

### 3.0 NETWORKX ARCHITECTURE FOR IP-BASED SERVICES (L.34.1.3) (M.2.1) (a), M.2.1.1(a)

*Qwest offers a unique combination of technical vision, true service convergence, and a proven track record of delivering services to Federal Agencies.*

Qwest takes a comprehensive view of the role of Networkx architecture in delivering high-quality, secure and reliable services for Federal Agencies. Qwest's security, operational, and network infrastructures lead the communications industry in the most important metrics. Qwest's network embodies the converged optical and IP-based technologies toward which our competitors strive. While many service providers ask Agencies to focus on network technology, Qwest believes that Agencies should also focus on the carrier's ability to deliver services on time and to ensure high quality over time. Telecommunications and information technologies will evolve significantly over the course of the Networkx program. Qwest has uniquely proven that we understand how to use our people and processes to deploy state-of-the-art technology in support of high quality and reliable services.

Qwest's entire network focus is based [REDACTED]

[REDACTED]

Qwest will provide a broad range of services that encompass the intent and purpose of the Networkx program, fulfilling Agency functional



[REDACTED]	[REDACTED]	[REDACTED]

Based on a private Multi-Protocol Label Switching (MPLS) core, Qwest's architecture already supports all of our IP-based services [REDACTED]

[REDACTED] and is fully integrated with our ATM and FR network, creating a single environment for data, voice, and Voice over Internet Protocol (VoIP) services. With a network-based on leading-edge MPLS technology, new services can be added in a modular fashion at the edge. Each of these edge services inherits the security, reliability, and other features of the core network. Qwest already delivers a full range of the required Networkx service offerings today.

Examples of these services include:

- Synchronous Optical Network (SONET) and Private Line Services [REDACTED]
- Optical Wavelength Services [REDACTED]
- Private MPLS-based IP Services [REDACTED]
- Internet services [REDACTED]
- [REDACTED] ATM and Frame Relay [REDACTED]
- Managed Security Services [REDACTED]

- Managed Hosting Services [REDACTED]

### Infrastructure Security

Qwest's security infrastructure complements our delivery of service, providing a pervasive capability that protects all aspects of our network and operational infrastructure. [REDACTED]

Access security also extends to our information systems, as our network management and security and operations support systems are

[REDACTED]. Core systems require two-factor authentication and our Risk Management department performs extensive background investigations of Qwest staff to ensure proper responsibility. The Qwest Risk Management group also provides guidance on the implementation of services to ensure that we maintain the required security profile. Qwest employs strict design, testing and monitoring practices to ensure our infrastructure remains resilient against cyber attacks. The Qwest Team has significant experience deploying secure services that meet Federal guidelines. This includes Certification and Accreditation of network services, [REDACTED]

## Service Quality and Reliability

While the reliability and security of a carrier's infrastructure is critical to delivering Networx services, Qwest focuses on end-to-end service quality. Qwest understands the Government's concern about how we interconnect with other service providers to ensure quality and reliability. Qwest has strict standards for interconnection of all [REDACTED]

[REDACTED]. This includes access facilities, monitoring and trouble resolution procedures needed for reliable operations, and the standard installation intervals, trouble resolution time, and other technical performance requirements.

Qwest uses proven leading-edge technologies, such as route-diverse [REDACTED] to provide a service backbone that has no single points of failure. Combined with conservative capacity planning and failure mode analysis, Qwest ensures high-performance during heavy network usage—even during rare cases of trunk or router failures.

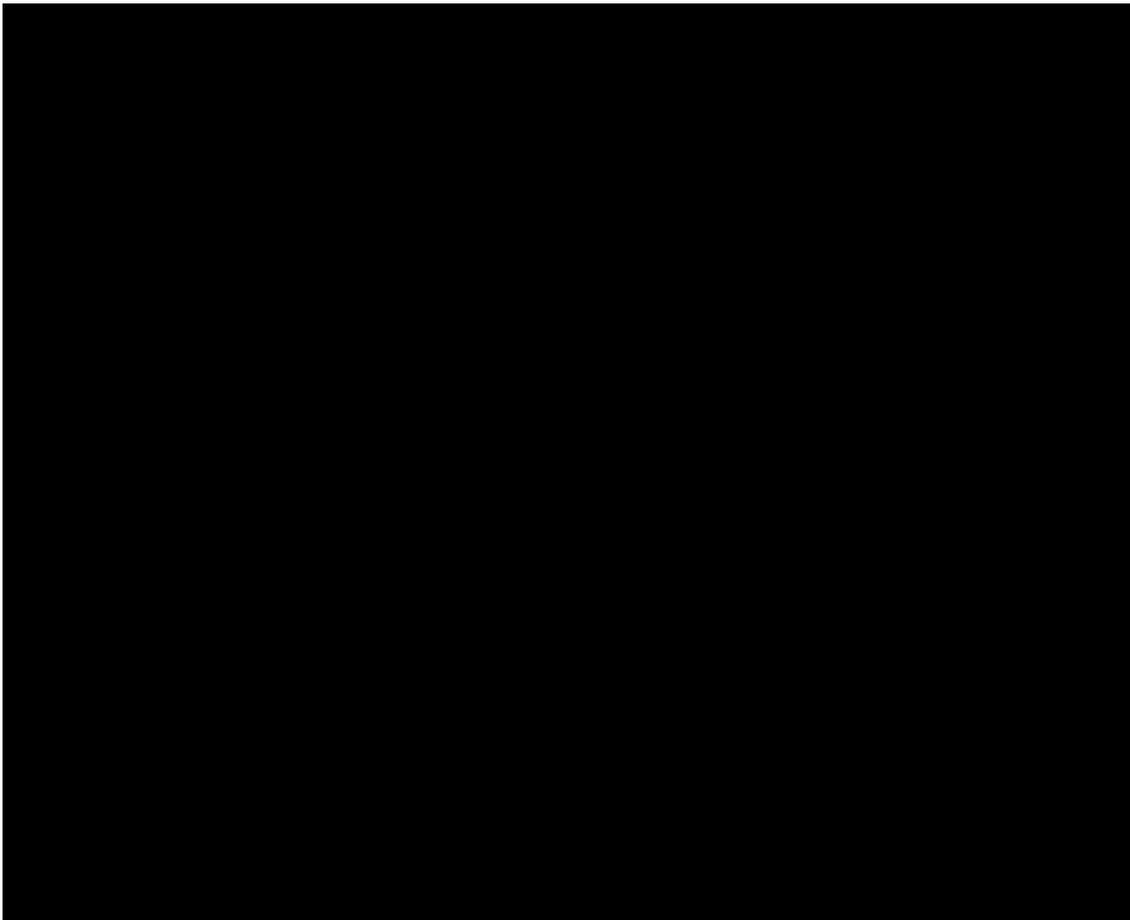
Under the direction of our Chief Technology Officer, the Qwest Technology Management Organization [REDACTED] to ensure that our services meet industry standards, performance, feature, and reliability requirements. Once in operation, Qwest monitors our service to provide real-time performance information and fault detection. This information is used by our network operations and is reviewed by our network planning organization for capacity planning.

Qwest understands the Government's need to ensure network quality and visibility at a variety of levels. By building on our existing network

management organizations, processes and procedures, we have designed a network management approach that meets the requirements of the Network program and will consistently exceed the expectations of both the GSA Program Management Office (PMO) and Agency customers.

The Qwest Team recognizes the importance of having established, proven network management policies and procedures. To this end, our policies address all five (5) areas of the International Organization for Standardization (ISO) network management model: 1) Fault Management, 2) Configuration Management, 3) Accounting Management, 4) Performance Management, and 5) Security Management (FCAPS). Our process framework begins with security management to ensure the integrity of all network services, meet the needs of a large, heterogeneous, and geographically distributed user community, and consistently improve the quality of service. [REDACTED]

[REDACTED]



## **Next Generation Architecture, Convergence, Interoperability, and Evolution**

While security and service reliability are critical elements for Networkx services, the program has also embraced convergence, interoperability and evolution as a means to ensure success over the ten year life of Networkx. Qwest has deployed a next-generation network and has demonstrated our ability to introduce leading-edge services. 



 shows some highlights of

Qwest's network technology. In particular, Qwest has established several domestic firsts, including:

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- In addition to these firsts, Qwest has valuable experience in providing managed services. Our experience includes enterprise data network services for end-to-end management of customer networks (commercial and Government), managed security services, such as firewall and Internet Protocol Security (IPsec) tunnel management, and a full range of managed application hosting services, from the operating system to applications. [REDACTED]

[REDACTED]

Qwest leads the way in providing the services and infrastructure that enable true convergence of services onto a converged architecture. Agencies gain access to a majority of Qwest Networx services through a single IP-based connection [REDACTED]

[REDACTED]

### **Non-Domestic Services**

As a global provider of communication services, Qwest's international coverage for the Networx Enterprise offering extends [REDACTED]

[REDACTED] This extensive breadth of coverage results from Qwest's strategy to partner with other leading providers in order to satisfy the voice and data connectivity requirements of our global customer base, and to provide world-class service with a high level of quality and reliability. Key tenets of our global strategy include:

[REDACTED]

Our international approach provides Agencies with global support for best-of-breed service, network connectivity, and a mature operations discipline. These services also include emerging technologies [REDACTED]

### **National Policy-Based Requirements**

A key complement of our global infrastructure involves Qwest's focus on national policy-based requirements. We are a leading provider of network services in the National Capital Region, where we have deployed a robust network architecture to ensure service continuity in the event of significant facility failures. Qwest already supports, and will continue to engineer, critical services to meet the requirements of each Agency to eliminate single points of failure for their network services.

In addition, Qwest already has an active and fully compliant National Security and Emergency Preparedness (NS/EP) plan. Qwest supports the National Communication Systems (NCS) with full-time staff located at NCS headquarters and with participation in several NCS-sponsored programs. Qwest has been providing Telecommunications Service Priority (TSP) services locally for decades and nationally [REDACTED] with an excellent track record of meeting critical emergency requirements. [REDACTED]

[REDACTED] Our NS/EP and NCS-related activities enable us to work in coordination with the Federal Government and to address our nation's telecommunication needs in times of emergency.

Qwest will comply fully with all mandatory Government requirements for service delivery to meet the needs of Agency users with disabilities. Qwest

has experience in developing Section 508-compliant services and applications. We will deliver a 508-compliant Network Web portal [REDACTED]

[REDACTED]

Continuing in the Technical Volume are the following sections:

*The Approach to Ensure Infrastructure Security (Section 3.1)*

This section will describe the mechanisms and controls Qwest employs in our networks to provide the strongest protection to our network infrastructure, ensuring our programs and applications extend the best possible services and performance required by Agencies. We will address the measures we employ against cyber attacks and other unwanted intrusion attempts. The supporting best practices in network architectures are addressed in detail; the Qwest approach to infrastructure security is laid out in regard to potential problems and solutions and how we intend to expand new security technologies in the future.

*Approach to Ensure Service Quality and Reliability (Section 3.2)*

Qwest access arrangements are described in this section, as well as how Qwest maintains consistent service performance by the use of industry best practices. We also address Qwest's peering partners and how Qwest ensures service quality end-to-end. Qwest's approach to meeting Acceptable Quality Levels (AQLs) is described at length, as well as how verification testing is performed and reported; this is a very critical area to Qwest and is reported to the highest levels of management. We identify our use of KPIs and other measurements to maintain consistent AQLs and our approach to methodology. Time-sensitive traffic is another crucial area discussed, explaining how Qwest's approach is embedded in our network management methodology.

*Approaches to Network Architecture, Convergence, Interoperability and Evolution (Section 3.3)*

This section illustrates Qwest's approach to network convergence and how different services and their different performance requirements are enabled by our network. Qwest's network architecture and the methodologies employed to ensure top performance, continuity and interoperability are discussed, as well as the benefits of implementing Qwest services. Present and future technologies and the evolution of networks are provided in this section, as well as the methodology we intend to follow to enable convergence and interoperability of these networks. Introduction of new technologies, services and applications is addressed, including expansion management, evolution, and anticipated problems and their solutions. Convergence methodology for interoperability between the IP networks and the Public Switched Telephone Network (PSTN) is explained

[REDACTED]

*Non-Domestic Services (Section 3.4)*

In this section we address non-domestic issues such as carrier and service provider arrangements, expected performance, end-to-end assurance and traffic priorities. Security measures and expectations are discussed at length, including how they are managed, with all foreign carriers and service providers. We address the criticality of reliability and interoperability with non-Qwest networks as well as how we peer with domestic and non-domestic carriers. We also discuss arrangements for the introduction of new

technologies and applications over foreign networks and how we ensure the evolution of network architectures and technologies.

National Security/Emergency Preparedness (NS/EP) (Section 3.5)

Basic functional requirements for NS/EP are discussed in this section, per RFP Section C.5.2.2.1.1, as well as the protection processes for Signaling System 7. [REDACTED]

[REDACTED] National Capital Region network architecture requirements are discussed per RFP Section C.5.2.7. It is also where Section 508 requirements are addressed and Qwest's commitment to the spirit of 508 practices are discussed.