4.1.4 Combined Services

> ***Qwest's Combined Services leverages our core competency as a local and inter-exchange services provider and our long term-relationships with other carriers to deliver a flexible and reliable integrated capability to Agencies.***

Qwest has a long history and rich tradition of providing leading-edge local and inter-exchange Voice Services (VS) and applications to the Federal Government. Qwest Combined Services (CS) provides a collection of telecommunications services combined into a fully compliant single-service offering of Analog Local Service, Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) Service, ISDN Primary Rate Interface (PRI) Service, Analog Private Branch Exchange (PBX) Trunk Service, and Digital T-1 Service. Qwest CS will provide local connectivity to and from the Public Switched Telephone Network (PSTN), which includes routing and terminating all calls. Qwest's CS offer includes the required core features and unlimited usage for local, regional toll, and domestic Long Distance (LD) calling. CS will be provided in Continental United States (CONUS) and Outside Continental United States (OCONUS) areas.

Figure 4.1.4-1 provides an easy reference to correlate narrative requirements to our proposal response.

Figure 4.1.4-1. Table of CS Narrative Requirements

Req _ ID	RFP Section	RFP Requirement	Proposal Response
6080	C.2.6.1.1.4 (2)	2. The contractor's CS core service shall also offer a portfolio of standard features with unlimited usage.	4.1.4.3.1.2
6077	C.2.6.1.1.4 (3)	3. The contractor shall have the flex bility to supplement the core CS service with additional optional service offerings such as non-domestic calling, wireless, toll free service, and Internet services.	4.1.4.3.1.2
6018	C.2.6.1.3.1 (1)	The contractor shall support the User-to-Network Interfaces (UNIs) at the SDP for each individual service offered under CS as described in this section. 1. C.2.2.3.3 Toll Free Service	4.1.4.3.1.3

Req _ID	RFP Section	RFP Requirement	Proposal Response
6017	C.2.6.1.3.1 (2)	The contractor shall support the User-to-Network Interfaces (UNIs) at the SDP for each individual service offered under CS as described in this section. 2. C.4.1.1.3 Internet Protocol Service	4.1.4.3.1.3
6016	C.2.6.1.3.1 (3)	The contractor shall support the User-to-Network Interfaces (UNIs) at the SDP for each individual service offered under CS as described in this section. 3. C.2.14.1 Cellular / Personal Communications Service	4.1.4.3.1.3

4.1.4.1 Qwest's Technical Approach to CS Delivery (L.34.1.4.1)

Qwest's approach to providing CS local connections is to use interconnected digital Central Offices (COs) and a widely deployed local fiber and copper-based infrastructure to create a PSTN environment that quickly and efficiently routes and terminates all of the Government's integrated calling needs. *Figure 4.1.4-2* provides a high-level overview of the CS architecture.

CS is represented by the connections between the End Office or digital CO and the Agency Service Delivery Point (SDP). These connections create the CS linkage to the multiple subtending services. Qwest LD, Qwest Non-
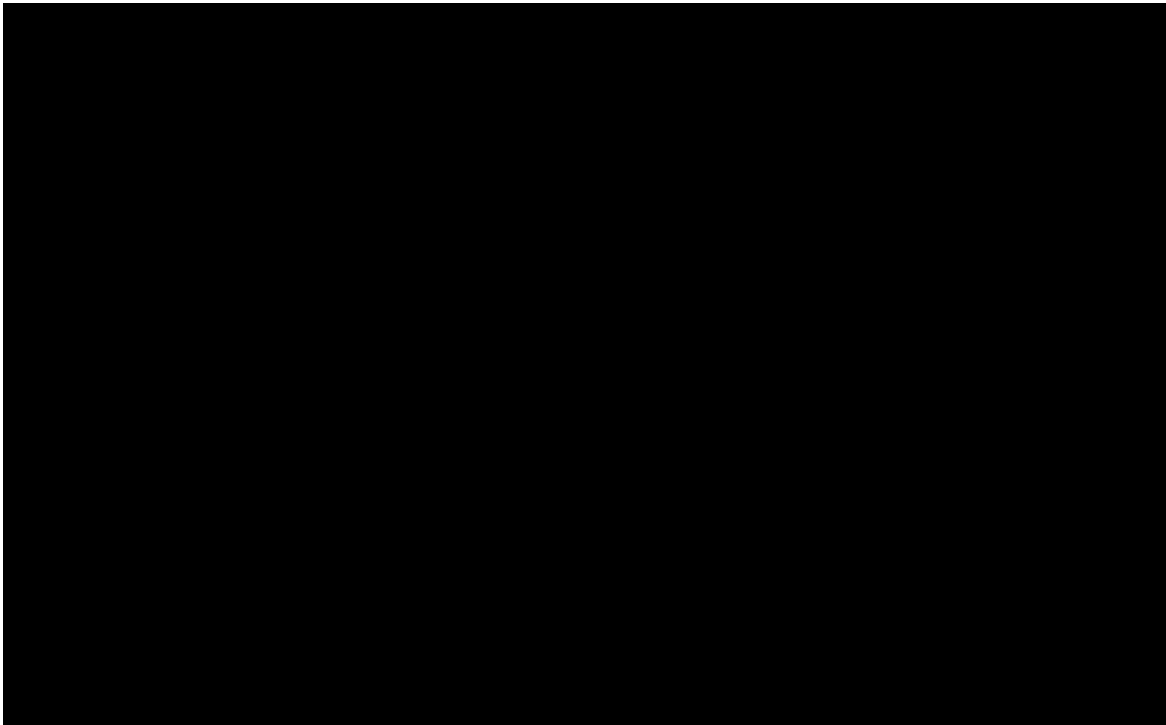
Domestic LD, access to Voice over Internet Protocol (VoIP) infrastructure, and access to Internet services on a dial-up basis are just a few examples of the many products Qwest has available for Networx CS.

4.1.4.1.1 Approach to CS Delivery (L.34.1.4.1(a))

Qwest's CS is available over our integrated Advanced Intelligent Network, Class 4 and 5 Toll/Voice Switches, and our backbone fiber network. These components combine to provide a highly reliable and flexible infrastructure for the delivery of quality local, regional toll, and LD calls.

Qwest CS includes:

- Analog Local Service
- ISDN BRI Service
- ISDN PRI Service
- Analog PBX Trunk Service
- Digital T-1

These services provide local, regional, and domestic LD calling capabilities combined into a single CS core package. Qwest's billing and inventory systems are designed to comply with all applicable local and Federal Communications Commission (FCC) regulatory requirements, including local number portability, directory assistance, and emergency services. The Qwest Control Networx Portal provides web-enabled access to the full suite of required ordering, billing, and reporting capabilities.

Qwest will provide CS and CS features to Agencies outside the Qwest local region by managing our Incumbent Local Exchange Carrier (ILEC) and Competitive Local Exchange Carrier (CLEC) alliances, with Qwest providing LD services. In order to enable delivery of CS, Qwest negotiates individual interconnect agreements with supporting local providers. These agreements establish the ability to provide CS at Agency locations; this includes PICing

(Primary Interexchange Carrier) the traffic to the Qwest network for LD. In addition, we establish ordering and billing interfaces with the local alliance to support integrated ordering and billing for the Agency.

Each alliance will use service delivery methods that are common for that service area. Qwest will develop Service Level Agreements with these alliances to ensure Agency requirements are met. As an example, in Georgia, Qwest will be providing the CS requirements via our teaming alliance BellSouth.

Qwest complies with Internet Engineering Task Force, International Telecommunications Union, Telcordia, American National Standards Institute (ANSI), and all applicable industry, national, and international standards. Qwest's network is built on standards-based technologies and enables a building block approach to evolution and supports the access methods required for Networx.

4.1.4.1.2 Benefits of Qwest's CS Technical Approach (L.34.1.4.1(b))

Qwest's CS provides Agencies with economical and efficient access to human and technical resources, lowering the cost to provide services.

- Qwest's CS is a managed service that involves no capital expense.
- Qwest's responsive and dedicated Customer Service Organization will provide the Government with an efficient and on-time CS implementation.
- Qwest customer representatives for repair are available 24x7x365.

Figure 4.1.4-3 contains a summary of CS benefits.

Figure 4.1.4-3. Qwest CS Features and Benefits

Feature	Benefit	Substantiation
Enhanced Intelligent Network Routing	Ensures reliable and highly available CS for Agencies	
Integrated Ordering, Billing and Reporting	Single source for ordering all services on one bill and comprehensive reporting of performance metrics	All pertinent data is accessible via the Qwest Control Networx portal
Unlimited Usage	Agencies have budget predictability for related telecom expenses	

Additionally, Qwest supports the Government's Federal Enterprise Architecture (FEA) objectives, as demonstrated by *Figure 4.1.4-4*.

Figure 4.1.4-4. Qwest's CS Support to FEA Objectives

FEA Objective	How CS Supports the Objective
Improve utilization of Government information resources to focus on core Agency mission and service delivery to citizens by using the FEA	Qwest CS requires no capital investment by the Agencies and leverages Agencys' existing telecommunications infrastructure and equipment
Enhance cost savings and cost avoidance through a mature FEA Government	CS is being offered in a core package of features that, when combined, will provide the Agencies cost savings
Increase cross-Agency and inter-Government collaboration	CS allows callers access to the PSTN. Qwest enables maximum connectivity among Government Agencies and their clients.

4.1.4.1.3 Solutions to CS Problems (L.34.1.4.1(c))

Qwest has extensive experience in the delivery of CS services. We apply this experience to ensure the delivery of high quality CS to Agencies. Extensive pre-deployment laboratory system and integration testing identifies the majority of problems, and Qwest's proactive network and configuration management/fault management systems and methods are leveraged to quickly resolve unforeseeable operational issues. *Figure 4.1.4-5* summarizes some of the key problems we have encountered and the solutions we apply to resolve issues.

Figure 4.1.4-5. Qwest's Approach to Common CS Delivery Challenges

Problem	Solution
Electrical power loss	Qwest CS is provided by equipment that is Network Equipment-Building System compliant and provides continuous service without power, delivered from our back-up power infrastructure.
Congestion: traffic volume exceeds telecommunications ability of connections to the PSTN	Qwest collects and analyzes traffic reports on CS, and recommends solutions to overcome congestion by adding to existing CS.
Hardware and software incompatibilities	Qwest supports and maintains a lab environment for all major network components, and selected customer premise devices. These systems are used for hardware/software certification and interoperability testing.

4.1.4.1.4 Synchronization Network Architecture (L.34.1.4.1 (d))

Figure 4.1.4-7. Qwest's Timing and Synchronization Architecture Provides Multiple Levels of Redundancy

SONET Timing and Synchronization Architecture		
Type of Timing Signal	**Configuration**	**Benefit**
██████	█████████ ███	███████████████ ███
███████████	███████ ███	█████████████ ███
█████████████	████████████ ███	██████████████ ███
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4.1.4.2 Satisfaction of CS Performance Requirements (L.34.1.4.2)

Qwest employs the PSTN network infrastructure designed to meet CS routine and critical service performance standards. Qwest meets these performance requirements by monitoring and measuring the Key Performance Indicators (KPIs) and Acceptable Quality Levels (AQLs). Qwest

pulls data from the root source, analyzes it, and provides performance measurement statistics. Qwest's network monitoring tools are built to drill down to the individual service level to report key metrics.

In addition, Qwest utilizes a customized trouble ticketing system that makes it effective in meeting prompt Time to Restore (TTR) performance. From this system, useful metrics are collected that are used internally to evaluate and improve our processes. The calculation for TTR uses the same business rules the Government requires for its services.

4.1.4.2.1 CS Quality of Service (L.34.1.4.2(a))

Qwest's network reliability and those of our alliances are designed to meet KPIs threshold standards. ***Figure 4.1.4-8*** summarizes the CS performance metrics.

Figure 4.1.4-8. Qwest Compliance with Government CS Performance Metrics

Key Indicator	Service Level	Performance Standard (Threshold)	Acceptable Quality Level (AQL)	Qwest Performance Metric
Availability (SDP-to-SDP)	Routine	99.5%	$\geq$ 99.5%	■
	Critical	99.95%	$\geq$ 99.95%	■
Grade of Service (Call Blockage) (SDP-to-SDP)	Routine	0.07	$\leq$ 0.07	■
	Critical	0.01	$\leq$ 0.01	■
Time to Restore	Without Dispatch	4 hours	$\leq$ 4 hours	■
	With Dispatch	8 hours	$\leq$ 8 hours	■

Qwest KPI definitions for CS comply with the Networx Request for Proposal (RFP) definitions as follows:

- **Availability:** Calculated as a percentage of the total reporting interval time that the voice service is operationally available to the Government

- **Time to Restore:** From the creation of a trouble ticket to the time service is restored, minus approved stopped time while Qwest is waiting on the Government (such as no access)

- **Grade of Service (GOS) (Call Blockage):** The proportion of calls that cannot be completed during the busy hour because of limits in the call handling capacity of one or more network elements

Details of how Qwest will monitor and measure the service to maintain the above AQLs is included in the following section.

4.1.4.2.2 Approach for Monitoring and Measuring CS KPIs and AQLs (L.34.1.4.2(b))

In compliance with RFP Section C.2.6.1.3.1, Qwest will measure KPI for CS at the User-to-Network Interfaces (UNIs) as defined for Voice Services (C.2.2.1). We will apply the same measurement and reporting capabilities for measurement of the KPIs for CS.

The metrics incorporate customer facing results, including provisioning intervals and percent commitments met, average speed of answer and call volumes, TTR and percent commitments met, and customer transaction survey results. On the network side, we track metrics such as network availability, network reliability, and Defects per Million (for switched networks)—all in support of meeting KPI thresholds.

Qwest monitors and measures the KPIs and AQLs from the root source, summarizing and displaying pertinent information through Web tools. These Web tools display actual results and indicate via red/green colorizing whether goals are met or not. Our approach is to completely automate displaying results so that the focus is on acting on the results, not merely reporting them. Further, we ensure that business rules are established to maintain the integrity of the data. Information collected from the Service Switching Platforms (SSPs) includes:

- Busy hour call attempts
- Call blockage
- Overflow counts

- SS7 link failures

Qwest's network monitoring tools drill down to our individual services and show detailed metrics. Within our Network Vital Scorecards, we are able to show dozens of metrics with results over several years for each service to give a complete picture of performance over time.

Qwest maintains a central data repository for key network performance information. These performance indicators are generated by a combination of system-specific statistics (e.g., call attempts generated by the SSP, monitoring tools, and call detail collection). Logs and traps are generated by the SSP, Signaling Transfer Points, and Service Control Points (SCPs), and sent to the Network Monitoring Team for instant responses. Data is analyzed, formatted, and sent to operations, engineering, and planning for pro-active network enhancement and capacity planning.

For Network KPIs, we use the Statistical Analysis System to display the Network Reliability Scorecard with the KPIs, the objectives, and an indication of whether the objectives are met or missed for each reporting period. The scorecard is reviewed daily at the executive level and by our network management teams to ensure Structured Query Language levels are consistently met.

For general service or capacity-level monitoring of circuit and switch Central Processing Unit (CPU), statistics are collected daily. The statistics include circuit overflow counts, call blockage counts, and CPU utilization percentages. These statistics are compared against engineering capacity limits to determine the locations where network augments or adjustments are required.

███ We perform quarterly failover exercises to ensure that proper operations and support functions are maintained.

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Tier II technicians in switch management maintain "command and control" of alarms and outages reported through the NMSs. They correct and document actions taken to mitigate the alarm condition. They also coordinate additional resources needed for repair and restoration with Field Operations and Advanced Technical Support.

For all services that Qwest offers, we use the Remedy® trouble ticketing system. Remedy is a trouble ticketing system that is an industry-leading off-the-shelf commercial application that we have customized to make more effective for our needs. From this system, we collect many useful metrics that we use internally to evaluate and improve our processes including TTR. The calculation for TTR uses the same business rules as the Government requires for its services.

4.1.4.2.3 CS Performance Improvements (L.34.1.4.2(c))

Qwest proposes to meet the all the KPIs and AQLs for CS. In the event an Agency has a specific business need or application problem, Qwest is willing to discuss service enhancements. Qwest will operate in good faith

to engineer a CS solution to serve unique Agency needs. Qwest is able to leverage our vast CS product portfolio, which includes a variety of Service Enabling Device (SED) providers and specific CS solutions. Through a special combination of vendor solutions and talented engineering capabilities, Qwest will be able to serve an Agency's business needs.

4.1.4.2.4 Additional CS Performance Metrics (L.34.1.4.2(d))

Qwest does not propose any additional performance metrics for CS.

4.1.4.3 Satisfaction of CS Service Specifications (L.34.1.4.3)

This section details the satisfaction of CS requirements, the proposed service enhancements for CS, network modifications for CS, and Qwest's experience with CS delivery.

4.1.4.3.1 Satisfaction of CS Requirements (L.34.1.4.3 (a))

Qwest is fully compliant with all stipulated and narratives requirements in the RFP. The following sections describe how Qwest satisfies the capabilities, features, and interfaces requirements for CS.

4.1.4.3.1.1 Satisfaction of CS Capabilities Requirements (L.34.1.4.3(a); C.2.6.1.1.4)

Qwest fully complies with all mandatory stipulated and narrative features, capabilities, and interface requirements for CS. The following *Figure 4.1.4-9* summarizes Qwest's technical approach to supporting the CS capabilities listed in RFP C.2.6.1.1.4, is intended to provide the technical description required per L.34.1.4.3(a), and does not limit or caveat Qwest's compliance in any way.

Figure 4.1.4-9. Qwest's Technical Approach to CS Capabilities

ID #	Capability	Qwest's Technical Approach
1	Calling with unlimited usage	Qwest CS will provide local, regional toll, and domestic long-distance (CONUS and OCONUS) calling capabilities. Outside the Qwest local region, local service will be provided utilizing ILEC and CLEC alliances with Qwest providing LD services. In order to enable delivery of CS, Qwest negotiates individual interconnect agreements with supporting local providers. These agreements establish the ability to provide CS at Agency locations; this includes PICing the traffic to the Qwest network for LD.

ID #	Capability	Qwest's Technical Approach
2	Features with unlimited usage	Qwest's core CS features are shown below in Figure 4.1.4-8.
3	Supplement core services with optional capabilities	Qwest is offering the CS features shown below in Figure 4.1.4-10. Qwest is offering Internet Protocol Services (IPS), Contact Center Solutions, TFS, and Cellular/Personal Communications Services (CPCS) as services described in Sections 4.1.14, 5.5, 4.1.3, and 7.1 respectively. Qwest is not offering these services as optional features under CS.
4	Single invoice	CS will enable Agencies to procure VS from a single source and Qwest will provide a single invoice for all services offered by CS.
5	Comply with regulatory requirements	Qwest will comply with all applicable local and FCC regulatory requirements, including Local Number Portability, directory assistance, and emergency services.
6	Non-domestic dialing	CS will provide transparent access to and internetwork with the domestic and non-domestic PSTN. CS supports interoperability with any 10 digit telephone number.

CS will support a wide range of features as described in the next section.

4.1.4.3.1.2 Satisfaction of CS Feature Requirements (L.34.1.4.3(a); C.2.6.1.2)

Qwest fully complies with all mandatory stipulated and narrative features, capabilities, and interface requirements for CS. The following *Figure 4.1.4-10* summarizes Qwest's technical approach to supporting the CS features listed in RFP C.2.6.1.2, is intended to provide the technical description required per L.34.1.4.3(a), and does not limit or caveat Qwest's compliance in any way.

Figure 4.1.4-10. Qwest's Technical Approach to CS Features

ID #	Name of Feature	Qwest's Technical Approach
1	Call Forwarding (All, Busy, No Answer)	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
2	Call Transfer	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
3	Call Waiting	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.

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ID #	Name of Feature	Qwest's Technical Approach
4	Caller ID	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
5	Caller ID Block	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
6	Remote Access to Call Forwarding	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
7	Speed Dial	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
8	Three Way Calling	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
9	Voice Mail	This feature is a software element included in a Class Five CO, or a SED. When the Combined Services core package is ordered, the feature is enabled at the CO or configured on a SED and made available to the line at the time of installation. This feature is provided from the CO on Analog, ISDN BRI, and Analog PBX lines or can be enabled on a SED for any access type.
10	Calling Card Service (Optional)	Qwest is not proposing Calling Card Service as an included feature with CS. Calling Card Service will be provided separately as described in section 4.1.1 of this Technical Volume.
11	Internet Service (Optional)	Qwest is not proposing Internet Service as an included feature with CS. Internet Service will be provided separately as described in section 4.1.14 of this Technical Volume.
12	Non-Domestic Calling Service	This feature is provided on all Combined Services by dialing an appropriate Country Code. Agencies may choose any provider, independent of Qwest, for non-domestic calling. Qwest will restrict non-domestic calling if requested by the subscribing Agency. CS is capable of selectively blocking or restricting non-domestic LD calling on the line or associated programmed SED in the following ways;

ID #	Name of Feature	Qwest's Technical Approach
		██
13	Toll-Free Calling Service (Optional)	Qwest is not proposing TFS as an included feature with CS. TFS will be provided separately as referenced in section 4.1.3 of this Technical Volume.
14	Wireless Service (Optional)	Qwest is not proposing Wireless Service as an included feature with CS. Wireless Service (CPCS) will be provided separately as referenced in section 7.1 of this Technical Volume.

Qwest is only proposing the mandatory CS features. Optional features in Figure 4.1.4-10 can be obtained separately as indicated in the referenced sections.

Qwest CS will connect to and interoperate with:

- Government-specified terminations (such as single-line telephones, Secure Telephone Unit III, multi-line key telephone systems, conference room audio equipment, PBX, Centrex, T1 MUX, modem, fax, and video teleconferencing system)

- PSTN, including both wireline and wireless networks, in domestic and non-domestic locations

- All other Networx Universal and Networx Enterprise VS Contractors' networks

- Inmarsat (terminal types A, B, M, Mini-M, and Aeronautical) for calls terminating to Inmarsat

Standard Features with Unlimited Usage (Req_ID 6080; C.2.6.1.1.4 (2))

Qwest will offer CS with all required features as standard and with unlimited usage. The capability to offer these features is enabled by the Class

Five CO switch and/or the SED supporting the service, depending upon the Agency's selected access type.

Option Services: Non-Domestic Calling, Toll-Free Service and Internet Services (Req_ID 6077; C.2.6.1.1.4 (3))

Qwest is not proposing optional capabilities and features for CS at this time. Qwest has the flexibility to supplement the CS with these service offerings:

- Toll-Free Service in Section C.2.2.3

- IPS in Section C.2.4.1

- Non-Domestic Calling or Voice Services in Section C.2.2.1

- CPCS in Section C.2.14.1

4.1.4.3.1.3 Satisfaction of CS Interface Requirements (L.34.1.4.3(a); C.2.6.1.3)

All CS services offered will have access to non-domestic dialing using the digital central office PIC Code or Local PIC (LPIC). The PIC/LPIC routes LD calls via the PSTN. This creates the ability to connect to any provider for non-domestic calling by changing the PIC/LPIC per the Agency direction.

Support UNIs at the SDP (Req_ID 6018; C.2.6.1.3.1 (1))

For core CS packages, Qwest supports all of the required two-wire and four-wire UNIs for VS. Qwest is not proposing the optional Toll Free, Internet Protocol, or CPCS under CS. Please see Section 4.1.1 of Qwest's Technical Proposal for full details of our compliant VS UNI support.

CS UNI Support for IPS (Req_ID 6017; C.2.6.1.3.1(2))

Qwest's CS complies with all mandatory User-to-Network Interfaces (UNIs) for IPS as described in Section 4.1.14.3.1.3.

CS UNI Support for CPCS (Req_ID 6016; C.2.6.1.3.1(3))

Qwest's CS complies with all mandatory User-to-Network Interfaces (UNIs) for CPCS as described in Section 7.1.3.1.3.

4.1.4.3.2 Proposed Enhancements to CS (L.34.1.4.3(b))

Specific CS enhancements are not proposed at this time. Qwest does continually address processes and systems involving billing, installation, and repair improvements. As these improvements become available, Qwest will propose their addition as service enhancements.

Qwest is one of the early pioneers of VoIP technology and services. As such, Qwest has a very competitive and attractive VoIP portfolio that will provide a manageable migration path for Agencies desiring CS-like capabilities.

Qwest's VoIP service is divided into three major product sub-categories:

- Hosted VoIP – Qwest-hosted VoIP offers a fully-hosted service that replaces a premises-based phone system and the multiple vendors required to provide popular applications such as voice mail and integrated messaging. The features and applications are delivered to an Agency user's handset via a single dedicated Internet access connection. These features can be individually customized by the user through a personalized Web portal.

- Integrated Access – Integrated Access is an Internet Protocol (IP)-based solution that integrates local and LD voice and data traffic on a single connection. It uses VoIP technology to give Agencies the advantage of using more bandwidth for data traffic when phones are not in use.

- Managed IP Telephony (IPT) – Managed IPT is a nationwide, SED-based VoIP solution. It offers Agencies plug-and-play functionality. Managed IPT provides all necessary hardware, software, licenses, installation, maintenance, and 24x7x365 application management and monitoring through a fully-bundled IPT service that includes a convergence readiness assessment.

Qwest considers VoIP a key element of next-generation service capabilities for the Government, and our commitment to VoIP is reflected in our commitment to VoIPTS within this proposal.

4.1.4.3.3 Network Modifications Required for CS Delivery (L.34.1.4.3(c))

No network modifications will be required to provide CS. Qwest will provide combined services using the combination of networks provided by Qwest and alliance Local Exchange Carriers.

4.1.4.3.4 Experience with CS Delivery (L.34.1.4.3(d))

Qwest operates as an ILEC, CLEC, and Inter-Exchange Carrier (IXC) and offers a full range of local and LD services. Since receiving 272 regulatory relief, Qwest has additionally enabled bundling of local and LD services, such as the Networx CS offering. We built and own our own state-of-the-art broadband, nationwide network and bring transport and applications together with Qwest converged services. Qwest is currently delivering in excess of four billion minutes of traffic on our network per month. Qwest offers an extensive product portfolio that includes cutting-edge products and services, giving the Government and other customers a vendor capable of providing new technologies as their business expands.

4.1.4.4 Robust Delivery of CS (L.34.1.4.4)

Qwest CS is a key component for making and receiving local, regional, national, and international calls. Qwest understands the importance of robust CS delivery to Networx. The following sections provide details of how Qwest ensures that robust delivery is achieved and maintained.

4.1.4.4.1 Support for Government CS Traffic (L.34.1.4.4(a))

The identified Networx traffic will not impact delivery or use of these services on the Qwest network. Networx-forecasted traffic represents approximately two percent of current Qwest traffic volume. Qwest's CS will easily absorb this additional load. Over time, as discussed in the following

section, Qwest planning activities will ensure that the ability to handle additional Networx traffic remains intact. Qwest will manage ILEC and CLEC relationships to ensure that forecasted CS service levels are readily met by an appropriately engineered and maintained telecommunications infrastructure.

4.1.4.4.2 CS Measures and Engineering Practices (L.34.1.4.4(b))

Qwest will use the PSTN, local COs, and our state-of-the-art LD network to provide CS. The PSTN is a recognized nationwide infrastructure that uses interconnected central offices to route local and LD calling traffic to and among any number of wireless, wireline, and broadband networks. The PSTN is robustly interconnected to the Qwest LD network, linking local CS to the Qwest national network. Qwest will provide CS and the mandatory CS features to Agencies outside the Qwest local region with the assistance of our ILEC and CLEC alliances, with Qwest providing packaging of domestic and non-domestic LD services.

A variety of Qwest practices, common to our ILEC suppliers for CS, will support a robust network design for the delivery of CS. These practices address availability of individual NEs, the resiliency of the overall network design, and plans for evolving the network.

Qwest has chosen vendor platforms that meet high availability. Depending on the system, there may be a 1+1 or N+1 hardware configuration to ensure high reliability for CS and VS.

Qwest's TDM network is constructed as a mesh of diverse Inter-Machine Trunks and interoffice facilities with calls having a minimum of two call set-up paths from an originating SSP to a terminating SSP. Access diversity connectivity to the customer premise can be done via physically diverse paths where facilities are available and the customer has specific requirements and agreements.

SS7 Signaling is done via a robust, redundant network. All links are engineered at a maximum 40 percent capacity to ensure safe failover to the fully redundant link mate. All of the SS7 systems have network and geographical redundancies. LD voice and signaling traffic is carried over SONET rings for reliable and secured transport.

Qwest's LD voice network uses digital and fully redundant SSP sites supporting various regions of the U.S. An SSP site supports communities of interest in a region with one or multiple physical SSPs. In addition, where required by the Agency, Qwest provides dual homing of dedicated access for enhancing Agency-specific network survivability. Qwest's voice network utilizes primary high usage routing methods providing direct inter-machine connectivity between SSPs sharing service coverage for large communities of interest. Qwest selects voice SSPs that are based on fault-tolerant or highly available hardware platforms.

Over the history of the Qwest network, we have developed tracking mechanisms for monitoring and tracking network performance. The data from the monitoring systems are used by planning and engineering organizations that have network traffic modeling and network planning responsibilities. Qwest's centralized engineering team applies a consistent capacity management model to all services. Qwest corrects identified network limitations for areas showing congestion.

Qwest has examined the Networx capacity requirements for CS, and we have sufficient direct capacity or the ability to obtain capacity from qualified alliances to meet the specified CS forecast.

4.1.4.5 CS Optimization and Interoperability (L.34.1.4.5)

Qwest continually monitors our services and network for optimization throughout our planning, operations, and provisioning organizations. Qwest is continually making improvements in all areas of technology and services.

Qwest engineers are available to support and design customer solutions that optimize Agency CS needs.

4.1.4.5.1 Optimizing the Engineering of CS (L.34.1.4.5(a))

Qwest continually undertakes activities designed to keep our products, services, and network operating capabilities at par or better than targeted performance levels. These activities include testing new engineering methodologies to enhance all customers' VS. Our network supports CS, VS, TFS, VoIP Services, and IP Telephony Services. Qwest uses traffic modeling and forecasting based on actual traffic and predicted traffic. This modeling is used to determine when to augment network equipment and how to route customer traffic.

Qwest engages in continuous dialogue with our strategic customers to identify potential service enhancements. These collected requirements, in addition to those captured as an element of competitive analysis and proactive service planning, are assessed by Qwest Network Engineering and Product Management. Our planners and engineers apply a proven

requirements-based, standard engineering methodology for functional analysis, function placement (e.g., platform identification), cost-benefit analysis, and development/deployment for all services. Platform and integration level test cases are directly derivative of the original functions required. Integral to this process is strictly controlled vendor management and associated laboratory testing to validate platform interoperation. The scope of these engineering activities may vary widely based upon demand, from relatively minor augmentation of existing services, to deployment of entire new service layers, but the fundamental requirements-driven engineering approach is consistent.

In addition to ensuring that all recommended solutions meet or exceed requirements, Qwest systems engineers are responsible for:

- Providing designs, technical guidance, and alternatives for hardware and network opportunities
- Providing consultative services on voice, data, and video applications
- Assisting in strategic planning, disaster recovery planning, and solution implementation

In addition, and pertinent to CS, Qwest leverages our established ILEC and CLEC relationships by actively managing quality of service for alliance-sourced capabilities for our Agency customers. We hold our suppliers contractually responsible for fulfilling agreed-upon performance standards. Qwest had led the industry in implementation of direct Measures of Quality that are periodically reviewed in joint operations and performance working groups.

4.1.4.5.2 Methods Applied to Optimize the Network Architecture (L.34.1.4.5(b))

Qwest continues to upgrade underlying network technologies that support CS. The following are examples of this network architecture optimization:

- Qwest has been replacing legacy Class V inter-office technologies with secure IP and Ethernet technology.

- Qwest has deployed copper pair bonding techniques and technology to provide higher broadband speeds to our customers.

These architecture improvements may be utilized to provide Government CS.

For CS requested outside the Qwest local network, Qwest will develop service level agreements with local service providers to ensure that local access networks are optimized for performance and capacity requirements.

4.1.4.5.3 Access Optimization for CS (L.34.1.4.5(c))

Qwest will survey and analyze the existing access facilities to Agency SDPs to determine their use with CS. Qwest will utilize the existing access infrastructure where possible, including subscriber loop carrier systems, optical, or copper access technologies. Qwest will utilize appropriate infrastructure for each seamless CS application.

Qwest optimizes CS access on a number of factors. These factors include requested services, availability requirements, number of subscribers, subscriber and data/IP service growth, Government Furnished Equipment (GFE), and security. Qwest-provided Channel Service Unit/Digital Service Unit equipment may be required to interface to GFE PBX, Private Automatic Branch eXchange (PABX), or IP-enabled PBXs.

Where Qwest has a relationship with ILEC or CLEC providers, we provide active management so that they achieve the same level of local

service access performance and capacity optimization. All CS feature capabilities will be combined to achieve the bid's packaging requirements.

**4.1.4.5.4 Vision for CS Internetworking (L.34.1.4.5(d))**

Qwest provides substantial elements of the PSTN and will continue to maintain this traditional network. Qwest has interconnection points between the PSTN and our own VoIP and IP-based networks that meet Agency internetworking requirements.

Qwest is one of the leaders in IP-centric architectures with the extensive deployment for both VS (CS-like) and data services. On the VS side, Qwest is a leader with their deployment of the SONUS VoIP platform. The Qwest voice infrastructure supports traditional VS over a PSTN IXC network, TFS, VoIP Services, and IPTelS.

Qwest is actively working with the best-in-class vendors, both nationally and internationally, to provide the highest-performing, lowest-cost solutions to support a seamless converged service architecture, as well as optimal bridge solutions between legacy and next-generation services in a common control plane.

Qwest is working in the standards forums to define key interoperability control points. Qwest is actively building network interfaces to fully enable the next-generation IMS architecture service enablers with its legacy network elements. This transition network solution will enable a seamless convergence across the multiple access infrastructure elements. This begins
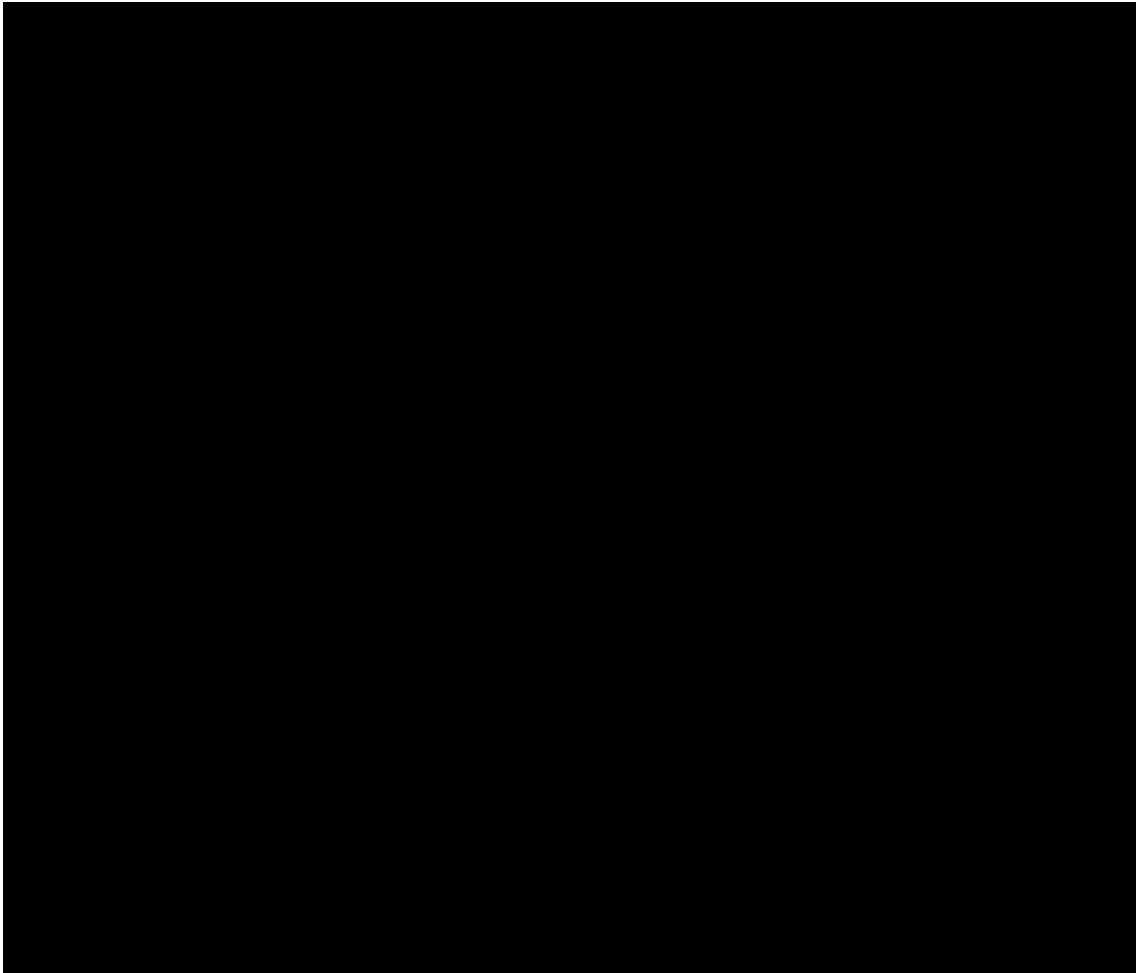
to bridge existing services with next-generation Web-centric services in a seamless fashion. All the while, Qwest as a full service operator is paying very close attention to meet the critical service offerings for 911/E911, Commission on Accreditation for Law Enforcement Agencies, and National Security and Emergency Preparedness—the mission-critical Government, military service, and business quality of service and reliability requirements in this new architecture.