

4.0 TRANSPORT/IP/OPTICAL SERVICES

4.1 MANDATORY SERVICES

The following sections present Qwest’s response to the mandatory Transport/IP/Optical services for the Networx Universal program. Qwest is an established leader in the delivery of a full range of voice, video, and data services and has successfully built a converged network architecture based on IP-based technologies such as Multi-Protocol Labeled Switching (MPLS). Qwest is offering all mandatory Transport/IP/Optical Services and the following **optional** services:

- Ethernet Services (EthS)
- Dark Fiber Services (DFS)
- Layer 2 Virtual Private Network Services (L2VPNS)

4.1.1 Voice Services (VS) (L.34.1.4)

Flexible, reliable, and scalable, Qwest’s Voice Services are provided to Agencies through Advanced Intelligent Network features, Class 4 and 5 Switches, and Qwest’s Macro Capacity® Fiber Network.

Qwest’s network is built on multi-vendor, standards-based technologies that enable a building block approach to evolution. Qwest’s Voice Services (VS) provide the Government with global connectivity to more than 250 countries [REDACTED]

[REDACTED] Qwest International Direct Dial, a high quality managed outbound voice solution, provides international direct dial capability

[REDACTED]

[REDACTED]

4.1.1.1 Qwest’s Technical Approach to VS Delivery (L.34.1.4.1)

Qwest’s approach to VS delivery is based on our converged, next-generation network, our seasoned staff, and a full complement of voice service functionality. The following sections describe the Qwest technical approach to delivering VS.

4.1.1.1.1 Qwest Technical Approach to VS Delivery (L.34.1.4.1(a))

Qwest’s Networx VS offering is delivered from a state-of-the-art network that is feature-rich, mature, and will support full compliance with all the VS requirements of the Request for Proposal (RFP). Our VS includes a full range of traditional direct dial and virtual private network (VPN) capabilities. Qwest’s VS is standards-based and connected and interoperable with:

- Government-specified devices (e.g., telephones, Private Branch Exchanges (PBXs), FAXes)
- Public Switched Telephone Network (PSTN)
- Other Universal and Enterprise Networx VS contractor’s networks
- Inmarsat for calls terminating to Inmarsat

Qwest VS is transported over the Qwest Macro Capacity Fiber Network. The network is an integrated, redundant, state-of-the-art architecture that adapts quickly and cost effectively to changing network needs.

Qwest VS is supported by Class 4 and 5 switches and our intelligent self-healing fiber network with 100 percent Feature Group D (FGD) trunking. Our VS network is interconnected with international carriers via gateway switches using dedicated transport. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Qwest complies with industry standards, both national and international, including Telcordia, Internet Engineering Task Force, International Telecommunications Union, and American National Standards Institute (ANSI). Qwest procures and certifies our VS platforms based on these industry standards. [REDACTED]

[REDACTED]

Our VS provides origination and termination domestically (Continental United States (CONUS) and Outside Continental United States (OCONUS)) and non-domestically as required for Networx. [REDACTED]

[REDACTED]

Agencies can extend their reach by connecting to employees around the world with Qwest VS. Qwest’s suite of VS features and capabilities provides Agencies with connectivity within the United States and around the world. Qwest International Direct Dial, a high quality managed outbound voice solution, provides international direct dial capability as required.

4.1.1.1.2 Benefits of Qwest’s VS Technical Approach (L.34.1.4.1(b))

Figure 4.1.1-1 describes the features and benefits of our approach to delivery of Networx VS.

Figure 4.1.1-1 Qwest’s VS Features and Benefits

Feature	Benefit	[REDACTED]
Intelligent Network Routing Capabilities	Reliable voice service for Agencies	[REDACTED]
Next Generation Voice Network Platform	Provides high availability and call completion rates with consistent call quality.	[REDACTED]
Robust Signaling	Reliable signaling	[REDACTED]

Feature	Benefit	
System	provides better call completion for Agencies.	
Network Evolution Focus	Proven testing methodology ensures service stability and consistent functionality.	
Fraud Prevention Management System	Agencies are assured of the integrity of their voice traffic and systems.	

Additionally, Qwest supports the Government’s Federal Enterprise Architecture (FEA) objectives, as demonstrated by the feature/benefit table in **Figure 4.1.1-2**.

Figure 4.1.1-2 Qwest’s VS Support to FEA Objectives

FEA Objectives	Qwest Benefits
Improve utilization of Government information resources to focus on core Agency mission and service delivery to citizens by using the FEA	VS is available in dedicated and switched access methods, enabling standards-based connectivity to the Government’s existing telecommunications systems.
Enhance cost savings and avoidance	VS requires no capital investment by the Government and leverages the Government’s existing telecommunications infrastructure and equipment.

FEA Objectives	Qwest Benefits
Increase cross-Agency and inter-Government collaboration	Qwest's VS allows Networx callers' access to CONUS and OCONUS locations through PSTN, calling card, cell phone, and any other standard telephone connection. [Redacted]

Qwest's network has a robust set of features that optimize and leverage Government resources.

4.1.1.1.3 Solutions to VS Problems (L.34.1.4.1 c)

Qwest has extensive experience in the delivery of VS services. We apply this experience to ensure the delivery of high quality VS 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. [Redacted]

[Redacted]

[Redacted]

Problem	Solution
Loss of dedicated access interrupting PSTN connectivity	Qwest monitors network availability 24x7x365 and has daily reports for tracking our network trunk reporting and system alarms. We have a proactive process to manage problems to resolution and maintain end-to-end service quality.
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.
Calling card fraud	Qwest calling cards provided to the customer will be monitored by our advanced fraud systems for potential fraudulent use, misuse, or abuse on a 24x7x365 basis. If potential fraud is detected, the detection center notifies the customer, and appropriate steps are taken to resolve the situation.

Problem	Solution
Long Distance (LD) Carrier Transition Coordination	Qwest takes on full responsibility for transition coordination to ensure service continuity. For example, our tightly controlled Primary Inter-exchange Carrier (PIC)/Customer Account Record Exchange process automatically identifies Automatic Number Identification (ANI) rejections to enable proactive resolution.

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

Time of Day Synchronization (IP Network)

[Redacted content]

[Redacted content]

[Redacted text block]

[Redacted text block]

SONET Timing and Synchronization Architecture		
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]

[Redacted text block]

[REDACTED]

4.1.1.2 Satisfaction of VS Performance Requirements (L.34.1.4.2)

Qwest’s network reliability is designed to meet or exceed the Government’s routine and critical service delivery requirements. Dedicated access diversity, including switch, route, local access, and card diversity, is available for critical Agency applications.

Qwest VS meets Networx performance requirements, and Qwest will actively monitor and measure Key Performance Indicators (KPIs) to ensure fulfillment of Acceptable Quality Levels (AQLs). We apply automated management systems that pull data from the root source, process, and display that information via Web tools.

4.1.1.2.1 VS Quality of Service (L.34.1.4.2(a))

[REDACTED]

[REDACTED]. Qwest’s standard objective for availability for the voice network is fully supportive of Networx performance requirements. [REDACTED]

[REDACTED] **Figure 4.1.1-6.**

Figure 4.1.1-6. Qwest Compliance with Government VS Performance Metrics

Key Performance Indicator (KPI)	Service Level	Performance Standard (Threshold)	Acceptable Quality Level (AQL)	[REDACTED]
Availability (POP-to-POP)	Routine	99.95%	≥ 99.95%	[REDACTED]
Availability (Service Delivery Point-to-Service Delivery Point)	Routine	99.5%	≥ 99.5%	[REDACTED]
	Critical	99.95%	≥ 99.95%	[REDACTED]

Key Performance Indicator (KPI)	Service Level	Performance Standard (Threshold)	Acceptable Quality Level (AQL)	
(SDP-to-SDP)				
Time to Restore	With Dispatch	8 hours	≤ 8 Hours	
	Without Dispatch	4 hours	≤ 4 hours	
Grade of Service (Call Blockage)	Routine	0.07 (SDP-to-SDP)	≤.07	
		0.01 (POP-to-POP)	≤.01	
	Critical	0.01 (SDP-to-SDP & POP-to-POP)	≤.01	

Qwest KPI definitions for VS comply with the Networx 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 we are waiting on the Government (such as no access).

Grade of Service (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.

4.1.1.2.2 Approach for Monitoring and Measuring VS KPIs and AQLs (L.34.1.4.2(b))

[Redacted content]

[REDACTED]

4.1.1.2.3 VS Performance Improvements (L.34.1.4.2(c))

Qwest proposes to meet all required KPIs and AQLs for VS. 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 VS solution to serve unique Agency needs. Qwest is able to leverage our vast VS product portfolio, which includes a variety of Service Enabling Device (SED) providers and specific VS solutions. Through a special combination of vendor solutions and talented engineering capabilities, Qwest will serve an Agency's business needs.

4.1.1.2.4 Additional VS Performance Metrics (L.34.1.4.2 d)

[REDACTED]

4.1.1.3 Satisfaction of VS Specifications (L.34.1.4.3)

Qwest will satisfy all service specifications as detailed throughout this section. Our ability to satisfy the VS specification stems from our network and experience.

- Qwest's network will support all aspects of the VS requested by the Government. Speeds are based upon the type of carrier service requested. The circuits vary in speed and are broken down from a single channel DS-0 (64 Kbps) to OC-192 level. Qwest supports the Government's request for a uniform numbering plan, along with the PSTN and North American Numbering plan, and private, non-commercial numbers. Qwest's VNS capabilities allow the Government to determine on-net and off-net call routing.

[REDACTED] Qwest offers diversity capabilities to its Networx VS offering [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

- Qwest Government Services, Inc. focuses its support on the Federal Government customer and has proven its ability to deliver services to a broad range of Federal Agencies.

4.1.1.3.1 Satisfaction of VS Requirements (L.34.1.4.3 a)

Qwest’s VS approach meets all service requirements of the Networx program. The following sections provide the technical descriptions of how Qwest will satisfy the capabilities, features, and interface requirements of VS.

4.1.1.3.1.1 Satisfaction of VS Capabilities Requirements (L.34.1.4.3(a); C.2.2.1.1.4)

Figure 4.1.1-7 summarizes Qwest’s technical approach to delivering the VS capabilities in RFP C.2.2.1.1.4. Qwest fully complies with all mandatory stipulated and narrative features, capabilities, and interface requirements for VS. The text in Figure 4.1.1-7 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 4.1.1-7 Qwest’s Technical Approach to VS Capabilities

ID #	Capability	
1	Uniform Numbering Plan	[Redacted]
	a. Unique Directory Number	[Redacted]
	b. PSTN	[Redacted]
	c. Agency-specific 700 Numbers	[Redacted]

ID #	Capability	
		[Redacted]
	c. i. Transparency and interconnectivity with other networks	[Redacted]
	c. ii. Originating and terminating on-net calls	[Redacted]
	d. Privacy Numbers	[Redacted]
2	Network Intercept	[Redacted]
	a. Number disconnected	[Redacted]
	b. Time-out during call	[Redacted]
	c. Network congestion	[Redacted]

ID #	Capability	
	d. Denial of access to off-net and non-U.S. calls	[Redacted]
	e. Denial of access to features	[Redacted]
3	Signaling via ISDN (Optional)	[Redacted]
4	Voice Quality	[Redacted]

Qwest's VS includes:

Qwest Domestic and International Outbound Long Distance

Qwest's service delivery approach provides Agencies with connectivity domestically and allows calls to originate from domestic locations and terminate in required non-domestic locations. [Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[REDACTED]

Qwest's VS network includes an AIN service model. [REDACTED]

[REDACTED]

International Direct Dial

Qwest provides global connectivity from required non-domestic locations around the globe. International Direct Dial (IDD) meets a wide range of needs, from small federal offices requiring only national and IDD calling, to departmental enterprises [REDACTED]

[REDACTED] The scope of Qwest's network means that Agencies are able to work with just one service provider for all voice telephony requirements, across multiple sites and multiple countries.

[REDACTED]

Voice Virtual Private Network

Qwest's VPN is an enhanced capability that provides the convenience, cost savings, and control achievable only with a virtual network. [REDACTED]

[REDACTED]

Qwest Networx Calling Card

Calling Cards provided by Qwest offer a cost-effective, convenient calling card, designed especially for business travelers [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Operator Services

Qwest allows users to reach an English- or Spanish-speaking operator for domestic and non-domestic for a wide range of assistance calls. [REDACTED]

[REDACTED]

4.1.1.3.1.2 Satisfaction of VS Features Requirements (L.34.1.4.3(a); C.2.2.1.2)

Qwest fully complies with all mandatory stipulated and narrative features, capabilities, and interface requirements for VS. The text in **Figure 4.1.1-8** 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 4.1.1-8 Qwest’s Technical Approach to VS Features

ID #	Name of Feature	
1	Agency-Recorded Message Announcements	[Redacted]
2	Authorization Codes/Calling Cards	[Redacted]
3	Caller Identification (ID)	[Redacted]
4	Call Screening for Users	[Redacted]
5	Customized Network Announcement Intercept Scripts (optional)	[Redacted]
6	Internal Agency Accounting Code	[Redacted]
7	Off-Net Information Calls	[Redacted]
8	Operator Services	[Redacted]
9	Support for Government Travel Cards (Optional)	[Redacted]

ID #	Name of Feature	
10	Suppression of Calling Number Delivery	

4.1.1.3.1.3 Satisfaction of VS Interface Requirements (L.34.1.4.3(a); C.2.2.1.3)

Qwest provides standards-based VS interfaces as required for Networx services. **Figure 4.1.1-9** summarizes our support for required VS interfaces, including the proposed SEDs.

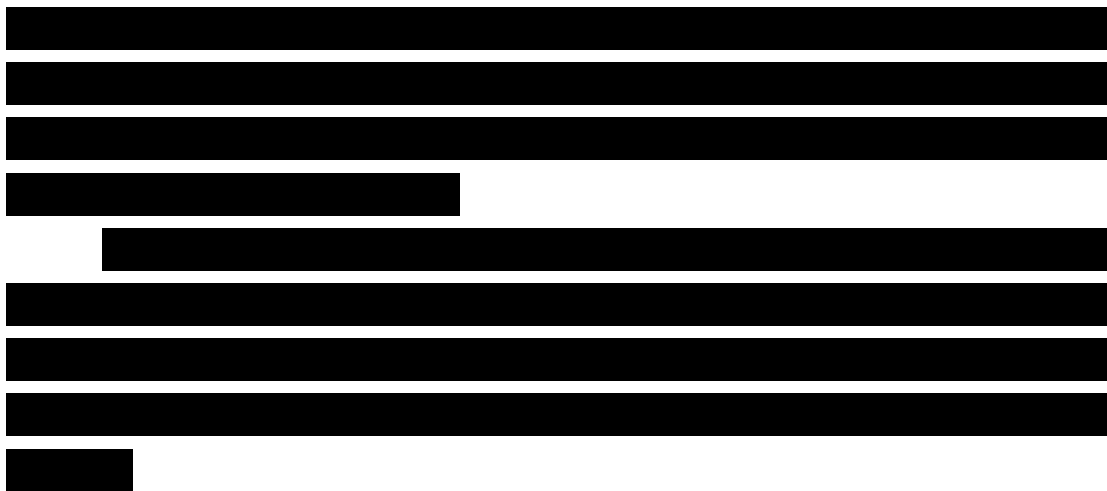


Figure 4.1.1-9. Qwest Provided VS Interfaces at the SDP

UNI Type	Interface Type and Standard	Payload Data Rate or Bandwidth	Signaling	
1	Analog Line: Two-Wire (Std: Telcordia SR TSV-002275)	4 kHz Bandwidth	Line-Loop Signaling	
2	Analog Line: Four-Wire (Std: Telcordia SR-TS V-002275)	4 kHz Bandwidth	Line-Loop Signaling	
3	Analog Trunk: Two-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk-Loop Signaling (loop and ground start)	
4	Analog Trunk: Four-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk-Wink Start Signaling	
5	Analog Trunk: Four-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk-E&M Signaling	
6	Digital Trunk: T-1 TSV-002275 and ANSI T1.102/1	(Std: Telcordia SR Signaling Up to 1.536	T-1 Robbed-Bit	

[Redacted text]

4.1.1.3.2 Proposed Enhancements to VS (L.34.1.4.3(b))

[Redacted text]

[Redacted text]

[Redacted text]

[Redacted text]

[Redacted text]

[Redacted]

4.1.1.3.3 Network Modifications Required for VS Delivery (L.34.1.4.3(c))

[Redacted]

4.1.1.3.4 Experience with VS Delivery (L.34.1.4.3(d))

Qwest provides long distance services and broadband data, as well as global voice and video communications. Qwest sells its products and services to large and small businesses, Government agencies, and public and private educational institutions.

Qwest has a rich tradition with more than 100 years of providing local, long distance, and operator services. Qwest has served Federal Agencies for more than 40 years and has a comprehensive understanding of their unique requirements, processes, and applications. [Redacted]

[Redacted]

[REDACTED]

4.1.1.4 Robust Delivery of VS (L.34.1.4.4)

The Qwest Fiber Network is the backbone of the intelligent Qwest network and combines leading-edge network technology with an advanced network, enabling it to respond quickly and cost-effectively to the Government's changing network needs. Qwest offers the General Services Administration (GSA) Networx program Voice Services delivered from this state-of-the-art network.

4.1.1.4.1 Support of Government VS Traffic (L.34.1.4.4(a))

[REDACTED]

Qwest continually monitors the network for traffic patterns and capacity. [REDACTED]

[REDACTED]

[REDACTED]

4.1.1.4.2 VS Measures and Engineering Practices (L.34.1.4.4 (b))

Qwest has evolved its network to support a host of traditional and emerging VS, including Toll Free Services, VoIP, and IP Telephony services. Over the history of the Qwest network, we have developed tracking mechanisms for monitoring and tracking network performance. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

4.1.1.5 VS Optimization and Interoperability (L.34.1.4.5)

Qwest's approach to service delivery for GSA Networx is comprehensive and customer-focused. [REDACTED]

[Redacted text block]

4.1.1.5.1 Optimizing the Engineering of VS

Qwest continually undertakes activities designed to keep our products, services, and network operating capabilities at par or better than targeted performance levels. [Redacted text]

[Redacted text block]

By managing Agency traffic patterns and engineering backbone capacity proactively, Qwest provides a high level of service performance to Agencies. [Redacted text]

[Redacted text block]

[REDACTED]

Qwest engages in continuous dialogue with our strategic customers to identify potential service enhancements. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[Redacted]

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

[Redacted]

4.1.1.5.3 Access Optimization for VS (L.34.1.4.5(c))

[Redacted]

[REDACTED]

Qwest has years of experience as a proven provider of converged technologies and solutions. The Government can depend on Qwest to safely and smoothly converge voice, data, and video network applications into one integrated communications platform that is scalable and reliable [REDACTED]

[REDACTED]

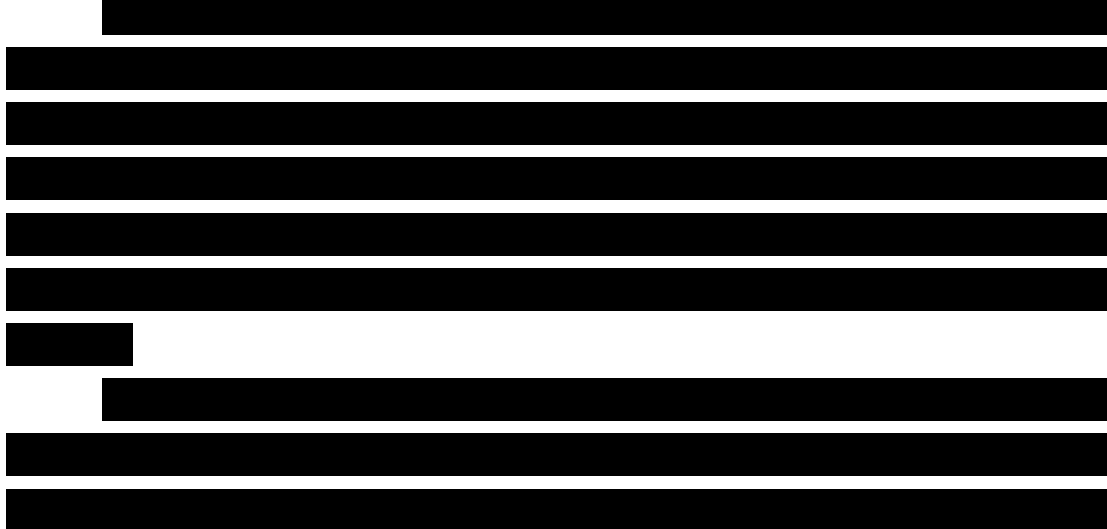
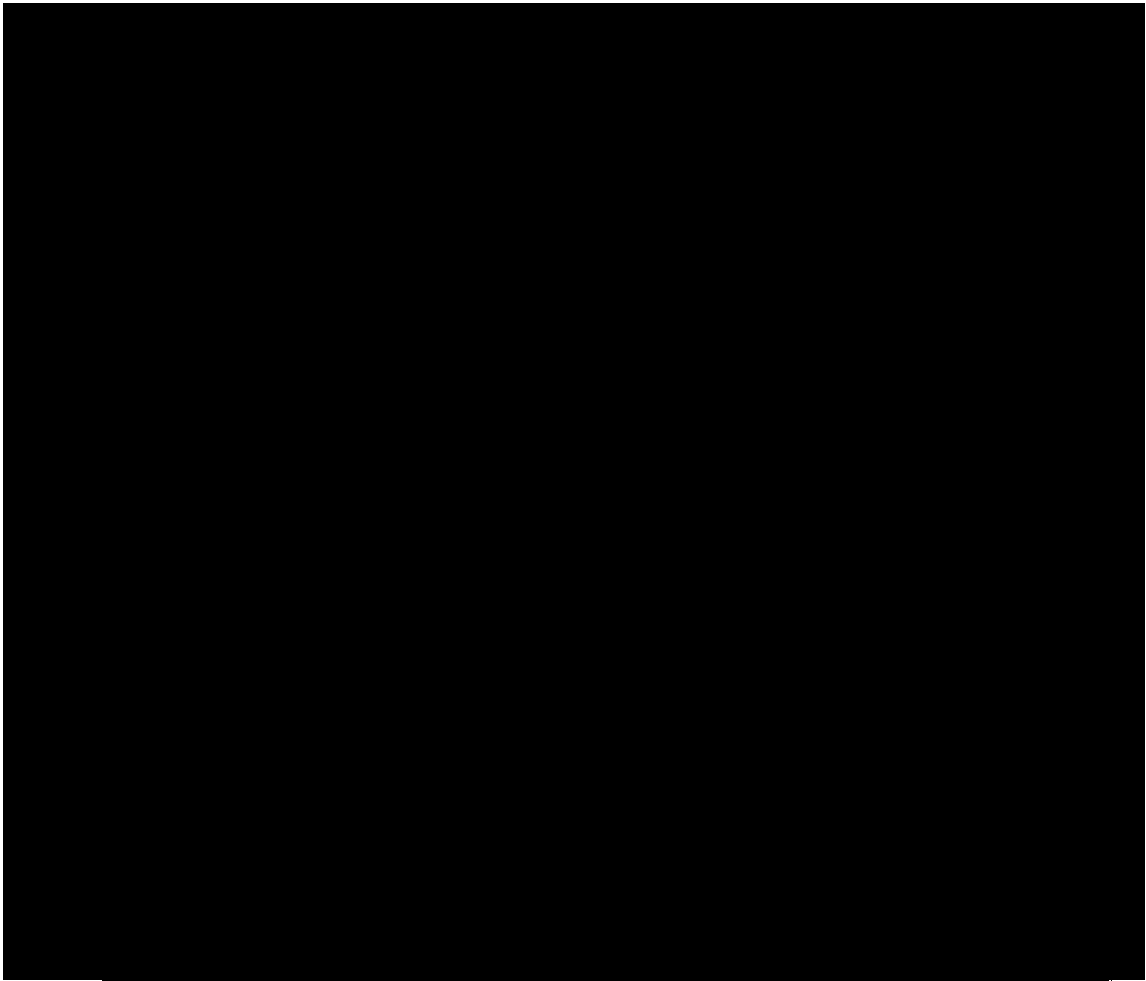
4.1.1.5.4 Vision for VS Internetworking (L.34.1.4.5(d))

[REDACTED]

[REDACTED]

[REDACTED]

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