, IP broadband managed network domain, with an eye to resiliency and scalability of solution as well as cost and ROI.

To illustrate how it's done, the following scenario presents our approach to an NG9-1-1 project for an eight-county region to optimize and connect the capabilities of each county and PSAP stakeholder. Clearly the assets already exist in this region to serve the needs of the underlying infrastructure for the region's ESInet. What Atos presents and has analyzed is a means to shift the costs spent today to pay for the Next Generation Core Services (NGCS) and ESInet construction phase while reducing operating expenses via network and infrastructure optimization at the layer 2/3 domain.

In this region, like many others, items including number of CPE positions with respect to the overall call volumes seem to be excessive. Further analysis uncovers an opportunity to optimize some of these positions to become multimedia management and/or special skills-based positions rather than dedicated call-handling positions.

Looking at the number of calls and extrapolating to a daily call load when deployed as a networked ESInet region, this cost (not factored as part of the TCO analysis herein) would likely contribute to additional CapEx and OpEx savings if repurposed for other NG9-1-1 functions.

Key Data Points

Analysis of our sample region captures the entire ESInet migration program. Keep in mind that it won't correlate directly to your NG9-1-1 infrastructure modernization effort, as every jurisdiction is unique. To show how shifting reductions (regulated access) pays for NG9-1-1 managed network domain services, we'll focus on these key data points:

- A list of domain assets today
- Efficiencies to be gained
- Optimization and access alternatives
- Carrier facilitation and aggregation alternatives
- Cost transference options

Details of the Sample Region

- Highly reliant on an ILEC for its 9-1-1 circuits
- Covers 24 cities with multiple sources for network access
- Recently put a smart city initiative in place
- Has 26 PSAPs serving 4.1 million residents
- Handles more than 3.2 million calls to 9-1-1 annually
- Supported by two paired Tandem Offices, both restricted within the LATA, delivering 1,360 regulated voice circuits to the PSAPs and public safety facilities

Bottom line for this region: selective routing and ALI tariffs combined with existing maintenance and 9-1-1 services account for an annual cost of $8,160,000. This amount is strictly for 9-1-1 network services and does not include PSAP equipment or any ancillary 9-1-1 call-taking systems.

Break the Status Quo

When looking at the number of assets serving the region, the clearest path to take is the one less traveled: reduce circuits! A region processing 3 million calls a year does not need so many regulated 9-1-1 CAMA trunks. It may be the norm in a 9-1-1 environment but this mindset absolutely must change; the status quo is dangerous. 9-1-1 agencies tasked with serving the public absolutely should not pay for something that they do not use.

Your business case for NG9-1-1 needs to break the status quo by determining what the biggest barrier to change is. In the case of building an ESInet, that barrier is the current network architecture and the sheer number of access lines contained within it — the single biggest cost for any 9-1-1 operation. Gather the data on your network and let this data tell the story to your constituents, stakeholders, fiscal planners and citizens served.

Two data sets: call volumes and circuit counts are all it takes to see firsthand the underutilization of assets, percentage of assets underutilized as an aggregate, and cost per call. By extrapolating this data, we can clearly see that not only is the status quo extraordinarily inefficient and costly, but we can also define a path forward that reduces waste, leverages the region's existing assets, improves service quality and capability, and decreases total cost of ownership (TCO).

In the case of building an ESInet, that barrier is the current network architecture and the sheer number of access lines contained within it — the single biggest cost for any 9-1-1 operation.

Data on Cost Reductions and Transference

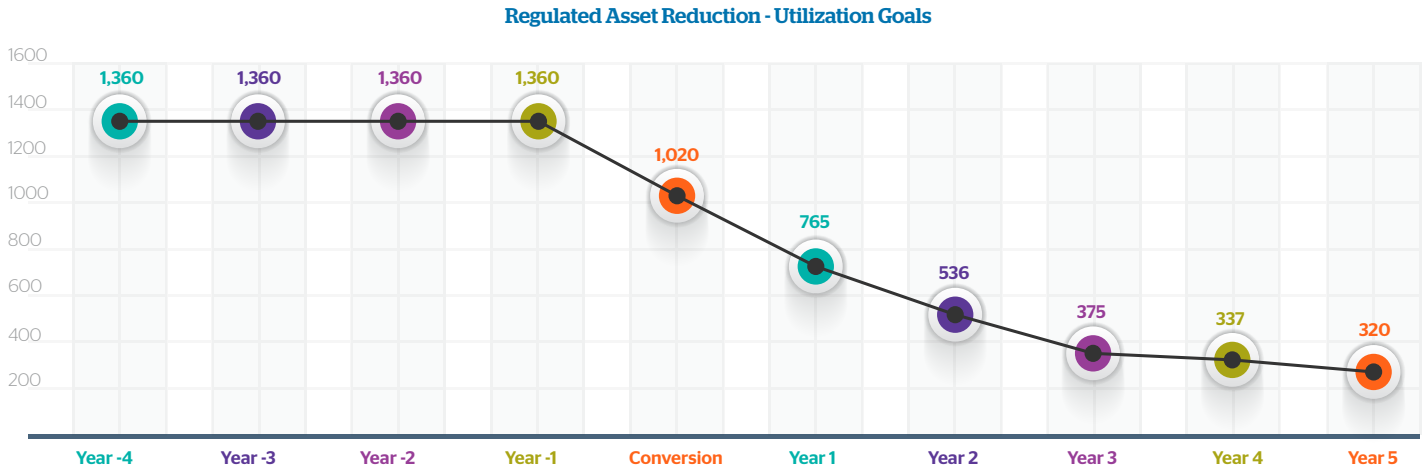
Reduce Regulated Assets to Improve Utilization

In looking at the situation in this region today, and laying the migration strategy in place using mixed assets and a managed network design architecture, we begin reducing the number of regulated assets based on two factors: underutilization (depicted in Figure 1) and transition of network services aggregation.

The reduction of circuits, in lieu of provisioning mixed assets serving the PSAPs, begins during the conversion year, aligning the new NGCS data center services to accept direct trunk termination from the carrier domain. This conversion period accounts for the downstream (egress) side network of the ESInet being turned up in parallel with decommissioning/reduction actions, as a significant portion of the underutilized regulated assets are connected directly to the PSAPs themselves. This is possible simply by switching to network assets that are faster, more diverse, contain multiple strands of fiber, and already exist and connect to the PSAPs.

How can one substantiate that this is even possible to do? The business case shows the current utilization rates of existing network assets and correlates the reduction to gained efficiencies. The data tells a clear and concise story showing waste and tying that waste to both underutilization and cost. The picture is immediately clear that the money is not only there to build the ESInet, but that additional savings can be gained beyond the deployment of the NG9-1-1 network domain.

Fig. 1, Regulated Asset Reduction - Utilization Gains

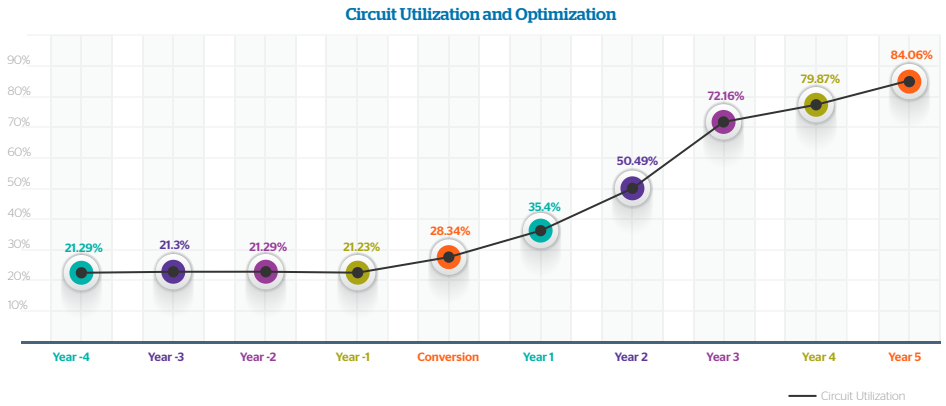


The Effect on Utilization Rates

With an inequitable distribution of network circuits and legacy CAMA trunks that are underutilized based on both county-level and regional traffic, Figure 2 reflects the asset utilization averages today versus gains in efficiency over the course of contract. Rather than pay for what is no longer used, we optimize assets with the regional stakeholders to:

- Eliminate waste
- Only retain regulated assets that are critical to operations
- Leverage owned and/or wholesale assets
- Diversify the network
- Decrease total cost.

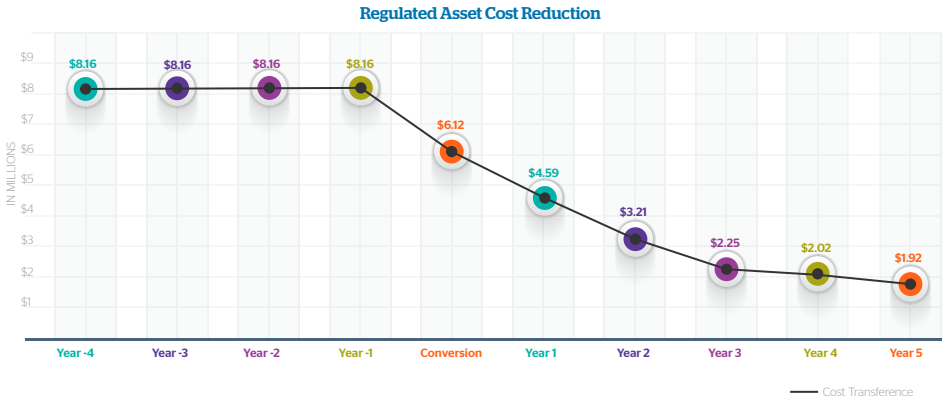
Fig. 2, Circuit Utilization and Optimization



Regulated Service Cost Transference

The key to transitioning to a mixed asset model is having a plan to decrease the costs of underutilized assets. When auditing the use of legacy 9-1-1 trunks, for example, most are still deployed and serviced based on landline call volumes even though wireless traffic has driven calling patterns in the opposite direction. This trend will continue as mobile device use increases, populations grow and demographics change. Figure 3 represents the typical cost reductions specifically related to regulated voice-only traffic experienced in an ESInet deployment with cost reductions being pulled to the egress (ESInet) side for concurrent build-out and transformation.

Fig.3, Regulated Asset Cost Reduction



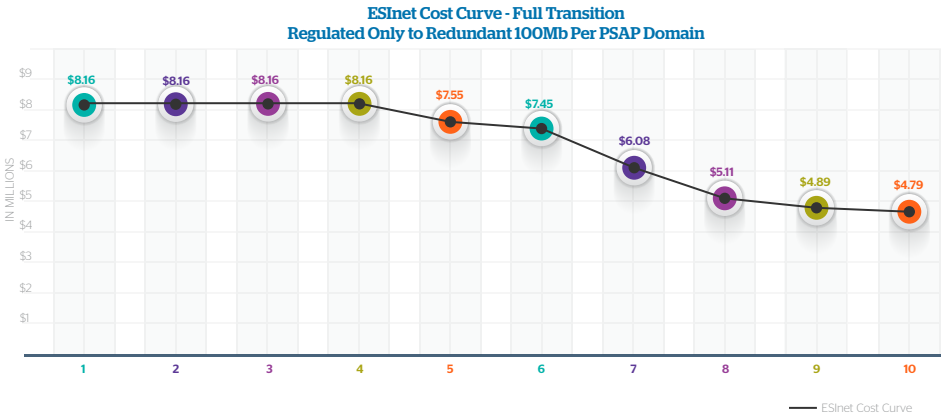
ESInet Cost Curve

As the reduction in regulated, cost-restrictive network assets continues, and the transition to ESInet mixed assets is completed, the savings gained through the conversion period are readily apparent.

Watch out for ESInet providers that preserve existing assets and then present a conversion period cost increase. In our experience, it's possible, with care, to transfer savings gained during the outset to capture the conversion costs and **reduce** the operating expense following full transition to the ESInet domain.

The model still reflects a preservation of regulated assets, hence the flattening of the reduction in years 4-5. While the option is there to continue the reduction at a more rapid pace equaling further cost savings, the transition to a completely CAMA-free domain is more likely to occur after the initial 5-year term.

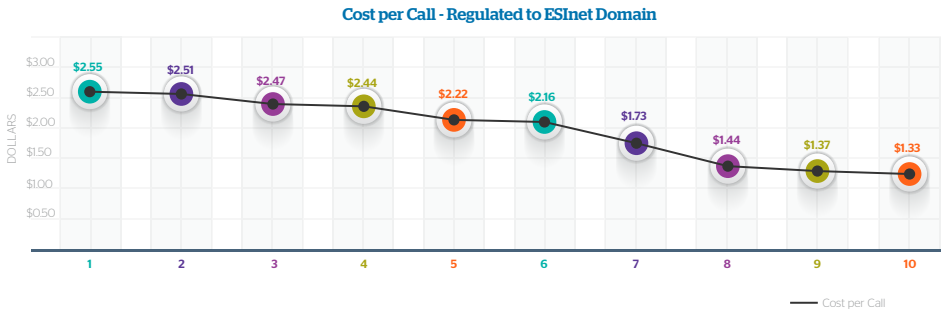
Fig. 4, ESInet Cost Curve - Full Transition Regulated Only to Redundant 100Mb Per PSAP Domain



Reduce Cost per Call

Through transference of cost from today's voice-only regulated domain to an IP-broadband, mixed asset, managed ESInet ecosystem; Figure 5 shows the region cuts per-call cost nearly in half and also reaches an NG9-1-1 end-state capability.

Fig. 5, Cost per Call - Regulated to ESInet Domain

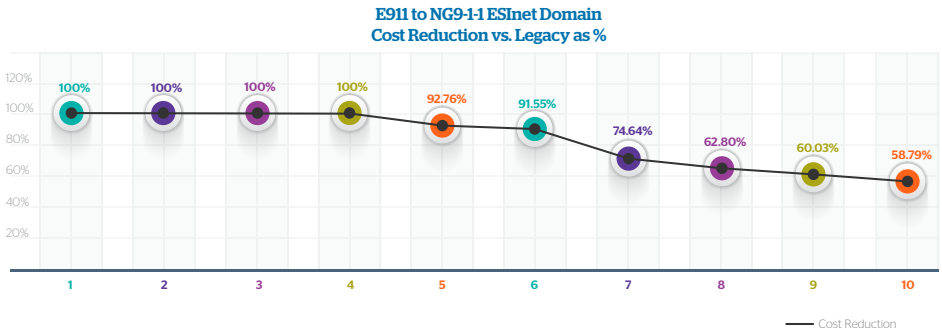


Cost Reduction from Legacy to ESInet

This region's first responders, PSAP professionals and citizen stakeholders should not accept excessive costs for underused or unused assets, yet we all pay into a fund that has preserved this status quo. By looking at the data, this region's stakeholders are able to see how they can afford and build an infrastructure domain that supports voice and data cost-effectively and securely.

Our model provides a 41% reduction in network costs, shown in Figure 6, builds the ESInet domain comprised of mixed assets (ILEC and non-ILEC provided), increases reliability and scalability, and provides the framework architecture for the region to build upon.

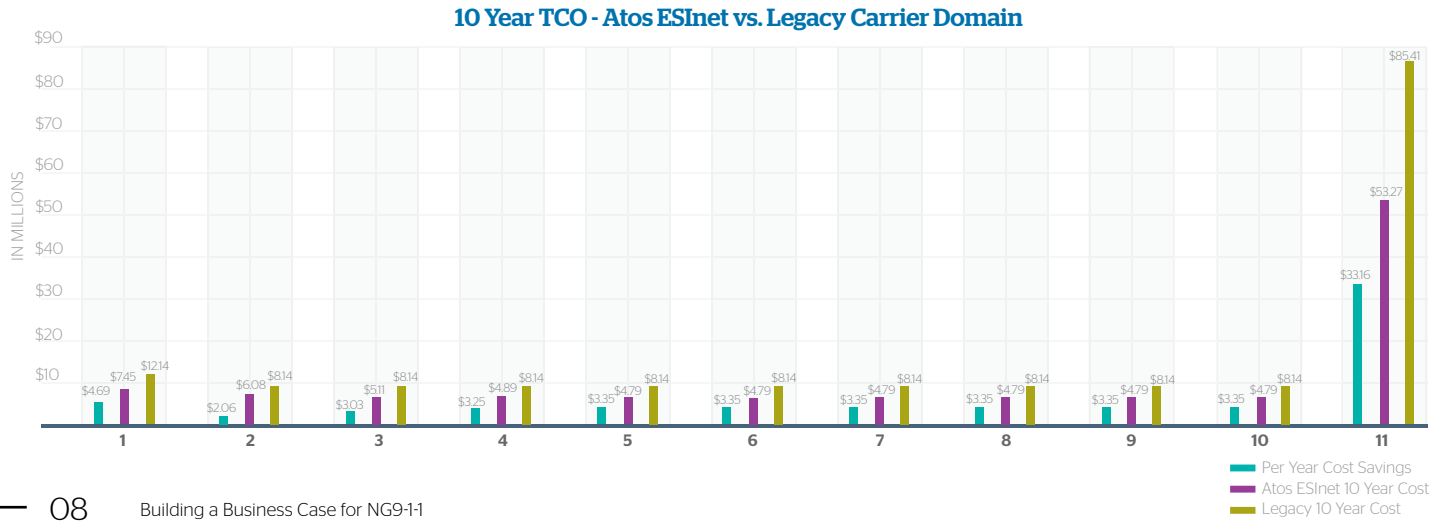
Fig.6, E9-1-1 to NG9-1-1 ESInet Domain Cost Reduction vs. Legacy as Percent



10-Year TCO

Using the Atos approach to ESInet regionalization, as reflected in Figure 7, the region would not only deploy a state-of-the-art NG9-1-1 managed network, but also reduce costs. Note that this cost curve includes the buildout/conversion years of the Atos NGCS ESInet domain. **When factoring in original CapEx buildout costs of the current infrastructure, the savings and 10-year deltas would likely present a total apples-to-apples savings of more than 41%.**

Fig.7, 10 Year TCO - Atos ESInet vs Legacy Carrier Domain



Project Conclusion

At the end of its NG9-1-1 upgrade project with Atos, our sample region reaps these benefits and more:

- Foundation built for NG9-1-1
- Redistribution of fees already collected
- Elimination of waste
- Creation of a redundant, resilient, multi-nodal 99.999% diverse network domain
- 10-year savings of $33.1 million ($3.3 million annually)

The money saved through this project translates into jobs created and preserved in an improved economy that's fit for fiscal transparency.

Going Forward

NG9-1-1 is a journey; a transition to an open and collaborative domain wherein no prescribed formula dictates success or completion. The only prescription for success is having a vision, a plan, a partner and a clear understanding of what it takes to achieve a next-generation networked IP domain.

Having provided this exact type of migration for client-partners in the United States and around the world, we have proven experience in an industry segment needing leadership beyond customer premises equipment (CPE) and Tandem Offices.

Our NGCS solution serves the high-volume calling and multimedia collaboration requirements of counties, states, even countries. Our OpenScape platform powers the United Kingdom's national telecommunications system, mission-critical included.

No provider in this industry has the same scalability and deployment expertise in large-scale migration programs to IP network domains as Atos, credentials that U.S. stakeholders can count on to lead beyond NG9-1-1. As we commit to all clients, our team works as your partner to guide your migration from time-division multiplexing (TDM) to IP independence and empowerment.

About the Author

Robert Clark
Vice President of NextGen, Atos Public Safety

A global public safety and security migration strategist, Rob Clark specializes in NG9-1-1/1-1-2 PSAP, ESInet and incorporating smart city ecosystem requirements to provide a single NGSmart blueprint for infrastructure modernization strategies. He leads Atos' NG9-1-1 organization, including strategic direction, solution alignment, partnerships, delivery models and total lifecycle sustainability models for public safety clients.

As lead subject matter expert for all Atos Public Safety offerings, Rob represents the organization in North America and abroad to align core competencies with market demands, customer requirements and forward-focused innovation.

About Atos

Atos SE (Societas Europaea) is a leader in digital transformation with circa 100,000 employees in 72 countries and pro forma annual revenue of circa € 12 billion. Serving a global client base, the Group is the European leader in Big Data, Cybersecurity, Digital Workplace and provides Cloud services, Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting edge technologies, digital expertise and industry knowledge, the Group supports the digital transformation of its clients across different business sectors: Defense, Financial Services, Health, Manufacturing, Media, Utilities, Public sector, Retail, Telecommunications, and Transportation. The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and is listed on the Euronext Paris market. Atos operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline.

For more information on our Public Safety offering and the solutions Atos provides, please visit us at:

pages.atos.net/nao-ng911

Let's start a discussion together

For more information: **info.na@atos.net**

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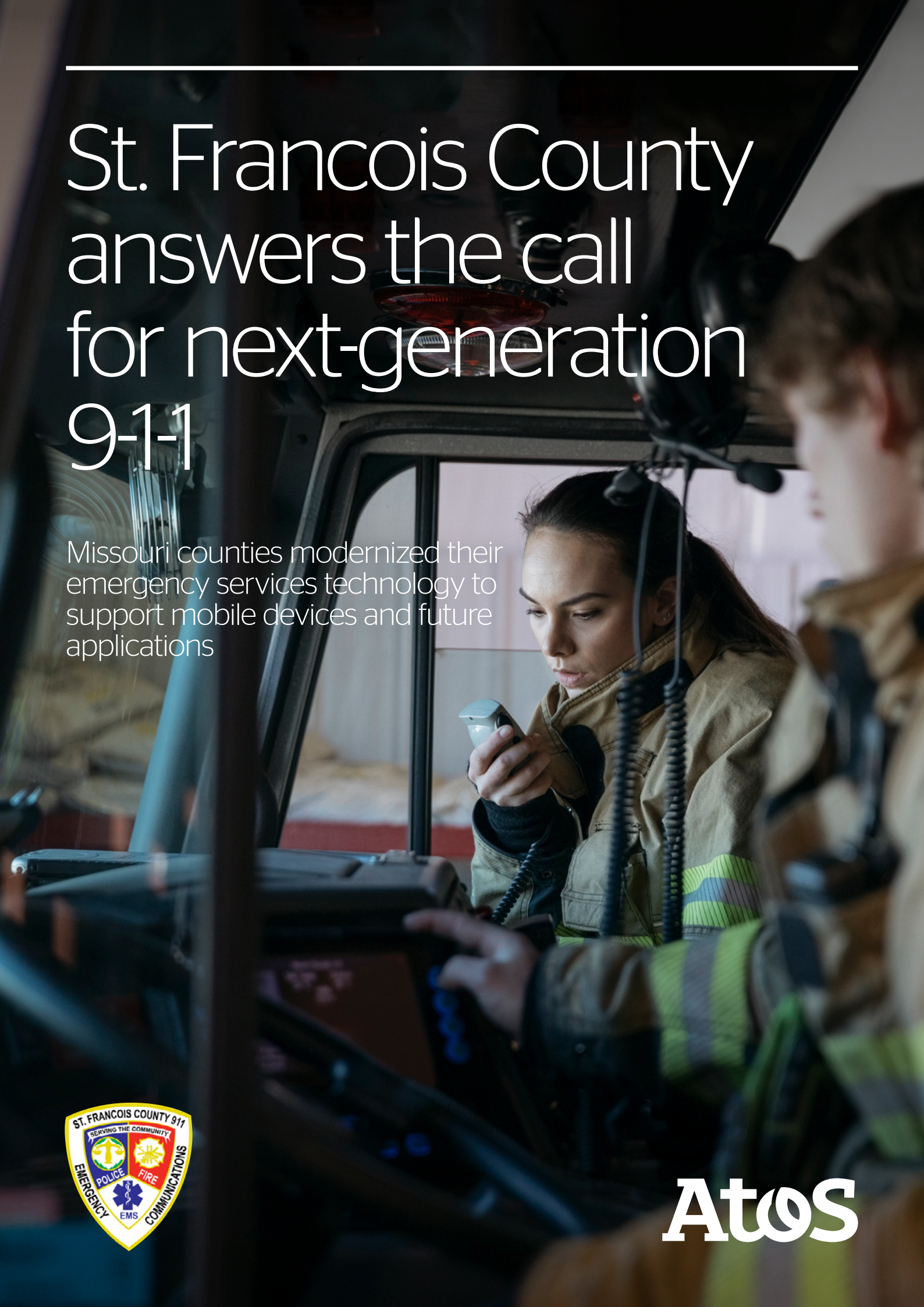
St. Francois County answers the call for next-generation 9-1-1

Missouri counties modernized their emergency services technology to support mobile devices and future applications



At a glance

Multiple counties in Missouri replaced an outdated analog 9-1-1 system with NG9-1-1 from Atos.

Outcomes

- Enabled mobile location, text and other inputs to call system
- Lowered costs through updated managed network
- Streamlined call management and dispatch processes

About St. Francois County Joint Communications

St. Francois County Joint Communications serves about 85,000 people in St. Francois and Ste. Genevieve Counties in southeast Missouri. They provide hosted 9-1-1 services to additional area PSAPs through a connected secure network.

A state of emergency

The nation's emergency call system is facing a crisis of its own – aging, obsolete infrastructures that weren't designed to accommodate today's wireless mobile society. Next-generation 9-1-1 (NG9-1-1) has emerged to adapt emergency communication services to the needs of a technology-dependent populace, providing the ability to transmit text, images, video and data to 9-1-1 public safety answering points (PSAPs).

St. Francois County Joint Communications, a consolidated dispatch center in rural southeast Missouri, saw NG9-1-1 as the path to the future when it needed to replace an out-of-date analog system. The center needed a solution that could meet current standards for call delivery, including better support for wireless callers, and quickly adapt to evolving requirements.

"People are more mobile and connected now, even in the most rural areas of the county," said St. Francois County 9-1-1 Director Alan Wells. "Citizens should be able to contact 9-1-1 in the fastest, most convenient way possible."

Looking to the future of 9-1-1

In the spring of 2017, Wells and team began the search for a system that would support NG9-1-1 as well as reducing network costs and improving processes for call-handling and dispatch.

Wells recalled, "When St. Francois County was exploring NG9-1-1, I called Atos' Phil Rotheram for advice because he's been working with public safety technology for more than 20 years and I trust his industry expertise. After many discussions, presentations and competitive comparisons we had almost made our decision. Then Phil took me to a facility in Madrid to see the systems in action, and I was blown away."

"St. Francois County is truly planning for the future with this initiative," said Rotheram, Global Head of Product Strategy for Public Safety at Atos. "There wasn't an example to follow in the U.S., but Atos' next-generation systems have been used extensively in Spain and a number of other European countries for public safety incident management and dispatching."

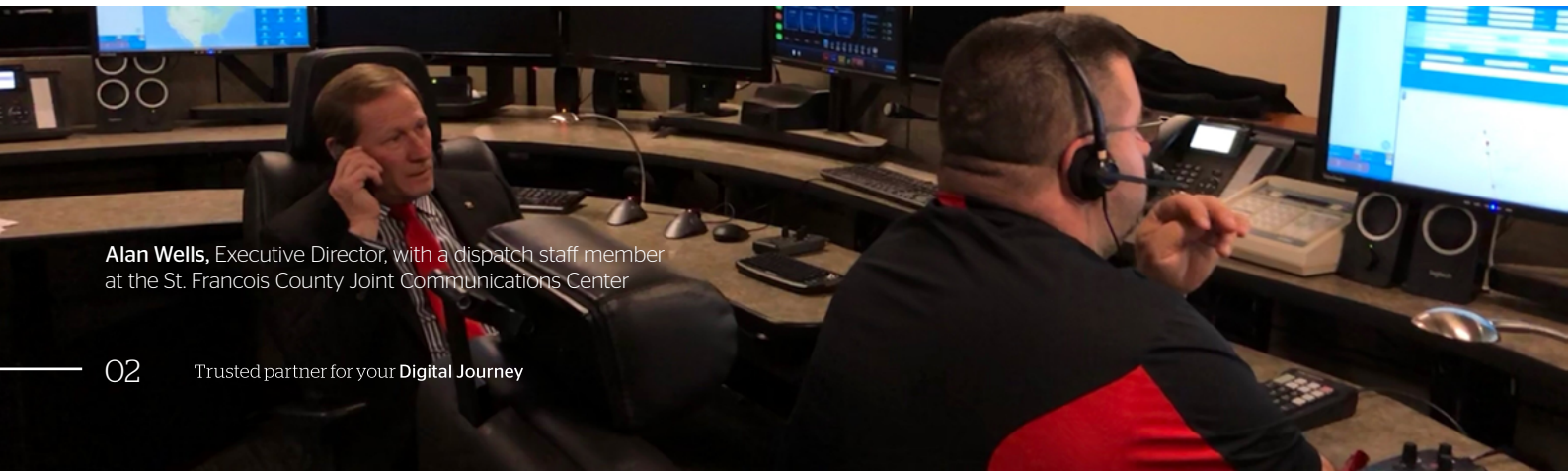
First in U.S. with OpenScape First Response v2.0

St. Francois County became the first agency in the U.S. to implement Atos' OpenScape First Response system and network services, including:

- OpenScape Voice unified communications that allow 9-1-1 centers to receive and accept calls from different sources (voice, video, SMS, social networks, apps and instant messaging)
- GEMMA (Global Emergency Management), Atos' end-to-end emergency management solution
- Managed network services connecting five PSAP locations across the St. Francois County 9-1-1 service area
- Migration to a new facility
- Up-to-date, ruggedized tablets and laptops for the field

Atos signed the initial contract with St. Francois County in June 2017 and went live with the system in March 2018. Being the first implementation in a new country comes with its own set of challenges. But Atos and St. Francois collaborated to adapt the technology to the counties' needs, finalizing the modifications in April 2019.

"In my business, seconds mean life or death," said Wells. "Atos' team understands this; they anticipate what we need and customize solutions to fit our operations."



Alan Wells, Executive Director, with a dispatch staff member at the St. Francois County Joint Communications Center

Dispatchers go mobile, too

For the first phase of the project, Atos implemented a geographically separated, redundant OpenScape Voice and GEMMA solution to provide comprehensive functionality to five 9-1-1 dispatch centers.

"Regardless of which PSAP facility they're in, operators can answer calls as if they were in their home PSAP," said Rotheram. This location-independence is invaluable in cases such as natural disasters, where the connection into one facility might be lost and calls need to be routed to another facility.

More flexible call handling

The GEMMA emergency call-taking and dispatching center software uses real-time geographic data combined with secure mobile technology.

The GEMMA user interface was adapted to let operators transfer calls to other agencies and add in resources to assist in the response. Atos also configured the system to handle different call types, including non-emergency and administrative calls, through a single user interface.

Wireless location support

With OpenScape First Response, operators can view a variety of location information on wireless callers depending on the data available from the wireless carrier. A map built into the user interface plots where the call is coming from. When the carrier provides Wireless Phase 1 information, the PSAP receives the caller's phone number and the location of the cell tower and sector. If the carrier provides Wireless Phase 2, the operator also receives additional location information such as latitude and longitude of the caller with a high degree of accuracy.

Benefits

OpenScape First Response accommodates changes in communications technologies to optimize resources, reduce response times and improve reliability. For St. Francois County, new capabilities include:

- Support for current and future call-delivery standards
- Ability for any dispatcher to log in and answer calls from any PSAP
- Detailed location information on wireless callers
- Single, integrated platform for NG9-1-1 workflow management
- Turnkey network management yielding 50 percent savings over the legacy vendor

The NEXT next-generation 9-1-1

For the second phase, St. Francois County agreed to be Atos' U.S. pilot case in Missouri for Emergency Services IP Network (ESInet) and Next-Generation Core Services (NGCS), the technology required to deliver voice, video, text and data calls to the PSAP. Atos will replace all the network connections coming into the 9-1-1 centers, moving from analog trunks to a full ESInet.

The Joint Communications Agency plans to expand beyond its current footprint to bring in other neighboring cities and counties. The long-term goal is to make NG9-1-1 technology available to agencies across Missouri, creating an interconnected statewide solution.

Why Atos for public safety

Atos' mission is to serve the nation's first responder community as its NG9-1-1 transformation partner. We design custom-fit communication ecosystems leveraging existing investments and assets using proven IT modernization methodologies.

Learn more about NG9-1-1 at atos.net/en-na/ng-9-1-1 or email info.na@atos.net.

"People are more mobile and connected now, even in the most rural areas of the county. As citizens, we should be able to contact 9-1-1 in the fastest, most convenient way possible."

June 2017
St. Francois County signs contract with Atos for OpenScape First Response

March 2018
Phase 1 system goes live

April 2019
Modifications completed for final customer acceptance of Phase 1 system

Fall 2019
St. Francois County finalization and deployment for Phase 2

January 2020
Full managed network with support for text and multimedia 9-1-1 calls

About Atos

Atos is a global leader in digital transformation with 110,000 employees in 73 countries and annual revenue of € 11 billion.

European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions. The group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

The purpose of Atos is to help design the future of the information technology space. Its expertise and services support the development of knowledge, education as well as multicultural and pluralistic approaches to research that contribute to scientific and technological excellence. Across the world, the group enables its customers, employees and collaborators, and members of societies at large to live, work and develop sustainably and confidently in the information technology space.

Find out more about us
atos.net
atos.net/careers

Let's start a discussion together

About Atos in Public Safety

Next-generation 9-1-1 (NG9-1-1) systems are highly specific to the specialized needs of emergency services agencies today and in the future. Atos Public Safety provides these agencies the most scalable NG Core Services (NGCS) carrier-grade routing solutions and Emergency Services IP Network (ESInet) managed service ecosystem available in the industry. Led by a veritable Who's Who of seasoned public safety professionals, Atos Public Safety's mission is to serve the nation's first responder community as its NG9-1-1 transformation partner. We design custom-fit communication ecosystems leveraging existing investments and assets using proven IT modernization methodologies. The names you know and trust, the company known and trusted worldwide for complex IT management, bringing the public safety industry an end-to-end NG9-1-1 managed network delivery system.

For more information: info.na@atos.net

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ECRF AND LVF

TRANSITION TO GEOSPATIAL CALL ROUTING AT YOUR OWN PACE

GIS data plays a critical role in NG9-1-1

GeoComm ECRF and LVF are part of an end-to-end NG9-1-1 GIS solution that delivers NENA i3 ECRF and LVF services to NG9-1-1 Emergency Services IP Networks (ESInets), replacing legacy 9-1-1 MSAG and Selective Router systems. It includes 9-1-1 GIS data management, aggregation, and quality control systems to provision GIS data to ECRF and LVF systems rapidly and with high frequency.

GeoComm ECRF and **LVF** provide the NENA i3 standard Emergency Call Routing Function and Location Validation Function required for NG9-1-1 systems. Based on NENA standards, GeoComm ECRF and LVF works with ANY vendor, make, and model of NG9-1-1 compliant Emergency Services Routing Proxy (ESRP), Public Safety Answering Point (PSAP) equipment, and other LoST clients.

Reliable and Robust Performance for 9-1-1 Systems

GeoComm ECRF and LVF use a load balanced multi-server architecture supporting geographic redundancy with no single point of failure, providing high availability and lightning fast performance for any agency, large or small.

GEOCOMM ECRF BENEFITS

- Provides fast, secure, and reliable core network ECRF services for NG9-1-1, compatible with NENA i3 NG9-1-1 equipment and systems from any vendor
- Enables a transition to geospatial call routing at your pace, allowing you to increase routing capabilities as you assess, improve, and maintain your GIS data over time
- Enables common selective call transfer information across PSAPs using different CPE/CTI brands

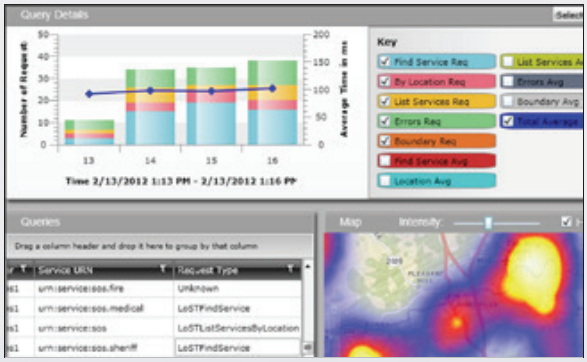
GEOCOMM LVF BENEFITS

- Provides fast, secure, and reliable core network LVF services for NG9-1-1, compatible with NENA i3 NG9-1-1 equipment and systems from any vendor
- Improves the accuracy of emergency call routing by ensuring that wireline and VoIP service subscriber addresses are valid and routable before emergency calls are placed

Spatial Router Web Dashboard

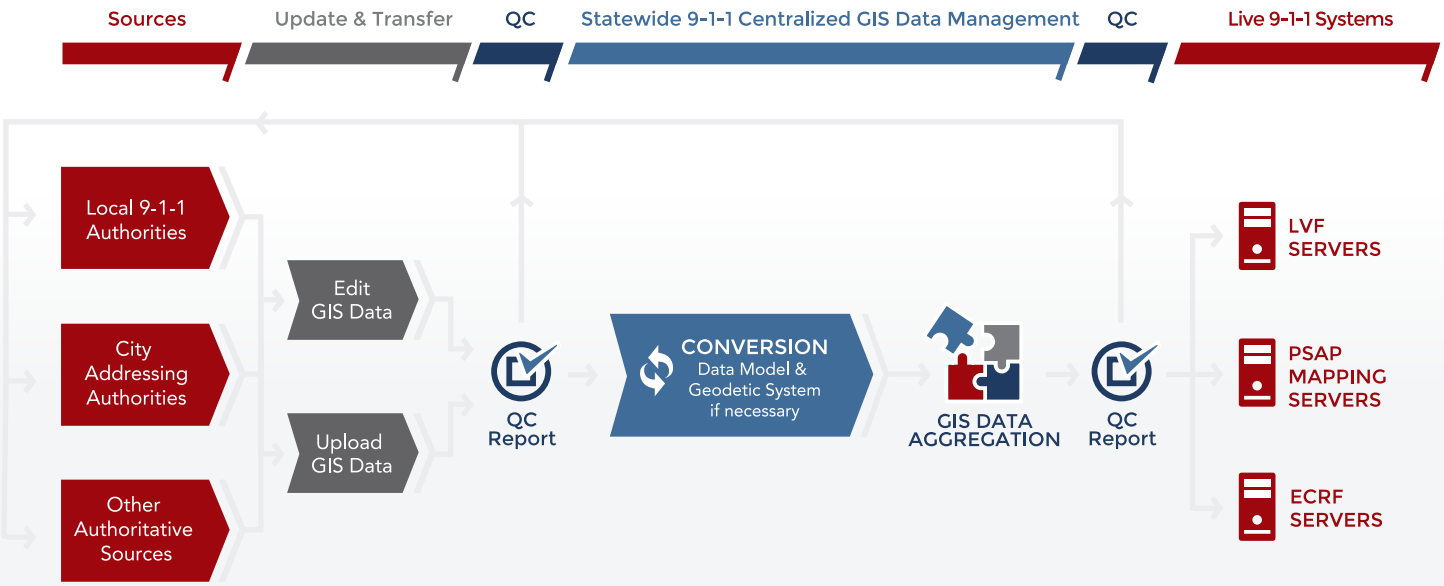
Logging and Reporting

Real-Time Performance Monitoring



#GISimplified

GIS CONTINUOUS WORKFLOW



ADDITIONAL GEOCOMM ECRF BENEFITS

- Improves response times by routing emergency calls to the correct Public Safety Answering Point (PSAP) faster
- Accomplishes fast routing changes in just a few seconds, such as adding virtual PSAP routing boundary during a public event, or large-scale manmade or natural disaster
- Uses industry leading Esri ArcGIS Enterprise technology to leverage existing GIS data, staff, expertise, and investment available to 9-1-1 authorities today
- Tested for interoperability at NENA Industry Collaboration Events (ICE1, ICE2, ICE3, ICE4, ICE5, ICE6, ICE7, and ICE8) and the European Emergency Number Association (EENA) / European Telecommunications Standards Institute (ETSI) NG1-1-2 Plugtest #1
- Integrates seamlessly with GeoComm's end-to-end NG9-1-1 GIS system for publishing GIS data from local authorities into the 9-1-1 network, performing QC and data coalescing, and provisioning into live 9-1-1 ECRF systems

ADDITIONAL GEOCOMM LVF BENEFITS

- Supports single and batch address validation
- When addresses are found to be invalid, provides details that describe which data is incorrect, to help remediate GIS data or location database discrepancies
- Integrates seamlessly with GeoComm's end-to-end NG9-1-1 GIS system for publishing GIS data from local authorities into the 9-1-1 network, performing QC and data coalescing, and provisioning into live 9-1-1 LVF systems
- Uses industry leading Esri ArcGIS for Server technology to leverage existing GIS data, staff, expertise, and investment available to 9-1-1 authorities today
- Tested for interoperability at NENA Industry Collaboration Events (ICE1, ICE2, ICE3, ICE4, ICE5, ICE6, ICE7, and ICE8) and the European Emergency Number Association (EENA) / European Telecommunications Standards Institute (ETSI) NG1-1-2 Plugtest #1
- Integrates seamlessly with GeoComm's end-to-end NG9-1-1 GIS system for publishing GIS data from local authorities into the 9-1-1 network, performing QC and data coalescing, and provisioning into live 9-1-1 LVF systems

esri Partner Network Platinum
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DataBond®

The Next Generation of Request / Response

Flexible and user-configurable, DataBond is designed to integrate the current needs of public safety and emergency response with the evolving technologies of 9-1-1 Next Generation functions, interfaces, and protocols. DataBond is a fully functional database ALI, supporting legacy and NG9-1-1 interfaces.

DataBond as LDB – DataBond can serve as a Location Database (LDB). An LDB is a data structure that can serve as both an Automatic Location Identification (ALI) and a Location Information Server (LIS) operating within a 9-1-1 authority's jurisdiction.

DataBond with ELS – DataBond can integrate with Enhanced Location Service (ELS) providers, such as the RapidSOS NG9-1-1 Clearinghouse, to obtain additional location information. Each participating 9-1-1- agency may elect to receive this information from DataBond for display at the call taker station.

DataBond as LIS - As the 9-1-1 industry evolves, subscriber location information is becoming more distributed as service providers operate their own LIS. This represents a challenge to both 9-1-1 authorities and carriers currently operating ALI databases. **DataBond** represents the melding of ALI and LIS functionality to overcome this challenge.

DataBond as ALI - Flexible and user-configurable, ALI is a stand-alone ALI database that provides ALI responses to ALI requests. ALI is compatible with all leading ANI / ALI controllers and Windows™-based software. WebALI is a web-based component to ALI and provides users with an Internet-based platform to exchange information.

DataBond as MSAG – DBMS incorporates more than 25 years of customer feedback and continuous product development. DBMS is the most fully-featured database management software on the market. WebDBMS is a web-based component of DBMS and provides users with an Internet-based platform to exchange information with telephone companies, PSAPs, and other county agencies.

DataBond also provides Cellular Phase I and Phase II solutions, extensive reporting capabilities, including a history of all database requests, automatic synchronization of records for full redundancy and reliability, automatic import of NENA standard files, and flexibility in record updating, automatically or manually.

DataBond is fully integrated with **SpatialCentral** and **DataNexus** for updating Location Validation Function (LVF) and Emergency Call Routing Function (ECRF). It also integrates directly with **SpatialStation** for co-maintenance of traditional and NG9-1-1 databases at the same time, from the same location. This helps ensure that every subscriber location record maintained is valid and routable BEFORE it is utilized in these applications.

Improving and managing your data quality today and positioning your organization for NG9-1-1 requirements, is our focus. With 911 Datamaster, success begins before the call is made. Visit us at 911Datamaster.com.

Product Specifications

- Microsoft™ Server-based for ease of use, lower cost, and easy maintenance.
- Encompasses all of the specifications for ALI and LIS.
- Supports IP communication with controllers and PSAPs.
- Supports i3 HTTP Enabled Location Determination (HELD) protocol.
- Meets J-STD-036 and E2+ cellular standards.
- Interfaces with DBMS software for ALI / LDB updates.
- Scalability from less than one thousand to more than 50 million records.
- Provides ALI response to multiple PSAP controllers.
- Provides five call history and stores details for individual telephone numbers.
- Supports 8-digit and 10-digit ALI requests.
- Simple or advanced password protection and user login auditing.
- Automatic synchronization of records on two servers for full redundancy and reliability.
- Maintains logs of call activity, imports, and selective router updates.
- Automatic status notification by pager, email, TLI, and SNMP.
- Supported by 911 Datamaster's comprehensive, 24/7/365 software support.

ECaTS

Information into Insights

The new standard for public safety MIS reporting.

You're there for us. So we're here for you. Let's connect.

Next-Gen Public Safety has arrived.

Introducing ECaTS: the first ever MIS designed exclusively for public safety.

ECaTS, or Emergency Call Tracking System, takes raw 911 call data and turns it into a neat, informative package that tells you everything you need to know about your PSAP's performance and future needs. That gives you the power to effect change and fulfill your mission to save lives.

Basically: This could be the best investment your PSAP ever makes.

3009 Douglas Blvd, Suite 300
Roseville, CA 95661

(916) 787-2200

info@ECaTS911.com

www.ECaTS911.com

@ECaTS911

The first ever online MIS in 9-1-1 is starting a revolution...

And you're invited.

Get the 4-1-1 on 9-1-1.

Every day, your PSAP compiles masses of information from every 9-1-1 call: where the calls originate, where they are sent, how many calls must be transferred, how long callers wait for a response, call duration, when the busiest hours are, circuit utilization, and much more.

The question is, what can you do with that information? The short answer is: When you're armed with intelligent insights, you can do anything. Oh, you want specifics? Keep reading.

Your mission is our mission.

As public safety personnell, we know that you're out to save lives. We also know that there are obstacles in your way: low budgets, old equipment, red tape, insufficient number of staff, and inefficient location devices, to name a few.

ECaTS provides the reports and analysis that give you the tools you need to fix those problems—and become pioneers and leaders in next-gen 9-1-1 service. That data already exists—why not use it to make your PSAP the best it can be?

Not just a pretty (inter)face.

First - and best - in the business.

20 years ago, ECaTS changed the standards for 9-1-1 call tracking and reporting by creating the first ever online public safety MIS. Today, we're still the only reporting system in our class—and that's because we designed it with dispatchers, directors, and citizens in mind (not stakeholders and profits).

Tech no one else has thought of.

Let's face it…information is better when it's easy to read and convenient to access. That's why we created the Dashboard, an interactive display that shows every 9-1-1 call, outage, and response in real time on a map. No other MIS has that. Oh, and did we mention that ECaTS is the only reporting solution for Text-to-9-1-1 technology?

Unmatched customer service.

Only ECaTS offers unlimited service with every contract—and we do mean unlimited. That doesn't just include our personal phone support and webinars: we'll actually develop custom reports for your specific needs. If you need to show data from X area that shows Y and is cross-referenced with Z, we will code it, just for you.

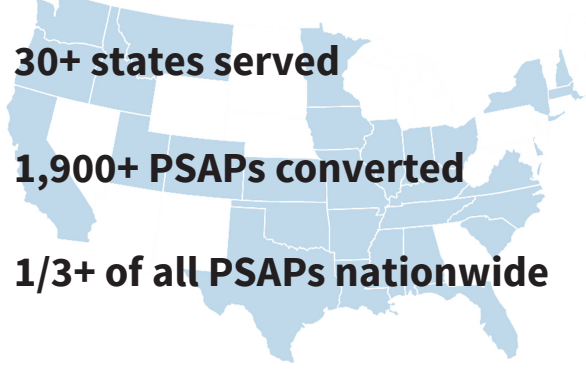
Let's talk about you.

Good technology is created for those who use it, not for the ego of its creators. For that reason, ECaTS is designed to make your work easier. Basically: **We like you just the way you are.**

That means no complicated tech talk, no sales-y buzzwords, and no painful transitions—just tracking and reporting made simple. ECaTS works with all CPE providers and adapts to suit the tech you already work with. We aren't out change the way you work—we adjust to you so we can supercharge your PSAP's results.

That's part of our commitment to serving the human side of public safety.

You'll be in good company.



You could say we get around. From California to Indiana to Virginia and beyond, there's a good chance your neighbors are already using ECaTS. Ask them how they like it—and then, why not try it out yourself?

ECaTS911 Dashboard

Turns 911 Data into Actionable Insights!

Anywhere, anytime, any device. Get access to your reporting data when and where you need it.

Data Sources

ECaTS pulls data from a standard CDR feed or from existing or newly established RDDM Connections to CPE equipment.

Data Updates by the Minute

Get statewide data updates every minute. For PSAP Values, time calculations update every hour, while class of service, carrier and volume update every minute.

Comprehensive Map of Calls

The ECaTS map plots each call and color codes them by carrier. Calls can be filtered by carrier and when you scroll over the dot representing a call, our system will provide the name of the PSAP that received the call, geographic coordinates, and the carrier.

PSAP Alerts Chart

See PSAP alerts at the top of your screen, identified by FCCID and color coded to indicate the status of the PSAP. Status of the PSAP is based on pre-determined thresholds.

Our comprehensive dashboard shows you:

- 911 call volume per hour
- Number of calls per minute
- Duration, answer and queue seconds
- NENA answer time standard
- NFPA answer time standard
- Class of service volume
- Carrier volume
- Abandoned percentage
- Map of jurisdiction

Contact us for a live demo today!

3009 Douglas Blvd., Suite 300, Roseville, CA 95661

ECaTS
Information into Insights

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916.787.2200
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Report Title: Incident Detail Report - [redacted] through today
Run Date and Time: 05-30-2020 11:25:00 Pacific Daylight Time
Run by: Eric Nesvick
Table name: Incident
Query Condition: Customer = [redacted] AND Opened Date between 09-01-2018 00:00:00 and 04-30-2020 23:59:59
Sort Order: Opened Date in ascending order

[redacted] Incidents

▲ Opened Date	Number	Caller	Short Description	Category	Priority	Assigned to
02-26-2020 01:51:36	INC001614385	[redacted]	Calling out	Telephony	3 - Medium	[redacted]
02-27-2020 10:40:28	INC001617254	[redacted]	[redacted] line is showing busy	System	3 - Medium	[redacted]
02-29-2020 12:59:17	INC001620672	[redacted]	UNABLE TO DIAL OUT	Telephony	3 - Medium	[redacted]
02-29-2020 22:39:38	INC001621149	[redacted]	Trouble with all phones	Telephony	3 - Medium	[redacted]
03-01-2020 14:13:26	INC001621819	[redacted]	unable to pick up incoming lines	Application	5 - Minimal	[redacted]
03-02-2020 02:37:20	INC001622451	[redacted]	F5 PHONES	Telephony	3 - Medium	[redacted]
03-02-2020 07:14:49	INC001622880	[redacted]	Phone position op4 user ID logged in as JCounts was locked, had to F5 to reset.	Application	3 - Medium	[redacted]
03-03-2020 11:43:01	INC001625601	[redacted]	test call - atos call center	Service Desk	3 - Medium	[redacted]
03-12-2020 04:06:38	INC001640845	[redacted]	Test call	Service Desk	3 - Medium	[redacted]
03-16-2020 21:16:21	INC001649162	[redacted]	Unable to answer ringing Admin Line on OSFR	Telephony	4 - Low	[redacted]
03-23-2020 08:39:37	INC001661289	[redacted]	OPERATION NOT ALLOWED ERROR MESSAGE	Telephony	5 - Minimal	[redacted]
03-24-2020 06:27:20	INC001663561	[redacted]	OPERATION NOT ALLOWED MESSAGE	Telephony	3 - Medium	[redacted]
03-27-2020 09:46:06	INC001671744	[redacted]	OPERATION NOT ALLOWED	Telephony	4 - Low	[redacted]
04-07-2020 09:50:18	INC001695753	[redacted]	OPERATION NOT ALLOWED MESSAGE	Telephony	5 - Minimal	[redacted]
04-10-2020 07:51:46	INC001715336	[redacted]	OPERATION NOT ALLOWED MESSAGE	Telephony	4 - Low	[redacted]

Atos | Public Safety

DRAFT Maintenance Plan

Next Generation 9-1-1 Emergency Services

DRAFT

Contact:
Version: 1.0 Draft for RFP
Document date: May 11, 2020
Doc. No:

Contents

1. Introduction 3
2. Maintenance Plan 4
2.1 System Monitoring 4
2.2 Service Tickets 5
2.3 Maintenance windows 5
2.4 Uninterrupted Service 6
2.5 Level 1 Support 6
2.6 Level 2 Support 7
2.7 Level 3 Support / Escalations 7
2.8 Change Management 7
2.9 Security updates 8
2.10 Hot Fix 9
2.11 Minor Releases 9
2.12 Major Releases 9
2.13 System Backup & Disaster Recovery 10
2.14 Field Services and Spares 11
3. NG 9-1-1 Support 12
3.1 Connectivity Support 12
3.2 Software Support 12
3.3 Hardware Support 12
3.4 SLAs & Reporting 13

DRAFT

1. Introduction

This maintenance plan describes how Atos will maintain the NG9-1-1 NGCS and ESInet solution after deployment and cutover. This plan will be enforced throughout the contract period to ensure uninterrupted reliable service.

The operations team will consist of the following staff:

- Operations Director
- Account Manager
- Quality Manager
- Shift Lead / Manager
- Engineers and technicians
- Field support team

Atos has NOC and SOC support centers in the USA to fully support the operations needs of the solution.

The team will have documented processes compliant to ITIL for service delivery and operations management. Our team will ensure 24/7/365 monitoring of the solution and various levels of support capability to ensure proactive and timely resolution to issues. Atos will adhere to the SLA guidelines set forth in the RFP.

Atos has dedicated onshore staff working on 9-1-1 service operations activities. This staff is fully trained on our complete NG9-1-1 solution. The support staff for 9-1-1 operations will be located in centralized regions of the USA to take advantage of time zones and special skillsets.

DRAFT

2. Maintenance Plan

2.1 System Monitoring

The system will be monitored 24/7/365 through various data collection tools. All system components will be configured to deliver alarms and traps as well as crucial logs to the NOC. The teams will be performing proactive monitoring of the solution as well as constantly evaluating thresholds for detecting anomalies. The monitoring will be configured for all equipment at the data centers and PSAPs. All active triggers for alarms, logs and traps will result in autogenerated tickets in our ticketing system; ServiceNow. These tickets will be dispatched to Level 1 support.

Aside from proactive monitoring through thresholds, our solution will also have automated synthetic tests that are run periodically from end to end. This synthetic test solution contains probes throughout the solution at critical component junctions to ensure the following is met:

- Packet Latency
- VOIP Jitter
- Media quality (MoS)
- Packet loss

The synthetic testing will have a default VOIP configuration to test voice calls and can also be used for troubleshooting other issues around data delivery and load testing. These tests can be configured for different times of the day and during critical events to ensure smooth operations. Any anomalies detected from the synthetic testing will generate automatic tickets and alerts into our NOC.

Our monitoring tools (Netscout, Zenoss, Splunk, CyberArk, Cisco tools) will collect and analyze data from the following devices in the solution:

Component	Type of Detection
Routers	SNMP / Syslog / APIs
Switches	SNMP / Syslog / APIs
Firewalls	SNMP / Syslog / APIs
Servers	SNMP / Syslog
vmWare	SNMP / Syslog / API
Atos Applications	Logs / API / SNMP
3rd Party Apps	Logs / SNMP /Syslog
Storage / DB	SNMP / Logs / API
POI / Agg Edge	SNMP / Probes
DNS/Time Server	SNMP / Syslog

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Component	Type of Detection
Security	SNMP / Syslog

Table 1: Monitoring Devices

Atos Service Delivery Manager will ensure customer care and communicate regularly with the [Customer].

2.2 Service Tickets

Atos will provide a secure web portal that will allow authorized resources access to the dashboard.

Service tickets are generated multiple ways during operation:

1. Automatically through triggers
2. Manually through service desk calls
3. Manually by engineers or QA team

Atos will have a 24/7/365 service desk to support field operations. A service desk will be published to [Customer] representatives. As questions or concerns are raised through service desk. Other tickets are auto generated by the system through alarm thresholds in the monitoring policies. These policies will be continuously reviewed and adjusted applying AI and machine learning over time. As tickets are created, they are correlated and aggregated based on events and scenarios.

Our solution will maintain the tickets and resolution for a minimum of 3 years for knowledge base, traceability, and historical information.

Tickets will remain open until adequate resolution and will be managed by our quality manager. The quality manager will review tickets daily and escalate when needed. All tickets will be assigned an SLA for tracking and reporting.

Atos will follow a three-tier system for handling tickets.

Level 1 – Service desk to open and categorize tickets for dispatch to level 2
Level 2 – troubleshoot and identify / resolve the issues
Level 3 – escalations and root cause analysis, problem isolation

Any tickets not resolved within SLA periods or need further escalation will be escalated to system engineering and product house for deep dive analysis.

2.3 Maintenance windows

Since 9-1-1 is a 24/7/365 operations, Atos will work with [Customer] to establish maintenance windows. Anytime a major maintenance window is required, Atos will notify

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[Customer] three (3) days in advance through writing and in alignment with the Change Management process.

Maintenance windows will not be more than 6 hours in length with adequate rollback period as needed. All maintenance periods will be negotiated and subject to critical operations and needs.

Atos will support any interim provisioning required during this maintenance period, to allow for uninterrupted service.

2.4 Uninterrupted Service

Atos solution architecture ensures uninterrupted service during maintenance periods and component outages. Atos will not perform any operation on the system that will have profound impact to 9-1-1 service.

- All system components have redundant independent paths through the solution.
- Atos solution has two geographically separated, independent data centers, in the event a single datacenter is impacted, the other datacenter can continue to process the calls
- Atos will only perform maintenance activities on a single independent lane at a time, isolating the entire impacted lane from the rest of the solution.
- All databases will have multiple cluster nodes to ensure adequate support during maintenance periods.
- The health of the solution is closely monitored during maintenance activities to ensure there is no degradation of service and SLAs continue to be met during maintenance activities.

2.5 Level 1 Support

Level 1 support will consist of service desk professionals that will be able to communicate with the customer during call in, as well as be able to identify the fault domain from autogenerated tickets.

The level 1 support will be stationed at our facilities and will provide 24/7/365 access for service desk. The level 1 support personnel will be responsible for the following:

- Problem identification
- Data collection
- Basic troubleshooting
- Categorization of the issue to system function
- Identifying initial priority and severity

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2.6 Level 2 Support

Level 2 support staff will consist of functional specialists with subject matter expertise in the solution. This team will be able to examine issues that span multiple domains. The functional skillset domains will include the following:

- Networking / Security
- Datacenter
- NG911 applications
- 9-1-1 NENA specifications
- Database (Call handling and recording)
- Network operations and monitoring tools

This will be a cross functional team that will work as a group to tackle non-trivial issues. This team will be responsible for issue isolation and resolution within SLA guidelines. This team will perform troubleshooting steps and enhanced data collection and perform resolution across multiple domains.

2.7 Level 3 Support / Escalations

The level 3 team will be able to perform deep dive analysis and subject matter expertise around complex issues. This is an escalation team consisting of architects and engineers that can perform enhanced troubleshooting of the solution and have a thorough understanding of products that make up the solution.

Tickets are escalated to level 3 after the level 2 team has exhausted all options for issue resolution.

This team will be able to reach out to standby development resources for further guidance and operational workarounds to get to quick resolution.

2.8 Change Management

All changes to the system will be documented, approved and executed within a mutually agreed upon, ITIL based change management process. As part of this process, detailed pre-change test results, implementation plans and backout plans will be provided.

A bulletin will be issued to all operations staff at [Customer] of the changes and impacts prior to the maintenance window.

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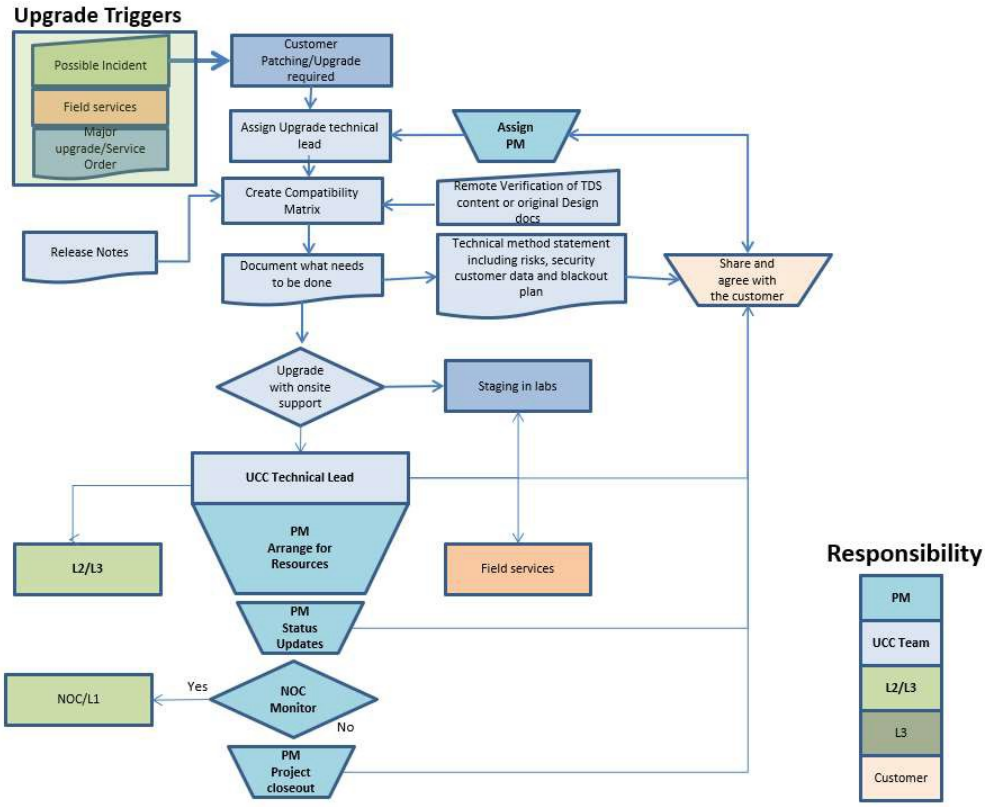

Figure 1: Change Management and Upgrade Process

2.9 Security updates

All security updates will be planned and scheduled. Atos does not support automatic security updates to be applied to the NG9-1-1 solution. As security bulletins are released by vendors, Atos will perform adequate testing in our NG9-1-1 lab prior to rolling out in operations. Security patches are rolled out per scheduled maintenance once they have been approved for use. All security updates are rolled up into the minor release for long term release management of the solution software.

In the event there is a high risk / high priority security update that must be deployed, particularly in the cases where there is a potential exploit in the wild, a mutually agreed upon exception process will be developed to plan / execute expedited rollouts of fixes in a timely manner.

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2.10 Hot Fix

Atos will publish critical patches system upgrades as needed. Installation of these updates will be performed during planned maintenance periods as described above. Critical patches releases contain fixes critical to the operations and will only be limited to correct any outage condition.

All patches and upgrades will be performed by first isolating a processing lane from the rest of the solution. The patch or minor upgrade will be performed on the isolated lane and thoroughly tested before rolling out the change in the rest of the system.

A Hotfix release contains a fix for an urgent priority 1 trouble ticket. These are only produced in the most exceptional of circumstances and are typically only installed at one customer. For example, v7 R1.1.1.

2.11 Minor Releases

Atos will publish non-critical patches or minor system upgrades four (4) times a year. Installation of these updates will be performed during planned maintenance periods as described above. Minor releases contain fixes and minor enhancements that are beneficial to the operations.

Patches may be required at different periods during operations. These patches may contain fixes for issues found during troubleshooting. Patches will be applied either for diagnostics or for stopgap issues to resume operations. Atos goal is not to keep patches in the system longer than the minor upgrade period once a quarter.

All patches and upgrades will be performed by first isolating a processing lane from the rest of the solution. The patch or minor upgrade will be performed on the isolated lane and thoroughly tested before rolling out the change in the rest of the system.

2.12 Major Releases

Atos will publish either one (1) or two (2) major release updates a year. These major releases are categorized as either architectural changes or major changes to functionality of the system. These will be released in a control manor into operations during a planned maintenance window via the change management process. In some cases, Major releases may require the maintenance period for a single lane to extend beyond the typical 6-hour window, if so, extended maintenance windows or multiple maintenance windows may be required to minimize impact.

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Major release updates follow the same guidelines as minor releases and patches. They are first sanity tested in our NG9-1-1 lab before approved for use. They are also applied to an isolated lane in the operational datacenter and support rollback as needed. Thorough system testing is performed on the N+1 lane before a decision to rollout through the remaining solution.

A major release contains significant new functionality in addition to change requests and trouble ticket resolutions. For example, v10.

2.13 System Backup & Disaster Recovery

Atos will create an initial system backup for each datacenter after project acceptance has been signed off. This will be the baseline version of the solution. This will include VM backups, config files, application settings, router and switch provisioning, active directory user accounts, etc.

The baseline of the solution will be version controlled and documented along with the system design. An automatic backup utility will be configured as part of the solution to perform daily backups.

Atos will adhere to strict change management guidelines to ensure all changes are authorized and reported and tracked. All authorized changes will be backed up either manually or through automated backup against the baseline.

Our tool will maintain the backup configuration data for 14 days. Only delta changes are backed up and maintained.

In the event of catastrophic failure of a component or critical resource, Atos will be able to restore the faulted system from the stored backup and quickly bring the failed component back into operations.

Backup results are tracked through monitoring and reported daily.

All backups are stored locally at each datacenter and cross replicated between both datacenters for resiliency.

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2.14 Field Services and Spares

In the event of component failures at a datacenter or [Customer] site supported by Atos, Atos will deploy field services to swap out failed parts. Atos will store spare parts for all critical components at the data center or a local depot in order to meet the SLA guidelines. As parts are used, the pool will be replenished. Atos will have field service personnel located within a distance to the Atos supported locations to be dispatched to meet the SLAs.

Serial numbers and other inventory control will be used per ITIL process for managing spare parts. Atos will utilize the backup and recovery model described above to quickly turn around failed components and ensure up to date configuration.

Atos will provide specific details of how it will meet the SLAs with regard to field service and spares in the SOW upon award as the final solution will be dependent upon the [Customer] location.

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3. NG 9-1-1 Support

3.1 Connectivity Support

Aside from proactive monitoring through thresholds, our solution will also have automated synthetic tests that are run periodically from end to end. This synthetic test solution contains probes throughout the solution at critical component junctions to ensure the following is met:

- Packet Latency
- VOIP Jitter
- Media quality (MoS)
- Packet loss

The synthetic testing will have a default VOIP configuration to test voice calls and can also be used for troubleshooting other issues around data delivery and load testing. These tests can be configured for different times of the day and during critical events to ensure smooth operations. Any anomalies detected from the synthetic testing will generate automatic tickets and alerts into our NOC.

3.2 Software Support

Atos software support will be provided through monitoring, product support and development operations and the manufacturer for in scope non-Atos applications, if any. Atos NG 9-1-1 support resources are co-located with the Atos NG 9-1-1 NOC/SOC and other support resources to facilitate faster response times and better collaboration. Software support includes security updates, hot fixes, minor releases and major releases.

Proposed software changes will be tested prior to deployment in the production environment. Atos will provide a backout/rollback plan as part of the change management process.

Atos will cover the following tasks for all in-scope Atos supported applications:

- SW upgrades
- SW patching
- System monitoring
- Problem analysis
- Emergency recovery

3.3 Hardware Support

In the event of hardware component failures including servers, routers, switches, firewalls, or other Atos supported hardware at either a data center or [Customer] site supported by Atos, Atos will deploy field services to swap out failed parts. Field service personnel will be located within a distance to the Atos supported facility to meet the SLA requirements. Atos

DRAFT

will store spare parts for all critical components at each datacenter and will store an inventory of spare components in a depot at or near the Atos supported locations that will be used as a pool for sites that require spare parts. As parts are used, the pool will be replenished to maintain the Atos prescribed minimums.

Atos will provide specific details of how it will meet the SLAs with regard to hardware support in the SOW upon award as the final solution will be dependent upon the PSAP location.

Serial numbers and other inventory control will be used per ITIL process for managing spare parts. Atos will utilize the backup and recovery model described above to quickly turn around failed components and ensure up to date configuration.

3.4 SLAs & Reporting

Atos service delivery model has been designed to support the SLAs as described in the RFP.

The final SLA document will be inserted here following contract award.

Monthly reports will be provided within 10 calendar days to the designated contracts as mutually agreed during the development of the operating policies and procedures document.

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Public Safety

Continuity of Operations Plan
(COOP
Next Generation 9-1-1
Emergency Services

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Contact: Eric Nesvick
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Version: 1.0 Client Draft
Document date: June 3, 2020
Doc. No: Customer Continuity of Operations Plan (COOP

Table of Contents

1 Purpose and Benefits of Continuity of Operations Planning 3
1.1 Applicability and Scope 3
2 Personnel and Resources to Support Continued Operations 5
3 Crisis Communications 7
4 Call Trees 8
5 Succession Plan 9
6 Backup Power and Power Supplies 10
7 Redundant and Diverse Communications Paths and Systems 11
8 Backup Software, Storage and Procedures 12
9 Backup Facilities and Redundancy 14
10 Cyber Incident Redundancy and Recovery 15
11 PNSP COOP Summary 16

DRAFT

Document Version History

Version	Date	Resource	Description of Change
1.0	June 3, 2020	Atos Public Safety	Continuity of Operations Plan Drafted

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1 Purpose and Benefits of Continuity of Operatior Planning

This Continuity of Operations Plan (COOP) has been created for the customer by ~~the Pr Services Provider (~~Atos Public Safety~~)~~. The Continuity of Operations Plan establishes po and guidance to ensure the execution of the mission critical functions for the customer in event that an emergency threatens or incapacitates standard operations; and the relocat of selected personnel and functions of any essential facilities of the Atos ~~-~~NG9- solution~~Prime Services provider~~.

Specifically, this COOP is designed to provide the following information:

- Ensure that the customer is prepared to respond to NG9-1-1 emergencies, recover fr them and mitigate against their impacts.
- Ensure that the customer is prepared to provide critical services in an environment t is threatened, diminished, or incapacitated.
- Provide timely direction, control, and coordination to the customer leadership and ot critical stakeholders before, during, and after an event or upon notification of a cred threat.
- Facilitate the return to normal operating conditions as soon as practical, based circumstances and the threat environment.
- Ensure that the customer COOP Plan is viable and operational.
- Ensure that the customer is fully capable of addressing all NG9-1-1 emergencies, that mission critical functions will continue with minimal or no disruption during all ty of emergencies.

1.1 Applicability and Scope

The provisions of this document apply to the Atos NG9-1-1 solution ~~Prime Services Provi~~ for the customer management and its offices. Support from other organizations will coordinated with the Director(s) of that service as applicable. Specific areas covered by document include:

- The plan and associated documents need to ensure the continuance of mission crit business processes / operations and maintain an acceptable level of service durin major outage or disaster until full services can resume.
- Personnel and resources to support continued operations
- Succession plans
- Crisis communications

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- Backup power, power supplies and power generation
- Redundant and diverse communications paths and systems
- Backup software, storage and procedures for all data and files
- Backup facilities and redundancy
- Cyber incident redundancy and recovery support
- Call trees

COOP Activation Scenarios

The following scenarios would likely require the activation of the customer COOP Plan:

- The primary facility supporting the Atos NG9-1-1 solution ~~Prime Services~~ infrastruct is affected by an outage of normal operations as a result of an event or credible threa an event that would preclude access or operations of that facilities.
- The primary facility is affected by a widespread utility failure, natural disaster, signific hazardous material incident, civil disturbance, or terrorist or military threat or attack.

COOP Activation

The following measures may be taken in an event that interrupts normal operations, c such an incident appears imminent and it would be prudent to evacuate the primary fac or any other essential facility as a precaution:

- The Service Delivery Director may activate the COOP Plan to Manage the outage a communication to ensure a full recovery of services from the affected location.
- Services are maintained and capable of being performed using the alternate facility, u full operations are re-established at the primary / impacted facility.

Incidents could occur with or without warning and during duty or non-duty hours. Whate the incident or threat, the Atos Public Safety COOP Plan will be executed in response to a range of disasters and emergencies, to include natural disasters, terrorist threats a incidents, and technological disruptions and failures. The technology is architected in suc way to mitigate impact to NG9-1-1 Services; therefore, the COOP plan will be communication vehicle for orderly alerts, notification of all personnel until facilities or servi can be restored.

During this outage, communication with customer Management and other organizati identified as "critical customers" (e.g., vendors or public / private entities that may prov resource support) will take place. However, if events turn out to be less severe than initi anticipated, the time-phased COOP activation may terminate during this phase and a ret to normal operations will take place.

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2 Personnel and Resources to Support Continued Operations

Should a major, Service impacting event trigger the COOP, the Atos customer Acco Management Office (AMO), utilizing the Atos Major Incident Management (MIM) Process Major Incident Management Team (MIMT), will assemble the required resources and man the incident through service restoration.

This process covers the determination that a Major Incident (MI) has occurred and w impact (or potential impact) that incident is having to services, the official communicatio that incident to key Atos and customer stakeholders, and management of resources activities throughout the service restoration process up to and through execution of the disaster recovery process if needed.

The Atos Major Incident Management Team (MIMT) will establish both technical management bridges for alerted Atos resources. The customer will be engaged by the A who may set up individual conference meetings as needed for communications with custo resources.

Generally, an Atos site disaster declaration will be a joint decision between members of Disaster Recovery Management Team (DRMT), the AMO and customer. However, depend upon the nature of the incident, the Atos AMO or DRMT may make an immediate decisio declare a disaster.

When the criteria for an Atos site disaster declaration has been met and a decision by DRMT to recommend the declaration of a disaster has been made, there is a formal invocat and the Disaster Recovery Procedures are executed depending upon the specific scen that is occurring.

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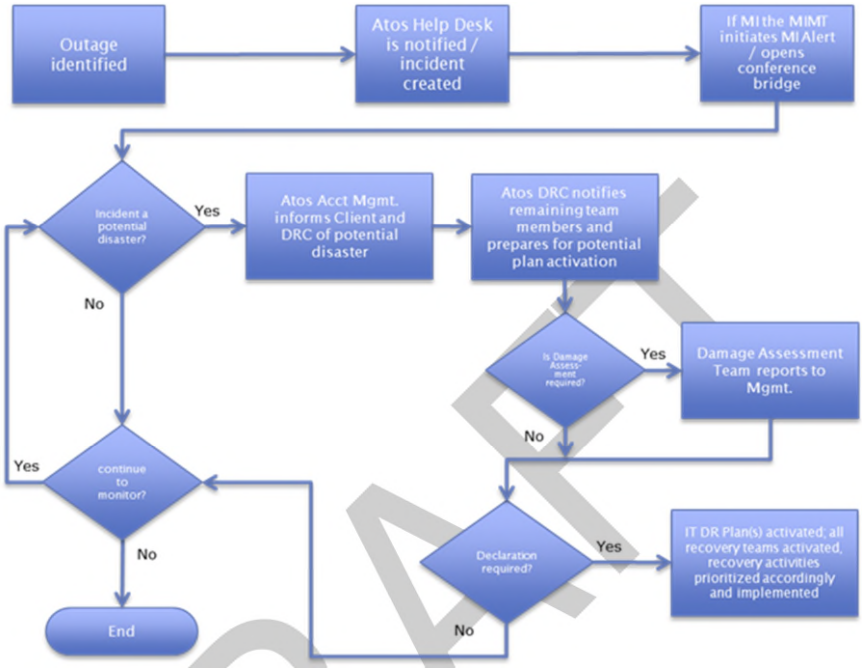

The figure above is an illustration of the process flow followed in the event an incident occurred resulting in disruption of services for any portion of the customer's NG9-1-1 NG solution.

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3 Crisis Communications

All communications are facilitated through the Atos Account Management Office (AMO) w the AMO leadership leveraging existing escalation procedures with regards to the poten of or event leading up to and including a real disaster.

Throughout the emergency, communications via the Atos AMO leadership will be conduc through bridge lines unless otherwise determined at time of event. Regular status calls be established as soon as possible. The Atos AMO leadership will manage all calls w customer team members.

It is imperative both organizations' executives and senior managers comme communications immediately. Once recovery activities are underway, the Atos A leadership will establish regularly scheduled management conference calls for b organizations' executives and senior managers.

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4 Call Trees

Key Role	Email	Phone
Customer NG 9-1-1 Service Desk (Toll Free #)		
Service Delivery Manager		
Service Delivery Manager		
Service Delivery Director		
Client Manager		
Executive Stakeholder		
Senior Executive Stakeholder		
Atos North America CEO		

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5 Succession Plan

A matrix will be provided detailing a two level (minimum) succession plan for each prim resource assigned to a key role within the project. This will be updated as needed and most current version will be included with the monthly governance materials provided to customer.

The primary resource will be responsible for ensuring that their designated successor is aw of activities within the project and that they are sufficiently informed of and experienced w the specifics of the solution deployed to allow them to step in if the senior resource becor unavailable. This will be validated regularly, and the specified succession resource(s) wil required to substitute during all planned and unplanned absences of the primary resource

As the project transitions from build out to steady state, this list of roles will be modifiec required to include the steady state resources supporting the solution.

Key Role
Project Coordinator
~~PNSP Alert and Warning Coordinator~~
NG9-1-1 Trunk Services Coordinator
NG9-1-1 Aggregation Services Coordinator
NG9-1-1 Core Services Coordinator
NG9-1-1 ~~Prime~~ Functions and Services Coordinator
~~PNSP~~ NG9-1-1 Text-to-9-1-1 Coordinator
System Monitoring and Outage Reporting Coordinator

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6 Backup Power and Power Supplies

As referenced in the Disaster Recovery Plan, each of the two data centers are tier 3 d
centers. Each data center is configured to support the entire call volume of the state and
identical configuration for NGCS. Since each data center operates independently, data is
shared between the data centers other than replicated backup storage.

Any single event at one data center will not impact the other data center. The aggregat
facilities for ~~PNSP or RNSP~~Atos will have dual connectivity to each of the data centers
can process 9-1-1 calls.

Atos will have dedicated floor space at each data center for ~~PNSP~~ Aggregation and ~~-~~NG
services. Backup power is supplied by the facility using backup generators that will sup
continuous power for up to 48 hours. Refueling arrangements are in place to ens
availability beyond that time frame.

All data centers selected for POI / Aggregation and ~~PNSP~~ NGCS services are tier 3 and abo
These data centers will also support dual independent power inputs to each equipment r
and generator power in the event of localized power loss.

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7 Redundant and Diverse Communications Paths and Systems

As referenced in the Disaster Recovery Plan, all network devices are duplicated within data center and across data centers. Each data center will have multiple MPLS connecti to all other portions of the ~~NDCS call handling~~ESINet/NGCS solution~~ if applicable~~.

- Router Equipment – Duplicate Routers and redundant MPLS and OSPF links betw network components.
- Network interface equipment – Paths and equipment are duplicated with redundant pa and hardware to allow load sharing and failure without service degradation and impa
- Alarming – Multiple layers with automatic prioritization and escalation. These incl automation ticket creation and escalation.
- Onsite spares for critical components will be maintained at a designated depot for e of the core NGCS data centers along with 24x7x365 onsite labor to allow for quick re of component failures.

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8 Backup Software, Storage and Procedures

Backup Software, Storage and Procedures

- As referenced in the Disaster Recovery Plan document, Atos ensures will ensure bac of all software and configurations are retained at each data center as well as offsit cloud storage or NOC center. As part of the change management process, backup changes is enforced.

Software Backup

- All software VMs are backed up after installation and configuration. A local backup is m at the data center site and stored. The backup image is replicated to the other data cer at each site, so the backup configurations can be restored even at a total loss at the lo site.

- All software is backed up daily locally at each site to ensure the latest configuration logs are preserved. As daily backups occur, the backed-up data is replicated to the ot data center asynchronously.

Storage

- Each data center contains double the anticipated storage space for the solution. replicated data is also stored off site in the cloud or NOC center to ensure adequ storage is available to maintain backup.

- All storage systems are monitored and alarmed at three thresholds for warning, ala and critical when storage becomes low. The storage solution is expandable and allo hot swap for failed storage devices.

- All backup data has a local retention period of a min of 180 days and is configurable ba on maintenance schedule requirements. Offsite retention period will support at leas versions of software changes.

Procedures

- When new software is installed, a backup of the virtual machines and running softwar created as part of the configuration step. The backup software is version controlled.

- Configuration changes are immediately backed up as a manual step as part of the cha management process.

- Daily backups are scheduled events that will back up all logs, configurations, recorc events to ensure historical data integrity.

- Backup systems are monitored near real time through event logging such as syslog SNMP traps. The monitoring systems tracks disk utilization, replication status, d integrity, system health.

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- Several levels Backup / Restore – All software components have a Detailed backup a restore plan for the ~~PNSP~~ NGCS, NGAS and PSAP solutions. Backups will be stored on (Designated backup server), Off site (Remote Data Center), Off Site (Independent)

  i. Data Base
     Complete DB backup
     Incremental DB backup
  ii. Application
     Complete DB backup
     Incremental DB backup
  iii. VMWare
     Container backup
     Snapshot
     Incremental
  iv. Configuration
     Complete
     Incremental

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9 Backup Facilities and Redundancy

As referenced in the Disaster Recovery Plan, each of the two data centers are tier 3 d
centers. Each data center is configured to support the entire call volume of the state and
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All data centers selected for POI / Aggregation and ~~PNSP~~ NGCSservices are tier 3 and abo
These data centers will also support dual independent power inputs to each equipment r
and generator power in the event of localized power loss.

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10 Cyber Incident Redundancy and Recovery

As referenced in the Disaster Recovery Plan, Atos will monitor all data center solutions security alarms. These security alarms that will be monitored from the Atos SOC will be:

- DDoS
- HIDS
- TDoS
- Access Breach
- Malware / Virus
- Volumetric Attacks

In the scenario where several paths in the data centers are under attack and autom intrusion cannot eliminate the threat, manual reroute, and threat blockage will take plac

Atos will have dual SOC centers to ensure redundancy to detect security incidents.

Each data center will have independent security hardware and software to ensure infect at a single site will not impact another site.

Security incidents will be isolated and infected equipment will be quarantined until correct action can be taken.

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11 ~~PNSP~~ Atos COOP Summary

This document is a living document and will be updated throughout the life of the project a minimum, this document will be reviewed every 12 months or after significant change the scope or infrastructure of the covered location, services, organization and clients.

As a part of the Change Control Procedures, all changes must be assessed for any poter impact to the COOP and DR Plans.

The owner of this document is responsible for the planning and execution of these revisic

Factors that may change the Plan include but are not limited to:

- Procedural changes
- Organizational structure changes
- Personnel changes / turnover
- Physical changes (e.g. facilities)
- Technology changes
- Recovery requirements changes
- Testing Issues

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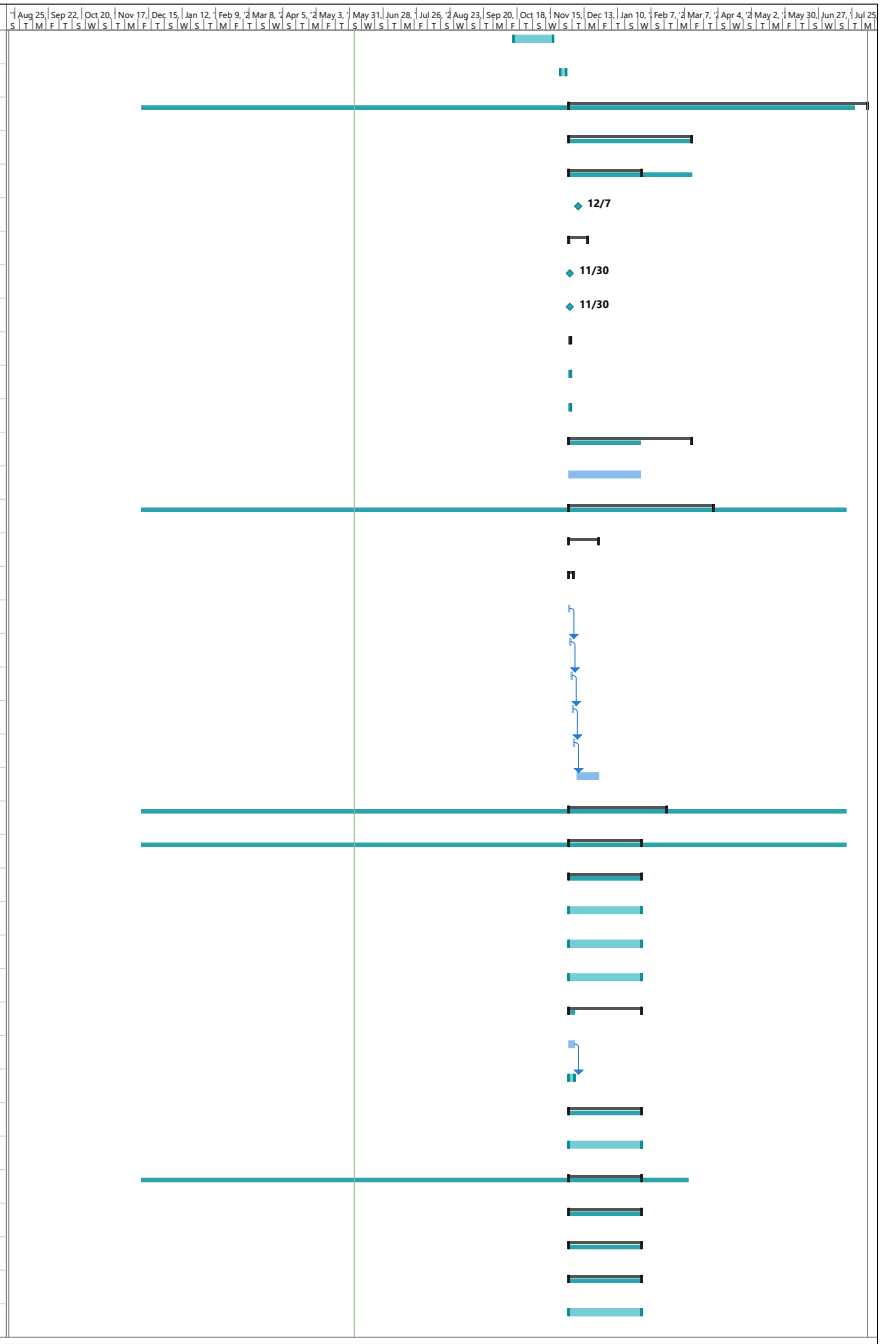
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		Contract Execution	23d	Thu 10/15/20	Mon 11/16/20	
2		**Thanksgiving week**	5d	Mon 11/23/20	Fri 11/27/20	
3		**State of Nebraska 9-1-1 NG9-1-1 Project**	**180d**	**Mon 11/30/20**	**Fri 8/6/21**	
4		**Project Initiation Phase**	**75d**	**Mon 11/30/20**	**Fri 3/12/21**	
5		**Project Kickoff & Initiation Phase Deliverables**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
6		Kickoff Meeting	1d	Mon 12/7/20	Mon 12/7/20	
7		**Organization Chart & Contact List**	**12d**	**Mon 11/30/20**	**Tue 12/15/20**	
8		Org Chart & Contacts Review w/State of Nebraska 9-1-1	1d	Mon 11/30/20	Mon 11/30/20	
9		Publish - Distribute Information	1d	Mon 11/30/20	Mon 11/30/20	
10		**Subcontractors List**	**1d**	**Tue 12/1/20**	**Tue 12/1/20**	
11		Review Subcontractor List	1d	**Tue 12/1/20**	**Tue 12/1/20**	
12		Publish - Distribute Information	1d	**Tue 12/1/20**	**Tue 12/1/20**	
13		**NG 9-1-1 Project Deployment Plan (WBS, Key Staff, Etc)**	**75d**	**Mon 11/30/20**	**Fri 3/12/21**	
14		Provide Proposed Plan	44d	Mon 11/30/20	Thu 1/28/21	
15		**Design, Planning, and Review**	**87d**	**Mon 11/30/20**	**Tue 3/30/21**	
16		**PSAP Surveys**	**19d**	**Mon 11/30/20**	**Thu 12/24/20**	
17		**PSAP Site Survey Plan**	**4d**	**Mon 11/30/20**	**Thu 12/3/20**	
18		Present Proposed Plan	1d	Mon 11/30/20	Mon 11/30/20	
19		Adjustments to Plan	1d	Tue 12/1/20	Tue 12/1/20	18
20		State of Nebraska 9-1-1 Approval	1d	Wed 12/2/20	Wed 12/2/20	19
21		Publish Plan	1d	Thu 12/3/20	Thu 12/3/20	20
22		PSAP Site Survey Schedule	1d	Fri 12/4/20	Fri 12/4/20	21
23		Conduct Site Surveys	14d	Mon 12/7/20	Thu 12/24/20	22
24		**Solution Architecture and Design**	**60d**	Mon 11/30/20	**Fri 2/19/21**	
25		**Solution Design and As Builts**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
26		**Block Diagrams, Wiring Diagrams, and Rack Elevations (PSAPs & DC's)**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
27		Draft Block Diagram, Wiring Diagrams & Rack Elevations	45d	Mon 11/30/20	Fri 1/29/21	
28		Final Block Diagram, Wiring Diagrams & Rack Elevations	45d	Mon 11/30/20	Fri 1/29/21	
29		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
30		**BOM**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
31		BOM Approval	5d	Mon 11/30/20	Fri 12/4/20	
32		Place BOM Orders for ESINet	5d	Mon 11/30/20	Fri 12/4/20	31
33		**DATA CENTER CONTRACTS**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
34		Contract Data Center - OSR	45d	Mon 11/30/20	Fri 1/29/21	
35		**Subsystem Development and design plans**	**45d**	Mon 11/30/20	**Fri 1/29/21**	
36		**Network Requirements/Final Design Plan**	**45d**	Mon 11/30/20	**Fri 1/29/21**	
37		**Network Subsystem**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
38		**Network Design**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
39		IP Schema	45d	Mon 11/30/20	Fri 1/29/21	



Project: Nebraska Project Plan
Date: Thu 6/4/20

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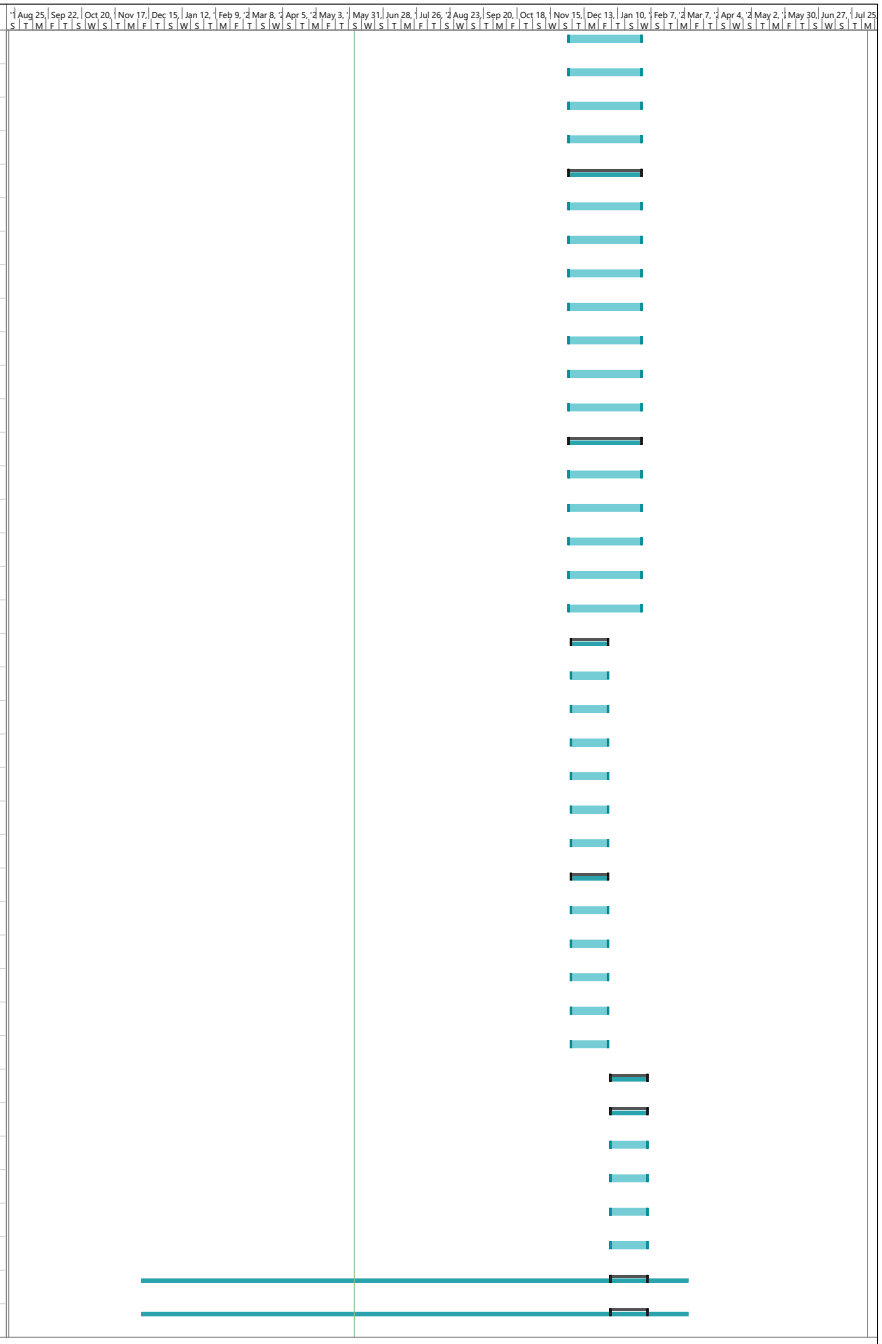
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
40		DNS Records	45d	Mon 11/30/20	Fri 1/29/21	
41		Network Time	45d	Mon 11/30/20	Fri 1/29/21	
42		VLAN IDs	45d	Mon 11/30/20	Fri 1/29/21	
43		VPN Info	45d	Mon 11/30/20	Fri 1/29/21	
44		**IP Layer 1,2, & 3 Technical Drawings**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
45		Draft IP Layer 1,2 & 3 Technical Drawings	45d	Mon 11/30/20	Fri 1/29/21	
46		Final IP Layer 1, 2, & 3 Technical Drawings	45d	Mon 11/30/20	Fri 1/29/21	
47		Provide Proposed Plan	45d	Mon 11/30/20	Fri 1/29/21	
48		Review Plan	45d	Mon 11/30/20	Fri 1/29/21	
49		Adjustments to Plan	45d	Mon 11/30/20	Fri 1/29/21	
50		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
51		Publish Plan	45d	Mon 11/30/20	Fri 1/29/21	
52		**Acceptance Testing Plan and Checklist**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
53		Draft Acceptance Testing Plan and Checklist	45d	Mon 11/30/20	Fri 1/29/21	
54		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
55		Final Acceptance Testing Plan and Checklist	45d	Mon 11/30/20	Fri 1/29/21	
56		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
57		Publish Plan	45d	Mon 11/30/20	Fri 1/29/21	
58		**Disaster Recovery Plan**	**23d**	**Wed 12/2/20**	**Fri 1/1/21**	
59		Provide Disaster Recovery Plan	23d	Wed 12/2/20	Fri 1/1/21	
60		Review Plan	23d	Wed 12/2/20	Fri 1/1/21	
61		Adjustments to Plan	23d	Wed 12/2/20	Fri 1/1/21	
62		State of Nebraska 9-1-1 Approval	23d	Wed 12/2/20	Fri 1/1/21	
63		Publish Plan	23d	Wed 12/2/20	Fri 1/1/21	
64		Reroute Procedures (90 Calendar Days prior to RNSP Go Live)	23d	Wed 12/2/20	Fri 1/1/21	
65		**Continuity of Operations Plan**	**23d**	**Wed 12/2/20**	**Fri 1/1/21**	
66		Provide Continuity of Operations Plan	23d	Wed 12/2/20	Fri 1/1/21	
67		Review Plan	23d	Wed 12/2/20	Fri 1/1/21	
68		Adjustments to Plan	23d	Wed 12/2/20	Fri 1/1/21	
69		State of Nebraska 9-1-1 Approval	23d	Wed 12/2/20	Fri 1/1/21	
70		Publish Plan	23d	Wed 12/2/20	Fri 1/1/21	
71		**Database Subsystem**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
72		**GIS**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
73		GIS Planning	23d	Mon 1/4/21	Wed 2/3/21	
74		Obtain ALI / GIS Databases	23d	Mon 1/4/21	Wed 2/3/21	
75		Geographical Information Database (Normalization / Validation)	23d	Mon 1/4/21	Wed 2/3/21	
76		Location Database (Normalization / Validation)	23d	Mon 1/4/21	Wed 2/3/21	
77		**Text to 9-1-1 subsystem**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
78		**Text to 9-1-1**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	



Project: Nebraska Project Plan
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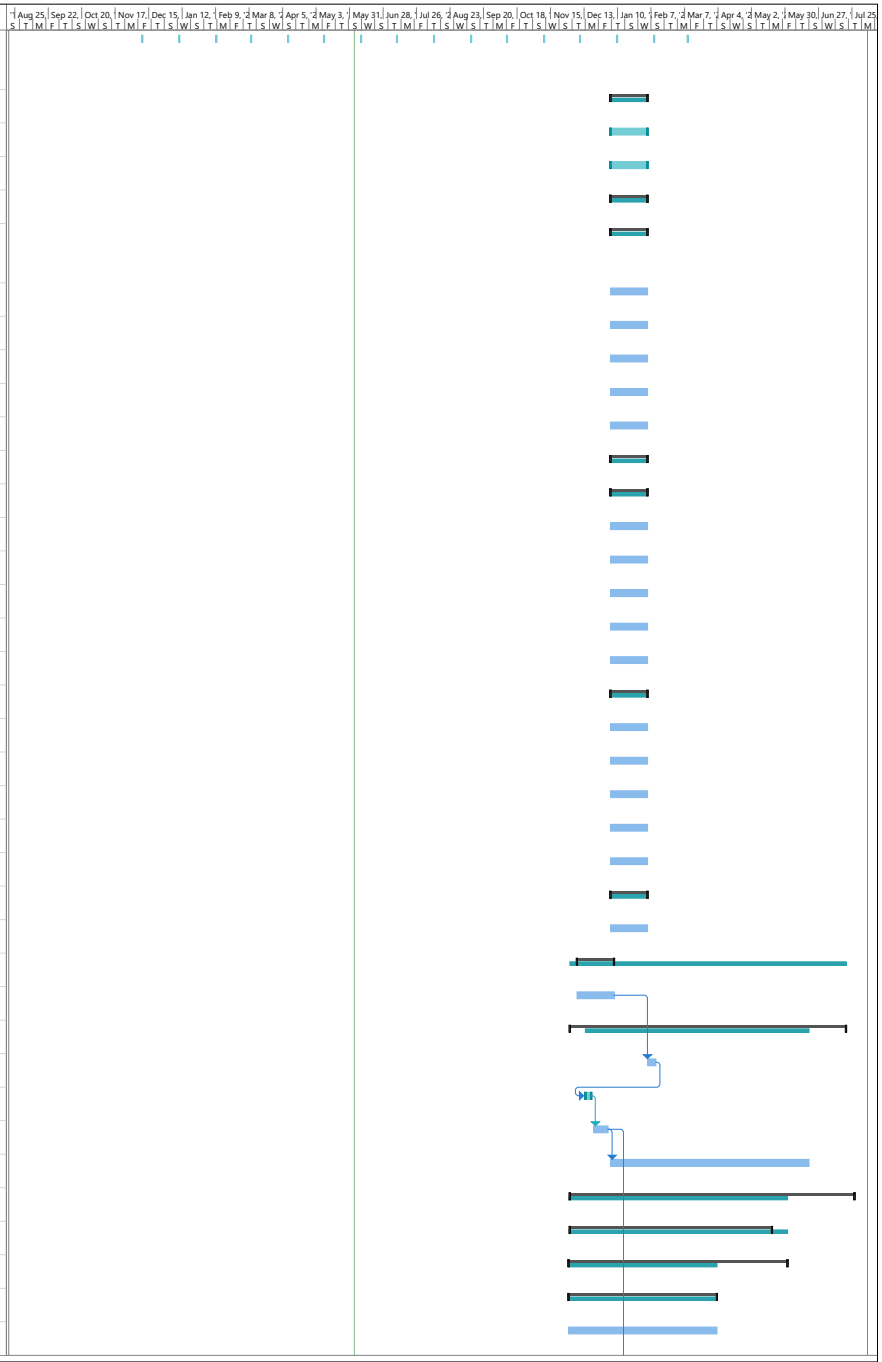
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
79		**Text to 9-1-1 Spreadsheet Tracking (Provide no later than 10th Calendar day of each month)**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
96		**Installation, Implementation and Training Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
97		Draft Installation, Implementation and Training Plan	23d	Mon 1/4/21	Wed 2/3/21	
98		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
99		**Training**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
100		**Training Course Material - User Training, Discrepancy Reporting, Policy Change Management, PSAP maintenance / outage reporting**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
101		Complete student and teacher course material	23d	Mon 1/4/21	Wed 2/3/21	
102		Deliver Training Material (Text App, Montoring and Dashboard App)	23d	Mon 1/4/21	Wed 2/3/21	
103		State of Nebraska 9-1-1 Apprval	23d	Mon 1/4/21	Wed 2/3/21	
104		Knowledge Transfer and Training (Class)	23d	Mon 1/4/21	Wed 2/3/21	
105		PSAP NG Text to 911 Training (Class)	23d	Mon 1/4/21	Wed 2/3/21	
106		**Day2 SupportPlans**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
107		**Maintenance Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
108		Provide Maintenance Plan	23d	Mon 1/4/21	Wed 2/3/21	
109		State of Nebraska 9-1-1 Review Plan	23d	Mon 1/4/21	Wed 2/3/21	
110		Adjustments to Plan	23d	Mon 1/4/21	Wed 2/3/21	
111		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
112		Publish Plan	23d	Mon 1/4/21	Wed 2/3/21	
113		**Monthly Billing and SLA Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
114		Present Proposed Plan	23d	Mon 1/4/21	Wed 2/3/21	
115		Review Plan	23d	Mon 1/4/21	Wed 2/3/21	
116		Adjustments to Plan	23d	Mon 1/4/21	Wed 2/3/21	
117		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
118		Publish Plan	23d	Mon 1/4/21	Wed 2/3/21	
119		**PSAP Help Desk/Call Center**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
120		Provide Help Desk/Call Center Number and Process to State of Nebraska 9-1-1	23d	Mon 1/4/21	Wed 2/3/21	
121		**OSP Migration/Transition Plan**	**23d**	**Mon 12/7/20**	**Wed 1/6/21**	
122		Provide Proposed Plan to State of Nebraska 9-1-1	23d	Mon 12/7/20	Wed 1/6/21	
123		**OSP Planning and Engagement**	**165d**	**Tue 12/1/20**	**Mon 7/19/21**	
124		Notifications Sent to Carriers	5d	Thu 2/4/21	Wed 2/10/21	122FS+20d
125		Carrier Kick Off Calls	5d	Mon 12/14/20	Fri 12/18/20	124FS+15d
126		Data Gathering Forms Sent / Received	10d	Mon 12/21/20	Fri 1/1/21	125
127		OSP Planning and Engineering Calls	120d	Mon 1/4/21	Fri 6/18/21	126
128		**PART A - NETWORK (ESInet & NGCS)**	**170d**	**Tue 12/1/20**	**Mon 7/26/21**	
129		**Build and Configure Phase**	**121d**	**Tue 12/1/20**	**Tue 5/18/21**	
130		**Network**	**131d**	**Mon 11/30/20**	**Mon 5/31/21**	
131		**Long Lead Items - Order Circuits size increase and configure VLAN's on them (Trunks, MPLS)**	**90d**	**Mon 11/30/20**	**Fri 4/2/21**	
132		Aggregation Facilities	90d	Mon 11/30/20	Fri 4/2/21	



Project: Nebraska Project Plan
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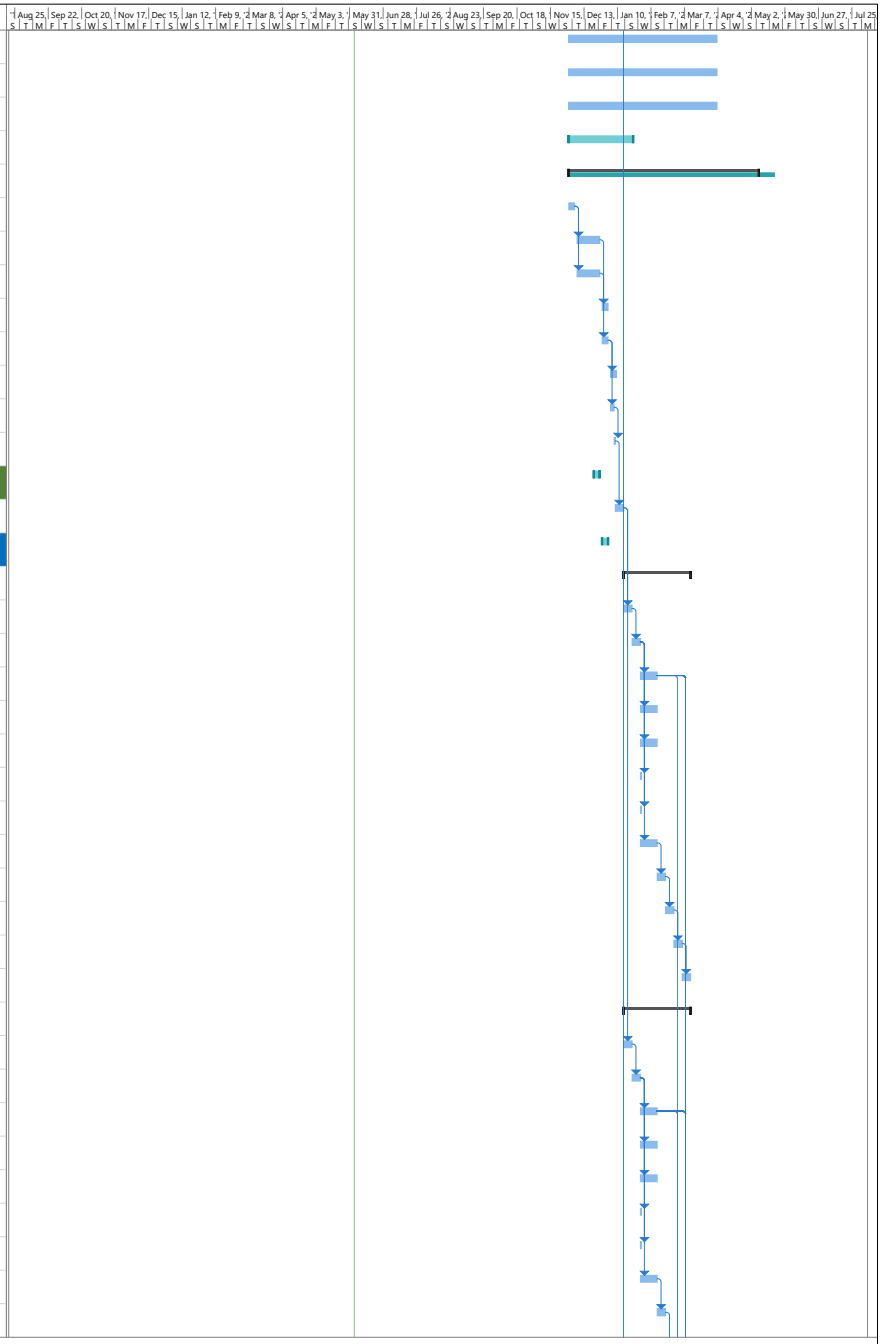
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
133		POIs	90d	Mon 11/30/20	Fri 4/2/21	
134		E2 Circuits	90d	Mon 11/30/20	Fri 4/2/21	
135		Training PSAP	90d	Mon 11/30/20	Fri 4/2/21	
136		Coordinate order placement for increases to State of Nebraska PSAP BW sites.	40d	Mon 11/30/20	Fri 1/22/21	
137		**Staging OSR Data Centers 1 & 2**	**115d**	**Mon 11/30/20**	**Fri 5/7/21**	
138		Receive and Inventory assest tags and serial numbers	5d	Mon 11/30/20	Fri 12/4/20	
139		Rack and Stack Equipment in Boca	15d	Mon 12/7/20	Fri 12/25/20	138
140		Configurations and Databases are downloaded and stored	15d	Mon 12/7/20	Fri 12/25/20	138
141		Racks and wires labeled	5d	Mon 12/28/20	Fri 1/1/21	139
142		QA Inspections/Testing at Factory (Performance & FAT)	5d	Mon 12/28/20	Fri 1/1/21	140
143		Review QA Report of Inspections w/State of Nebraska 9-1-1	5d	Mon 1/4/21	Fri 1/8/21	142
144		Document prelim State of Nebraska config for As-Built Documentation to deliver to State of Nebraska 9-1-1 as	3d	Mon 1/4/21	Wed 1/6/21	142
145		Approval and Prepare Equipment for Shipment	1d	Thu 1/7/21	Thu 1/7/21	144
146		**Christmas Eve / Christmas**	**5d**	**Mon 12/21/20**	**Fri 12/25/20**	
147		Shipment	5d	Fri 1/8/21	Thu 1/14/21	145
148		**New Years**	**5d**	**Mon 12/28/20**	**Fri 1/1/21**	
149		**OSV Router Datacenter build and configure - Data Center #1**	**40d**	**Fri 1/15/21**	**Thu 3/11/21**	
150		Shelf integration into the electrical and cooling system at the DC	5d	Fri 1/15/21	Thu 1/21/21	147
151		Rack and Stack Equipment in assigned data centers	5d	Fri 1/22/21	Thu 1/28/21	150
152		Network Intergration for the MPLS Ingress and Egress Feeds (cross connects)	10d	Fri 1/29/21	Thu 2/11/21	151
153		DMZ Configuration and Integration with DMZ Network	10d	Fri 1/29/21	Thu 2/11/21	151
154		NOC/SOC Integration and Configuration	10d	Fri 1/29/21	Thu 2/11/21	151
155		Secure Web Proxy Interconnect to Textblue	1d	Fri 1/29/21	Fri 1/29/21	151
156		TCC Integration with Intrado and Comtech	1d	Fri 1/29/21	Fri 1/29/21	151
157		Security and Access Control Configuration	10d	Fri 1/29/21	Thu 2/11/21	151
158		Confirm Configuration and Make Adjustments	5d	Fri 2/12/21	Thu 2/18/21	157
159		Final Configuration and Backup	5d	Fri 2/19/21	Thu 2/25/21	158
160		Site Labeling and Inventory Management	5d	Fri 2/26/21	Thu 3/4/21	159
161		Confirm QA Inspections After Onsite Assembly	5d	Fri 3/5/21	Thu 3/11/21	160
162		**OSV Router Datacenter build and configure - Data Center #2**	**40d**	**Fri 1/15/21**	**Thu 3/11/21**	
163		Shelf integration into the electrical and cooling system at the DC	5d	Fri 1/15/21	Thu 1/21/21	147
164		Rack and Stack Equipment in assigned data centers	5d	Fri 1/22/21	Thu 1/28/21	163
165		Network Intergration for the MPLS Ingress and Egress Feeds (cross connects)	10d	Fri 1/29/21	Thu 2/11/21	164
166		DMZ Configuration and Integration with DMZ Network	10d	Fri 1/29/21	Thu 2/11/21	164
167		NOC/SOC Integration and Configuration	10d	Fri 1/29/21	Thu 2/11/21	164
168		Secure Web Proxy Interconnect to Textblue	1d	Fri 1/29/21	Fri 1/29/21	164
169		TCC Integration with Intrado and Comtech	1d	Fri 1/29/21	Fri 1/29/21	164
170		Security and Access Control Configuration	10d	Fri 1/29/21	Thu 2/11/21	164
171		Confirm Configuration and Make Adjustments	5d	Fri 2/12/21	Thu 2/18/21	170



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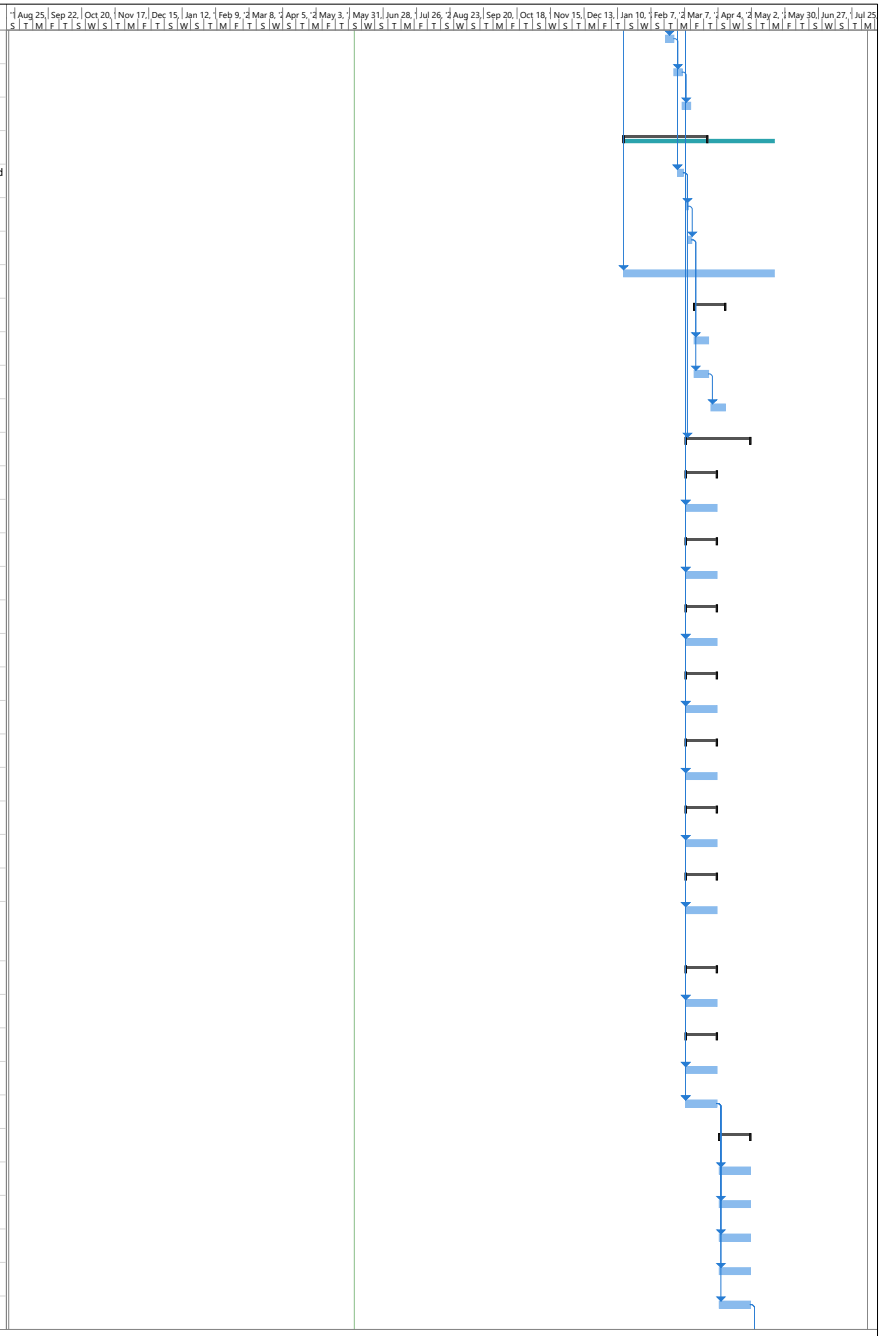
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
172		Final Configuration and Backup	5d	Fri 2/19/21	Thu 2/25/21	171
173		Site Labeling and Inventory Management	5d	Fri 2/26/21	Thu 3/4/21	172
174		Confirm QA Inspections After Onsite Assembly	5d	Fri 3/5/21	Thu 3/11/21	173
175		**Aggregator Connectivity, Configuration and Testing**	**50d**	**Fri 1/15/21**	**Thu 3/25/21**	
176		Finalize aggregation center connection to Atos	5d	Mon 3/1/21	Fri 3/5/21	152FS+11d,165FS+11d
177		Configure application connections with Aggregator	2d	Mon 3/8/21	Tue 3/9/21	176
178		Test MPLS connections and data transfer with Aggregator	3d	Wed 3/10/21	Fri 3/12/21	177
179		Finalize aggregation center OSP connection requirements	90d	Fri 1/15/21	Thu 5/20/21	126
180		**Perform System Integration Testing (SIT)**	**20d**	**Mon 3/15/21**	**Fri 4/9/21**	
181		TEST OSP Integration to POI (multiple phases)	10d	Mon 3/15/21	Fri 3/26/21	178
182		TEST State of Nebraska 9-1-1 integration	10d	Mon 3/15/21	Fri 3/26/21	178
183		TEST Partner integration	10d	Mon 3/29/21	Fri 4/9/21	182
184		**Part A - Integration and Test Phase**	**40d**	**Mon 3/8/21**	**Fri 4/30/21**	**176**
185		**Network Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
186		I&T of the ESInet For Data Centers, POIs and Aggregation Facilities	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
187		**Aggregation/POI Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
188		I&T of the ESInet with Core Components and External WAN Interfaces Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
189		**Ingress/Egress Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
190		I&T of the BCF Functions and Components	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
191		**Database Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
192		I&T of ESInet Core with GIS Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
193		**NCGS Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
194		I&T of the Virtualized Software Components	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
195		**Monitoring and Dashboard Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
196		I&T of the ESInet and Core text subsystems to the State of Nebraska 9-1-1 Monitoring System	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
197		**Configuration Management Database**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
198		I&T of the ESInet Core and text subsystems to the Atos ITIL Compliant Help Desk / CMDB Software Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
199		**NG911 Text Traffic Statistics**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
200		Provide Interface and data to support existing text session CDR	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
201		**Perform System Integration Testing (SIT)**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
202		TEST OSP Integration with Aggregator and Atos	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
203		TEST Partner integration	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
204		**Failure Mode Testing (FMT)**	**20d**	**Mon 4/5/21**	**Fri 4/30/21**	
205		Load and Stress Test	20d	Mon 4/5/21	Fri 4/30/21	203
206		Fault Injection	20d	Mon 4/5/21	Fri 4/30/21	203
207		System Behavior logging and documentation	20d	Mon 4/5/21	Fri 4/30/21	203
208		Provide formal FMT report to State of Nebraska 9-1-1	20d	Mon 4/5/21	Fri 4/30/21	203
209		Configuration and integration lockdown implemented	20d	Mon 4/5/21	Fri 4/30/21	203



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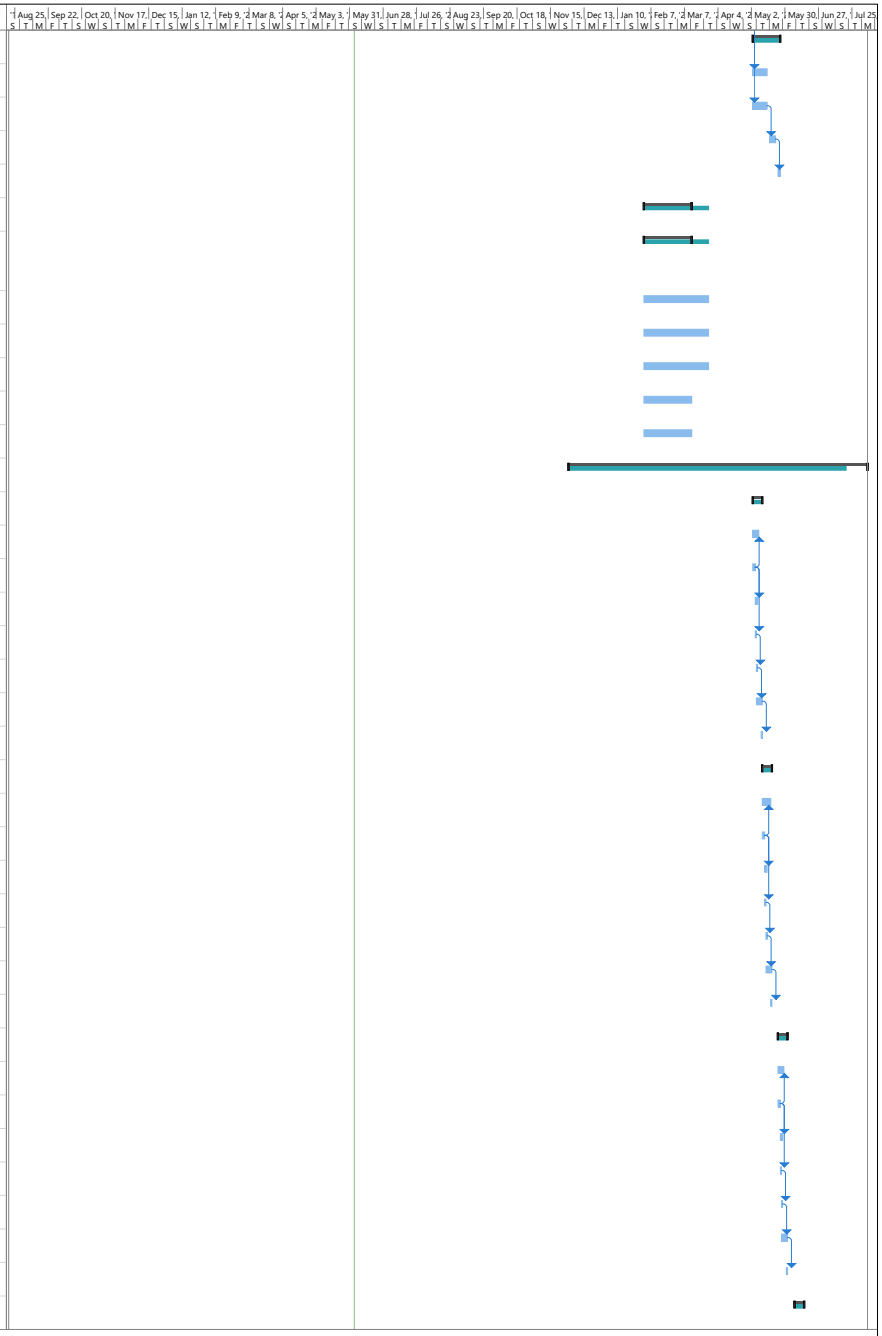
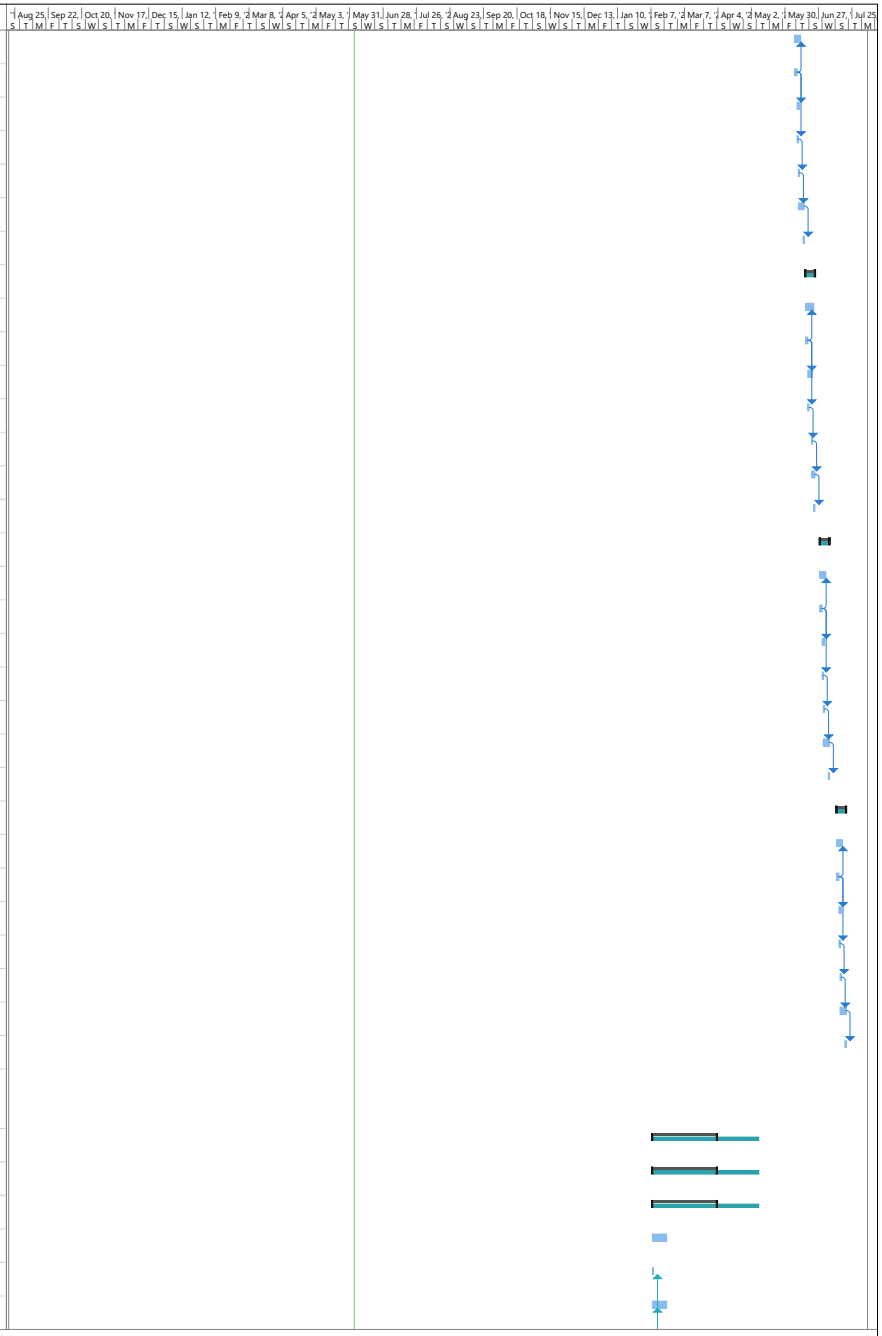
210		**Execute Formal SAT Test as per Agreed Procedures (Built System and 3rd Party Subsystems)**	**17d**	**Mon 5/3/21**	**Tue 5/25/21**	
211		Perform System Acceptance Testing	10d	Mon 5/3/21	Fri 5/14/21	209
212		Perform acceptance testing for Software	10d	Mon 5/3/21	Fri 5/14/21	209
213		Provide Formal SAT Test Report	5d	Mon 5/17/21	Fri 5/21/21	212
214		Work off any Agreed Patching, Fix, and Regression Testing	2d	Mon 5/24/21	Tue 5/25/21	213
215		**Training**	**30d**	**Mon 2/1/21**	**Fri 3/12/21**	
216		**Training Course Material - User Training, Discrepancy Reporting, Policy Change Management, PSAP maintenance / outage reporting**	**30d**	**Mon 2/1/21**	**Fri 3/12/21**	
217		Complete student and teacher course material	40d	Mon 2/1/21	Fri 3/26/21	
218		Deliver Training Material (Text Web App, Montoring and Dashboard App, A&W App, ICD Q/A)	40d	Mon 2/1/21	Fri 3/26/21	
219		State of Nebraska 9-1-1 Approval	40d	Mon 2/1/21	Fri 3/26/21	
220		Knowledge Transfer and Training (Class)	30d	Mon 2/1/21	Fri 3/12/21	
221		PSAP NG Text to 911 Training (Class)	30d	Mon 2/1/21	Fri 3/12/21	
222		**Part B - Call Handling Host Site Equipment Phase**	**180d**	**Mon 11/30/20**	**Fri 8/6/21**	
223		**Region Cutover - Region #1 - State of Nebraska**	**6d**	**Mon 5/3/21**	**Mon 5/10/21**	
224		PSAP Training	5d	Mon 5/3/21	Fri 5/7/21	225FS-10d
225		Conversion MOP finalized	2d	Mon 5/3/21	Tue 5/4/21	
226		Final Testing completed	2d	Wed 5/5/21	Thu 5/6/21	225
227		Go/No Go Meeting	1d	Wed 5/5/21	Wed 5/5/21	225
228		Cutover	1d	Thu 5/6/21	Thu 5/6/21	227
229		Post Cutover Monitoring	3d	Thu 5/6/21	Mon 5/10/21	228FS-1d
230		Roll to Day 2 Support Service	1d	Mon 5/10/21	Mon 5/10/21	229FS-1d
231		**Region Cutover - Region #2 - State of Nebraska**	**6d**	**Tue 5/11/21**	**Tue 5/18/21**	
232		PSAP Training at State of Nebraska training PSAP	5d	Tue 5/11/21	Mon 5/17/21	233FS-10d
233		Conversion MOP finalized	2d	Tue 5/11/21	Wed 5/12/21	
234		Final Testing completed	2d	Thu 5/13/21	Fri 5/14/21	233
235		Go/No Go Meeting	1d	Thu 5/13/21	Thu 5/13/21	233
236		Cutover	1d	Fri 5/14/21	Fri 5/14/21	235
237		Post Cutover Monitoring	3d	Fri 5/14/21	Tue 5/18/21	236FS-1d
238		Roll to Day 2 Support Service	1d	Tue 5/18/21	Tue 5/18/21	237FS-1d
239		**Region Cutover - Region #3 - State of Nebraska**	**6d**	**Mon 5/24/21**	**Mon 5/31/21**	
240		PSAP Training at State of Nebraska training PSAP	5d	Mon 5/24/21	Fri 5/28/21	241FS-10d
241		Conversion MOP finalized	2d	Mon 5/24/21	Tue 5/25/21	
242		Final Testing completed	2d	Wed 5/26/21	Thu 5/27/21	241
243		Go/No Go Meeting	1d	Wed 5/26/21	Wed 5/26/21	241
244		Cutover	1d	Thu 5/27/21	Thu 5/27/21	243
245		Post Cutover Monitoring	3d	Thu 5/27/21	Mon 5/31/21	244FS-1d
246		Roll to Day 2 Support Service	1d	Mon 5/31/21	Mon 5/31/21	245FS-1d
247		**Region Cutover - Region #4 - State of Nebraska**	**6d**	**Mon 6/7/21**	**Mon 6/14/21**	



Project: Nebraska Project Plan
Date: Thu 6/4/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
248		PSAP Training at State of Nebraska training PSAP	5d	Mon 6/7/21	Fri 6/11/21	249FS-10d
249		Conversion MOP finalized	2d	Mon 6/7/21	Tue 6/8/21	
250		Final Testing completed	2d	Wed 6/9/21	Thu 6/10/21	249
251		Go/No Go Meeting	1d	Wed 6/9/21	Wed 6/9/21	249
252		Cutover	1d	Thu 6/10/21	Thu 6/10/21	251
253		Post Cutover Monitoring	3d	Thu 6/10/21	Mon 6/14/21	252FS-1d
254		Roll to Day 2 Support Service	1d	Mon 6/14/21	Mon 6/14/21	253FS-1d
255		**Region Cutover - Region #5 - State of Nebraska**	**6d**	**Wed 6/16/21**	**Wed 6/23/21**	
256		PSAP Training at State of Nebraska training PSAP	5d	Wed 6/16/21	Tue 6/22/21	257FS-10d
257		Conversion MOP finalized	2d	Wed 6/16/21	Thu 6/17/21	
258		Final Testing completed	2d	Fri 6/18/21	Mon 6/21/21	257
259		Go/No Go Meeting	1d	Fri 6/18/21	Fri 6/18/21	257
260		Cutover	1d	Mon 6/21/21	Mon 6/21/21	259
261		Post Cutover Monitoring	3d	Mon 6/21/21	Wed 6/23/21	260FS-1d
262		Roll to Day 2 Support Service	1d	Wed 6/23/21	Wed 6/23/21	261FS-1d
263		**Region Cutover - Region #6 - State of Nebraska**	**6d**	**Mon 6/28/21**	**Mon 7/5/21**	
264		PSAP Training at State of Nebraska training PSAP	5d	Mon 6/28/21	Fri 7/2/21	265FS-10d
265		Conversion MOP finalized	2d	Mon 6/28/21	Tue 6/29/21	
266		Final Testing completed	2d	Wed 6/30/21	Thu 7/1/21	265
267		Go/No Go Meeting	1d	Wed 6/30/21	Wed 6/30/21	265
268		Cutover	1d	Thu 7/1/21	Thu 7/1/21	267
269		Post Cutover Monitoring	3d	Thu 7/1/21	Mon 7/5/21	268FS-1d
270		Roll to Day 2 Support Service	1d	Mon 7/5/21	Mon 7/5/21	269FS-1d
271		**Region Cutover - Region #7 - State of Nebraska**	**6d**	**Mon 7/12/21**	**Mon 7/19/21**	
272		PSAP Training at State of Nebraska training PSAP	5d	Mon 7/12/21	Fri 7/16/21	273FS-10d
273		Conversion MOP finalized	2d	Mon 7/12/21	Tue 7/13/21	
274		Final Testing completed	2d	Wed 7/14/21	Thu 7/15/21	273
275		Go/No Go Meeting	1d	Wed 7/14/21	Wed 7/14/21	273
276		Cutover	1d	Thu 7/15/21	Thu 7/15/21	275
277		Post Cutover Monitoring	3d	Thu 7/15/21	Mon 7/19/21	276FS-1d
278		Roll to Day 2 Support Service	1d	Mon 7/19/21	Mon 7/19/21	277FS-1d
279		***The OSP Migration Section is an EXAMPLE ONLY. This illustrates the methodology when converting carriers. Actual carrier counts and dates will be finalized as we move into the project***				
280		**Migration Phase / Site Specific Training**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
281		**PSAP Migration**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
282		**Carrier / OSP Migration**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
283		**Carrier 1 - OSP Migration**	**10d**	Mon 2/8/21	Fri 2/19/21	
284		Validate testing completed with Carriers	1d	Mon 2/8/21	Mon 2/8/21	286FS-5d
285		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/8/21	Fri 2/19/21	286FS-10d



Project: Nebraska Project Plan
Date: Thu 6/4/20

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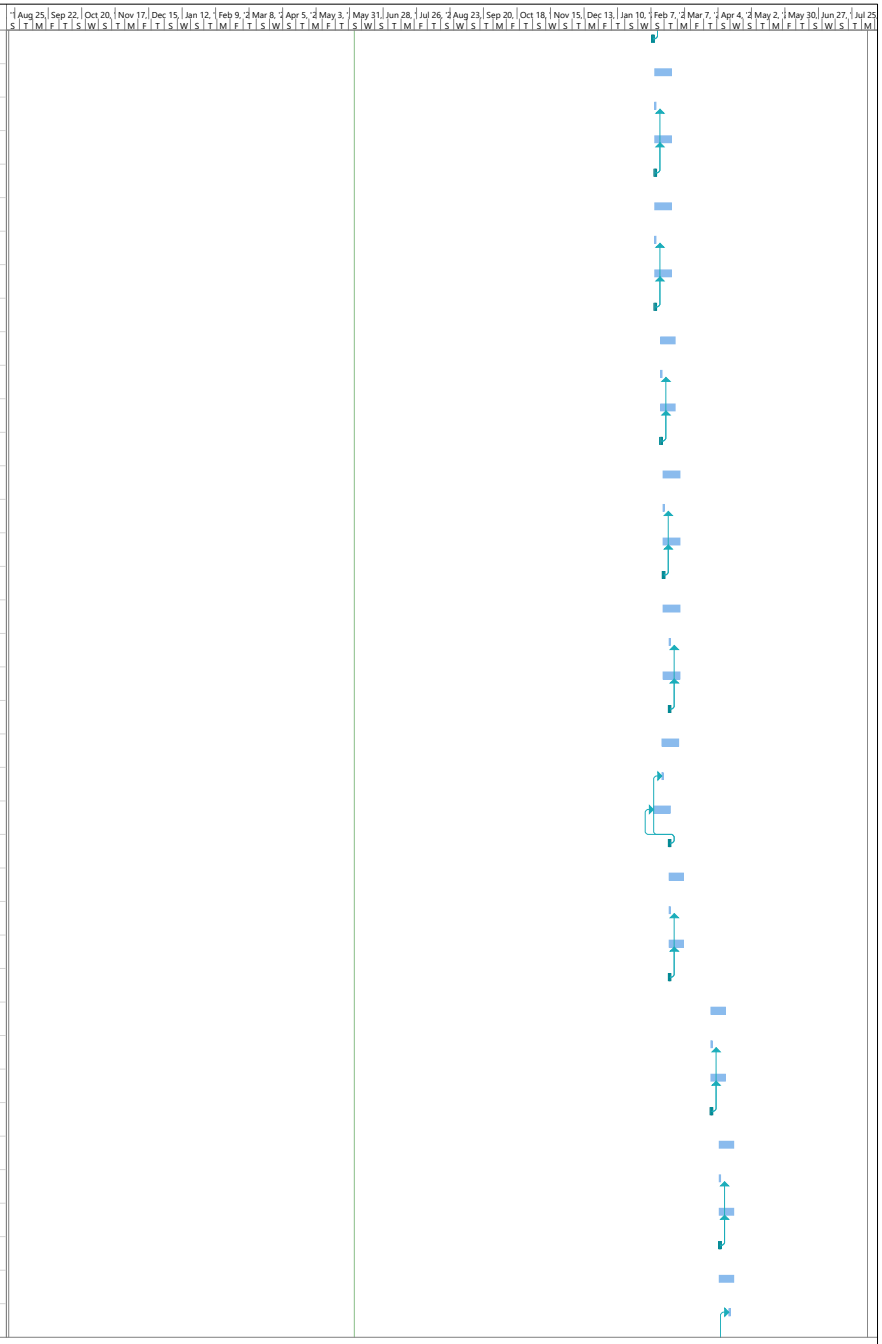
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
286		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/8/21	Mon 2/8/21	
287		**Carrier 2 - OSP Migration**	**10d**	**Wed 2/10/21**	**Tue 2/23/21**	
288		Validate testing completed with Carriers	1d	Wed 2/10/21	Wed 2/10/21	290FS-5d
289		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/10/21	Tue 2/23/21	290FS-10d
290		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/10/21	Wed 2/10/21	
291		**Carrier 3 - OSP Migration**	**10d**	**Wed 2/10/21**	**Tue 2/23/21**	
292		Validate testing completed with Carriers	1d	Wed 2/10/21	Wed 2/10/21	294FS-5d
293		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/10/21	Tue 2/23/21	294FS-10d
294		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/10/21	Wed 2/10/21	
295		**Carrier 4 - OSP Migration**	**10d**	**Mon 2/15/21**	**Fri 2/26/21**	
296		Validate testing completed with Carriers	1d	Mon 2/15/21	Mon 2/15/21	298FS-5d
297		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/15/21	Fri 2/26/21	298FS-10d
298		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/15/21	Mon 2/15/21	
299		**Carrier 5 - OSP Migration**	**10d**	Wed 2/17/21	**Tue 3/2/21**	
300		Validate testing completed with Carriers	1d	Wed 2/17/21	Wed 2/17/21	302FS-5d
301		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/17/21	Tue 3/2/21	302FS-10d
302		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/17/21	Wed 2/17/21	
303		**Wireless Carrier 1 - OSP Migration**	**10d**	**Wed 2/17/21**	**Tue 3/2/21**	
304		Validate testing completed with Carriers	1d	Mon 2/22/21	Mon 2/22/21	306FS-5d
305		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/17/21	Tue 3/2/21	306FS-10d
306		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
307		**Wireless Carrier 2 - OSP Migration**	**10d**	**Tue 2/16/21**	**Mon 3/1/21**	
308		Validate testing completed with Carriers	1d	Tue 2/16/21	Tue 2/16/21	310FS-5d
309		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 2/9/21	Mon 2/22/21	310FS-10d
310		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
311		**Wireless Carrier 3 - OSP Migration**	**10d**	**Mon 2/22/21**	**Fri 3/5/21**	
312		Validate testing completed with Carriers	1d	Mon 2/22/21	Mon 2/22/21	314FS-5d
313		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/22/21	Fri 3/5/21	314FS-10d
314		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
315		**Wireless Carrier 4 - OSP Migration**	**10d**	**Mon 3/29/21**	**Fri 4/9/21**	
316		Validate testing completed with Carriers	1d	Mon 3/29/21	Mon 3/29/21	318FS-5d
317		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 3/29/21	Fri 4/9/21	318FS-10d
318		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 3/29/21	Mon 3/29/21	
319		**VPC # 1 - Voip OSP Migration**	**10d**	**Mon 4/5/21**	**Fri 4/16/21**	
320		Validate testing completed with Carriers	1d	Mon 4/5/21	Mon 4/5/21	322FS-5d
321		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 4/5/21	Fri 4/16/21	322FS-10d
322		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/5/21	Mon 4/5/21	
323		**VPC # 2 - Voip OSP Migration**	**10d**	**Mon 4/5/21**	**Fri 4/16/21**	
324		Validate testing completed with Carriers	1d	Tue 4/13/21	Tue 4/13/21	326FS-5d



Project: Nebraska Project Plan
Date: Thu 6/4/20

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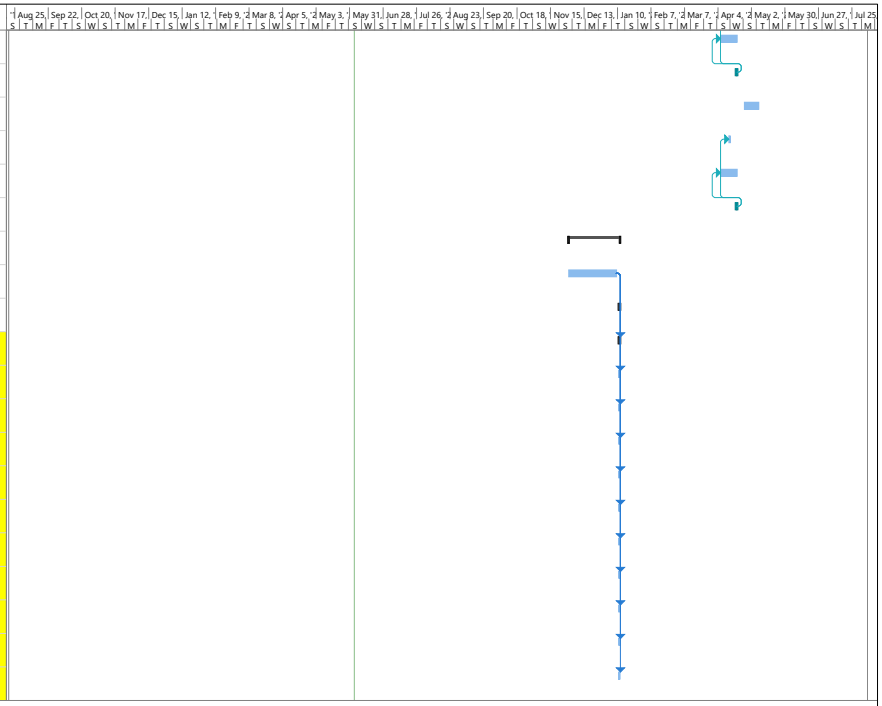
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
325		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 4/6/21	Mon 4/19/21	326FS-10d
326		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/19/21	Mon 4/19/21	
327		**VPC # 3 - Voip OSP Migration**	**10d**	**Mon 4/26/21**	**Fri 5/7/21**	
328		Validate testing completed with Carriers	1d	Tue 4/13/21	Tue 4/13/21	330FS-5d
329		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 4/6/21	Mon 4/19/21	330FS-10d
330		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/19/21	Mon 4/19/21	
331		**Operational (DAY 2 Support Add, Moves, Changes)**	**31d**	**Mon 11/30/20**	**Mon 1/11/21**	
332		30 DAY FSAT (Following formal operational cutover period)	30d	Mon 11/30/20	Fri 1/8/21	
333		**Notification/Reporting**	**1d**	**Mon 1/11/21**	**Mon 1/11/21**	
334		NG911 Text Traffic Statistics (Start of reports avaiable)	1d	Mon 1/11/21	Mon 1/11/21	332
335		Provide Interface and data to support existing text session CDR	1d	Mon 1/11/21	Mon 1/11/21	332
336		Text Session Data	1d	Mon 1/11/21	Mon 1/11/21	332
337		Text Session Statistic Data	1d	Mon 1/11/21	Mon 1/11/21	332
338		Outage Notification System	1d	Mon 1/11/21	Mon 1/11/21	332
339		Event Notification	1d	Mon 1/11/21	Mon 1/11/21	332
340		Trouble Ticket Log	1d	Mon 1/11/21	Mon 1/11/21	332
341		Monthly SLA Compliance Reports	1d	Mon 1/11/21	Mon 1/11/21	332
342		Outage Reporting	1d	Mon 1/11/21	Mon 1/11/21	332
343		System Monitoring Dashboard	1d	Mon 1/11/21	Mon 1/11/21	332
344		NG911 Service Project Reporting (Lifecycle of project)	1d	Mon 1/11/21	Mon 1/11/21	332



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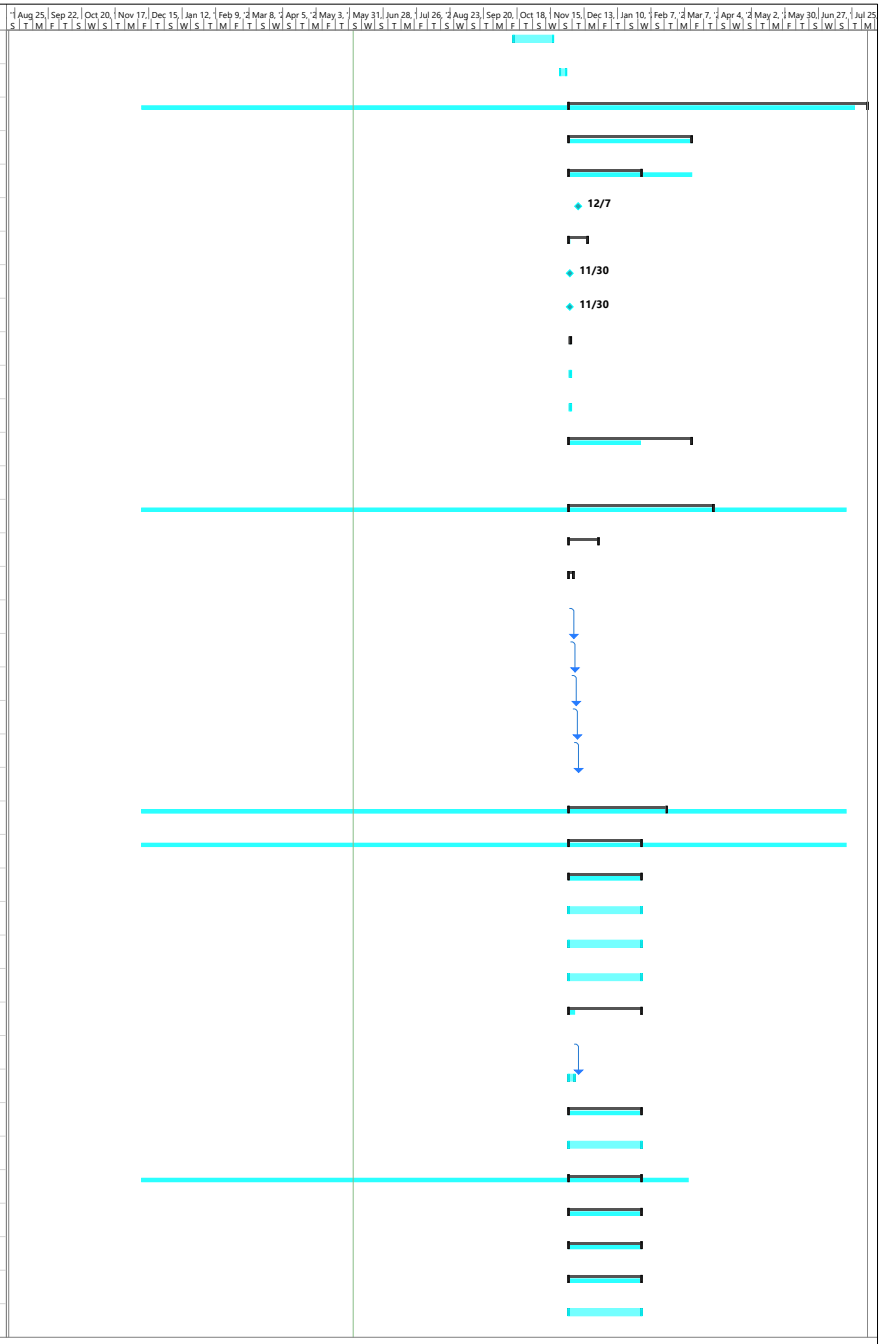
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		Contract Execution	23d	Thu 10/15/20	Mon 11/16/20	
2		**Thanksgiving week**	5d	Mon 11/23/20	Fri 11/27/20	
3		**State of Nebraska 9-1-1 NG9-1-1 Project**	**180d**	**Mon 11/30/20**	**Fri 8/6/21**	
4		**Project Initiation Phase**	**75d**	**Mon 11/30/20**	**Fri 3/12/21**	
5		**Project Kickoff & Initiation Phase Deliverables**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
6		Kickoff Meeting	1d	Mon 12/7/20	Mon 12/7/20	
7		**Organization Chart & Contact List**	**12d**	**Mon 11/30/20**	**Tue 12/15/20**	
8		Org Chart & Contacts Review w/State of Nebraska 9-1-1	1d	Mon 11/30/20	Mon 11/30/20	
9		Publish - Distribute Information	1d	Mon 11/30/20	Mon 11/30/20	
10		**Subcontractors List**	**1d**	**Tue 12/1/20**	**Tue 12/1/20**	
11		Review Subcontractor List	1d	**Tue 12/1/20**	**Tue 12/1/20**	
12		Publish - Distribute Information	1d	**Tue 12/1/20**	**Tue 12/1/20**	
13		**NG 9-1-1 Project Deployment Plan (WBS, Key Staff, Etc)**	**75d**	**Mon 11/30/20**	**Fri 3/12/21**	
14		Provide Proposed Plan	44d	Mon 11/30/20	Thu 1/28/21	
15		**Design, Planning, and Review**	**87d**	**Mon 11/30/20**	**Tue 3/30/21**	
16		**PSAP Surveys**	**19d**	**Mon 11/30/20**	**Thu 12/24/20**	
17		**PSAP Site Survey Plan**	**4d**	**Mon 11/30/20**	**Thu 12/3/20**	
18		Present Proposed Plan	1d	Mon 11/30/20	Mon 11/30/20	
19		Adjustments to Plan	1d	Tue 12/1/20	Tue 12/1/20	18
20		State of Nebraska 9-1-1 Approval	1d	Wed 12/2/20	Wed 12/2/20	19
21		Publish Plan	1d	Thu 12/3/20	Thu 12/3/20	20
22		PSAP Site Survey Schedule	1d	Fri 12/4/20	Fri 12/4/20	21
23		Conduct Site Surveys	14d	Mon 12/7/20	Thu 12/24/20	22
24		**Solution Architecture and Design**	**60d**	Mon 11/30/20	**Fri 2/19/21**	
25		**Solution Design and As Builts**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
26		**Block Diagrams, Wiring Diagrams, and Rack Elevations (PSAPs & DC's)**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
27		Draft Block Diagram, Wiring Diagrams & Rack Elevations	45d	Mon 11/30/20	Fri 1/29/21	
28		Final Block Diagram, Wiring Diagrams & Rack Elevations	45d	Mon 11/30/20	Fri 1/29/21	
29		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
30		**BOM**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
31		BOM Approval	5d	Mon 11/30/20	Fri 12/4/20	
32		Place BOM Orders for ESINet	5d	Mon 11/30/20	Fri 12/4/20	31
33		**DATA CENTER CONTRACTS**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
34		Contract Data Center - OSR	45d	Mon 11/30/20	Fri 1/29/21	
35		**Subsystem Development and design plans**	**45d**	Mon 11/30/20	**Fri 1/29/21**	
36		**Network Requirements/Final Design Plan**	**45d**	Mon 11/30/20	**Fri 1/29/21**	
37		**Network Subsystem**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
38		**Network Design**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
39		IP Schema	45d	Mon 11/30/20	Fri 1/29/21	



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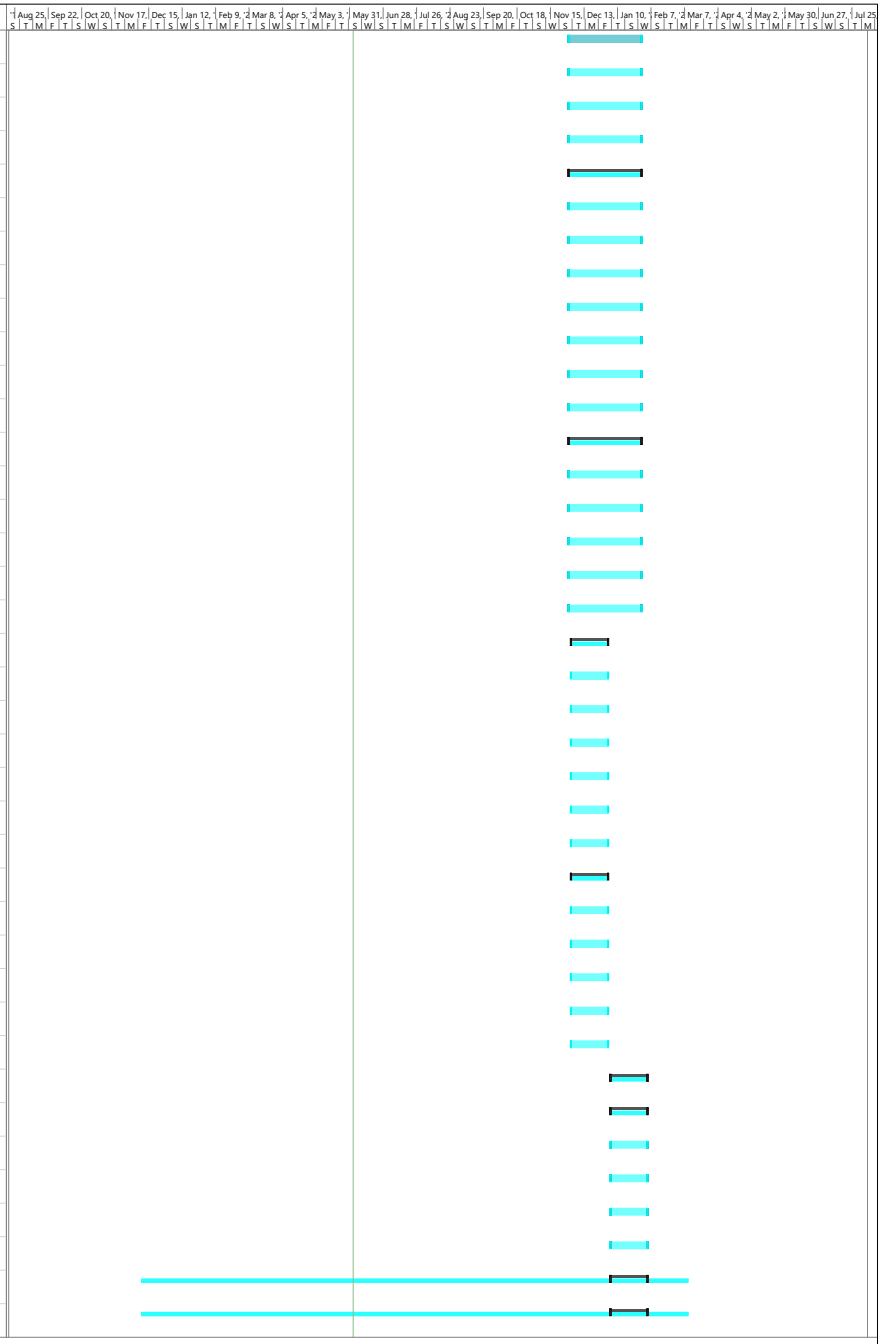
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
40		DNS Records	45d	Mon 11/30/20	Fri 1/29/21	
41		Network Time	45d	Mon 11/30/20	Fri 1/29/21	
42		VLAN IDs	45d	Mon 11/30/20	Fri 1/29/21	
43		VPN Info	45d	Mon 11/30/20	Fri 1/29/21	
44		**IP Layer 1,2, & 3 Technical Drawings**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
45		Draft IP Layer 1,2 & 3 Technical Drawings	45d	Mon 11/30/20	Fri 1/29/21	
46		Final IP Layer 1, 2, & 3 Technical Drawings	45d	Mon 11/30/20	Fri 1/29/21	
47		Provide Proposed Plan	45d	Mon 11/30/20	Fri 1/29/21	
48		Review Plan	45d	Mon 11/30/20	Fri 1/29/21	
49		Adjustments to Plan	45d	Mon 11/30/20	Fri 1/29/21	
50		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
51		Publish Plan	45d	Mon 11/30/20	Fri 1/29/21	
52		**Acceptance Testing Plan and Checklist**	**45d**	**Mon 11/30/20**	**Fri 1/29/21**	
53		Draft Acceptance Testing Plan and Checklist	45d	Mon 11/30/20	Fri 1/29/21	
54		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
55		Final Acceptance Testing Plan and Checklist	45d	Mon 11/30/20	Fri 1/29/21	
56		State of Nebraska 9-1-1 Approval	45d	Mon 11/30/20	Fri 1/29/21	
57		Publish Plan	45d	Mon 11/30/20	Fri 1/29/21	
58		**Disaster Recovery Plan**	**23d**	**Wed 12/2/20**	**Fri 1/1/21**	
59		Provide Disaster Recovery Plan	23d	Wed 12/2/20	Fri 1/1/21	
60		Review Plan	23d	Wed 12/2/20	Fri 1/1/21	
61		Adjustments to Plan	23d	Wed 12/2/20	Fri 1/1/21	
62		State of Nebraska 9-1-1 Approval	23d	Wed 12/2/20	Fri 1/1/21	
63		Publish Plan	23d	Wed 12/2/20	Fri 1/1/21	
64		Reroute Procedures (90 Calendar Days prior to RNSP Go Live)	23d	Wed 12/2/20	Fri 1/1/21	
65		**Continuity of Operations Plan**	**23d**	**Wed 12/2/20**	**Fri 1/1/21**	
66		Provide Continuity of Operations Plan	23d	Wed 12/2/20	Fri 1/1/21	
67		Review Plan	23d	Wed 12/2/20	Fri 1/1/21	
68		Adjustments to Plan	23d	Wed 12/2/20	Fri 1/1/21	
69		State of Nebraska 9-1-1 Approval	23d	Wed 12/2/20	Fri 1/1/21	
70		Publish Plan	23d	Wed 12/2/20	Fri 1/1/21	
71		**Database Subsystem**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
72		**GIS**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
73		GIS Planning	23d	Mon 1/4/21	Wed 2/3/21	
74		Obtain ALI / GIS Databases	23d	Mon 1/4/21	Wed 2/3/21	
75		Geographical Information Database (Normalization / Validation)	23d	Mon 1/4/21	Wed 2/3/21	
76		Location Database (Normalization / Validation)	23d	Mon 1/4/21	Wed 2/3/21	
77		**Text to 9-1-1 subsystem**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
78		**Text to 9-1-1**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	



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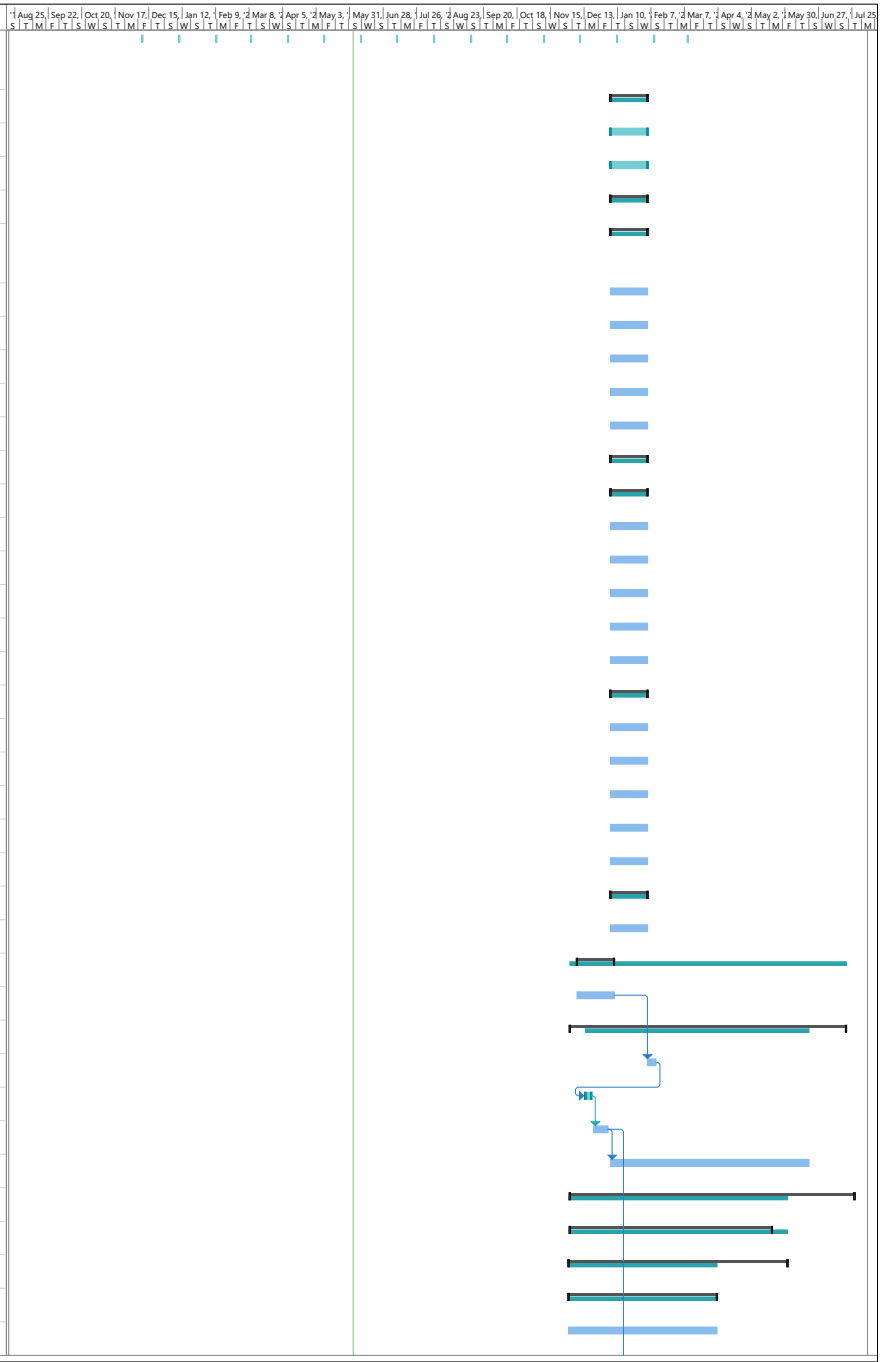
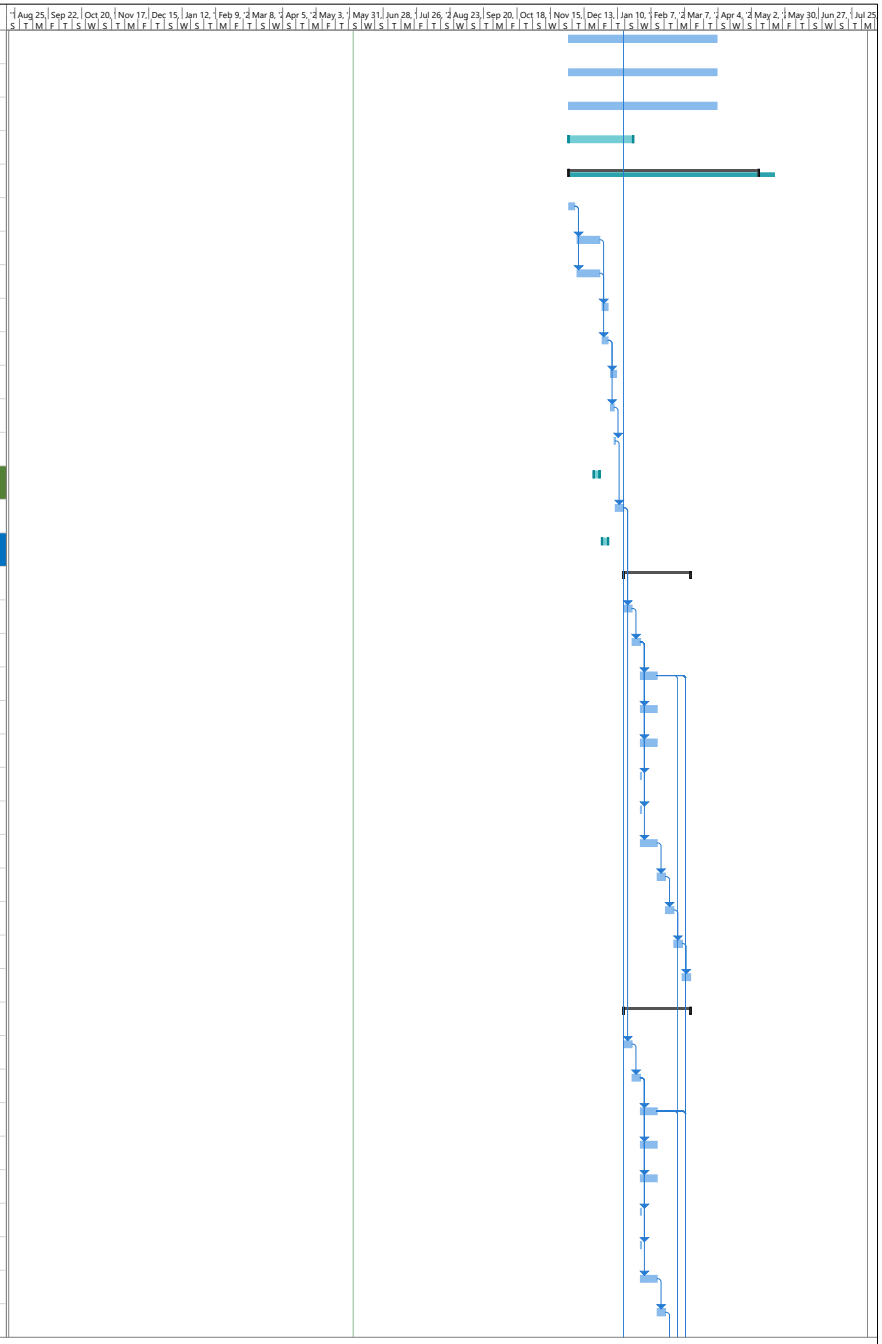
79		**Text to 9-1-1 Spreadsheet Tracking (Provide no later than 10th Calendar day of each month)**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
96		**Installation, Implementation and Training Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
97		Draft Installation, Implementation and Training Plan	23d	Mon 1/4/21	Wed 2/3/21	
98		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
99		**Training**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
100		**Training Course Material - User Training, Discrepancy Reporting, Policy Change Management, PSAP maintenance / outage reporting**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
101		Complete student and teacher course material	23d	Mon 1/4/21	Wed 2/3/21	
102		Deliver Training Material (Text App, Montoring and Dashboard App)	23d	Mon 1/4/21	Wed 2/3/21	
103		State of Nebraska 9-1-1 Apprval	23d	Mon 1/4/21	Wed 2/3/21	
104		Knowledge Transfer and Training (Class)	23d	Mon 1/4/21	Wed 2/3/21	
105		PSAP NG Text to 911 Training (Class)	23d	Mon 1/4/21	Wed 2/3/21	
106		**Day2 SupportPlans**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
107		**Maintenance Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
108		Provide Maintenance Plan	23d	Mon 1/4/21	Wed 2/3/21	
109		State of Nebraska 9-1-1 Review Plan	23d	Mon 1/4/21	Wed 2/3/21	
110		Adjustments to Plan	23d	Mon 1/4/21	Wed 2/3/21	
111		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
112		Publish Plan	23d	Mon 1/4/21	Wed 2/3/21	
113		**Monthly Billing and SLA Plan**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
114		Present Proposed Plan	23d	Mon 1/4/21	Wed 2/3/21	
115		Review Plan	23d	Mon 1/4/21	Wed 2/3/21	
116		Adjustments to Plan	23d	Mon 1/4/21	Wed 2/3/21	
117		State of Nebraska 9-1-1 Approval	23d	Mon 1/4/21	Wed 2/3/21	
118		Publish Plan	23d	Mon 1/4/21	Wed 2/3/21	
119		**PSAP Help Desk/Call Center**	**23d**	**Mon 1/4/21**	**Wed 2/3/21**	
120		Provide Help Desk/Call Center Number and Process to State of Nebraska 9-1-1	23d	Mon 1/4/21	Wed 2/3/21	
121		**OSP Migration/Transition Plan**	**23d**	**Mon 12/7/20**	**Wed 1/6/21**	
122		Provide Proposed Plan to State of Nebraska 9-1-1	23d	Mon 12/7/20	Wed 1/6/21	
123		**OSP Planning and Engagement**	**165d**	**Tue 12/1/20**	**Mon 7/19/21**	
124		Notifications Sent to Carriers	5d	Thu 2/4/21	Wed 2/10/21	122FS+20d
125		Carrier Kick Off Calls	5d	Mon 12/14/20	Fri 12/18/20	124FS+15d
126		Data Gathering Forms Sent / Received	10d	Mon 12/21/20	Fri 1/1/21	125
127		OSP Planning and Engineering Calls	120d	Mon 1/4/21	Fri 6/18/21	126
128		**PART A - NETWORK (ESInet & NGCS)**	**170d**	**Tue 12/1/20**	**Mon 7/26/21**	
129		**Build and Configure Phase**	**121d**	**Tue 12/1/20**	**Tue 5/18/21**	
130		**Network**	**131d**	**Mon 11/30/20**	**Mon 5/31/21**	
131		**Long Lead Items - Order Circuits size increase and configure VLAN's on them (Trunks, MPLS)**	**90d**	**Mon 11/30/20**	**Fri 4/2/21**	
132		Aggregation Facilities	90d	Mon 11/30/20	Fri 4/2/21	



Project: Nebraska Project Plan
Date: Wed 6/3/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
133		POIs	90d	Mon 11/30/20	Fri 4/2/21	
134		E2 Circuits	90d	Mon 11/30/20	Fri 4/2/21	
135		Training PSAP	90d	Mon 11/30/20	Fri 4/2/21	
136		Coordinate order placement for increases to State of Nebraska PSAP BW sites.	40d	Mon 11/30/20	Fri 1/22/21	
137		**Staging OSR Data Centers 1 & 2**	**115d**	**Mon 11/30/20**	**Fri 5/7/21**	
138		Receive and Inventory assest tags and serial numbers	5d	Mon 11/30/20	Fri 12/4/20	
139		Rack and Stack Equipment in Boca	15d	Mon 12/7/20	Fri 12/25/20	138
140		Configurations and Databases are downloaded and stored	15d	Mon 12/7/20	Fri 12/25/20	138
141		Racks and wires labeled	5d	Mon 12/28/20	Fri 1/1/21	139
142		QA Inspections/Testing at Factory (Performance & FAT)	5d	Mon 12/28/20	Fri 1/1/21	140
143		Review QA Report of Inspections w/State of Nebraska 9-1-1	5d	Mon 1/4/21	Fri 1/8/21	142
144		Document prelim State of Nebraska config for As-Built Documentation to deliver to State of Nebraska 9-1-1 as	3d	Mon 1/4/21	Wed 1/6/21	142
145		Approval and Prepare Equipment for Shipment	1d	Thu 1/7/21	Thu 1/7/21	144
146		**Christmas Eve / Christmas**	**5d**	**Mon 12/21/20**	**Fri 12/25/20**	
147		Shipment	5d	Fri 1/8/21	Thu 1/14/21	145
148		**New Years**	**5d**	**Mon 12/28/20**	**Fri 1/1/21**	
149		**OSV Router Datacenter build and configure - Data Center #1**	**40d**	**Fri 1/15/21**	**Thu 3/11/21**	
150		Shelf integration into the electrical and cooling system at the DC	5d	Fri 1/15/21	Thu 1/21/21	147
151		Rack and Stack Equipment in assigned data centers	5d	Fri 1/22/21	Thu 1/28/21	150
152		Network Intergration for the MPLS Ingress and Egress Feeds (cross connects)	10d	Fri 1/29/21	Thu 2/11/21	151
153		DMZ Configuration and Integration with DMZ Network	10d	Fri 1/29/21	Thu 2/11/21	151
154		NOC/SOC Integration and Configuration	10d	Fri 1/29/21	Thu 2/11/21	151
155		Secure Web Proxy Interconnect to Textblue	1d	Fri 1/29/21	Fri 1/29/21	151
156		TCC Integration with Intrado and Comtech	1d	Fri 1/29/21	Fri 1/29/21	151
157		Security and Access Control Configuration	10d	Fri 1/29/21	Thu 2/11/21	151
158		Confirm Configuration and Make Adjustments	5d	Fri 2/12/21	Thu 2/18/21	157
159		Final Configuration and Backup	5d	Fri 2/19/21	Thu 2/25/21	158
160		Site Labeling and Inventory Management	5d	Fri 2/26/21	Thu 3/4/21	159
161		Confirm QA Inspections After Onsite Assembly	5d	Fri 3/5/21	Thu 3/11/21	160
162		**OSV Router Datacenter build and configure - Data Center #2**	**40d**	**Fri 1/15/21**	**Thu 3/11/21**	
163		Shelf integration into the electrical and cooling system at the DC	5d	Fri 1/15/21	Thu 1/21/21	147
164		Rack and Stack Equipment in assigned data centers	5d	Fri 1/22/21	Thu 1/28/21	163
165		Network Intergration for the MPLS Ingress and Egress Feeds (cross connects)	10d	Fri 1/29/21	Thu 2/11/21	164
166		DMZ Configuration and Integration with DMZ Network	10d	Fri 1/29/21	Thu 2/11/21	164
167		NOC/SOC Integration and Configuration	10d	Fri 1/29/21	Thu 2/11/21	164
168		Secure Web Proxy Interconnect to Textblue	1d	Fri 1/29/21	Fri 1/29/21	164
169		TCC Integration with Intrado and Comtech	1d	Fri 1/29/21	Fri 1/29/21	164
170		Security and Access Control Configuration	10d	Fri 1/29/21	Thu 2/11/21	164
171		Confirm Configuration and Make Adjustments	5d	Fri 2/12/21	Thu 2/18/21	170



Project: Nebraska Project Plan
Date: Wed 6/3/20

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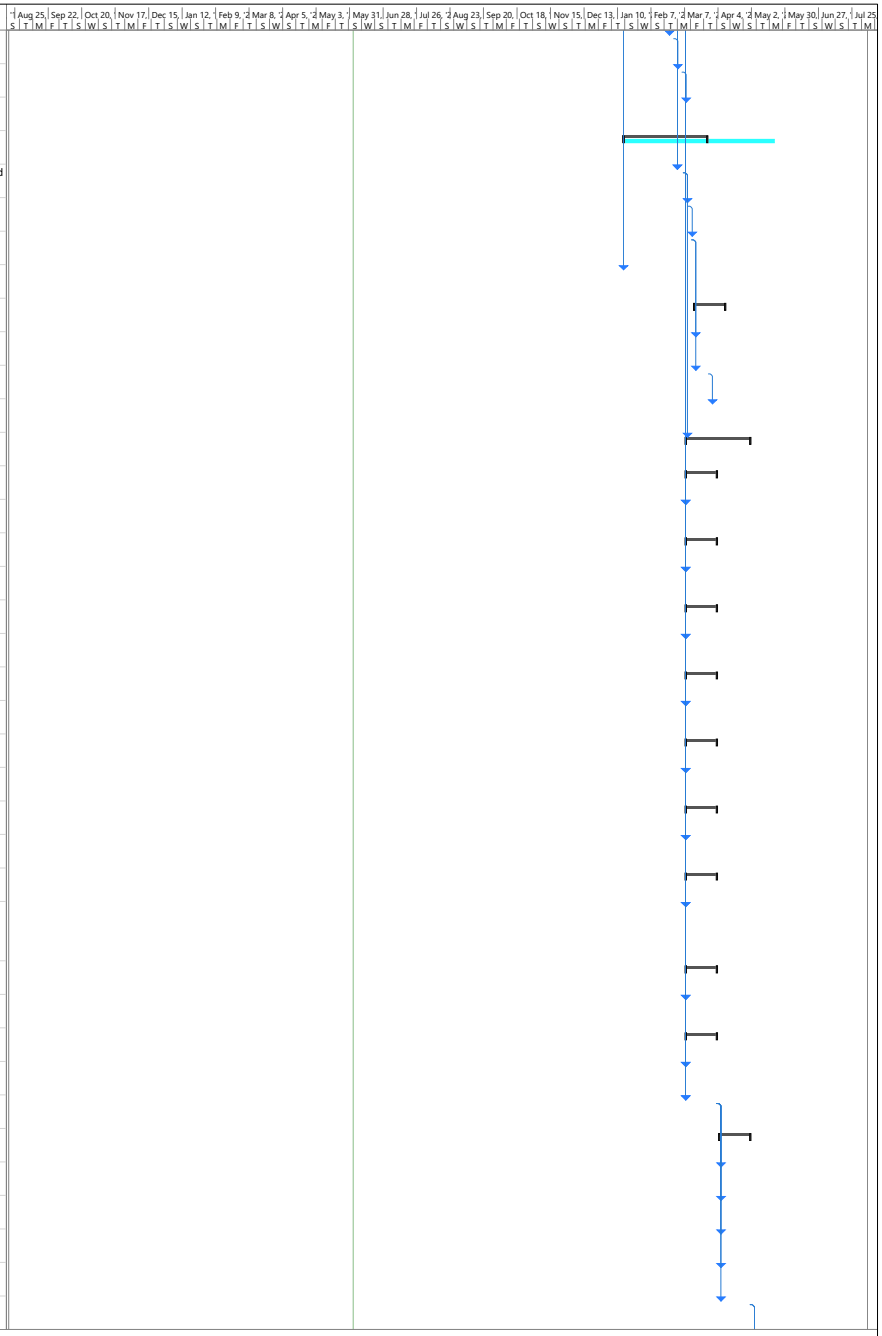
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
172		Final Configuration and Backup	5d	Fri 2/19/21	Thu 2/25/21	171
173		Site Labeling and Inventory Management	5d	Fri 2/26/21	Thu 3/4/21	172
174		Confirm QA Inspections After Onsite Assembly	5d	Fri 3/5/21	Thu 3/11/21	173
175		**Aggregator Connectivity, Configuration and Testing**	**50d**	**Fri 1/15/21**	**Thu 3/25/21**	
176		Finalize aggregation center connection to Atos	5d	Mon 3/1/21	Fri 3/5/21	152FS+11d,165FS+11d
177		Configure application connections with Aggregator	2d	Mon 3/8/21	Tue 3/9/21	176
178		Test MPLS connections and data transfer with Aggregator	3d	Wed 3/10/21	Fri 3/12/21	177
179		Finalize aggregation center OSP connection requirements	90d	Fri 1/15/21	Thu 5/20/21	126
180		**Perform System Integration Testing (SIT)**	**20d**	**Mon 3/15/21**	**Fri 4/9/21**	
181		TEST OSP Integration to POI (multiple phases)	10d	Mon 3/15/21	Fri 3/26/21	178
182		TEST State of Nebraska 9-1-1 integration	10d	Mon 3/15/21	Fri 3/26/21	178
183		TEST Partner integration	10d	Mon 3/29/21	Fri 4/9/21	182
184		**Part A - Integration and Test Phase**	**40d**	**Mon 3/8/21**	**Fri 4/30/21**	**176**
185		**Network Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
186		I&T of the ESInet For Data Centers, POIs and Aggregation Facilities	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
187		**Aggregation/POI Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
188		I&T of the ESInet with Core Components and External WAN Interfaces Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
189		**Ingress/Egress Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
190		I&T of the BCF Functions and Components	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
191		**Database Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
192		I&T of ESInet Core with GIS Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
193		**NCGS Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
194		I&T of the Virtualized Software Components	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
195		**Monitoring and Dashboard Subsystem**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
196		I&T of the ESInet and Core text subsystems to the State of Nebraska 9-1-1 Monitoring System	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
197		**Configuration Management Database**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
198		I&T of the ESInet Core and text subsystems to the Atos ITIL Compliant Help Desk / CMDB Software Subphase	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
199		**NG911 Text Traffic Statistics**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
200		Provide Interface and data to support existing text session CDR	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
201		**Perform System Integration Testing (SIT)**	**20d**	**Mon 3/8/21**	**Fri 4/2/21**	
202		TEST OSP Integration with Aggregator and Atos	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
203		TEST Partner integration	20d	Mon 3/8/21	Fri 4/2/21	152,165FS+1d
204		**Failure Mode Testing (FMT)**	**20d**	**Mon 4/5/21**	**Fri 4/30/21**	
205		Load and Stress Test	20d	Mon 4/5/21	Fri 4/30/21	203
206		Fault Injection	20d	Mon 4/5/21	Fri 4/30/21	203
207		System Behavior logging and documentation	20d	Mon 4/5/21	Fri 4/30/21	203
208		Provide formal FMT report to State of Nebraska 9-1-1	20d	Mon 4/5/21	Fri 4/30/21	203
209		Configuration and integration lockdown implemented	20d	Mon 4/5/21	Fri 4/30/21	203



Project: Nebraska Project Plan
Date: Wed 6/3/20

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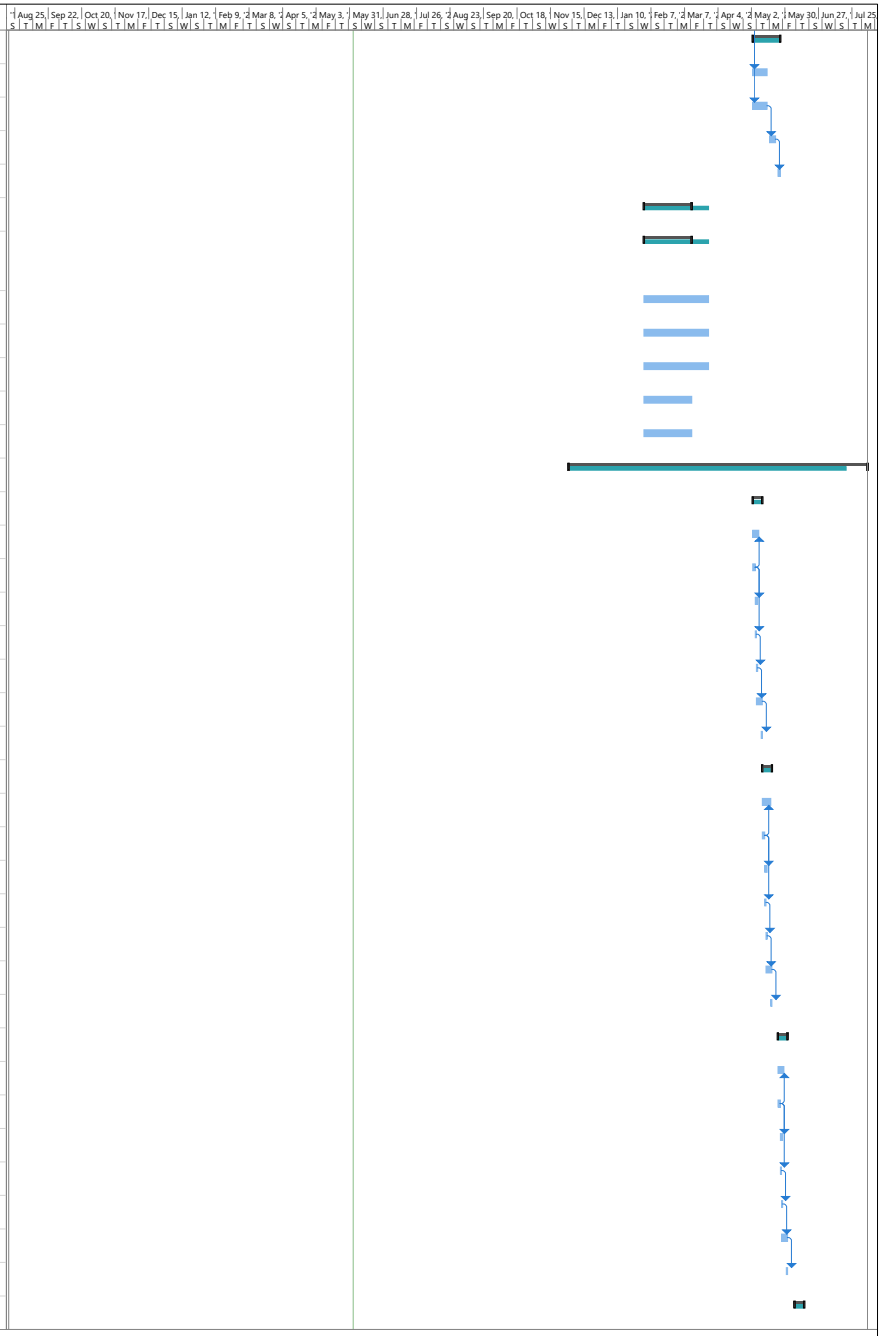
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
210		**Execute Formal SAT Test as per Agreed Procedures (Built System and 3rd Party Subsystems)**	**17d**	**Mon 5/3/21**	**Tue 5/25/21**	
211		Perform System Acceptance Testing	10d	Mon 5/3/21	Fri 5/14/21	209
212		Perform acceptance testing for Software	10d	Mon 5/3/21	Fri 5/14/21	209
213		Provide Formal SAT Test Report	5d	Mon 5/17/21	Fri 5/21/21	212
214		Work off any Agreed Patching, Fix, and Regression Testing	2d	Mon 5/24/21	Tue 5/25/21	213
215		**Training**	**30d**	**Mon 2/1/21**	**Fri 3/12/21**	
216		**Training Course Material - User Training, Discrepancy Reporting, Policy Change Management, PSAP maintenance / outage reporting**	**30d**	**Mon 2/1/21**	**Fri 3/12/21**	
217		Complete student and teacher course material	40d	Mon 2/1/21	Fri 3/26/21	
218		Deliver Training Material (Text Web App, Montoring and Dashboard App, A&W App, ICD Q/A)	40d	Mon 2/1/21	Fri 3/26/21	
219		State of Nebraska 9-1-1 Approval	40d	Mon 2/1/21	Fri 3/26/21	
220		Knowledge Transfer and Training (Class)	30d	Mon 2/1/21	Fri 3/12/21	
221		PSAP NG Text to 911 Training (Class)	30d	Mon 2/1/21	Fri 3/12/21	
222		**Part B - Call Handling Host Site Equipment Phase**	**180d**	**Mon 11/30/20**	**Fri 8/6/21**	
223		**Region Cutover - Region #1 - State of Nebraska**	**6d**	**Mon 5/3/21**	**Mon 5/10/21**	
224		PSAP Training	5d	Mon 5/3/21	Fri 5/7/21	225FS-10d
225		Conversion MOP finalized	2d	Mon 5/3/21	Tue 5/4/21	
226		Final Testing completed	2d	Wed 5/5/21	Thu 5/6/21	225
227		Go/No Go Meeting	1d	Wed 5/5/21	Wed 5/5/21	225
228		Cutover	1d	Thu 5/6/21	Thu 5/6/21	227
229		Post Cutover Monitoring	3d	Thu 5/6/21	Mon 5/10/21	228FS-1d
230		Roll to Day 2 Support Service	1d	Mon 5/10/21	Mon 5/10/21	229FS-1d
231		**Region Cutover - Region #2 - State of Nebraska**	**6d**	**Tue 5/11/21**	**Tue 5/18/21**	
232		PSAP Training at State of Nebraska training PSAP	5d	Tue 5/11/21	Mon 5/17/21	233FS-10d
233		Conversion MOP finalized	2d	Tue 5/11/21	Wed 5/12/21	
234		Final Testing completed	2d	Thu 5/13/21	Fri 5/14/21	233
235		Go/No Go Meeting	1d	Thu 5/13/21	Thu 5/13/21	233
236		Cutover	1d	Fri 5/14/21	Fri 5/14/21	235
237		Post Cutover Monitoring	3d	Fri 5/14/21	Tue 5/18/21	236FS-1d
238		Roll to Day 2 Support Service	1d	Tue 5/18/21	Tue 5/18/21	237FS-1d
239		**Region Cutover - Region #3 - State of Nebraska**	**6d**	**Mon 5/24/21**	**Mon 5/31/21**	
240		PSAP Training at State of Nebraska training PSAP	5d	Mon 5/24/21	Fri 5/28/21	241FS-10d
241		Conversion MOP finalized	2d	Mon 5/24/21	Tue 5/25/21	
242		Final Testing completed	2d	Wed 5/26/21	Thu 5/27/21	241
243		Go/No Go Meeting	1d	Wed 5/26/21	Wed 5/26/21	241
244		Cutover	1d	Thu 5/27/21	Thu 5/27/21	243
245		Post Cutover Monitoring	3d	Thu 5/27/21	Mon 5/31/21	244FS-1d
246		Roll to Day 2 Support Service	1d	Mon 5/31/21	Mon 5/31/21	245FS-1d
247		**Region Cutover - Region #4 - State of Nebraska**	**6d**	**Mon 6/7/21**	**Mon 6/14/21**	



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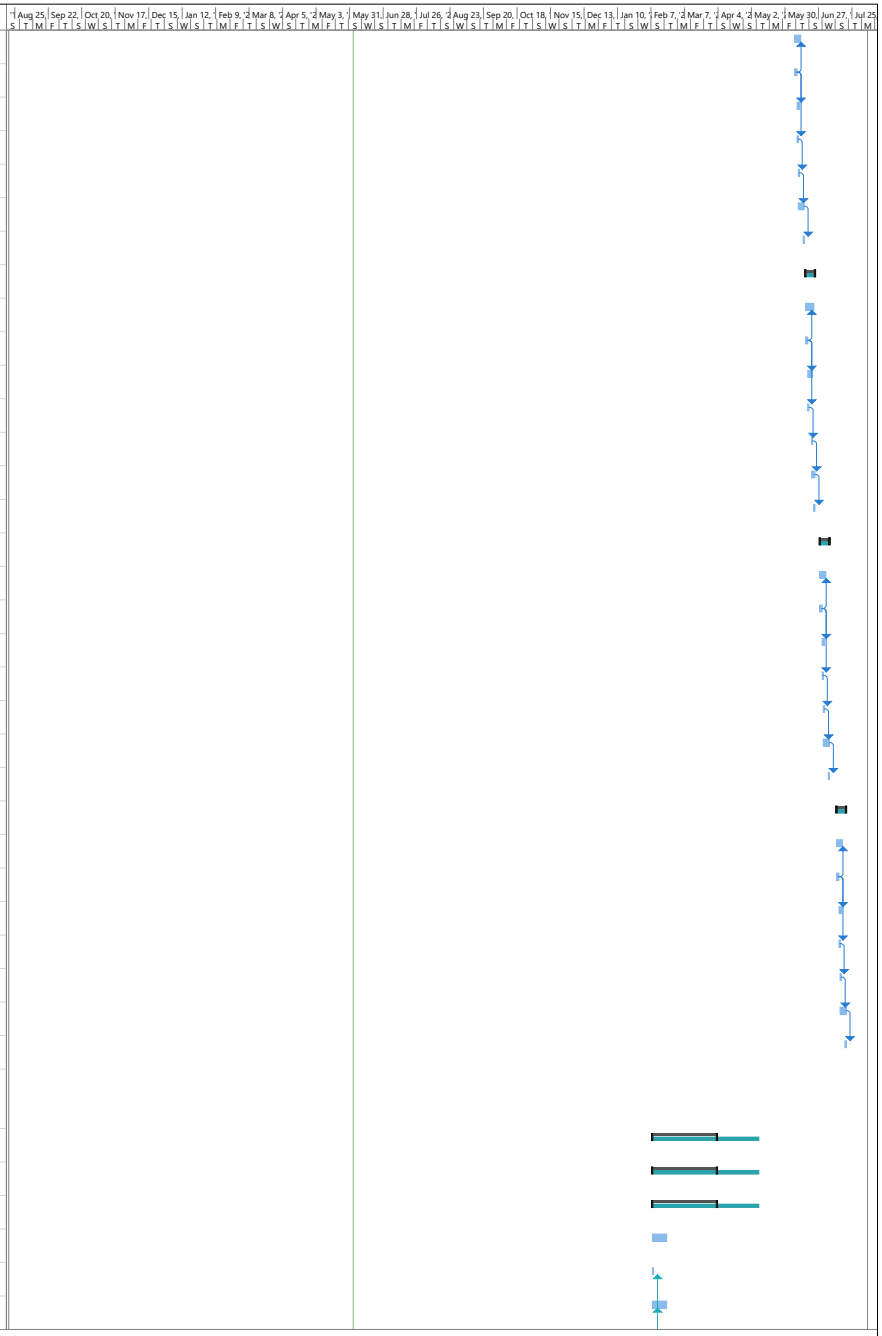
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
248		PSAP Training at State of Nebraska training PSAP	5d	Mon 6/7/21	Fri 6/11/21	249FS-10d
249		Conversion MOP finalized	2d	Mon 6/7/21	Tue 6/8/21	
250		Final Testing completed	2d	Wed 6/9/21	Thu 6/10/21	249
251		Go/No Go Meeting	1d	Wed 6/9/21	Wed 6/9/21	249
252		Cutover	1d	Thu 6/10/21	Thu 6/10/21	251
253		Post Cutover Monitoring	3d	Thu 6/10/21	Mon 6/14/21	252FS-1d
254		Roll to Day 2 Support Service	1d	Mon 6/14/21	Mon 6/14/21	253FS-1d
255		**Region Cutover - Region #5 - State of Nebraska**	**6d**	**Wed 6/16/21**	**Wed 6/23/21**	
256		PSAP Training at State of Nebraska training PSAP	5d	Wed 6/16/21	Tue 6/22/21	257FS-10d
257		Conversion MOP finalized	2d	Wed 6/16/21	Thu 6/17/21	
258		Final Testing completed	2d	Fri 6/18/21	Mon 6/21/21	257
259		Go/No Go Meeting	1d	Fri 6/18/21	Fri 6/18/21	257
260		Cutover	1d	Mon 6/21/21	Mon 6/21/21	259
261		Post Cutover Monitoring	3d	Mon 6/21/21	Wed 6/23/21	260FS-1d
262		Roll to Day 2 Support Service	1d	Wed 6/23/21	Wed 6/23/21	261FS-1d
263		**Region Cutover - Region #6 - State of Nebraska**	**6d**	**Mon 6/28/21**	**Mon 7/5/21**	
264		PSAP Training at State of Nebraska training PSAP	5d	Mon 6/28/21	Fri 7/2/21	265FS-10d
265		Conversion MOP finalized	2d	Mon 6/28/21	Tue 6/29/21	
266		Final Testing completed	2d	Wed 6/30/21	Thu 7/1/21	265
267		Go/No Go Meeting	1d	Wed 6/30/21	Wed 6/30/21	265
268		Cutover	1d	Thu 7/1/21	Thu 7/1/21	267
269		Post Cutover Monitoring	3d	Thu 7/1/21	Mon 7/5/21	268FS-1d
270		Roll to Day 2 Support Service	1d	Mon 7/5/21	Mon 7/5/21	269FS-1d
271		**Region Cutover - Region #7 - State of Nebraska**	**6d**	**Mon 7/12/21**	**Mon 7/19/21**	
272		PSAP Training at State of Nebraska training PSAP	5d	Mon 7/12/21	Fri 7/16/21	273FS-10d
273		Conversion MOP finalized	2d	Mon 7/12/21	Tue 7/13/21	
274		Final Testing completed	2d	Wed 7/14/21	Thu 7/15/21	273
275		Go/No Go Meeting	1d	Wed 7/14/21	Wed 7/14/21	273
276		Cutover	1d	Thu 7/15/21	Thu 7/15/21	275
277		Post Cutover Monitoring	3d	Thu 7/15/21	Mon 7/19/21	276FS-1d
278		Roll to Day 2 Support Service	1d	Mon 7/19/21	Mon 7/19/21	277FS-1d
279		***The OSP Migration Section is an EXAMPLE ONLY. This illustrates the methodology when converting carriers. Actual carrier counts and dates will be finalized as we move into the project***				
280		**Migration Phase / Site Specific Training**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
281		**PSAP Migration**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
282		**Carrier / OSP Migration**	**40d**	**Mon 2/8/21**	**Fri 4/2/21**	
283		**Carrier 1 - OSP Migration**	**10d**	Mon 2/8/21	Fri 2/19/21	
284		Validate testing completed with Carriers	1d	Mon 2/8/21	Mon 2/8/21	286FS-5d
285		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/8/21	Fri 2/19/21	286FS-10d



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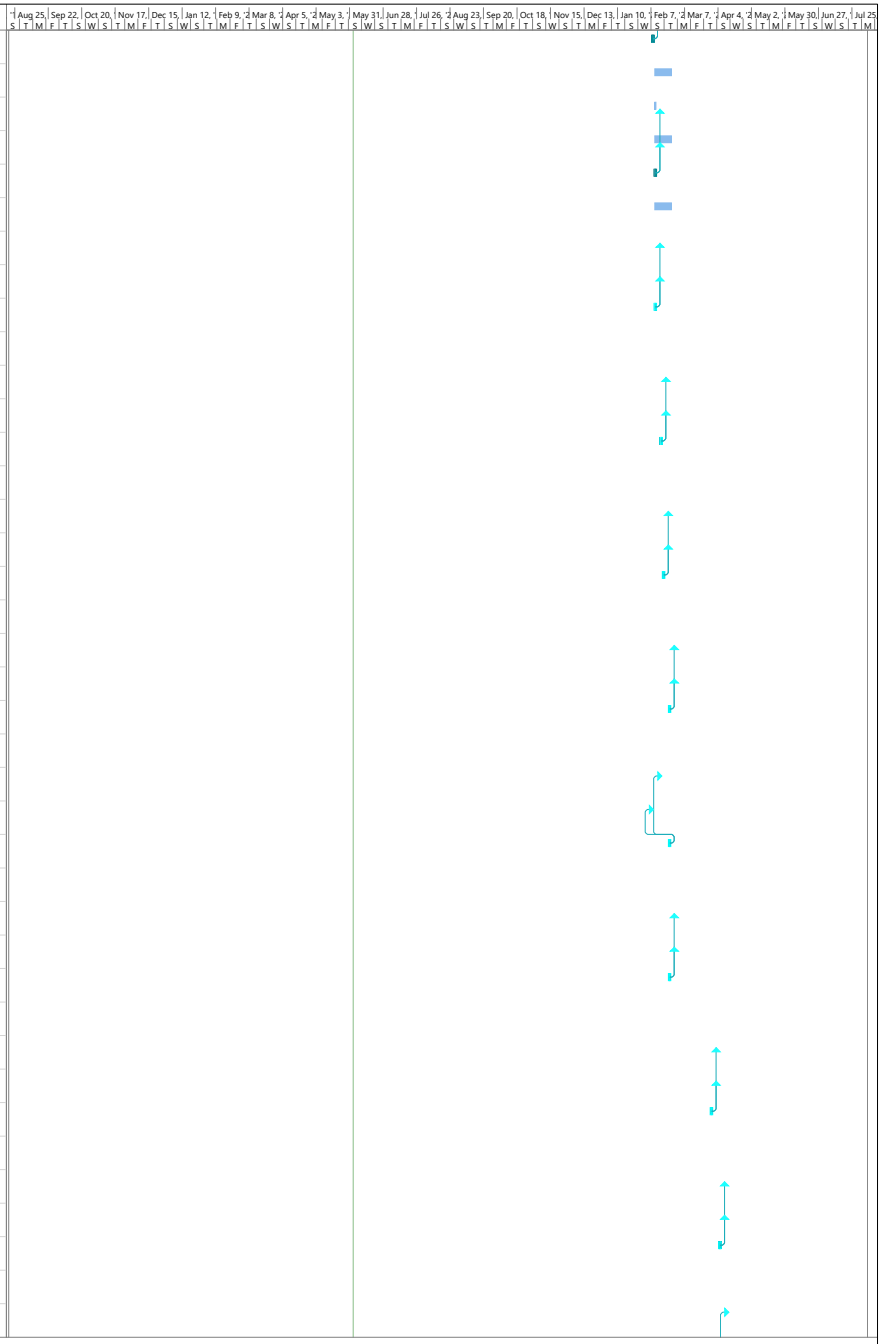
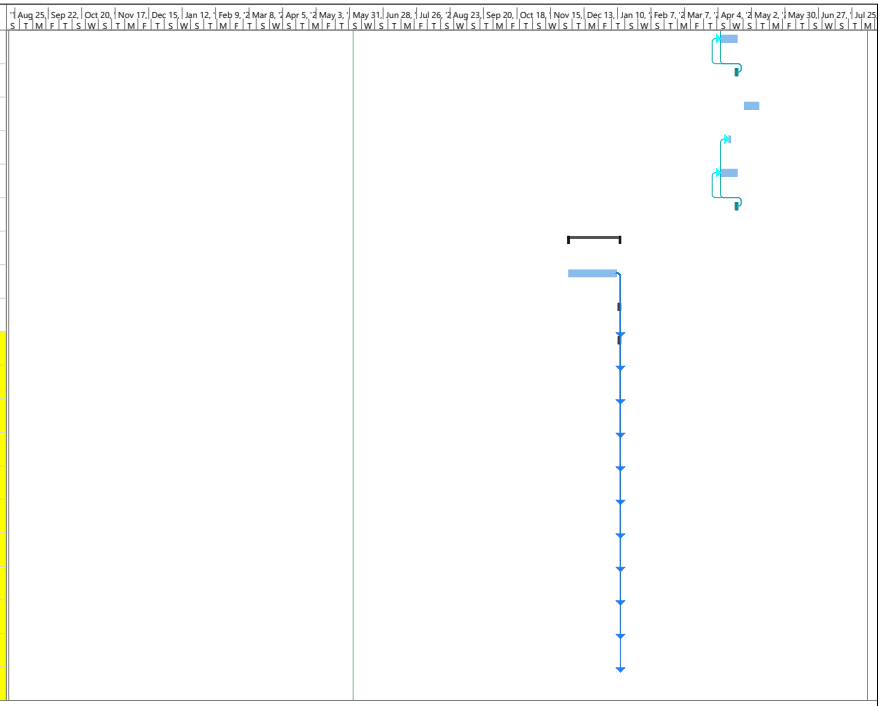
286		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/8/21	Mon 2/8/21	
287		**Carrier 2 - OSP Migration**	**10d**	**Wed 2/10/21**	**Tue 2/23/21**	
288		Validate testing completed with Carriers	1d	Wed 2/10/21	Wed 2/10/21	290FS-5d
289		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/10/21	Tue 2/23/21	290FS-10d
290		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/10/21	Wed 2/10/21	
291		**Carrier 3 - OSP Migration**	**10d**	**Wed 2/10/21**	**Tue 2/23/21**	
292		Validate testing completed with Carriers	1d	Wed 2/10/21	Wed 2/10/21	294FS-5d
293		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/10/21	Tue 2/23/21	294FS-10d
294		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/10/21	Wed 2/10/21	
295		**Carrier 4 - OSP Migration**	**10d**	**Mon 2/15/21**	**Fri 2/26/21**	
296		Validate testing completed with Carriers	1d	Mon 2/15/21	Mon 2/15/21	298FS-5d
297		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/15/21	Fri 2/26/21	298FS-10d
298		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/15/21	Mon 2/15/21	
299		**Carrier 5 - OSP Migration**	**10d**	Wed 2/17/21	**Tue 3/2/21**	
300		Validate testing completed with Carriers	1d	Wed 2/17/21	Wed 2/17/21	302FS-5d
301		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/17/21	Tue 3/2/21	302FS-10d
302		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Wed 2/17/21	Wed 2/17/21	
303		**Wireless Carrier 1 - OSP Migration**	**10d**	**Wed 2/17/21**	**Tue 3/2/21**	
304		Validate testing completed with Carriers	1d	Mon 2/22/21	Mon 2/22/21	306FS-5d
305		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Wed 2/17/21	Tue 3/2/21	306FS-10d
306		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
307		**Wireless Carrier 2 - OSP Migration**	**10d**	**Tue 2/16/21**	**Mon 3/1/21**	
308		Validate testing completed with Carriers	1d	Tue 2/16/21	Tue 2/16/21	310FS-5d
309		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 2/9/21	Mon 2/22/21	310FS-10d
310		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
311		**Wireless Carrier 3 - OSP Migration**	**10d**	**Mon 2/22/21**	**Fri 3/5/21**	
312		Validate testing completed with Carriers	1d	Mon 2/22/21	Mon 2/22/21	314FS-5d
313		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 2/22/21	Fri 3/5/21	314FS-10d
314		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 2/22/21	Mon 2/22/21	
315		**Wireless Carrier 4 - OSP Migration**	**10d**	**Mon 3/29/21**	**Fri 4/9/21**	
316		Validate testing completed with Carriers	1d	Mon 3/29/21	Mon 3/29/21	318FS-5d
317		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 3/29/21	Fri 4/9/21	318FS-10d
318		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 3/29/21	Mon 3/29/21	
319		**VPC # 1 - Voip OSP Migration**	**10d**	**Mon 4/5/21**	**Fri 4/16/21**	
320		Validate testing completed with Carriers	1d	Mon 4/5/21	Mon 4/5/21	322FS-5d
321		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Mon 4/5/21	Fri 4/16/21	322FS-10d
322		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/5/21	Mon 4/5/21	
323		**VPC # 2 - Voip OSP Migration**	**10d**	**Mon 4/5/21**	**Fri 4/16/21**	
324		Validate testing completed with Carriers	1d	Tue 4/13/21	Tue 4/13/21	326FS-5d



Project: Nebraska Project Plan
Date: Wed 6/3/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
325		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 4/6/21	Mon 4/19/21	326FS-10d
326		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/19/21	Mon 4/19/21	
327		**VPC # 3 - Voip OSP Migration**	**10d**	**Mon 4/26/21**	**Fri 5/7/21**	
328		Validate testing completed with Carriers	1d	Tue 4/13/21	Tue 4/13/21	330FS-5d
329		PSAP NG 9-1-1 Call processing refresher materials provided	10d	Tue 4/6/21	Mon 4/19/21	330FS-10d
330		Carrier Conversion from LSR to NG 9-1-1 ESINet	1d	Mon 4/19/21	Mon 4/19/21	
331		**Operational (DAY 2 Support Add, Moves, Changes)**	**31d**	**Mon 11/30/20**	**Mon 1/11/21**	
332		30 DAY FSAT (Following formal operational cutover period)	30d	Mon 11/30/20	Fri 1/8/21	
333		**Notification/Reporting**	**1d**	**Mon 1/11/21**	**Mon 1/11/21**	
334		NG911 Text Traffic Statistics (Start of reports avaiable)	1d	Mon 1/11/21	Mon 1/11/21	332
335		Provide Interface and data to support existing text session CDR	1d	Mon 1/11/21	Mon 1/11/21	332
336		Text Session Data	1d	Mon 1/11/21	Mon 1/11/21	332
337		Text Session Statistic Data	1d	Mon 1/11/21	Mon 1/11/21	332
338		Outage Notification System	1d	Mon 1/11/21	Mon 1/11/21	332
339		Event Notification	1d	Mon 1/11/21	Mon 1/11/21	332
340		Trouble Ticket Log	1d	Mon 1/11/21	Mon 1/11/21	332
341		Monthly SLA Compliance Reports	1d	Mon 1/11/21	Mon 1/11/21	332
342		Outage Reporting	1d	Mon 1/11/21	Mon 1/11/21	332
343		System Monitoring Dashboard	1d	Mon 1/11/21	Mon 1/11/21	332
344		NG911 Service Project Reporting (Lifecycle of project)	1d	Mon 1/11/21	Mon 1/11/21	332



Project: Nebraska Project Plan
Date: Wed 6/3/20

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

Instructions To Bidders

General

- All cells are locked except those allowing input (shaded green).
- **Do not attempt to edit formula cells**. Any attempt to edit a formula may cause bidder's entire response to be rejected.
- Tabs will contain cells for Non-Recurring Costs (NRC) and Monthly Recurring Charges (MRC).
- Follow the instructions for each Tab.
- Save as an Excel file and give it a unique name, using the following format: "**Company XYZ XXXX Z1 Cost Proposal Option C ESInet and NGCS**".
- Print the workbook (not just the worksheets) to verify content of each tab. Also, verify that all data can be seen in each cell.
- Include the saved Excel file when submitting the RFP response package to the Nebraska State Purchasing Bureau.
- If more rows are needed in each region, you can insert additional rows.
- Each sheet is divided into the 7 regions. Enter pricing information for each region based on bidders implementation plan.
- All PSAPs and regions may not be ready for geospatial routing on day one of operations and Bidder shall provide tabular routing services, also known as Internet Protocol Selective Routing (IPSR), until such time as PSAPs and regions are ready for geospatial routing. Be sure the cost proposal response indicates the pricing difference between tabular and geospatial routing.
- Include pricing for Optional NGCS services on the Optional Svc tab.

NRC Milestones

- Milestone Payments - NRC payments will be made as structured on the NRC Milestones Tab.As each region is completed on each tab, it is calculated into the total milestone. **Bidders should prepare their cost proposal to reflect the timeline submitted with Bidder's Implementation Plan.**

Summary Tab

- As the name implies, this tab contains the totals from the ESInet, **Legacy Network Gateway (LNG)**, **Border Control Function (BCF)**, **Emergency Services Routing Proxy and Policy Routing Function (ESRP & PRF)**, **Emergency Call Routing Function and Location Validation Function (ECRF & LVF)**, **Spatial Interface (SI)**, **Location Database (LDB)** and **Miscellaneous (MISC) tabs.**
- Enter the Bidder name and date in the designated cells. This information automatically populates the other tabs.
- All other cells are locked.

ESInet Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Emergency Services IP Network services (hardware, software, connectivity, training, maintenance, etc.) for each region. Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly per person amounts in cents**. The monthly amounts are automatically multiplied by the population of the region and by 12 months.

LNG Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Legacy Network Gateway services (hardware, software, connectivity, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the region's population.

BCF Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Border Control Function services (hardware, software, connectivity, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the Region's population.

ESRP & PRF Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Emergency Services Routing Proxy and Policy Routing Function services (hardware, software, connectivity, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the Region's population.

ECRF & LVF Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Emergency Call Routing Function and Location Validation Function services (hardware, software, connectivity, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the Region's population.

SI Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information for Spatial Interface services (hardware, software, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the Region's population.

LDB Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Location Database services (hardware, software, training, maintenance, etc.). Add rows for each region as needed.
- Enter the NRC in whole dollars and the **MRC in monthly amounts per person amounts in cents**. The monthly amounts are automatically multiplied by 12 and the Region's population.

MISC Tab

- Change the free form "Bidder Input" labels as needed and enter the pricing information **in each region** for Miscellaneous services that are not part of one of the above functional elements or that may not have been covered in the RFP but are required in order to complete the project. Add rows for each region as needed.

ESInet Milestones	
Milestone 1: **Region 1** regional host connection and testing acceptance	13381.18
Milestone 2: **Region 2** regional host connection and testing acceptance	13381.18
Milestone 3: **Region 3** regional host connection and testing acceptance	13381.18
Milestone 4: **Region 4** regional host connection and testing acceptance	13381.18
Milestone 5: **Region 5** regional host connection and testing acceptance	13381.18
Milestone 6: **Region 6** regional host connection and testing acceptance	13381.18
Milestone 7: **Region 7** regional host connection and testing acceptance	13381.18
TOTAL	93668.29

NGCS Milestones	
Milestone 1: **Region 1** deployments complete	262,350.18
Milestone 2: **Region 2** deployments complete	262,350.18
Milestone 3: **Region 3** deployments complete	262,350.18
Milestone 4: **Region 4** deployments complete	262,350.18
Milestone 5: **Region 5** deployments complete	262,350.18
Milestone 6: **Region 6** deployments complete	262,350.18
Milestone 7: **Region 7** deployments complete	262,350.18
TOTAL	1836451.25

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Next Generation Core Services	**INITIAL CONTRACT PERIOD**														
	YEAR 1		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**YEAR 6**	**YEAR 7**	**YEAR 8**	**YEAR 9**	**YEAR 10**
	NRC	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**
ESInet	93,668.29	685,961.15	0.00	819,918.04	0.00	819,918.04	0.00	819,918.04	0.00	819,918.04	819,918.04	819,918.04	819,918.04	819,918.04	819,918.04
LNG	776,562.50	255,862.56	0.00	341,150.08	0.00	341,150.08	0.00	341,150.08	0.00	341,150.08	341,150.08	341,150.08	341,150.08	341,150.08	341,150.08
BCF	96,478.14	3,274.00	0.00	3,274.00	0.00	3,274.00	0.00	3,274.00	0.00	3,274.00	3,274.00	3,274.00	3,274.00	3,274.00	3,274.00
ESRP & PRF	858,733.62	397,300.07	0.00	531,282.39	0.00	534,136.06	0.00	536,956.63	0.00	539,799.54	534,351.25	537,342.95	540,399.15	543,521.30	546,710.89
ECRF & LVF	10,570.80	302,934.13	0.00	479,568.17	0.00	479,568.17	0.00	479,568.17	0.00	479,568.17	479,568.17	479,568.17	479,568.17	479,568.17	479,568.17
SI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDB	0.00	179,603.03	0.00	342,353.90	0.00	342,353.90	0.00	342,353.90	0.00	342,353.90	342,353.90	342,353.90	342,353.90	342,353.90	342,353.90
MISC	94,106.19	412,994.28	0.00	329,967.80	0.00	334,854.37	0.00	341,970.42	0.00	346,820.90	351,783.04	358,190.72	363,383.94	368,696.71	331,108.28
Total	1,930,119.54	2,237,929.23	0.00	2,847,514.38	0.00	2,855,254.62	0.00	2,865,191.24	0.00	2,872,884.64	2,872,398.48	2,881,797.86	2,890,047.28	2,898,482.21	2,864,083.36
Project Totals	**Year 1**		**Year 2**		**Year 3**		**Year 4**		**Year 5**		**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Yearly Totals (NRC+MRC)	4,168,048.77		2,847,514.38		2,855,254.62		2,865,191.24		2,872,884.64		2,872,398.48	2,881,797.86	2,890,047.28	2,898,482.21	2,864,083.36
Initial Contract (5 Year NRC+MRC)	15,608,893.65														
+ Optional Year 6 (6 Year NRC+MRC)	18,481,292.13														
+ Optional Years 7 (7 Year NRC+MRC)	21,363,089.98														
+ Optional Years 8 (8 Year NRC+MRC)	24,253,137.27														
+ Optional Years 9 (9 Year NRC+MRC)	27,151,619.47														
+ Optional Years 10 (10 Year NRC+MRC)	30,015,702.84														
State Population															
	2019 Estimates														
Region One - ~~SE~~ SC	259,183														
Region Two - ~~SC~~ SE	512,126														
Region Three - Metro	772,006														
Region Four - NC	28,227														
Region Five - EC	180,423														
Region Six - NE	114,203														
Region Seven - Metro West	63,100														
Total Population	1,929,268														

Bidder Name:	0
Date (MM/DD/YYYY):	1/0/1900

Emergency Services IP Network	INITIAL CONTRACT PERIOD														
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 1 TOTAL	13,381.1842	92,153.8470	0.0000	110,149.9720	0.0000	110,149.9720	0.0000	110,149.9720	0.0000	110,149.9720	110,149.9720	110,149.9720	110,149.9720	110,149.9720	110,149.9720
Region Two Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 2 TOTAL	13,381.1842	182,089.0299	0.0000	217,648.0114	0.0000	217,648.0114	0.0000	217,648.0114	0.0000	217,648.0114	217,648.0114	217,648.0114	217,648.0114	217,648.0114	217,648.0114
Region Three Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 3 TOTAL	13,381.1842	274,490.6987	0.0000	328,094.2008	0.0000	328,094.2008	0.0000	328,094.2008	0.0000	328,094.2008	328,094.2008	328,094.2008	328,094.2008	328,094.2008	328,094.2008
Region Four Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 4 TOTAL	13,381.1842	10,036.2548	0.0000	11,996.1697	0.0000	11,996.1697	0.0000	11,996.1697	0.0000	11,996.1697	11,996.1697	11,996.1697	11,996.1697	11,996.1697	11,996.1697
Region Five Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 5 TOTAL	13,381.1842	64,150.3244	0.0000	76,677.8237	0.0000	76,677.8237	0.0000	76,677.8237	0.0000	76,677.8237	76,677.8237	76,677.8237	76,677.8237	76,677.8237	76,677.8237
Region Six Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 6 TOTAL	13,381.1842	40,605.4633	0.0000	48,535.0399	0.0000	48,535.0399	0.0000	48,535.0399	0.0000	48,535.0399	48,535.0399	48,535.0399	48,535.0399	48,535.0399	48,535.0399
Region Seven Milestone															
Hardware	3,946.4286	0.0041		0.0046		0.0046		0.0046		0.0046	0.0046	0.0046	0.0046	0.0046	0.0046
Software	8,923.9080	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Services	510.8476	0.0013		0.0018		0.0018		0.0018		0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Circuits		0.0242		0.0290		0.0290		0.0290		0.0290	0.0290	0.0290	0.0290	0.0290	0.0290
Bidder Input															
Bidder Input															
NRC/MRC REGION 7 TOTAL	13,381.1842	22,435.5291	0.0000	26,816.8176	0.0000	26,816.8176	0.0000	26,816.8176	0.0000	26,816.8176	26,816.8176	26,816.8176	26,816.8176	26,816.8176	26,816.8176
ESInet Total	93,668.2893	685,961.1472	0.0000	819,918.0352	0.0000	819,918.0352	0.0000	819,918.0352	0.0000	819,918.0352	819,918.0352	819,918.0352	819,918.0352	819,918.0352	819,918.0352

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
	INITIAL CONTRACT PERIOD														
Legacy Network Gateway	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	110,937.5000	34,373.2579	0.0000	45,831.0106	0.0000	45,831.0106	0.0000	45,831.0106	0.0000	45,831.0106	45,831.0106	45,831.0106	45,831.0106	45,831.0106	45,831.0106
Region Two Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	110,937.5000	67,918.9572	0.0000	90,558.6096	0.0000	90,558.6096	0.0000	90,558.6096	0.0000	90,558.6096	90,558.6096	90,558.6096	90,558.6096	90,558.6096	90,558.6096
Region Three Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	110,937.5000	102,384.6523	0.0000	136,512.8698	0.0000	136,512.8698	0.0000	136,512.8698	0.0000	136,512.8698	136,512.8698	136,512.8698	136,512.8698	136,512.8698	136,512.8698
Region Four Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	110,937.5000	3,743.5092	0.0000	4,991.3456	0.0000	4,991.3456	0.0000	4,991.3456	0.0000	4,991.3456	4,991.3456	4,991.3456	4,991.3456	4,991.3456	4,991.3456
Region Five Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	110,937.5000	23,927.9826	0.0000	31,903.9768	0.0000	31,903.9768	0.0000	31,903.9768	0.0000	31,903.9768	31,903.9768	31,903.9768	31,903.9768	31,903.9768	31,903.9768
Region Six Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	110,937.5000	15,145.7818	0.0000	20,194.3758	0.0000	20,194.3758	0.0000	20,194.3758	0.0000	20,194.3758	20,194.3758	20,194.3758	20,194.3758	20,194.3758	20,194.3758
Region Seven Milestone															
LNG (includes OSP & LSR aggregration)	110,937.5000	0.0111		0.0147		0.0147		0.0147		0.0147	0.0147	0.0147	0.0147	0.0147	0.0147
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	110,937.5000	8,368.4214	0.0000	11,157.8953	0.0000	11,157.8953	0.0000	11,157.8953	0.0000	11,157.8953	11,157.8953	11,157.8953	11,157.8953	11,157.8953	11,157.8953
LNG Total	**776,562.5000**	**255,862.5625**	**0.0000**	**341,150.0834**	**0.0000**	**341,150.0834**	**0.0000**	**341,150.0834**	**0.0000**	**341,150.0834**	**341,150.0834**	**341,150.0834**	**341,150.0834**	**341,150.0834**	**341,150.0834**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
	INITIAL CONTRACT PERIOD														
Border Control Function	**YEAR 1**		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
	NRC	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**
Region One Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	13,782.5920	439.8379	0.0000	439.8379	0.0000	439.8379	0.0000	439.8379	0.0000	439.8379	439.8379	439.8379	439.8379	439.8379	439.8379
Region Two Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	13,782.5920	869.0864	0.0000	869.0864	0.0000	869.0864	0.0000	869.0864	0.0000	869.0864	869.0864	869.0864	869.0864	869.0864	869.0864
Region Three Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	13,782.5920	1,310.1071	0.0000	1,310.1071	0.0000	1,310.1071	0.0000	1,310.1071	0.0000	1,310.1071	1,310.1071	1,310.1071	1,310.1071	1,310.1071	1,310.1071
Region Four Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	13,782.5920	47.9017	0.0000	47.9017	0.0000	47.9017	0.0000	47.9017	0.0000	47.9017	47.9017	47.9017	47.9017	47.9017	47.9017
Region Five Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	13,782.5920	306.1808	0.0000	306.1808	0.0000	306.1808	0.0000	306.1808	0.0000	306.1808	306.1808	306.1808	306.1808	306.1808	306.1808
Region Six Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	13,782.5920	193.8044	0.0000	193.8044	0.0000	193.8044	0.0000	193.8044	0.0000	193.8044	193.8044	193.8044	193.8044	193.8044	193.8044
Region Seven Milestone															
Software	13,782.5920	0.0001		0.0001		0.0001		0.0001		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	13,782.5920	107.0818	0.0000	107.0818	0.0000	107.0818	0.0000	107.0818	0.0000	107.0818	107.0818	107.0818	107.0818	107.0818	107.0818
BCF Total	**96,478.1443**	**3,274.0000**	**0.0000**	**3,274.0000**	**0.0000**	**3,274.0000**	**0.0000**	**3,274.0000**	**0.0000**	**3,274.0000**	**3,274.0000**	**3,274.0000**	**3,274.0000**	**3,274.0000**	**3,274.0000**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Emergency Services Routing Proxy & Policy Routing Function	**INITIAL CONTRACT PERIOD**														
	YEAR 1		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
	NRC	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**
Region One Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	122,676.2316	53,374.3493	0.0000	71,373.8912	0.0000	71,757.2604	0.0000	72,136.1832	0.0000	72,518.1077	71,786.1692	72,188.0824	72,598.6606	73,018.0989	73,446.5970
Region Two Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	122,676.2316	105,463.6763	0.0000	141,029.4094	0.0000	141,786.9179	0.0000	142,535.6406	0.0000	143,290.2946	141,844.0395	142,638.1896	143,449.4610	144,278.2394	145,124.9191
Region Three Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	122,676.2316	158,981.5609	0.0000	212,595.2407	0.0000	213,737.1494	0.0000	214,865.8138	0.0000	216,003.4194	213,823.2575	215,020.4016	216,243.3553	217,492.7001	218,769.0301
Region Four Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	122,676.2316	5,812.8726	0.0000	7,773.1596	0.0000	7,814.9114	0.0000	7,856.1790	0.0000	7,897.7735	7,818.0598	7,861.8312	7,906.5463	7,952.2263	7,998.8930
Region Five Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	122,676.2316	37,155.0612	0.0000	49,684.9391	0.0000	49,951.8109	0.0000	50,215.5873	0.0000	50,481.4534	49,971.9349	50,251.7155	50,537.5281	50,829.5083	51,127.7953
Region Six Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	122,676.2316	23,518.1737	0.0000	31,449.2559	0.0000	31,618.1787	0.0000	31,785.1423	0.0000	31,953.4285	31,630.9167	31,808.0105	31,988.9223	32,173.7381	32,362.5458
Region Seven Milestone															
Hardware		0.0074		0.0100		0.0100		0.0100		0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
Logging		0.0026		0.0033		0.0033		0.0033		0.0033	0.0030	0.0030	0.0030	0.0030	0.0030
Software	68,344.2405	0.0012		0.0016		0.0016		0.0016		0.0016	0.0016	0.0016	0.0017	0.0017	0.0017
Services	54,331.9911	0.0060		0.0081		0.0082		0.0083		0.0084	0.0085	0.0086	0.0087	0.0089	0.0090
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	122,676.2316	12,994.3763	0.0000	17,376.4967	0.0000	17,469.8307	0.0000	17,562.0822	0.0000	17,655.0646	17,476.8688	17,574.7175	17,674.6757	17,776.7911	17,881.1121
ESRP & PRF Total	**858,733.6214**	**397,300.0703**	**0.0000**	**531,282.3927**	**0.0000**	**534,136.0595**	**0.0000**	**536,956.6283**	**0.0000**	**539,799.5417**	**534,351.2464**	**537,342.9482**	**540,399.1493**	**543,521.3022**	**546,710.8925**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Emergency Call Routing Function & Location Validation Function	INITIAL CONTRACT PERIOD														
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	1,510.1138	40,696.9779	0.0000	64,426.4647	0.0000	64,426.4647	0.0000	64,426.4647	0.0000	64,426.4647	64,426.4647	64,426.4647	64,426.4647	64,426.4647	64,426.4647
Region Two Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	1,510.1138	80,414.1495	0.0000	127,301.8202	0.0000	127,301.8202	0.0000	127,301.8202	0.0000	127,301.8202	127,301.8202	127,301.8202	127,301.8202	127,301.8202	127,301.8202
Region Three Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	1,510.1138	121,220.5705	0.0000	191,901.5418	0.0000	191,901.5418	0.0000	191,901.5418	0.0000	191,901.5418	191,901.5418	191,901.5418	191,901.5418	191,901.5418	191,901.5418
Region Four Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	1,510.1138	4,432.2104	0.0000	7,016.5320	0.0000	7,016.5320	0.0000	7,016.5320	0.0000	7,016.5320	7,016.5320	7,016.5320	7,016.5320	7,016.5320	7,016.5320
Region Five Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	1,510.1138	28,330.0635	0.0000	44,848.6824	0.0000	44,848.6824	0.0000	44,848.6824	0.0000	44,848.6824	44,848.6824	44,848.6824	44,848.6824	44,848.6824	44,848.6824
Region Six Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	1,510.1138	17,932.1829	0.0000	28,388.0330	0.0000	28,388.0330	0.0000	28,388.0330	0.0000	28,388.0330	28,388.0330	28,388.0330	28,388.0330	28,388.0330	28,388.0330
Region Seven Milestone															
GeoComm	1,510.1138	0.0131		0.0207		0.0207		0.0207		0.0207	0.0207	0.0207	0.0207	0.0207	0.0207
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	1,510.1138	9,907.9774	0.0000	15,685.0948	0.0000	15,685.0948	0.0000	15,685.0948	0.0000	15,685.0948	15,685.0948	15,685.0948	15,685.0948	15,685.0948	15,685.0948
ECRF & LVF Total	**10,570.7969**	**302,934.1321**	**0.0000**	**479,568.1689**	**0.0000**	**479,568.1689**	**0.0000**	**479,568.1689**	**0.0000**	**479,568.1689**	**479,568.1689**	**479,568.1689**	**479,568.1689**	**479,568.1689**	**479,568.1689**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Spatial Interface	**INITIAL CONTRACT PERIOD**														
	YEAR 1		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
	NRC	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**NRC**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**	**MRC[1]**
Region One Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Two Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Three Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Four Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Five Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Six Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Seven Milestone															
Included in ECRF + LVF															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SI Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Location Database	INITIAL CONTRACT PERIOD														
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	0.0000	24,128.3496	0.0000	45,992.7351	0.0000	45,992.7351	0.0000	45,992.7351	0.0000	45,992.7351	45,992.7351	45,992.7351	45,992.7351	45,992.7351	45,992.7351
Region Two Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	0.0000	47,675.7934	0.0000	90,878.1650	0.0000	90,878.1650	0.0000	90,878.1650	0.0000	90,878.1650	90,878.1650	90,878.1650	90,878.1650	90,878.1650	90,878.1650
Region Three Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	0.0000	71,869.0295	0.0000	136,994.5847	0.0000	136,994.5847	0.0000	136,994.5847	0.0000	136,994.5847	136,994.5847	136,994.5847	136,994.5847	136,994.5847	136,994.5847
Region Four Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	0.0000	2,627.7608	0.0000	5,008.9587	0.0000	5,008.9587	0.0000	5,008.9587	0.0000	5,008.9587	5,008.9587	5,008.9587	5,008.9587	5,008.9587	5,008.9587
Region Five Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	0.0000	16,796.2761	0.0000	32,016.5568	0.0000	32,016.5568	0.0000	32,016.5568	0.0000	32,016.5568	32,016.5568	32,016.5568	32,016.5568	32,016.5568	32,016.5568
Region Six Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	0.0000	10,631.5997	0.0000	20,265.6360	0.0000	20,265.6360	0.0000	20,265.6360	0.0000	20,265.6360	20,265.6360	20,265.6360	20,265.6360	20,265.6360	20,265.6360
Region Seven Milestone															
911 Data Master		0.0078		0.0148		0.0148		0.0148		0.0148	0.0148	0.0148	0.0148	0.0148	0.0148
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	0.0000	5,874.2235	0.0000	11,197.2683	0.0000	11,197.2683	0.0000	11,197.2683	0.0000	11,197.2683	11,197.2683	11,197.2683	11,197.2683	11,197.2683	11,197.2683
LDB Total	**0.0000**	**179,603.0326**	**0.0000**	**342,353.9045**	**0.0000**	**342,353.9045**	**0.0000**	**342,353.9045**	**0.0000**	**342,353.9045**	**342,353.9045**	**342,353.9045**	**342,353.9045**	**342,353.9045**	**342,353.9045**

6264 Z1 Cost Proposal Option C ESInet NGCS Revision One

Bidder Name:	Atos														
Date (MM/DD/YYYY):	6/3/2020														
Miscellaneous	INITIAL CONTRACT PERIOD														
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	13,443.7411	55,482.7514	0.0000	44,328.7522	0.0000	44,985.2274	0.0000	45,941.2174	0.0000	46,592.8436	47,259.4703	48,120.2947	48,817.9661	49,531.6980	44,481.9680
Region Two Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	13,443.7411	109,629.7194	0.0000	87,590.2607	0.0000	88,887.4062	0.0000	90,776.3699	0.0000	92,063.9341	93,381.1380	95,082.0618	96,460.6078	97,870.8879	87,893.0036
Region Three Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	13,443.7411	165,261.6762	0.0000	132,038.2227	0.0000	133,993.6088	0.0000	136,841.1333	0.0000	138,782.0761	140,767.6994	143,331.7625	145,409.8562	147,535.7875	132,494.5934
Region Four Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	13,443.7411	6,042.4936	0.0000	4,827.7383	0.0000	4,899.2334	0.0000	5,003.3480	0.0000	5,074.3150	5,146.9158	5,240.6661	5,316.6478	5,394.3786	4,844.4246
Region Five Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	13,443.7411	38,622.7664	0.0000	30,858.2216	0.0000	31,315.2085	0.0000	31,980.6942	0.0000	32,434.3056	32,898.3591	33,497.5979	33,983.2624	34,480.1069	30,964.8785
Region Six Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	13,443.7411	24,447.1924	0.0000	19,532.4403	0.0000	19,821.7010	0.0000	20,242.9359	0.0000	20,530.0599	20,823.7936	21,203.0959	21,510.5087	21,824.9982	19,599.9514
Region Seven Milestone															
Miscellaneous	13,443.7411	0.0178		0.0143		0.0145		0.0148		0.0150	0.0152	0.0155	0.0157	0.0159	0.0143
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	13,443.7411	13,507.6823	0.0000	10,792.1595	0.0000	10,951.9832	0.0000	11,184.7259	0.0000	11,343.3691	11,505.6642	11,715.2382	11,885.0915	12,058.8547	10,829.4610
MISC Total	**94,106.1875**	**412,994.2817**	**0.0000**	**329,967.7953**	**0.0000**	**334,854.3685**	**0.0000**	**341,970.4244**	**0.0000**	**346,820.9034**	**351,783.0403**	**358,190.7173**	**363,383.9405**	**368,696.7118**	**331,108.2804**

Bidder Name:	Atos
Date (MM/DD/YYYY):	6/3/2020

Optional Svc for NGCS	INITIAL CONTRACT PERIOD														
	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		Year 6	Year 7	Year 8	Year 9	Year 10
	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	NRC	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]	MRC[1]
Region One Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 1 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Two Milestone															
Bidder Input															
Bidder Input															
Bidder Inpur															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 2 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Three Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 3 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Four Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 4 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Five Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 5 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Six Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 6 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Region Seven Milestone															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
Bidder Input															
NRC/MRC Region 7 Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Opt. Svc NGCS Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**