3.3 Data Services

Verizon provides an ever-growing array of advanced data services across the entire NCR for the Federal Government.

3.3.1 Circuit Switched Data Service (C.2.3) - Service Overview

Circuit Switched Data Service (CSDS) is a robust and reliable switched data solution that provides Government agencies high-quality switched data services, such as videoconferencing solutions. CSDS provides the Government with circuit-switched data speeds of up to 1.5 Mbps (T1). Verizon offers the following CSDS products:

- Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) Access Trunk
- Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) Access Trunk
- Channelized T1 Trunk

Integrated Services Digital Network Basic Rate Interface. ISDN BRI supports up to three simultaneous transmission paths on a digital subscriber loop or line. ISDN BRI is an all-digital service:

- There are no conversions from or to analog. For customers transmitting data, ISDN BRI provides superior transmission with a significantly lower error rate.
- The ultimate value of ISDN BRI is the single integrated link it provides from the workstation to all network services. It eliminates the need for multiple networks and protocols, which can be expensive and time consuming to install, maintain, and administer.

ISDN BRI provides high performance, fully-digital access to the worldwide telecommunications network through standard copper telephone lines. This digital transmission service is available virtually everywhere within

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the NCR. From offices, homes, and remote locations, ISDN BRI allows employees to tap into resources and use new business applications where video images and data flow simultaneously along with fax transmissions and phone conversations.

ISDN BRI supports a wide range of applications by enabling a seamless exchange of information in any medium—voice, data, or video. ISDN BRI sends clear digital signals over regular facilities. ISDN-BRI service requires that the customer specify a pipe configuration—2B+D, 1B+D, or 0B+D (for packet only).

CSDS - ISDN BASIC RATE INTERFACE (BRI)

Product Description

ISDN BRI integrates service by letting users perform several digital functions at one time. ISDN BRI customers can research pertinent data on the Internet while participating in a conference call; fax important documents while e-mailing the recipients; and send large digital files (graphics or text) in a quarter of the time it would take with an ordinary dial-up connection. All of this is accomplished with ordinary copper phone lines and an ISDN card.

Benefits to the Customer

- Convenience
- Increased employee productivity efficiencies
- Cost savings resulting from allowing multiple desktop devices to share one loop, integrating multiple networks into one, and reducing onsite wiring

CSDS - ISDN BASIC RATE INTERFACE (BRI)
• User does not need to purchase multiple lines to meet multiple needs
• Reduced network complexity -- much easier network management
• Flexibility
• Data connectivity from anywhere to anywhere
• Instantaneous connections
• Increased throughput
• Reduced error rate
• Disaster recovery backup circuit

Service-Specific Architecture

ISDN BRI describes an end-to-end digital telecommunications network architecture. This means the entire network including all facilities and equipment must be digital. The ISDN network architecture supports simultaneous transmission of voice, data, and image/video. The customer's ISDN line is a channelized "pipe" that supports simultaneous access to multiple service capabilities. ISDN BRI is a two-wire digital subscriber line that provides the following capabilities:

• Two 64 Kbps Bearer (B) channels that can be used for voice, data, and video. Both B channels can be bonded providing a 128Kbps circuit

• One 16 Kbps Data (D) channel that is used as the signaling channel for call set-up and call-completion messages to support enhanced features such as caller ID and to carry low-bandwidth, packet-switched data.

Verizon supports both national (standard) and custom ISDN. National is promoted and preferred. National ISDN is standards-based and is supported by all switch suppliers to ensure switch interoperability. ISDN BRI lines are supported per the specifications found in ANSI/EIA T1.607 and 610.

Integrated Services Digital Network Primary Rate Interface. ISDN PRI is a Central Office (CO)-based service arrangement that utilizes ISDN architecture to provide network offerings. ISDN PRI is provisioned on a clear channel 1.5 Mbps facility (T1) and uses the ISDN architecture of 23 B channels and one D channel or 24 B channels to provide the customer simultaneous access, transmission, and switching of voice, data, and imaging services via channelized transport.

ISDN PRI service provides intra-exchange access for integrated services between the customer premises and the serving office via a 1.5 Mbps facility. ISDN PRI denotes an end-to-end digital network capable of supporting a combination of public and private network access services. ISDN PRI's 24 channels are arranged into twenty-three 64 Kbps B channels for user information and one 64 Kbps D channel for signaling and control functions. "Out-of-band" signaling from ISDN offers clear 64 Kbps channels for data communications. The 64 Kbps channels can be bundled to provide
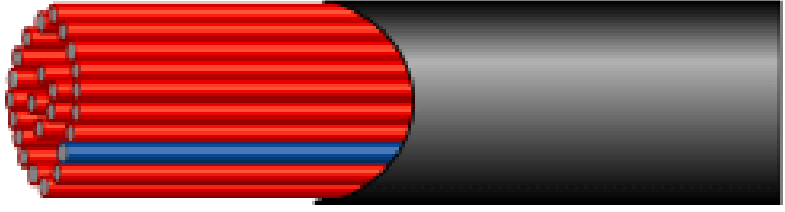
speeds up to 1.5 Mbps per line. The channel arrangements can carry several different services, depending on the customer's needs and the capabilities of their equipment.

- Circuit switched data

- Dedicated B channel configuration

- Dedicated T1 line elimination

- Disaster recovery

- Host computer access

- LAN-to-LAN connection

- PBX trunking efficiency

- 23 B+D channel arrangements

- 23 B+ back-up D channel arrangements

- 24 B channel arrangements

- Video conferencing

CSDS - ISDN PRIMARY RATE INTERFACE (PRI)

Product Description

ISDN PRI is a local exchange access service that creates a direct digital connection to a Verizon central office to

CSDS - ISDN PRIMARY RATE INTERFACE (PRI)
provide voice, data, image, and video services on a single circuit or line.

Benefits to the Customer

- *Dedicated T1 line elimination:* If a dedicated T1 is being underutilized, it may be cost effective to replace it with a PRI and route those calls over the network rather than pay the entire cost of the T1.
- *Disaster recovery:* Circuit switched capability can provide alternate paths in the event of an emergency
- *Host computer access:* Large bandwidth for high speed data communications
- *Local Area Network (LAN)-to-LAN connection:* Large bandwidth essential for heavy graphics and data intensive applications (i.e., Computer-Aided Design (CAD)/Computer-Aided Manufacturing (CAM))
- *Video conferencing:* Large bandwidth increases video resolution, allows for faster screen refresh, and provides a sharper picture
- *PBX trunking efficiency:* Call-By-Call (CBC) service selection can reduce the customer's trunking requirements and allow customized time-of-day selection of service

Service-Specific Architecture

PRI uses the ISDN architecture and has a bandwidth of 1.536 Mbps for communication from a CO to the customer premises. There are two kinds of channels in ISDN-PRI.

- B Channels full 64 Kbps, free of call set-up signaling, for use in voice and switched data transmission
- D Channel control signaling functions

Based on the equipment and needs, the Government may select an appropriate PRI arrangement from the following options:
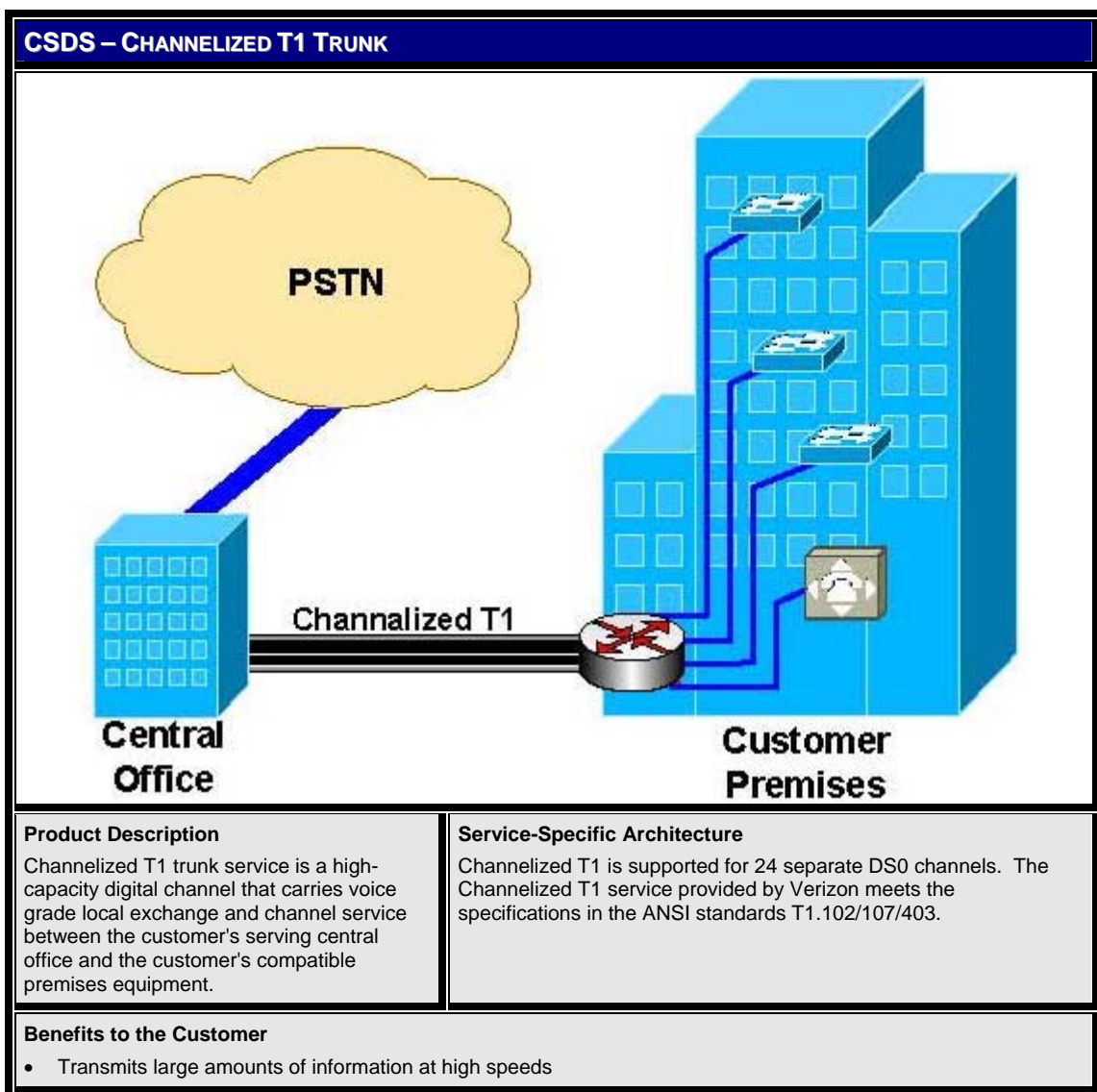
- 23 B Channels + 1 D Channel
- 23 B Channels + 1 Back-up D Channel
- 24 B Channels

ISDN PRI (23B+D) is supported at an information payload data rate of 1.472 Mbps and ITU-TSS Q.931 signaling type. The D channel cannot be shared by another ISDN PRI trunk. The applicable standards are *ANSI/EIA T1.607* and *610/ NIUF National ISDN-1 (Telcordia Pub SR-NWT-001937), NIUF National ISDN-2 (Telcordia Pub SR-NWT-002120)*, and *NIUF National ISDN-3 (Telcordia Publication SR-NWT 002457).*

ISDN PRI (24B+0D) is supported at an information payload data rate of 1.536 Mbps and ITU-TSS Q.931 signaling type and shares a D channel with another ISDN PRI trunk. The applicable standards are *ANSI/EIA T1.607* and *610/ NIUF National ISDN-1 (Telcordia Pub SR-NWT-001937), NIUF National ISDN-2 (Telcordia Pub SR-NWT-002120)*, and *NIUF National ISDN-3 (Telcordia Publication SR-NWT 002457).*

Channelized T1 Trunk. A channelized T1 trunk contains 24 individual channels, each capable of carrying voice or data. The full set of channels has the same speed as a full T1, but the individual channels may be split into voice or data lines using a Channel Service Unit (CSU)/Data Service Unit (DSU). The CSU/DSU is used to split the voice and data channels, allowing the voice channels to be connected to a phone system or PBX and the data channels to a router serial interface. Data channels are often used to provide Internet connectivity.

High capacity digital data services transmit heavy volumes of digital information and support applications that demand high bandwidth such as LAN-to-LAN connectivity and teleconferencing. Customers can connect directly to an Internet Service Provider (ISP) for unrestricted access to the Internet and faster download times. Government agencies would be able to exchange large files and process high volumes of on-line transactions such as payroll and inventory management.

CSDS – CHANNELIZED T1 TRUNK

Product Description	Service-Specific Architecture
Channelized T1 trunk service is a high-capacity digital channel that carries voice grade local exchange and channel service between the customer's serving central office and the customer's compatible premises equipment.	Channelized T1 is supported for 24 separate DS0 channels. The Channelized T1 service provided by Verizon meets the specifications in the ANSI standards T1.102/107/403.

| Benefits to the Customer |
|---|
| • Transmits large amounts of information at high speeds |

CSDS – CHANNELIZED T1 TRUNK
• Using high-capacity digital data services is an economical alternative to using multiple lower-speed channels to transmit the same information
• Guaranteed transmission capacity is not subject to network congestion or delays
• Meetings can be held by videoconferencing, reducing travel time and expense
• Increased security access reduces unauthorized network access
• Gain versatility to allocate a changing number of lines (up to a total of 24) to data transport, Internet access, local or long distance calling and rearrange them as needed
• Dedicated Internet access prevents delays on the Web
• Digital-quality data and voice connections plus additional cost savings by consolidating voice and data services onto a single high-capacity digital circuit.
• High-speed, secure point-to-point communications between the Government agencies and the Internet with a 99.9 percent uptime guarantee.

3.3.2 Dedicated Transmission Service (C.2.4) - Service Overview

Verizon's proposed network architecture and infrastructure will ensure the delivery of high-quality, secure, and reliable Dedicated Transmission Service (DTS). Verizon will provide DTS by deploying a dedicated point-to-point circuit using its existing fiber-based or copper-based facilities (up to T1 level) or a Synchronous Optical Network (SONET) and Dense Wave Division Multiplexing (DWDM) network using a self-healing platform of fiber-optic facilities already servicing WITS2001 customers to interconnect the WITS 3 network with other specified Government networks.

Verizon's mission-critical DTS infrastructure extends throughout the NCR. Verizon has continuously deployed advanced technologies such as SONET and DWDM. Figure 3.3.2-1, WITS 3 DTS Network depicts the Verizon network that will support WITS 3 DTS.

Figure 3.3.2-1: WITS 3 DTS Network
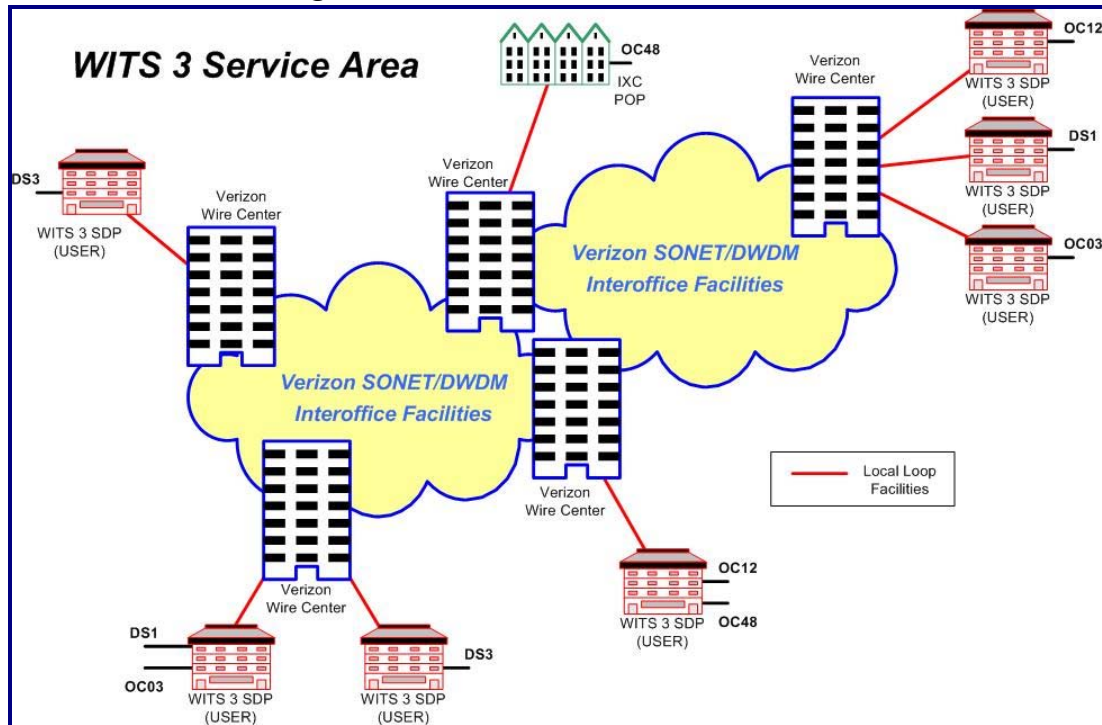
The DTS performance parameters for originating or terminating connections will meet the following specifications:

- All analog transmission parameters will satisfy the values and ranges set forth in *Telcordia Pub GR-335-CORE* and *Sections 7.4 and 7.5, Transmission, BOC Notes on the LEC Networks (Telcordia Pub SR-TSV-2275)*. Verizon has been a member of the standards body, helped to develop these requirements, and is in compliance.

- All Verizon digital transmission parameters will satisfy the standards set forth in the *High-Capacity Digital Special Access Service - Transmission Parameter Limits and Interface Combinations* (Standard: Telcordia Pub GR-342-CORE); ANSI/EIA T1.503/510 for T1, Telcordia Pub TR-499 for T3, and ANSI/EIA Standards T1.105 for SONET OC3, OC12, OC48, and OC192 service).

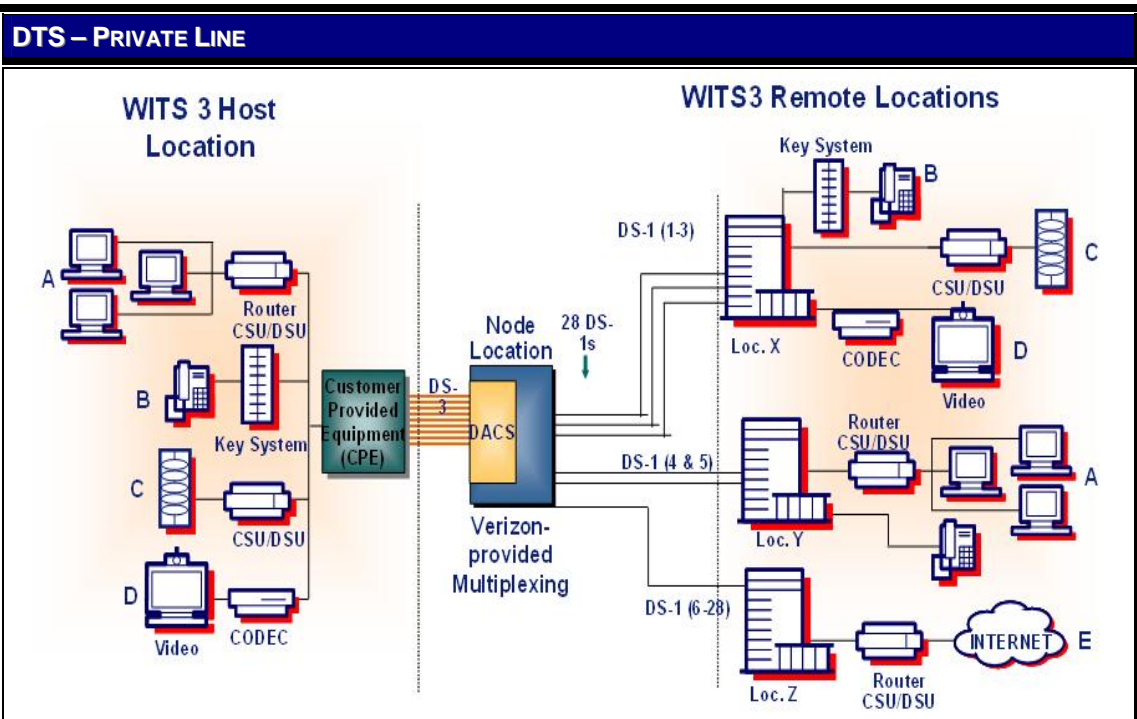*Use or disclosure of the data contained on this sheet is subject to the restrictions on the title page of this proposal.*

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Verizon's DTS solution is based primarily upon SONET technology that has inherently high-quality service features. SONET technology will provide the Government with near 100 percent uptime, extreme reliability, and relatively error-free transmission. The DTS services will be routed over Verizon-owned SONET networks. Circuits will also be diversely routed when possible to maintain a high degree of survivability. In situations where DTS circuits are routed over copper, Verizon will work with the Government to design the circuits in a way to achieve maximum survivability and diversity. Verizon SONET ███████ ██████████ ██████ ██.██ █████ ████████ ██ ██ █████ ████ ████ ███ ████ ██ ███████████ (██) █████ █.█ ███ ██ ████. █ █ █████ ██████, █.█ ████ ██████ ████ ████ ████ ███ █, █████ rings installed. This infrastructure will ensure that Verizon will be able to meet all of the WITS 3 DTS requirements throughout the contract life.

Verizon dedicated transmission service at the T1, T3, and SONET digital rates is monitored around the clock by █████ ███████████ ████████ (████), which supports rapid response and proactive trouble reporting to network alarms. ███ █ ██ █ ███████-████████ ████████ ███ █ ███ ██████ ████ ████, ████ █████'█ █████ █████ ██████, ██████ ████ ███ █████/████ █████ ████ █████ ████ ██ ████████ ██ ███ ██ ████████. The objective of performance monitoring in maintenance is to allow timely detection of performance degradation or related troubles in various network elements, preferably before the end user is adversely affected. The Verizon NOC provides 24x7 provisioning, surveillance, maintenance, trouble resolution, and network management functions. ███ █ ██████ █ █████████ █ █ ████████

██████ █ █ █ ██ █ █ █ █ ██ █-
██████, ████-████ ████████. WITS 3 customers will receive the added service assurance that come with this configuration.

Verizon's approach will accommodate traffic growth, evolution requirements, and technology advancement for dedicated transmission bandwidth between Service Delivery Points (SDPs) at user sites within the WITS 3 service area using existing local access to the WITS 3 SDP and interoffice network. Verizon will also provide private customer ring using dedicated SONET and dedicated DWDM technology for dedicated services between multiple SDP user sites within the WITS 3 service area. Dedicated SONET and dedicated DWDM rings are designed with complete diversity (no single points of failure) so no single fiber or node failure causes a ring failure. Verizon fiber design has complete diversity. The fiber cannot share common cables, conduits, or intermediate COs such that a single event can damage both fiber routes and isolate a node on the ring. This provides the Government with the highest possible level of survivability in the event of a facility or equipment failure.

The following DTS products are described below:

- Private Line
- Dedicated SONET Ring/Nodes
- Dedicated DWDM Ring/Nodes
- TV-1

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DTS – PRIVATE LINE

Product Description

DTS provides low, medium, and high speed point-to-point or multi-point circuits from alarm, voice grade, and data circuits; Digital Data Services (DDS) - T1, T3; and SONET-based services - OC-3, OC12, OC48, and OC192. Verizon will utilize its technical resources to help customers design service to allow aggregation of bandwidth. Such designs make it possible for voice and data to converge for transmission between two WITS2001 sites using point-to-point circuits.

Benefits to the Customer

- Provide a secure transmission medium for mission-critical data versus shared bandwidth on the public data network
- Provide performance superior to switched services with less latency
- Configured to an individual customer's needs

Service-Specific Architecture

For digital DTS using T1 rates and below provided by Verizon, the network will provide network-derived clocking to the connected Dedicated Transmission Equipment (DTE), digital PBX, intelligent multiplexers, or Local Area Network (LAN) bridge/router. The service will also provide data transport and will be transparent to any commercially supported protocol used by the DTE or bridge/router. All bit sequences transmitted by the DTE through the SDP will be data transparent. The following categories of DTS will be supported by the Verizon network, except where noted:

- *Analog:* 4 kHz nominal bandwidth
- *Subrate DS0:* Information payload data rates of 4.8, 9.6, and 19.2 Kbps
- *DS0:* Information payload data rates of 56 and 64 Kbps
- *T1:* Line rate of 1.5 Mbps, which will be used to provide channelized or unchannelized T1 service as follows:
  – *Channelized T1:* 24 separate DS0 channels of 64 Kbps where each DS0 channel may be either a clear channel or contain multiple sub-rate DS0 payloads
  – *Unchannelized T1:* A single 1.536 Mbps information payload

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DTS – PRIVATE LINE

- *Fractional T1:* Verizon will provision up to 24 separate DS0 channels where each DS0 may be either clear channel 64 Kbps or contain multiple sub-rate DS0 payloads. Verizon will provide fractional T1 by deploying a T1 circuit between the two WITS2001 SDPs. Verizon will interface this circuit with a CSU/DSU installed at both ends. The number of DS0s will be provisioned by configuring the CSU/DSU based on the customer's designation, and upon notification to the WITS 3 CSC, can be reconfigured within eight hours to provide a different number of channels. As an option, if the customer wishes this reconfiguration to be automated, on-demand, or remote, Verizon can design the appropriate equipment configuration for this implementation.

- *Channelized T3:* A line rate of 44.736 Mbps, 28 separate T1 channels of 1.536 Mbps information payload rate

- *Unchannelized T3:* A single 43.008 Mbps payload

- *Fractional T3:* A line rate of 44.736 Mbps, Verizon will provision up to 28 separate T1 channels at 1.5 Mbps where each T1 may be either a channelized or unchannelized T1 payload.

- *Channelized OC3:* In this mode, line rate of 155.520 Mbps, three separate T3 or STS-1 channels, each with an information payload data rate of 45 Mbps or 49.536 Mbps respectively, will be supported.

- *Concatenated OC3c:* In this mode, line rate of 155.520 Mbps, a single channel having an information payload data rate of 148.608 Mbps, will be supported.

- *Channelized OC12:* In this mode line rate of 622.080 Mbps, four separate OC3c channels, each with an information payload data rate of 148.608 Mbps, will be supported.

- *Concatenated OC12c.* In this mode line rate of 622.080 Mbps, a single channel having an information payload data rate of 594.432 Mbps will be supported.

- *SONET OC48:* In this category of DTS service, Verizon proposes to offer the Government OC48 SONET rings and DWDM ring with interfaces at the bandwidth rate of 2.488 Gbps. These SONET rings and DWDM rings offer the Government a survivable and robust platform with which to serve their customers OC-48 and sub-OC48 rates.

- *SONET OC192:* In this category of DTS service, Verizon proposes to offer the Government DWDM ring with interfaces at the bandwidth rate of 9.9532 Gbps. These DWDM rings offer the Government a survivable and robust platform with which to serve their customers single SONET OC-192 Channel.

- *Dark Fiber.* Dark fiber may be required on Government agency campuses and between point-to-point locations within the WITS 3 service area. Agencies acquiring dark fiber should have the option of either providing their own optoelectronics equipment or leasing optoelectronics equipment from the contractor.

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DTS – DEDICATED SONET RING
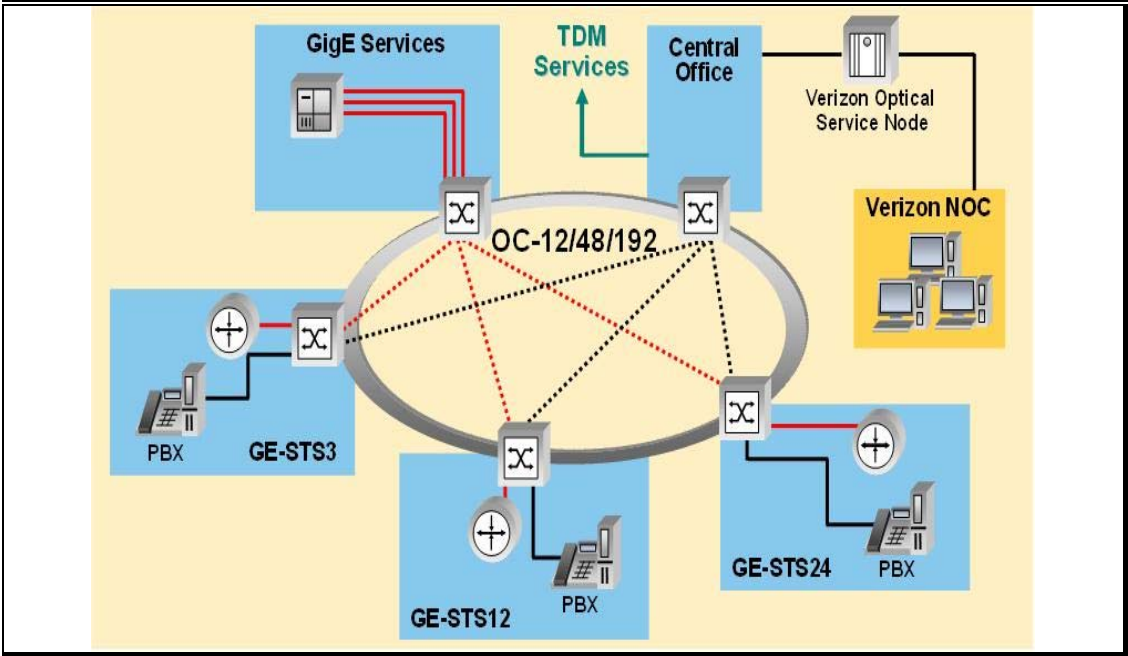
Product Description

Dedicated SONET Ring (DSR) is a SONET-based multi-node self-healing ring architecture that includes Gigabit Ethernet and Fibre Channel/Fiber Connectivity (FICON) over SONET functionality in addition to the existing T1, T3, OC3/3c, OC12/12c, and OC48/48c interfaces. Both the facilities and Add/Drop Multiplexer (ADM) nodes are fully dedicated. The service is designed as a self-healing SONET ring or partial ring by diversely routing the fiber paths where available.

The DSR service is an optical high-capacity service provided using SONET-based technology. DSR is provided on SONET facilities except where a service is extended on an "off-net" facility. DSR will provide the Government a dedicated high-capacity customized network. The network is in a ring architecture or topology that assures greater survivability and can be arranged as a full ring or as a partial ring that provides connectivity to multiple locations. The rate elements of the DSR service are rated discretely. Discrete rate elements include ports, nodes, mileage, and high-speed interfaces (certain partial ring configurations only). The node rate elements for the DSR service consist of OC3, OC12, OC48, and OC192 nodes on a ring. Generally, the ring capacity determines the highest node rate element at each location.

The port rate elements on the DSR service are charges for the interface at which a channelized or lower speed service terminates or originates at a DSR node.

Service-Specific Architecture

Built on a self-healing architecture that provides a highly reliable network, DSR can be used to construct network backbones over which high-speed, high-volume voice, video, data, and storage area networking applications can travel. Supported technologies include Time Division Multiplexing (TDM), Asynchronous Transfer Mode (ATM), frame relay, OC-N, Ethernet, FICON, and fibre channel.

SONET-based services have the following features:

- *Survivability:* DSR is installed over a resilient, dual-fiber ring architecture

- *Reliability:* DSR provides highly available and reliable service

- *Fully managed Verizon solution:* DSR service is proactively monitored 24x7

- *Fully dedicated service:* Both the facilities and ADM nodes are fully dedicated

- *Multi-service platform:* DSR facilitates network convergence by providing the ability to bundle a variety of

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DTS – DEDICATED SONET RING
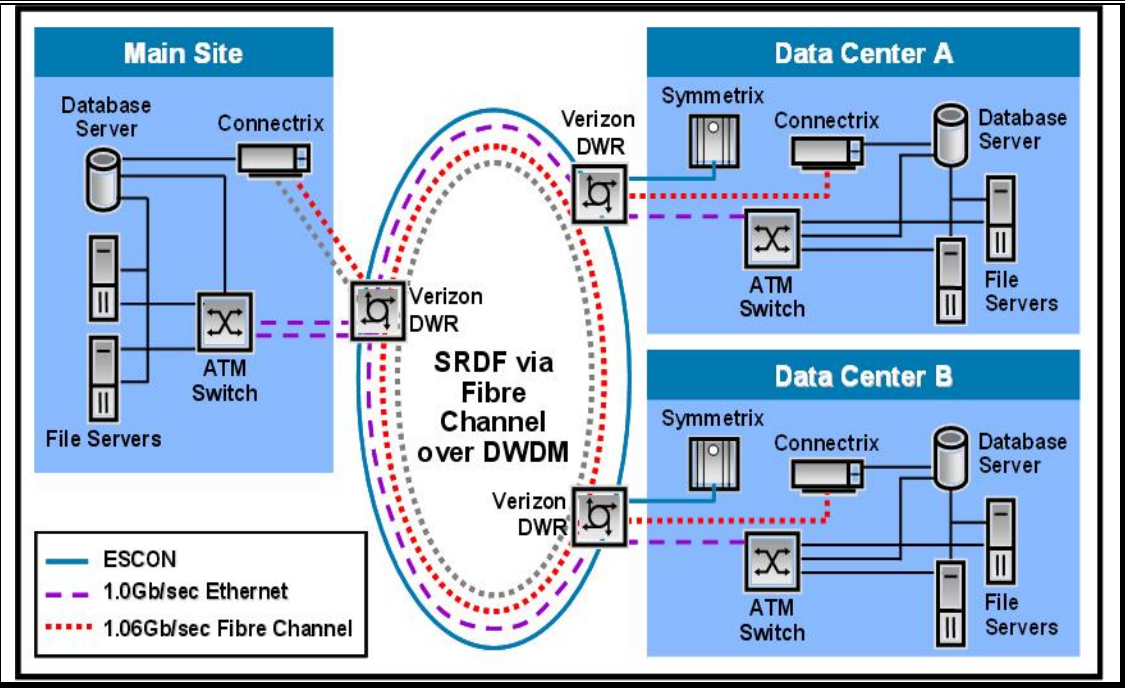
interfaces on one fiber backbone (IP and TDM)

- *Integrated Ethernet multi-point capability:* The Ethernet switching capability of Ethernet Packet Ring Service (EPRS) enables multi-point connectivity via bandwidth allocated between locations on the DSR
- *Cost-effectiveness:* Verizon offers flexible bandwidth and pricing options with term discount plans
- *Scalability:* DSR can meet current and future bandwidth requirements with no forklift upgrades required

Verizon DSR is available at OC-3, OC-12, OC-48, and OC-192 bandwidths. Available TDM interfaces include T1/T3, OC-3/3c, OC-12/12c, and OC-48/48c. DSR for GigE interfaces available include GigE1 (50 Mbps), GigE3 (150 Mbps), GigE6 (300 Mbps), GigE9 (450 Mbps), GigE12 (600 Mbps), and GigE24 (1000 Mbps). Storage interfaces, where available, include FICON and Fibre Channel at 1 Gbps. EPRS is available on OC-12, OC-48 and OC-192 DSRs and can be provisioned with bandwidths of 50 Mbps, 150 Mbps, 300 Mbps, 450 Mbps, 600 Mbps, and 1000 Mbps. EPRS interfaces include 10M, 100M, and 1000M Ethernet.

Benefits to the Customer

- Able to run TDM, Ethernet Private Line (EPL), and switched Ethernet services over the same DSR backbone
- Flexible native Ethernet connections to Ethernet Customer Premises Equipment (CPE)
- Sub-50ms resiliency for native Ethernet Layer 2 connectivity
- Able to reach multiple endpoints from a single UNI (E-LAN)
- Support of 802.1Q IEEE Virtual LAN (VLAN) tagging specification used to define communities of interest
- EPRS Ethernet service creates an optical WAN/LAN within the customer's DSR
- Better bandwidth utilization (the same Synchronous Transport Signal (STS) paths are used around the ring and the SONET protection path is disabled for increased data transmission)

DTS – DEDICATED WAVELENGTH RING (DWR)

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DTS – DEDICATED WAVELENGTH RING (DWR)

Product Description

DWR is an advanced data networking service that uses Dense Wave Division Multiplexing (DWDM) technology. DWDM uses the properties of refracted light to combine and separate optical signals based on their wavelengths within the optical spectrum. Therefore, DWDM allows for a more efficient use of existing fiber by providing multiple optical paths along a single pair of fibers.

Verizon DWR solutions utilize a ring or point-to-point architecture. DWDM is a Layer 1 transport technology that combines multiple optical data interfaces onto one optical fiber pair with each signal carried on its own separate light wavelength. DWDM allows for a greater range of protocol transmission better suited than legacy network for data-centric applications (e.g., GigE, ESCON, Fibre Channel, D1 Video, and ISC). The Government can consolidate multiple networks supporting these technologies along with SONET-based data networks thereby increasing network efficiency and centralizing network management.

Benefits to the Customer

Verizon DWR was developed to meet WITS 3 requirements:

- Network security
    - Protecting the network
    - Maintaining application availability
- Scalability
    - Offering more bandwidth
    - Adding more locations
    - Networking more applications
- Reliability
    - Ensuring application performance
    - Providing faster recovery

Service-Specific Architecture

DWR is a dedicated customer ring network service using DWDM technology. DWRs consist of WITS 3 customer and Verizon Optical Add/Drop Multiplexer (OADM) nodes built in closed ring architecture with complete fiber and node diversity. One of the major drivers for DWDM is the WITS 3 customers growing need to optically extend their enterprise storage networks. The following applications meet this need:

- Consolidation of server and storage farms
- Business continuance/disaster avoidance
- Remote disk mirroring
- Secure data sharing
- Video on demand
- Vertical specific applications

These applications are referred to as storage area networking solutions. Through Verizon's co-marketing agreement with EMC[2], RFP assistance and joint sales engagements are available to support customers' storage area networking requirements.

DTS - TV-1 Service

Verizon in an effort to provide continuity of service is proposing TV-1 service, which provides for point-to-point circuits used for video transmission. This service is currently used by several agencies within the National Capital Region (NCR).

Basic Service Capability. The Government can utilize the TV-1 service to transmit broadcast quality audio and video between locations. TV-1 service will provide a basic video channel with one-way transmission capability for a standard 525-line/60-field monochrome or National Television Systems Committee color, video signal, and one or two associated 5 or 15kHz audio signal(s). Video channels will be provided between the customer-designated premises and a Verizon hub. The following two service levels are available:

- TV - 15 Video Basic Service
- TV Video Basic Service

If fiber is already in place, the standard interval for implementing TV-1 service is five business days. If fiber is not in place, a site survey will be required and the interval may be up to 90 business days for fiber implementation.

Interfaces. The termination rate element for TV-1 service will include the use of up to twenty-five feet of coaxial cable from the point of entry into the customer's building to the channel interface. In the event that the customer requests that Verizon extend the location of the channel interface beyond 25 feet, the Inside Wiring and Technical Supports Services portion of this proposal response will provide for extended channel interfaces. The extended communications path is subject to distance limitations, which are specific to the communications paths being extended. Verizon will provide TV-1 service in accordance with F.C.C. Tariff No. 1, Sections 7.2.5 and 7.5.5.

3.3.3 Teleconferencing Service (C.2.5) - Service Overview

Verizon Teleconferencing Service (TS) offers the Government the ability to conduct a point-to-point or point-to-multipoint conference using the Public Switched Telephone Network (PSTN), a Government agency private

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intranet, or the public Internet. The Government can use TS to conference with other users in the NCR, the United States, Europe, the Middle East, and Africa (EMEA), and Asia. TS conferences may be scheduled by telephone, fax, or online via the Consolidated Conferencing Reservation System (CCRS). CCRS operates on a high-end DEC alpha computer with full disaster recovery capabilities and currently ████████ █ ████ █ ████████ ████████ ████ █ ██, ████████ ████ █ ████ █ ████ ██ ████ ████ ████ █ ██, ████████████████ ████.

TS dial-up analog or Integrated Services Digital Network (ISDN) access uses Verizon's reliable PSTN network. IP access to TS is individually designed on a case-by-case basis. When a WITS 3 user registers IP sites, requesting access to TS, Verizon will assign an engineering team to design network access from each customer IP node to a TS access point.
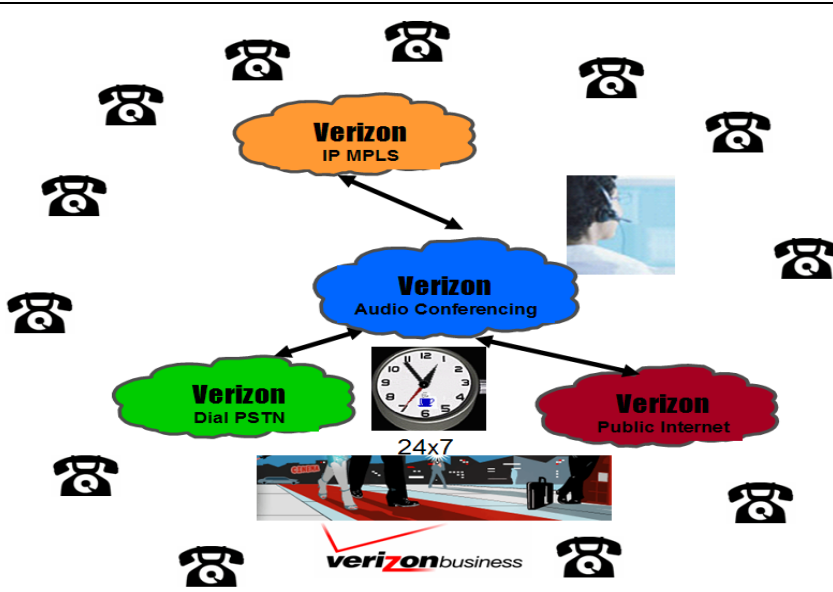
TS video uses Polycom MGC100 and Voyant bridges. TS audio uses Polycom MGC100 and Compunetix bridges. All TS bridges are ITU-T H.320, H.323, T.120, and H.239 compliant and fully meet the requirements of FTR-1080 ██ █ ██ ████ █ ██.

TS has a comprehensive security policy based on the ISO 17799 – Information Technology – Code of Practice for Information Security Management, the Generally Accepted Information Security Principles (GAISP), and the National Institute of Standards and Technology (NIST). Verizon's security groups include (1) Network & Information Security (NIS), (2) Government Network Security Operations Center (GNSOC), and (3) Enterprise Security Task Force (ESTF).

Verizon conferencing uses the Consolidated Conferencing Tracking System (CcTS) to measure the quality of TS processes and procedures. CcTS runs on a Clarity-based platform and a case is opened for each affected conference. The data that CcTS provides gives TS an invaluable

tool for trending and analysis on the types of calls handled and the problems associated with them. CcTS is designed to enable TS to continue to provide Verizon's customers with the highest level of quality control and exceptional customer service.

VERIZON AUDIO CONFERENCING

Product Description

Verizon Audio Teleconferencing Service supports more than 334,000 hours of audio conferences per month and is scalable as to accommodate additional capacity as needed. Audio conferencing provides a multipoint local and long distance telecommunications service between a single calling station and two or more called stations. Audio Conferencing requires a teleconferencing bridge port for each called station. Verizon Audio Conferencing Centers provide the necessary bridge ports. This service is not available for collect calling.

Access Methods (1) *Dial-out access*: conference coordinator sets up dial-out conference calls; (2) *Toll-free meet-me access*: reserve a toll-free number for a pre-arranged date and time; (3) *Toll meet-me access*: reserve a direct long distance dial number for a pre-arranged date and time; (4) *Voice services dial-out access*: reserve an attendant-assisted direct long distance dial-out conference call for a pre-arranged date and time

Four levels of service (1) *Premier service*: provides a conference coordinator to greet and announce each participating caller into the conference call, take roll call, and monitor the call until it ends (2) *Standard service*: reserved in advance and is an attended service that provides two entry methods – a) a coordinator greets and announces participants as they dial in or a) the call leader and participants are given a numeric pass code to automatically enter the conference; (3) *Unattended service*: provides a coordinator for technical assistance only, conference call participants enter the call by entering a pre-assigned pass code; and (4) *Instant meeting service*: provides 24x7 conference calling availability supported by pre-assigned bridge ports. Verizon will issue two pass codes to the customer for use with instant meeting service at the time enrollment. One pass code is assigned for the customer's use to activate the subscribed ports for a conference call. A second pass code is provided to the customer to be made available to the participants on any instant meeting conference call that the customer initiates. Conferences maybe scheduled via telephone, fax, or on-line.

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VERIZON AUDIO CONFERENCING

Benefits to the Customer

- Reaches people quickly enabling them to make important decisions faster
- Reduces cost and travel time
- Brings dispersed groups together despite time and location limitations
- Improves communications and broadens meeting participation
- Allows users to tailor meetings and collaborate using value-added features designed to meet specific needs
- Gives users the ability to select their service level on a call-by-call basis, allowing them to customize meetings

Service-Specific Architecture

The primary means of accessing Verizon's audio conferencing resource is over the PSTN, but IP access over the customer's private extranet and the public Internet is also available. When the user registers IP audio conferencing sites, a Verizon engineering team will be assigned to design audio conferencing access (video conferencing as well if required) on a case-by-case basis. Verizon Very-high-performance Backbone Network Service (vBNS) is well suited for transporting IP audio and video traffic to the TS access point. Private IP is based on Multi-Protocol Label Switching (MPLS) technology, which integrates the performance and traffic management capabilities of Layer 2 with the scalability and flexibility of Layer 3 routing. In addition, Verizon MPLS enables PIP to separate customer traffic through a VPN. The result is the security and Quality of Service (QoS) of Layer 2 switching with the scalability and any-to-any connectivity of PIP. PIP vBNS is not required, but Verizon T1, DS3, and ATM-T1 services with QoS activated on a voice, video, and share transport is required.

- *PSTN TS Access* – The user accesses TS service by dialing or is dialed from the TS center via the PSTN. The ISDN call is not routed directly to the affected TS center. It is routed to one of three geographically diverse data centers in the United States. The data centers are connected in an interlocking grid to every Verizon switch and to each other. In the event of an emergency, one data center can control the entire network. The reservation system has direct diverse data center connections that allow real-time scheduling changes. Therefore, routing around failed equipment or traffic congestion is easily accomplished. Call center facilities can operate any bridge in the TS network around the world. Connectivity to the facilities and bridges is based on the vast and redundant Verizon digital and fiber optic networks. The switched network is based on a self-healing architecture that automatically routes around service-affected areas.

- *IP TS Access* – When the customer indicates to the account team that there is an interest in establishing PIP network access to the TS the following steps will be taken: (1) The account teams begins by documenting the Verizon Extranet features for MPLS; (2) After collecting as much extranet information as possible, the account team will arrange a meeting with the engineering team; (3) The account team will confirm the design after the meeting with the engineering team; (4) When the IP service circuit IDs are ready, the account team will submit the TS extranet forms; (5) The account team will assist the customer with registering the video conferencing end-points; (6) The customer receives a confirming e-mail; (8) The engineering team confirms the number of video end-points, the maximum required bandwidth per site, and the endpoints are part of the customer's intranet or on a separate network segment; (12) The engineering team will confirm the PIP addresses, implement the customers video IP options, gather the firewall or application proxy vendor and model information, establish WAN port speed, circuit ID site location registration, PIP car selection, register CPE router information, open video ports in the firewall, and determine if NAT is used, extranet provisioning, establish Layer 23 network connectivity date, gatekeeper registration, and H.323 start date, verify network pipe bandwidth, set circuit SLAs, and turn up service.

- *e-Scheduling* – When TS registration is complete, a user profile has been issued and the software has been loaded on the user's computer. The customer is ready to start managing and administering the TS resource.

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VERIZON VIDEO CONFERENCING

Product Description

Verizon Video Conferencing is live, interactive image and voice communication between two or more locations. It provides businesses with all the advantages of face-to-face interaction while helping to save money on travel expenses. Verizon Video Conferencing allows companies to conduct remote meetings with locations virtually anywhere in the world via state-of-the-art conferencing centers in the United States, the United Kingdom, and Hong Kong, China.

Flexible reservations

- *Phone.* Users can make video reservations via the phone through any of Verizon's global centers where a conferencing specialist will be able to advise about Verizon's video conferencing services.

- *Website.* Online reservations are enabled through e-scheduling on Verizon's Web site. Upon registering for a login name and password on Verizon's Web site, the user can reserve video conferences at their company's registered sites and see which rooms are available in real time.

- *Bridging.* Verizon Conferencing can easily connect a user to a single video location or multiple video locations worldwide. Verizon offers professional conferencing with numerous specialized features.

- *Gateway and Transcoding.* Verizon Conferencing provides the flexibility to support the interconnection of video endpoints using different transport protocols (ISDN or H323/IP) and speeds on Verizon's video bridges. IP connectivity is supported either over the public Internet or through connection to Verizon's Private IP MPLS-based network.

- *Point-to-Point Video Connect.* Many companies prefer to have their video provider connect all of their calls. Verizon offers point-to-point connection through its video bridges. This enables a conferencing specialist to quality check the call and to assist with setup. Support is provided at any time during the call on request.

- *Standard and Premier Services.* With Standard Service, a conferencing specialist assists with the setup and quality check on all video conferences. With Premier Service, a conferencing specialist will monitor the call for the entire duration for quality assurance and technical assistance.

- *Instant Video.* Verizon Conferencing also provides the flexibility for customers to conduct an instant video conference call for up to six participants, in any combination of video and audio participants, at any time. This is a subscription-based reservation-less video conferencing service with a unique dial-in number, host and participant passcodes, which can be used over and over again. Instant video enables participants to connect at speeds up to 384 Kbps via ISDN or IP.

Conferencing Applications

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VERIZON VIDEO CONFERENCING

Sales and Marketing
- Sales Training
- Meetings - internal and external
- Management and Administration
- Board Meetings
- Meetings - internal and external

Staff Meetings
- Remote Location Management
- Corporate Training
- Consultation
- Technical Training
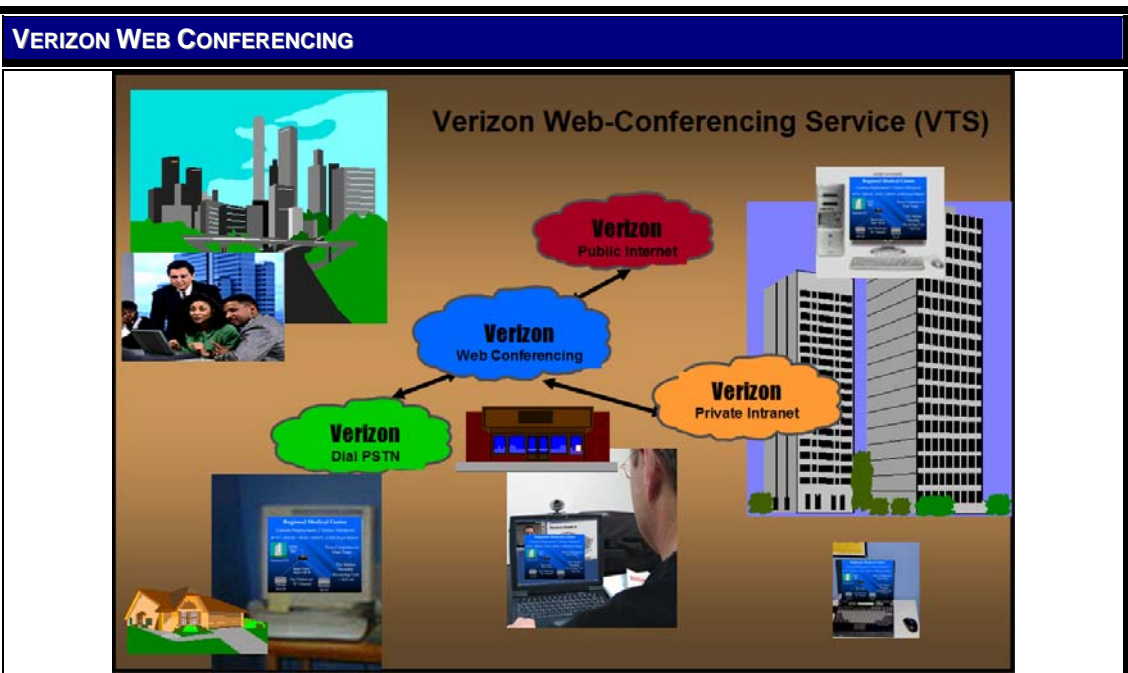- Continuing Education

Human Resources
- Employee Recruitment
- Policy and Procedures Training and Implementation
- Research, Development and Engineering

Product Development
- Product Issues
- Vendor Meetings
- Finance and Accounting
- Fiscal Reporting
- Budget Planning

Management Information Systems
- Project Management
- PC Training
- Crisis Management
- Purchasing

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VERIZON WEB CONFERENCING

Product Description

Verizon Web conferencing provides a multipoint Web-based service that allows a WITS 3 Customer to conduct a document conference call allowing text, documents, data or images (collectively "data") to be transmitted via the Internet either with a reserved session or on demand. Web conferencing may be used to provide data on a one-way, one-to-many, view-only basis or on a multipoint, many-to-many, collaborative basis. To initiate a session, a Web conferencing leader and participants must have browser access to the Internet. The Web conferencing leader and participants may also access an accompanying audio conferencing call. Each participant is allotted an individual server connection on the Web conferencing server. Verizon provides Web conferencing powered by either Microsoft Live Meeting or WebEx Meeting Center platforms.

Verizon Web conferencing offers the following four options, which will allow the Government to choose the right solution for its needs:

1. Reserved Net Conference is an interactive Internet-based service used to connect widely-dispersed individuals or groups to view information and/or edit documents while holding a simultaneous discussion. Reserved Net conference offers operator-assisted support to help leaders troubleshoot, join, or conduct formal Q&A sessions and collaborate on documents in real time. Reserved Net conference, powered by Live Meeting Professional, is perfect for large or small highly-visible events.

Net Replay, a feature of Reserved Net Conference, can be ordered at the time the conference is reserved. During the presentation, Verizon will record and synchronize both the data and audio portions of the call. Verizon will host the Net Replay. Those who missed the live event can still get the full impact of the presentation from their PCs. Additionally, time is saved because the presentation does not have to be repeated for those who missed it. To view the Net Replay, simply enter a Web address and pass code. To access Net Replay, participants will need the following:

- Internet access
- Audio sound card and speakers
- Microsoft Windows Media® Player 9.0 or later
- 128 Kbps connection or faster

WITS 3 customers can set up Net Replays in 30-day increments for up to 360 days. Net Replays can be extended in additional 30 day increments for up to one year. Web conferencing leaders may also choose to have a copy of the Net Replay by adding the FTP Download feature to the meeting.

2. Instant Net Conference is a subscription-based service that allows leaders to create Web conferences within

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VERIZON WEB CONFERENCING

seconds to be used as a personal, on-demand meeting place. Each Instant Net conference subscription provides a consistent, personal meeting ID and password, which leaders are able to communicate to participants at a moment's notice. Leaders may select either Microsoft Live Meeting or WebEx Meeting Center platforms.

3. Customized Net Conference provides customers with a full spectrum of scheduling and registration tools at a unique Web site branded with their name and logo. A customer can further customize the offering by disabling certain features such as desktop sharing. Customized Net conference can utilize either Microsoft Live Meeting or WebEx Meeting Center platforms.

4. Advanced Net Conference offers customers an easy and effective way to communicate and collaborate over the Internet. Advanced Net conference enables organizations to work more productively in nearly every aspect of their business by providing them with the option to choose from two conferencing platforms – Microsoft Live Meeting and WebEx. By utilizing these popular platform features, customers can benefit from virtually all native vendor features including audio and Outlook integration.

The majority of Verizon web conferencing customers combine Web conferencing with Verizon audio conference to deliver a complete communications solution. In these cases, no Web conferencing network bandwidth is consumed by the audio conference. The audio portion of the call is conducted over the existing telephone network.

Web Conferencing Security

Conference ID names for Web conferences are randomly assigned. Pass codes can be randomly assigned or the leader can choose the pass code. The leader pass code for a reserved net conference has a limit of 16 alphanumeric characters. The participant pass code for a reserved net conference is the same as the audio conferencing pass code, which has a limit of 12 alphanumeric characters.

All reserved net conferences offer enhanced security, which encrypts slides while they are on the server. The slide presentation is encrypted using strong-128-bit Advanced Encryption Standard (AES) encryption protocol and transmitted as encrypted Portable Network Graphics (ePNG) files to each participant. This security encrypts the host's presentation as it is uploaded and distributed. It offers additional layers of security for Web conferencing and helps protect the user's content. For additional security, a leader may use Secure Socket Layer (SSL) encryption as well. SSL encryption is an industry standard security protocol that is used by the financial and government sectors, as well as all sectors requiring secure environments to conduct virtual meetings. SSL may be used over a customer's secure VPN. SSL encryption is available at no additional charge.

Benefits to the Customer

- WITS 3 customers can use existing Internet access (LAN, dial-up, Verizon DSL, etc.) and view shared information without specific software and customers do not have to budget for high capital outlay. Available 24x7.
- Collaboration allows real-time editing and replaces document distribution, editing, collection, integration, and redistribution. It saves tedium, time, and resources.
- Maintains document security and privacy through multiple levels of password access for Web conference leaders and Web conference participants. Recurring meetings can be scheduled using the same meeting information and passwords.
- Provides easy access for WITS 3 users. It improves efficiency and productivity and facilitates decision making by promoting all team member contributions and experts can be consulted easily.
- Reduces processing costs by eliminating courier costs and overnight deliver service through on screen document creation, editing and delivery.
- Web conference leaders can coordinate participation in meetings or events quickly and easily.
- Web conference leader can better gauge meeting or event attendance by collecting and viewing participant information on line and for 30 days after the event.

3.3.4 Frame Relay Service (FRS) (C.2.6) - Service Overview

Verizon's Frame Relay Service (FRS) is a virtual private data service that uses virtual connectivity to give users the look and feel of a private network with the flexibility and economies of a public network. FRS reduces

network and equipment expenditures and management and administrative costs. It increases network performance through greater connectivity, availability, and throughput. FRS improves overall price and performance for data networks and provides strategic mission advantages that will enhance Government productivity and collaboration.

FRAME RELAY SERVICE (FRS)

Product Description

Verizon offers a variety of dedicated and remote IP access options that enable Government organizations to create a single enterprise network. In addition, Verizon's dedicated access options include 56 Kbps, fractional T1, T1's, and T3's. For maximum efficiency, FRS supports Verizon's digital gateway options. T1 digital gateway enables customers to allocate any part of the access T1 bandwidth in DS0 increments to different Verizon services. The DS0s may be configured in channelized (56 Kbps) or clear channel (64 Kbps) formats. Government organizations may access FRS at port speeds ranging from 56 Kbps to 45 Mbps. FRS may be accessed at the following port speeds:

Port Speed	PVC (CIR)
64 Kbps	16 Kbps, 32 Kbps, 64 Kbps
1.5 Mbps	128 Kbps, 256 Kbps, 384 Kbps, 512 Kbps, 768 Kbps, 1024 Kbps
45 Mbps	3.072 Mbps, 4.608 Mbps

Verizon currently supports low-speed ports of 56 and 64 Kbps and Committed Information Rates (CIRs) of 16 and 32

FRAME RELAY SERVICE (FRS)
Kbps for narrowband Subscriber Network Access Lines (SNALs). Verizon also currently supports a wideband SNAL of 1.536 Mbps and CIRs of 128, 192, 256, 384, 512, and 768 Kbps. Verizon supports the requirement for one Permanent Virtual Circuit (PVC) per SNAL. The customer may select the CIR from Verizon for the PVC. Data can be transmitted only between pre-established PVCs identified by Data Link Connection Identifier (DLCI) markers that appear in the frame headers. Each customer may specify the DLCIs to use for each direction of a PVC, or request Verizon to assign the DLCIs. Once the DLCI is assigned to an access port, the Verizon switch sends a response message to the customer's User-to-Network Interface (UNI)/AAF Customer Premises Equipment (CPE), indicating its existence. The customer's UNI/AAF CPE pulls the assigned DLCI for the new PVC into its routing table, goes through the remote address discovery protocol, and sets up a relationship in the UNI/AAF CPE tables between the DLCI and the customer's internal address. This entire process ensures proper end-to-end data routing. Once Verizon Frame Relay Service (FRS) is provisioned, the service provides unlimited usage within the WITS 3 service area.

Benefits to the Customer

- Support for "bursty" Local Area Network (LAN) interconnection and connectivity to both small and large locations
- Multi-protocol support to transport Ethernet, token ring, Transmission Control Protocol/Internet Protocol (TCP/IP, Systems Network Architecture (SNA), and Internetwork Packet Exchange (IPX)
- Use of a common infrastructure offers process efficiencies that improve the speed of service delivery
- Allows Government agencies to share data across a common network
- Government departments are no longer burdened by disparate infrastructures that perpetuate operational inefficiencies and slow responses
- Provides support for eGovernment collaboration initiatives that cross agency boundaries
- Systems are added or expanded in advance of traffic need in a manner that is transparent to customers
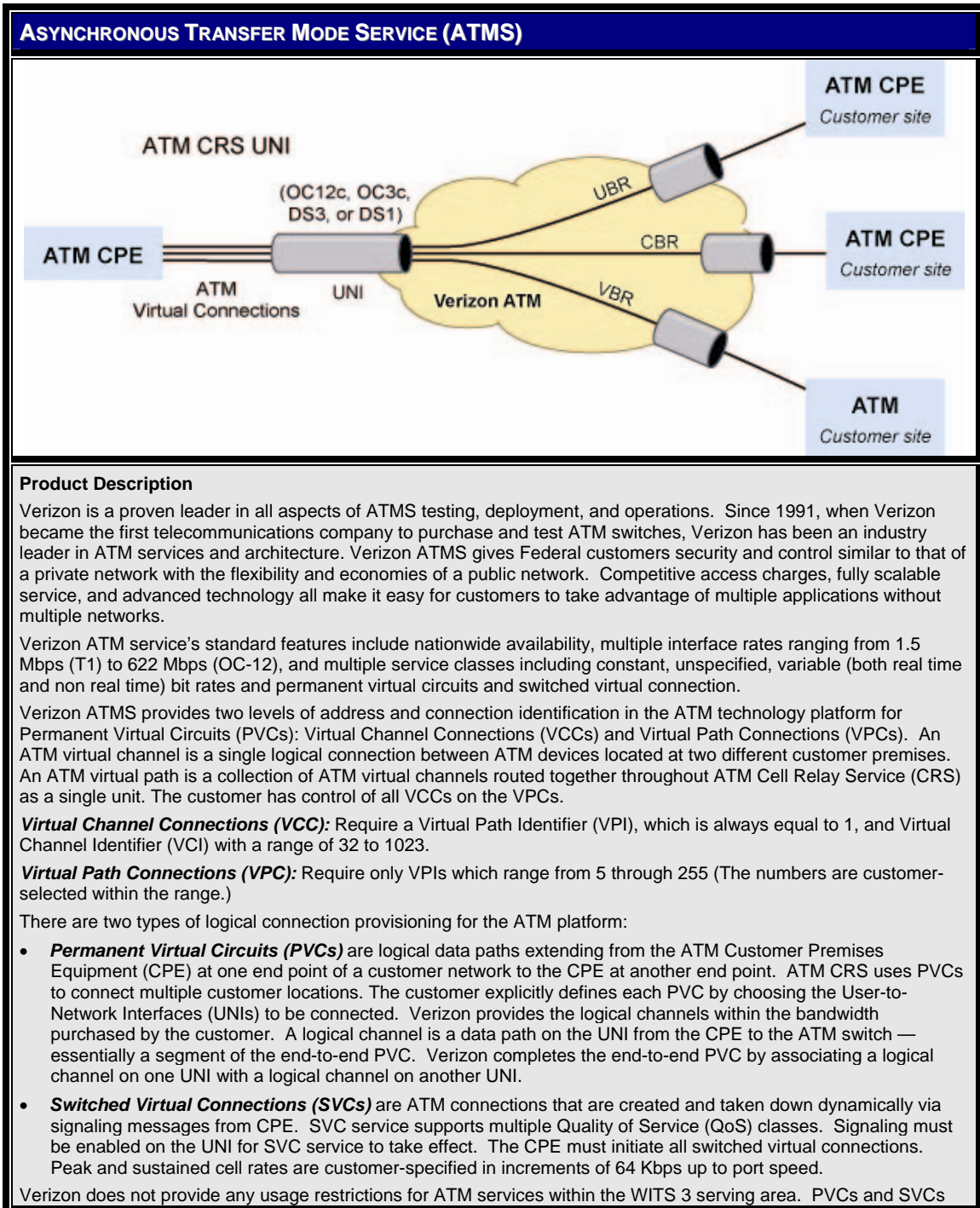
Service-Specific Architecture

The Verizon FRS network backbone architecture employs high-speed, digital switching, and fiber-optic transmission. Verizon's FRS switches are designed with redundant processors and power to provide no fault service. Verizon's FRS switches are also designed with hot, changeable line cards to minimize down time if ever there is a failure. FRS provides coverage across the entire NCR. Verizon has FRS Points-of-Presence (POPs) uniformly scattered across the National Capital Region (NCR). The Verizon footprint will be able to support all WITS 3 customers. The Network Interface Device (NID) and switch availability currently measure 99.99%.

In addition, Frame Relay ATM Service Internetworking (FRASI) allows FRS PVCs to be built across an ATM backbone. Government agencies with large applications benefit with high-speed access and FRASI interconnectivity between agencies using ATM as a hub location and FRS for their remote sites. Currently a significant number of Verizon FRS and ATM customers have begun utilizing an MPLS-based service either in conjunction with their existing frame relay and/or ATM network(s) or as an alternative solution. While momentum for migrating to MPLS-based solutions is growing, many frame relay and ATM customers plan to leverage their existing investment in frame relay and ATM until their business needs necessitate migrating to an MPLS- or IP-based solution. Verizon is pleased to offer technical and management assistance in establishing plans for migration, transition support, and/or hybrid technology environments.

3.3.5 Asynchronous Transfer Mode (ATM) Service (C.2.7) - Service Overview

Verizon's ATM Service (ATMS) is based on up-to-date standards and technology that make it possible to run all needed applications over one network. ATM will enable the Government to eliminate the expense of deploying, operating, and maintaining separate networks for voice, data, video, and frame relay. ATM is a high-speed transport technology that

simplifies network complexity by handling different traffic types, interface speeds, and user applications.

ASYNCHRONOUS TRANSFER MODE SERVICE (ATMS)

Product Description

Verizon is a proven leader in all aspects of ATMS testing, deployment, and operations. Since 1991, when Verizon became the first telecommunications company to purchase and test ATM switches, Verizon has been an industry leader in ATM services and architecture. Verizon ATMS gives Federal customers security and control similar to that of a private network with the flexibility and economies of a public network. Competitive access charges, fully scalable service, and advanced technology all make it easy for customers to take advantage of multiple applications without multiple networks.

Verizon ATM service's standard features include nationwide availability, multiple interface rates ranging from 1.5 Mbps (T1) to 622 Mbps (OC-12), and multiple service classes including constant, unspecified, variable (both real time and non real time) bit rates and permanent virtual circuits and switched virtual connection.

Verizon ATMS provides two levels of address and connection identification in the ATM technology platform for Permanent Virtual Circuits (PVCs): Virtual Channel Connections (VCCs) and Virtual Path Connections (VPCs). An ATM virtual channel is a single logical connection between ATM devices located at two different customer premises. An ATM virtual path is a collection of ATM virtual channels routed together throughout ATM Cell Relay Service (CRS) as a single unit. The customer has control of all VCCs on the VPCs.

Virtual Channel Connections (VCC): Require a Virtual Path Identifier (VPI), which is always equal to 1, and Virtual Channel Identifier (VCI) with a range of 32 to 1023.

Virtual Path Connections (VPC): Require only VPIs which range from 5 through 255 (The numbers are customer-selected within the range.)

There are two types of logical connection provisioning for the ATM platform:

- *Permanent Virtual Circuits (PVCs)* are logical data paths extending from the ATM Customer Premises Equipment (CPE) at one end point of a customer network to the CPE at another end point. ATM CRS uses PVCs to connect multiple customer locations. The customer explicitly defines each PVC by choosing the User-to-Network Interfaces (UNIs) to be connected. Verizon provides the logical channels within the bandwidth purchased by the customer. A logical channel is a data path on the UNI from the CPE to the ATM switch — essentially a segment of the end-to-end PVC. Verizon completes the end-to-end PVC by associating a logical channel on one UNI with a logical channel on another UNI.

- *Switched Virtual Connections (SVCs)* are ATM connections that are created and taken down dynamically via signaling messages from CPE. SVC service supports multiple Quality of Service (QoS) classes. Signaling must be enabled on the UNI for SVC service to take effect. The CPE must initiate all switched virtual connections. Peak and sustained cell rates are customer-specified in increments of 64 Kbps up to port speed.

Verizon does not provide any usage restrictions for ATM services within the WITS 3 serving area. PVCs and SVCs

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ASYNCHRONOUS TRANSFER MODE SERVICE (ATMS)

may be bi-directional point-point or unidirectional point-multipoint. Bi-directional Virtual Connections (VC) may be either symmetric or asymmetric. This is true of all UNIs in the Verizon network, regardless of port speed and conforms to af-uni-0010.002, the UNI 3.1 specification. Verizon will support additional Constant Bit Rate (CBR) and Variable Bit Rate (VBR) bandwidths in multiples of 5Mbps. Peak and sustained cell rates are customer-specified in increments of 64 Kbps up to port speed.

Benefits to the Customer

- *Cost effective* – multiple logical connections can be established over a single physical access line
- *Port flexibility* – additional logical connections can be added to an existing ATMS location with the need for additional access facilities or customer equipment
- *High performance* – support of delay-sensitive applications such as real-time video, multimedia, file-transfers, and distributed computing
- *Bandwidth flexibility* – support for CBR, VBR, and unspecified bit rate (UBR)

Service-Specific Architecture

Verizon ATM services provide coverage across the entire WITS 3 service area. The Verizon footprint will be able to support all existing and future WITS customers. The WITS 3 ATM network is one component of Verizon's broadband network infrastructure. Verizon's fully redundant network architecture includes physically-diverse network trunking at speeds up to OC48. These trunk facilities interconnect Verizon ATM switches to create a fully redundant fast packet network to support full and automatic network restoration.

The figure above describes a typical ATM access configuration where a Government agency can access Verizon's ATM network at various PVC speeds. The PVCs for speeds aggregating below OC-12 typically terminate at a Verizon ATM edge switch, whereas, higher speed PVCs (i.e., OC-12) will terminate directly at a Verizon ATM backbone switch. There can be numerous end devices behind the customer's ATM switch including PBX, PCs, etc., with different QoS traffic requirements.

Verizon's current network contains sufficient excess traffic capacity today such that incremental infrastructure additions for the WITS 3 contract are minimal at most. Verizon has shown since the beginning of WITS2001 that it can manage the continuous expansion of network resources to meet future capacity demands. Systems are added or expanded in advance of traffic need in a manner that is transparent to customers. As a general objective, Verizon's network capacity engineering organization maintains ███████ █████ ████████████████████████████ ███████ above the committed requirement necessary for additional growth and burst capabilities. This alone would handle any additional ATM port or PVC requirements incremental to the Verizon ATM utilization already supported. Forecasts from marketing are also factored for growth. ████████████████████████████████ ██ ████████████████████████████████████.

3.3.6 Dark Fiber Service (DFS) (C.2.8) - Service Overview

To ensure the delivery of high quality, secure, and reliable WITS 3 Dark Fiber Services (DFS), Verizon has agreed to team with several leading Dark Fiber Service providers in the NCR. This allows Verizon the widest range of potential diverse dark fiber networks in the area. The Verizon Partners, in conjunction with the Verizon WITS 3 PMO will support DFS.

DARK FIBER SERVICE (DFS) (C.2.8)

Benefits to the Customer

- Cost-effective, scalable, high-quality fiber-optic networks

- Network designs based on individual or group agency requirements

- Diversely-routed, dedicated fiber ensure security and survivability of transport

- Wide variety of standard service options including: custom network engineering and design, network construction, fiber maintenance, 24x7 fiber monitoring, and emergency restoration
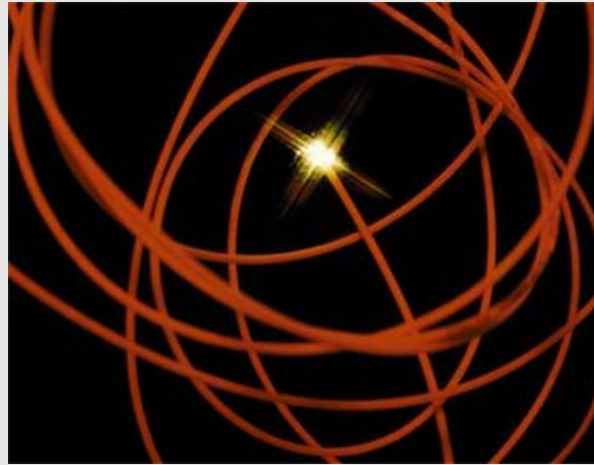
Product Description

Network Maintenance. Verizon performs regular routine maintenance on shared network systems and custom applications including inspections, maintenance on the general infrastructure, relocations, and general upkeep. Verizon has integrated numerous advanced technologies into its daily operations to improve accuracy, minimize response time, and reduce potentially hazardous situations:

- Remote network monitoring and testing

- Records management

- Street-level mapping and network overlays

- Design and engineering with AutoCAD®

- Technologically advanced locating and Web-enabled ticket management applications

Locate Services. Verizon marks the cable system for utility development, general construction, and landscaping in the area and coordinates and executes routine and emergency locates utilizing a proprietary frequency. Verizon locators also provide the following array of other services as they perform their normal duties:

- Routine ride out of the network path to spot activity that could cause harm to Verizon facilities.

- Stand-by services during pre-identified construction activities.

Verizon maintains contact with local utility companies and economic development planners to obtain accurate and current information about street widening and pole change-out projects. Verizon's compliance with local, state, and federal authorities and its response to and cooperation with utility locate services help to protect the network.

The following are a few of the useful Verizon fiber monitoring features:

- *On Demand Testing Mode*: Quick-and-easy performance testing

- *Local and Remote Alarms:* Reduces duration of outages and speeds identification of failures

- *Electronic and Hard Copy Documentation*: Ensures up-to-date, accurate records and information flow

Fiber Monitoring. The primary objective of fiber monitoring is to facilitate a quick response to identified faults or to stabilize network troubles with variable maintenance routines. Verizon uses comprehensive optical cable plant management systems encompassing configuration, fault management, performance monitoring, and data management. These systems continuously evaluate fiber condition, observe degradations and breaks, and transmit alarms to the appropriate personnel center. All fiber information is transmitted instantaneously. The system is operational 24x7.

Emergency Restoration. Upon detection that the network is damaged or not functioning properly, Verizon immediately investigates the situation and expedites emergency restoration, if necessary. Verizon has made specific preparations to ensure the readiness and accessibility of personnel and equipment required for response to emergency conditions.

DARK FIBER SERVICE (DFS) (C.2.8)

- Emergency restoration contractors in place and on stand by in each market

Network Planning, Design and Engineering

Network Planning. Verizon helps WITS 3 customers prepare for successful network operations by tailoring each project to the specific customer. Verizon is experienced in meeting the unique challenges of network planning by helping customers strategically design a fiber-optic network. All potential issues that affect a network development project are examined, and Verizon performs market analysis including regional right-of-way and franchise assessments, identification of carriers, and sizing and evaluating the market through business and residential line research.

Design and Engineering. Based on the Government's network objectives, Verizon develops a preliminary route design and recommendations for potential network paths. Once a preliminary route design is completed, the Verizon engineering group can provide the Government with detailed engineering plans designed to promote success in a given market. Capacity requirements and expansion opportunities are identified and considered in the engineering phase.

Network Project Management & Construction Services. Verizon provides a full range of project management and construction services that ensure network development projects are completed on time and within budget. Verizon develops innovative and effective solutions to challenges inherent in network development. Verizon's extensive experience in managing and constructing large network implementation guarantees its customers the ability to partner with a successful provider of network infrastructure.

Project Management. Verizon provides customers with all-inclusive project management services for implementation of a quality telecommunications network. Experienced technical support managers are assigned to streamline operations and provide customers a single point of contact. Working with the Government, a detailed project schedule will be developed for effective and efficient execution of the network development project. The following project management services are included:

- Timetable and schedule coordination
- Accounting and invoice management
- Quality control assurance
- Onsite management and inspection

Construction and Fiber Deployment. Verizon has developed an extensive network of suppliers to provide the highest quality equipment at the lowest cost. Whether the network is aerial, underground, or a combination of both, Verizon has the experience to deliver quality communications networks that exceed expectations. Each contractor is screened and pre-qualified to ensure quality then required to follow a rigid assurance plan to maintain their qualified status.

Verizon's construction services include:

- Deploy fiber using the latest standards to ensure slack points are strategically placed for fast network restoration due to potential fiber cuts and to allow access for future customer tie-ins
- Provide enhanced fiber testing using a state-of-the-art Optical Time Domain Reflectometer (OTDR) capable of long range and high resolution testing

Service-Specific Architecture

Verizon's DFS solution will accommodate evolution in service requirements, advances in technology, and changes in the regulatory environment. Dark fiber (fiber optics) provides large bandwidth capabilities, exceeding wireless, copper, and microwave in terms of traffic growth potential. By adjusting the equipment's size and speed capabilities, the Government can take advantage of bandwidth with dark fiber. In addition, Verizon can install and provide multiple numbers of fibers for use. The current dark fiber backbones installed today have an average of 350 fibers per market, which more than exceed the requirements necessary to light and support all voice and data traffic in the NCR.

Evolution in Service and Technology Advances: Except for some improvements in wireless, fiber remains the primary choice of carriers today for transmitting traffic. Currently, dark fibers' advances are centered on the new equipment that can send a signal further without loss. The expectation is this equipment will continue to evolve and improve the dark fiber delivery. Today's regulatory environment is favorable to DFS. The need for bandwidth has encouraged the franchisees and right of way owners to work with dark fiber providers to ensure delivery.

3.3.7 Internet Access Services (C.2.9) - Service Overview

Internet Access Services (IAS) consist of a suite of high-speed and high-performance access solutions that typically offer full-time dedicated access to the Internet. Verizon IAS are comprised of basic Local Area Network (LAN)/Wide Area Network (WAN) applications, high-bandwidth access up to 2,488 Mbps (OC-48), end-to-end public Virtual Private Networks (VPN), and Private IP networks. Verizon provides IAS on its wholly-owned access and network facilities in multiple locations around the world. By maintaining an end-to-end solution, Verizon can offer competitive Service Level Agreements (SLAs).

More and more applications are becoming Web-based. These applications are increasingly involving voice, video, and data-in applications such as streaming video, Web browsing (online shopping using high-resolution images), e-mail, MP3 files, and VoIP. These applications require high-speed and high-performance Internet access. Verizon provides comprehensive, facilities-based IP solutions to help Government agencies maximize Internet opportunities. Verizon offers a vast selection of access choices for Internet services.

Access Type	Description
Dial-up	Using voice analog line to dial up for Internet Access
Broadband	Residential/home-office and small business using digital subscriber line services
Dedicated	Dedicated Internet Ports at the following Port Speeds - 56/64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps, 768 Kbps, 1.536 Mbps, 4 Mbps, 10 Mbps, 16 Mbps, 34 Mbps, 100 Mbps, 155 Mbps, and 45 Mbps. Access for the dedicated service can be DTS, Frame Relay, ATM or GES.

Integrated access with Verizon's line of Internet products feature an array of customer benefits that are built on Verizon's industry-recognized global IP Network. Verizon's Internet network architecture has been designed with redundancy and automatic failover of systems. Verizon's IP network is monitored 24x7 at both network and service levels and offers

customers high-quality performance as well as multiple levels of data security. To protect its network, Verizon uses a combination of traditional "defense in depth" approaches and perimeter security approaches. Verizon implements many layers of security including physical, perimeter, host-based, personnel, and procedural security. Verizon IAS includes Domain Name Service (DNS), news, e-mail, IP address assignment and management.

Verizon delivers reliable IP solutions to ███ █ ███ █ ██ U.S. Federal customers and a variety of commercial customers. Verizon operates an expansive IP network based on a backbone that provides connectivity in more than ███ countries and operates at speeds up to OC-192—the fastest available. Verizon has more than ███ ███ █ █████ throughout the world and its network spans more than █,██ ████ █ ████████ ████ █ ████ █.█ ██████ ███ █ █████.

- **Comprehensive Coverage & Access.** With the world's largest global IP network and an extended access footprint, Verizon's IAS solution is unique in the market today. The access footprint consists of dialup 56K and ISDN, broadband DSL, FR/ATM, PLS, Ethernet, and dedicated access for the following speeds: 56/64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps, 768 Kbps, 1.536 Mbps, 4 Mbps, 10 Mbps, 16 Mbps, 34 Mbps, 100 Mbps, 155 Mbps, and 45 Mbps—all of which adds up to the flexibility, availability, and capacity to handle any application and file transfer needs, large or small.

- **Converged Service.** Secure Gateway (SG) provides customers with a way to integrate all service suites—IAS, FRS, ATMS, NBIP-VPNS, PBIP-VPNS, and VoIP—into a single secure WAN architecture.

- **Internet Dedicated Access.** Verizon provides customer Internet dedicated-access connections ranging in speeds from 56/64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps, 768 Kbps, 1.536 Mbps, 4 Mbps, 10 Mbps, 16

Mbps, 34 Mbps, 100 Mbps, 155 Mbps, and 45 Mbps (including 10/100 fast and gigabit Ethernet access), dial-access connections at speeds up to 56 Kbps (analog) and 128 Kbps (ISDN), and DSL services.
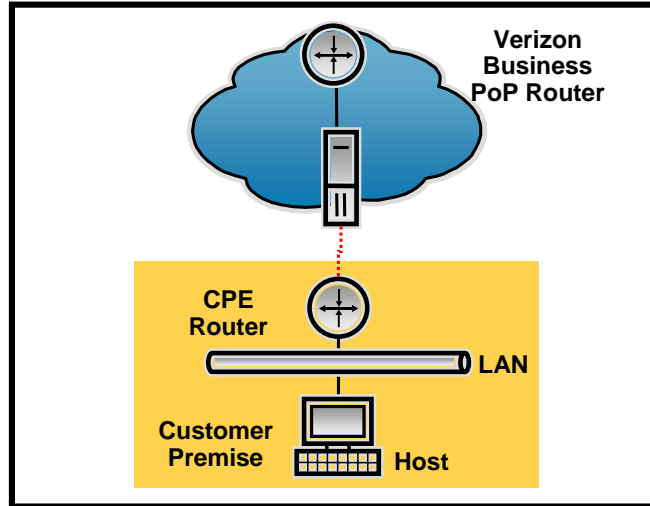
- **Ubiquitous IP Presence.** For public peering, Verizon ███████████ ██
  ████ ███████ ██ █ ██████ █ ██████ ██ ██████ █ ████ █
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  ████ ██-██ ██-██ █████.

- **Customer Service.** Verizon's customer service provides 24x7 support from circuit provisioning and equipment testing to proactive NOC monitoring and IP address allocation. The following Internet access services are described in the tables below:

  - Dedicated Access
  - Broadband Access
  - Managed Security
  - Web Hosting
  - Web-based Directory

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DEDICATED INTERNET ACCESS

Dedicated Access Standard Offer Architecture:

Dedicated Access with Redundancy:

Option 1: Double
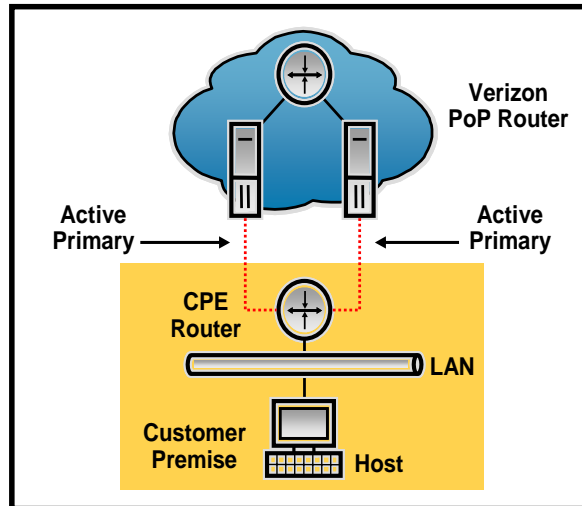

- Option 1 provides two circuits of equivalent bandwidth to the network. (The access for this service is procured through the Dedicated Transmission Services described in Section 3.3.2 of this document. The service assurance CLIN includes a second Internet port.)

- Option 1 service terminating both circuits at the same PoP/same edge router to enable load sharing across the connections.

- Service is port only and available speeds are for 56/64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps, 768 Kbps, 1.536 Mbps, 4 Mbps, 10 Mbps, 16 Mbps, 34 Mbps, 100 Mbps, 155 Mbps, and 45 Mbps.

- Port access can be Frame Relay (FR), Asynchronous Transfer Mode (ATM), and Gigabit Ethernet Services (GES).

Option 2: Diverse

DEDICATED INTERNET ACCESS
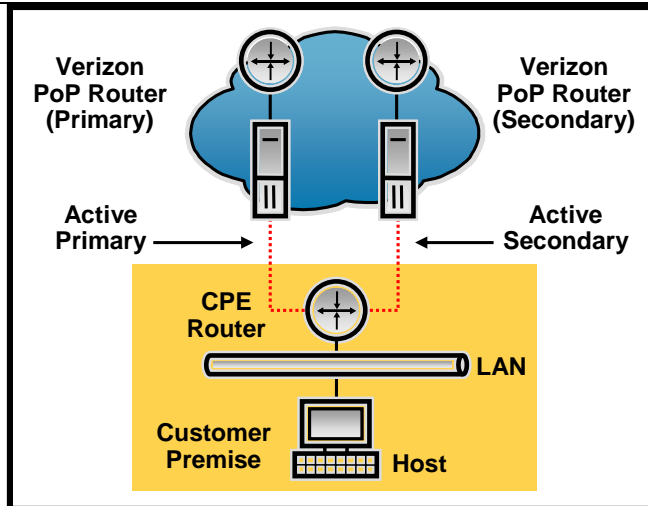
- Option 2 provides two circuits of equivalent bandwidth to the IP network. (The access for this service is procured through the Dedicated Transmission Services described in Section 3.3.2 of this document. The service assurance CLIN includes a second Internet port.)
- Circuit terminates into different Verizon PoP routers.
- Both circuits are active at all times.
- Service is available for T1, T3, OC-3c, OC-12c, OC-48c, and Gig-E Port Only.
- POP diversity

Verizon will ensure that diverse IP connections are provisioned to IP edge routers that are on different maintenance windows to ensure that one of the connections is available during scheduled maintenance.

Option 3: Shadow
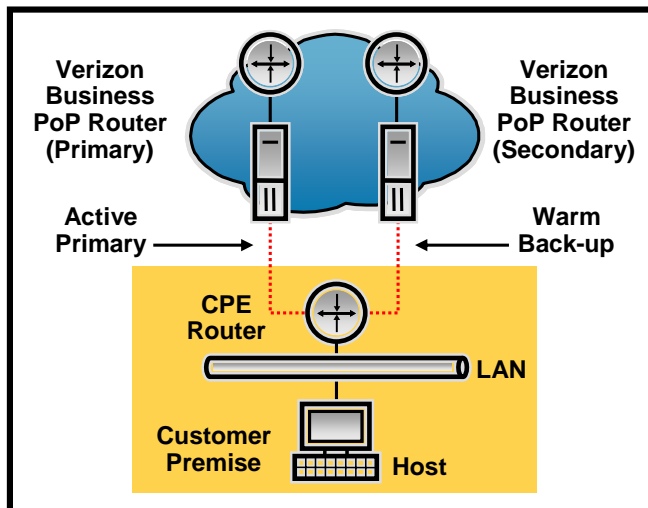
- Option 3 services provide a second circuit of equivalent bandwidth to the IP network.
- Circuit terminates into different Verizon PoP routers.
- Primary circuit is active with "warm" stand-by secondary circuit.

DEDICATED INTERNET ACCESS

- Service is available for T1, T3, OC-3c, OC-12c, OC-48c, and Gig-E port only.
- Disaster recovery model

Verizon will ensure that the Shadow IP Connection is provisioned to the IP Edge Router that is on a different maintenance window to help ensure that one of the connections is available during scheduled maintenance.

Product Description

Verizon's dedicated access products offer the Government high-performance, full-time dedicated Internet access. This product suite offers a range of options to suit access needs and support all mission-critical communications.

Internet Dedicated Access Port Only offers permanently open, high-bandwidth, dedicated ports for connection to Verizon's global IP network via access circuits from 56/64 Kbps, 128 Kbps, 256 Kbps, 512 Kbps, 768 Kbps, 1.536 Mbps, 4 Mbps, 10 Mbps, 16 Mbps, 34 Mbps, 100 Mbps, 155 Mbps, and 45 Mbps in the NCR. Standard Internet dedicated access includes IP services with domain name, DNS, news, IP addresses, and SLAs as well as 24x7 monitoring.

Benefits to the Customer

- Verizon's global IP network is one of the highest-quality, most-scalable, and rigorously-engineered Internet networks in the world, spanning six continents.
- Verizon has more than 3,000 global POPs making it the most expansive IP network in the world.
- The OC-48/OC-192 network carries traffic flow at a high transmission rate of 10 gigabits per second and is domestically protected against fiber cuts by true optical switches that restore traffic in less than 50 milliseconds.
- Verizon was first-to-market with an OC-192 backbone network.
- In a survey of more than 1,000 Information Technology (IT) professionals, Verizon was ranked the highest at being able to offer customers a comprehensive set of Internet products and services.
- No other IP network provider is cited more consistently for offering sufficient network capacity to its customers than Verizon.
- Verizon provides 100% availability, always-on connectivity to its customers.
- Verizon delivers full service coverage, and comprehensive, customized, agency-specific, end-to-end integrated solutions to customers throughout the NCR with single point of accountability.

Service-Specific Architecture

Redundancy: Verizon Internet network architecture has been designed with redundancy and automatic failover of systems as a guiding design principle. Verizon's backbone hubs and Network Operations Center (NOC) uses uninterruptible power supplies, batteries and diesel generators that provide additional protection from would-be disasters caused by local power failures. On Verizon's IP backbone, multiple circuits connect each backbone hub to at least two others, providing both high performance and redundancy. Further, the nature of IP routing and Verizon's implementation of an Multi-Protocol Label Switching (MPLS) and Asynchronous Transfer Mode (ATM)-based network are designed to minimize the network impact due to the failure of any piece of equipment or backbone circuit. The Verizon IP backbone is segmented at a routing level into separate, independently-survivable regions with multiple exits from each region. The network is configured in a "dual plane" architecture that uses redundant sets of routing devices from edge to edge. Verizon has made significant efforts to provide a highly reliable, redundant, and rigorously-engineered platform for the deployment of business-critical applications.

Peering: Verizon

Domain Name Service (DNS) and IP Address: Verizon will provide customers with IP addresses and domain name service. There are two main types of name servers: authoritative and caching. Authoritative name servers are, as the name implies, the authority on a particular domain name. Caching servers store frequently-requested addresses so there's no need to do an extensive search each time someone requests a particular site. Verizon offers both authoritative and caching name service for its customers. Both authoritative and caching servers are deployed in geographically diverse locations.

DEDICATED INTERNET ACCESS

Quality of Service (QoS) and SLA: Verizon also offers the following QoS and SLAs for IAS. Network availability is calculated based on the ability of all network nodes to be reached via all network paths on a five minute cycle around the clock from the viewpoint of a single monitoring system. This metric, by its nature, is very conservative since multiple paths exist to each node in the network; thus, the actual availability experienced by Verizon customers will be higher. These metrics are supplemented by ongoing diagnostic monitors, which track link bandwidth utilization, link errors, nodal processor utilization, packet loss, and path latency. Network Operations and Capacity Planning personnel review this monitoring data on a regular basis and initiate action accordingly. As more customers look to push their voice, video, and key business applications onto a converged IP network, the ability to ensure acceptable performance levels becomes more and more critical. Internet dedicated QoS can help ensure that key applications or network traffic is prioritized by allowing customers to assign various degrees of importance to different types of network traffic. Verizon Internet dedicated QoS allows four traffic priority classes:

* Real-time
* Mission-critical
* Business-critical
* Best effort

BROADBAND ACCESS
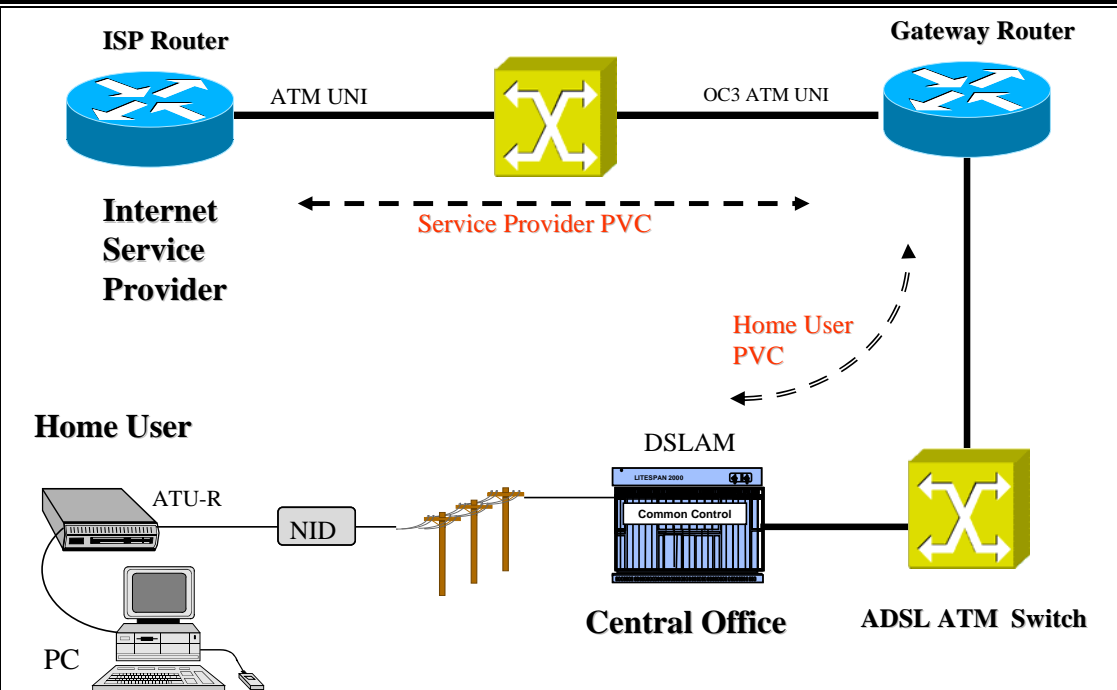
Product Description

To provide residential/small-office users with broadband access services, Verizon has deployed DSL access technology extensively within its 28-state serving area. Verizon has consistently improved its DSL services, Verizon-on-line (VOL), to meet residential/small-office user requirements for greater download speeds. Recent upgrades to the DSL network now provide download speeds up to 7.1 Mbps. Coupled with local and long distance voice services, Verizon believes DSL provides the foundation to a compelling package of voice and data services. VOL service offers multiple speeds: up to 768K/128K, 3.0M/768K, 7.1M/768K, supports both dynamic IP and static IP, e-mail boxes for up to three domain names, personal Web space up to 20M, mobile dial-up access, Verizon Internet

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BROADBAND ACCESS

security suite, one year of domain name registration, modem and gateway, self installation package, and 30-day satisfaction guarantee.

Progress has been made over the past decade to deliver high-quality, cost-effective broadband access services to residential, business, and mobile users. Verizon has been at the forefront of providing these services to its residential, enterprise, and mobile customers.

Benefits to the Customer

- Extensive coverage capability enables Verizon to draw upon a broad array of access options to provide customers a complete network solution.
- Supports multiple speed options to match customers' application and price requirements.
- Verizon provides a consistent, limited set of CPE models across all providers. This enables Verizon to provide uniform installations across a customer's network. This consistent service model is the key to reliable service support and distinguishes Verizon from many providers where the implementation varies by service provider.
- VOL support static IP in its standard package. Static IP addresses are essential to an IT administrator for security and logging purposes. Each site can be identified uniquely.
- Verizon VOL is provided using static ATM Permanent Virtual Circuits (PVCs) throughout the network. This design allows for a "connectionless" service. There is no logon software required to activate sessions.
- Low backbone network oversubscription. Verizon designs the network to avoid slowdown during busy usage times.

Service-Specific Architecture

Whenever the threshold is crossed, additional bandwidth is added to the backbone network. Where DSL is available, Verizon will activate business DSL service with static IP within 20 business days and Verizon Business DSL with dynamic IP within 20 business days from Verizon's acceptance date of order and/or an approved contract. Verizon Internet security suite service helps protect against most intrusions and Internet viruses, with the understanding that no security service can provide absolute protection.

WEB HOSTING SERVICE
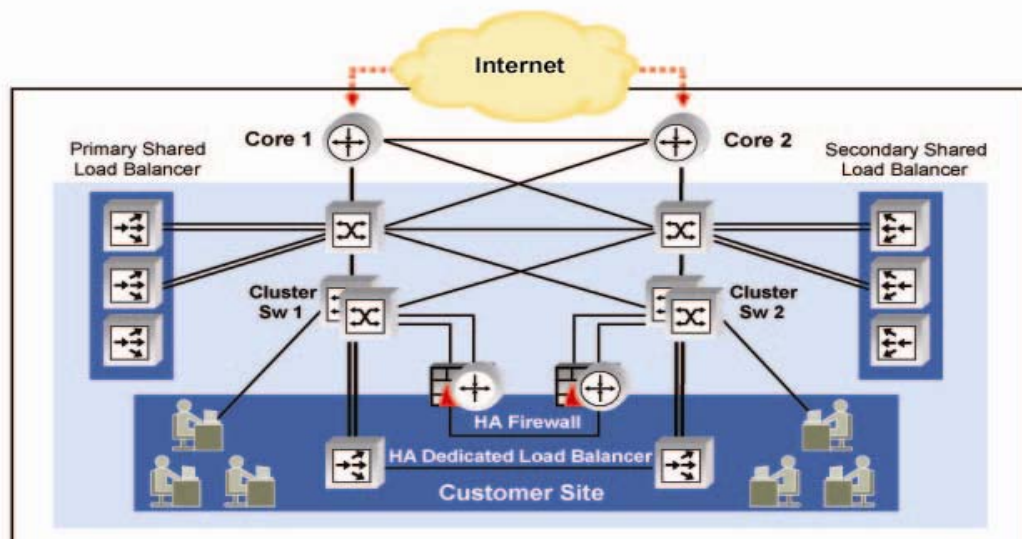
High Availability (HA)

WEB HOSTING SERVICE

Product Description

Verizon Web hosting service can be delivered as either a dedicated or a shared/collocation hosting service. The pricing will be according to Table B.9-3, which reflects the following items.

- Web Hosting – Shared Server(s)
  - Per MB of Storage
  - Per Mbs of Bandwidth
- Web Hosting – Dedicated Server(s)
  - Per MB of Storage
  - Per Mbs of Bandwidth

Dedicated Hosting Services (DHS): Verizon's approach to delivering DHS is to provide a fully-compliant response to all DHS service requirements based on Verizon's industry-leading enterprise hosting service. Verizon's enterprise hosting solution includes Verizon enterprise hosting services (the core of Verizon's enterprise hosting services) and capabilities from Totality, an industry leading remote managed services provider. This solution provides a comprehensive set of DHS, including both simple and complex services from Verizon's industry-leading and high-security smart centers, as well as infrastructure and application management services at Government agency or other third-party data centers. These solutions include fully-managed servers, network infrastructure, storage infrastructure, and firewalls; fully-redundant, high-availability hosting solutions; 24x7 physical, logical, and network security; and comprehensive authentication services. Verizon offers unsurpassed reliability with state-of-the-art smart center data centers, high-speed connectivity, and ultra secure private networking. These data centers make up the heart of Verizon's DHS offering. Their fully redundant network infrastructure drives Verizon's smart services, managed applications, and professional services.

Shared/Collocation Hosting Services (CHS): Verizon's CHS solution will provide the Government secure, carrier-grade space to collocate their equipment in a managed environment to ensure quality, reliability, and redundancy of mission-critical operations and applications. Verizon currently ███ are designed to provide enhanced security and redundancy for critical facility systems. Verizon also provides professional service, in an hourly rate, to assist the Government in the development of Web pages and services.

Benefits to the Customer

- By leveraging Verizon's IP network, customers are directly connected to one of the most rigorously engineered networks in the industry. Additionally, their Web traffic flow has the ability to travel at optimal speeds with redundant, diversely routed bandwidth out of the data center facility via numerous paths so there is no single point of failure and information can be sent from point-to-point in the most efficient manner.

- Verizon managed platforms offer a strong foundation designed to maximize an application's reliability and availability. As the only vendor who offers five of the most popular operating platforms tuned specifically for Web-based applications, enterprises can outsource full management of their Web sites, portals, e-commerce, and business applications to Verizon.
  - Internet-ready version of software
  - Performance tuned for Web
  - Security hardened for Web
  - Server, storage, operating system combination tested for interoperability, serviceability, and performance

- Verizon managed hosting services allows customers to outsource their Web-enabled business sites in a secure environment with 24x7 support and fast, reliable, and scalable bandwidth resources.

- Verizon delivers these managed services in four state-of-the art data centers connected to Verizon's global IP network. The services offer customers a lower total cost of ownership, higher SLA, and enhanced levels of security, scalability, and performance. Full continuum of secure and dependable hosting service.

- Smart center networking services optimize the network layer standing between customer servers and their end-users (or customers). These services ensure continuous availability, optimal routing, and secure delivery of rich graphical interfaces that are personalized to end-users. From managed firewalls that protect the network to advanced load balancing solutions that optimize load, Verizon uses industry-leading technologies for all solutions.

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WEB HOSTING SERVICE

- High availability solutions offer a more resilient platform for mission-critical applications. Verizon's high availability services provide options that help ensure continuous operation of its customer's e-business. From standby databases to dynamic fail-over options for databases and applications, Verizon has designed these services giving the customer assurance that spikes in traffic, or a hardware or database problem, will not result in lost revenue or a business failure.
- Verizon strategically combines its shared, dedicated, and collocation hosting technologies with the custom-managed Web and application hosting expertise of Verizon to offer businesses of all sizes the full continuum of secure, dependable hosting services.
- Verizon hosting professional services provide a suite of value-added services designed specifically to aid in extracting maximum capacity and performance out of a customer's infrastructure components. Hosting professional services provide customers with the additional security, assurance, and information necessary to meet their business goals.

Service-Specific Architecture

IP Application Hosting Infrastructure

Smart Centers. Smart Centers are the data Centers that provide smart services to Verizon customers. These services include all of the essential services designed to keep customer applications available, including administration, monitoring, reporting, security, and back-up. Each smart center data center features biometric physical security, highly-redundant power infrastructure, fire suppression systems, and state-of-the-art environmental support systems. ██

Verizon's Global IP Network. Verizon's global IP network is fully meshed and redundant, and it delivers comprehensive authentication, firewalls, and security. Verizon offers unsurpassed reliability with state-of-the-art data centers and a fully redundant network infrastructure.

Ultra-Secure Farm. The ultra-secure farm is a special room within the data center, designed for the highest levels of physical security required by Federal Government agencies and financial firms. The ultra-secure farm features anti-tailgating mechanisms, anti-pass back measures, and redundant video surveillance systems. Each customer's infrastructure is completely enclosed in secure cages.

Smart Center Private Network. Verizon maintains an inter-data center network between its U.S. smart centers. Shared, networking segments are available for data replication and systems administration.

Managed Platforms

- Microsoft Windows
- Sun Solaris
- Red Hat Linux
- IBM AIX
- HP UX
- Managed storage

Smart Services

- Smart security
- Smart back-up
- Smart monitoring
- Smart reporting
- Smart administration

Smart Center Networking Services

- Load balancing
- Managed firewalls
- Virtual Private Networks (VPNs)
- Private networking
- PIP smart center inter-connect services
- Data networking services (includes private line, frame relay, and ATM services)

High Availability Services

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WEB HOSTING SERVICE

- Dynamic fail over
- Standby database
- Enterprise fail over
- Application clusters

Load Balancing. Verizon offers intelligent networking services to clients with multiple servers. These services include options for geographical distribution of network traffic between data centers (global load balancing) and server load balancing within a single data center (local load balancing). Local load balancing may be used individually or in tandem with the global load balancing service to meet customers' requirements.

Restoration. Backup and restore is offered as a standard part of the service and will be automatically provided to the Government after an incident to meet the performance measure.
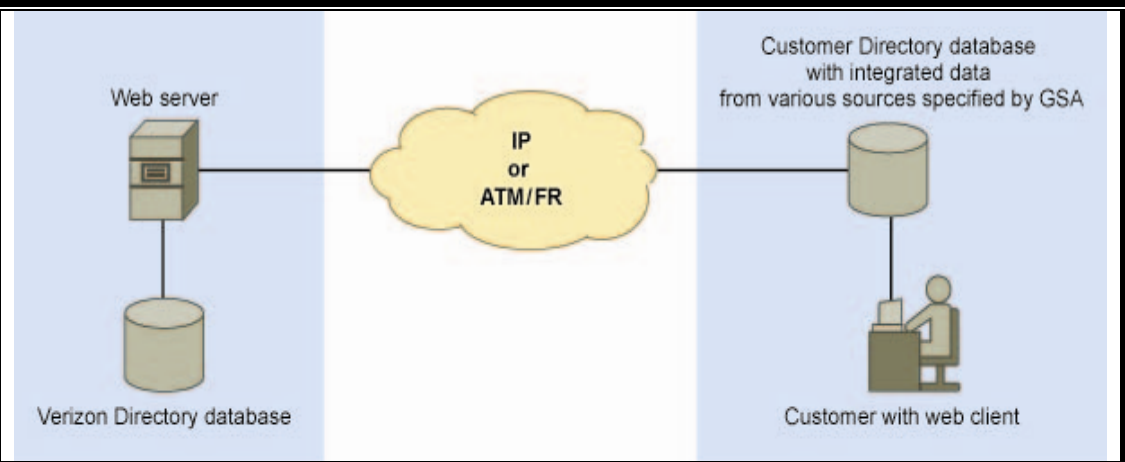
Web Server Traffic Analyses. This provides standard reports which will be available to the Government as they are bundled into the server management tools. The Verizon solutions include full management of the underlying infrastructure that supports these applications. Verizon currently manages ▮▮▮▮ ▮▮▮▮▮ ▮▮▮ ▮▮▮▮▮▮▮▮▮▮ of Microsoft SQL server and a wide variety of other database applications. Customers have direct and unlimited access to any database systems managed on their behalf to run planned and ad hoc queries.

Availability. Verizon Web Hosting Services are currently available in the United States and internationally.

Credibility. Verizon is a premier world class hosting and e-commerce solutions provider with the following qualifications:

- Pioneer - first managed hosting,▮▮▮▮
- Explosive market with approximately ▮▮▮ ▮▮▮▮▮▮▮▮
- More than ▮,▮▮▮ ▮▮▮▮▮▮▮▮ implemented and under management.
- ▮▮▮▮▮▮▮▮▮▮▮▮ ▮,▮ ▮▮▮▮▮▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮ ▮▮▮▮▮▮▮ ▮▮▮▮▮▮▮▮▮▮.
- ▮▮▮▮ state-of-the-art data hosting smart centers (each smart center is a back up to the other smart centers, so if one smart center fails, the other ▮▮▮▮▮▮ can provide backup)
  - ▮▮▮▮▮▮▮▮▮▮▮ ▮,▮./▮▮▮▮▮▮▮▮▮▮, ▮▮▮▮▮▮
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- Scalable infrastructure and operations model
- Well-defined and engineered product solution

WEB-BASED DIRECTORY SERVICE

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WEB-BASED DIRECTORY SERVICE

Product Description

Web-based Directory Services (WBDS) is a browser-based application that provides customers with a Web-based Directory Assistance (DA) mechanism. This service is available to retrieve directory assisted information via Verizon's frame relay, ATM, and IP data services. As a Web-based application, WBDS is more dynamic than traditional telephony-based directory assistance services. Verizon WBDS performs comprehensive searches to retrieve business and residential names, phone numbers, and addresses by providing a Web-based service interface to access Verizon's high-quality DA information.

Additionally, WBDS provides its directory assistance service at a lower cost than any competitor's standard dial-up connections. Customers who typically dial long distance (XXX) 555-1212 or 411 on a local connection to access national listings from AT&T, Sprint, or the regional bells can have a less expensive and more intuitive interface alternative via a Verizon data network connection to the WBDS capabilities.

Verizon also offers a Web services interface to the WBDS database. Verizon's Directory Assistance Web Services (DAWS) provides programmatic access through the use of a standards-based Extensible Markup Language (XML)/Simple Object Access Protocol (SOAP) interface. With this service, once a customer completes the existing registration process for Web-based directory assistance, they receive an additional access method to integrate applications to the WBDS data.

Benefits to the Customer

WBDS will provide customers the following benefits:

- Reduce the cost on directory assistance
- Improve productivity by integrating directory information database and improving data consistency and accuracy
- Reduce the maintenance cost by integrating various databases

Service-Specific Architecture

Customers connect to WBDS by utilizing Verizon's Internet Protocol (IP) and Frame Relay (FR) data services. If the customer uses (Asynchronous Transfer Mode) ATM, this connection is established with a FRASI interface to convert the ATM service into frame relay Private Virtual Circuits (PVC). The correct PVC size can be determined by using the bandwidth calculator provided by Verizon.

Although, WBDS is an application and does not actually require equipment, it does require the customer to order a bi-directional PVC for their frame port. In addition, WBDS requires the customer to have a browser-based environment to connect with the WBDS servers. The customers intranet is connected through their data services to Verizon. Since the customers' intranet interfaces with a public network, an IP router and server table controls are required to assure that the customers' connectivity is private. An extensive firewall implemented at both the Verizon and customer premises guarantees this privacy.

Any customization work needed to interface existing directory services or databases will be done through Verizon professional service, Customized Engineering and Design Service, base on mutual agreed Statement of Work (SOW).
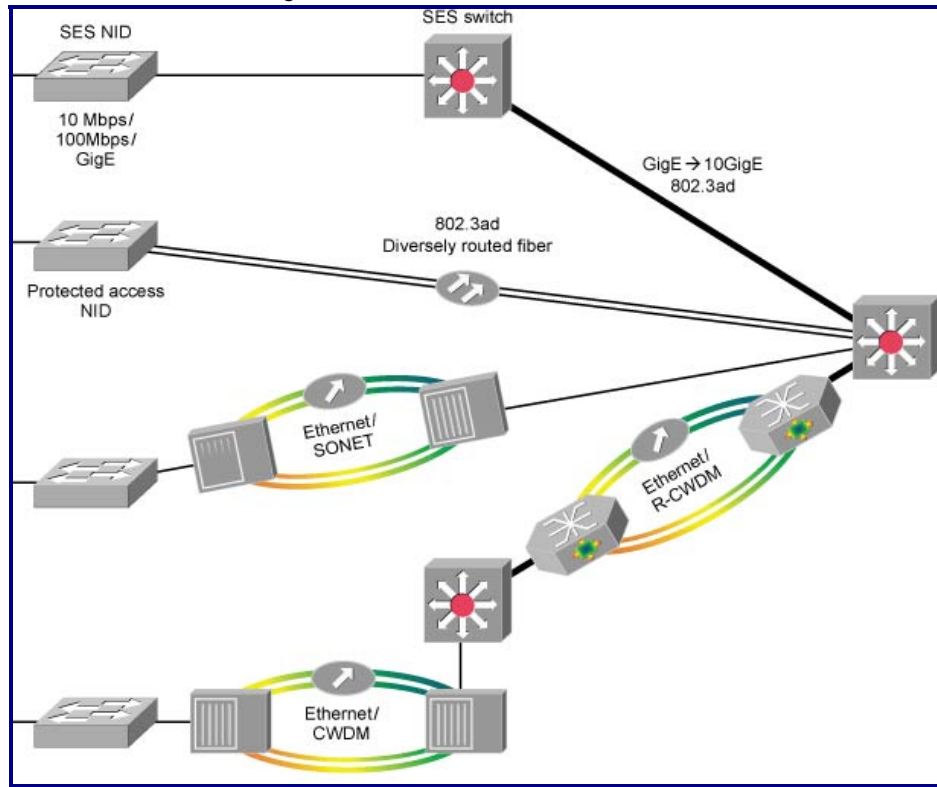
3.3.8 Gigabit Ethernet Service (GES) (C.2.10) - Service Overview

Verizon's rich history of providing Ethernet services has grown from supporting only "best effort" transport to enhanced capabilities such as point-to-point and multipoint-to-multipoint service types, class of service support, and performance SLAs. Verizon's GES is a high-throughput, low delay data service that uses dedicated fiber access to a shared Layer 2 switching platform that allows for the interconnection of Local Area Networks (LANs).

Verizon offers two flavors of GES: Ethernet virtual private line (EVPL) and Ethernet LAN (ELAN). Verizon offers three native Ethernet connection interfaces—10, 100, and 1,000 Mbps. Verizon is currently active in various standards groups that have been developing specifications for supporting carrier-class Ethernet services including Metro Ethernet Forum (MEF), IEEE 802.1, and IETF L2VPN. As a result, Verizon's GES services are closely aligned with the standard service definitions specified by the MEF. *On April 26, 2006, Verizon was awarded the Ethernet Service Provider Certification from the MEF.*

EVPL and ELAN share the same components of Verizon's GES network architecture. The architecture consists of switches in the central office and Network Interface Devices (NID) at the customer premises. The service intelligence resides in the GES switch, while the NID provides the customer interface, a test access point, and performance measurement capabilities. Dedicated fiber is predominantly used today between the GES switches and the NID; however, Coarse Wavelength Division Multiplexing (CWDM) and next-generation SONET transport are used in specific situations. Backbone links connecting GES switches primarily consists of redundant Gigabit Ethernet links using standard IEEE link aggregation. Verizon is phasing 10G Gigabit Ethernet and Dense Wave Division Multiplexing (DWDM) transport into the GES backbone to meet traffic demand. Figure 3.3.8-1: GES Network Architecture displays the GES architecture setup.

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Figure 3.3.8-1: GES Network Architecture

The Verizon switched Ethernet network has been built for reliability, performance, and cost effectiveness. Verizon has ████ ██ ██ ██ Ethernet switches in the WITS 3 service area. This distribution gives Verizon a wide service area and significantly reduces instances of backhauling facilities to a hub office.

Verizon switches have been configured to be highly reliable by using redundant common equipment. This includes dual supervisor engines working in an active/standby mode. If the primary engine should fail, a switchover will occur within 1 to 2 seconds. Dual power supplies load share and ensures operation in the event of a failure until the defective power supply can be replaced. Dual ████ ████████ █ █████████ offer customers high performance and additional reliability.

Verizon delivers network availability of ██.██ GES includes SLAs that cover operational and performance metrics. Operational metrics include Mean Time To Repair (MTTR), Network Availability (NA), and On-Time Provisioning (OTP). The operational performance objectives are summarized in the following table for the three enhanced classes of service (EVPL-RT, EVPL-PD, and E-LAN RT).

	On Time Provisioning (OTP) (Service Level Objective)	Network Availability (NA)	Mean Time To Repair (MTTR)
Switched Ethernet Services	██	██.██	███████████

Performance metrics include data delivery, delay, and jitter. The service performance objectives are summarized in the following table for the three enhanced classes of service EVPL-RT, EVPL-PD, and E-LAN RT.

Service Performance Attribute	Parameters	Class of Service Offering		
		EVPL-RT	**EVPL-PD**	**E-LAN RT – SLO ONLY**
████	███████████	████	████	████
	██████	██	██	██
	██████████	███████	███████	███████
	██████████	████	████	████
██████	███████████	██	██	██
	██████	██	██	██
	██████████	████	██	██
	██████████	████	██	██
████████ (██)	█████████	████	██	██
	███████████	██████	██████	██████
	█████████	████	████	████
████████	█████████	██████████	████████████	█████████

E-LAN RT will offer performance objectives. GES switches and premises network interface devices are continuously monitored for

operational status. GES Network Management Systems (NMS) use Simple Network Management Protocol (SNMP) to monitor all network elements, which in turn monitor the facilities for faults and error conditions. HP OpenView, a generic SNMP management package, is currently used for GES network management. SNMP provides proactive, real-time fault monitoring:

- NMS periodically pings CO switches and NIDs at demarcations s to ensure availability

- Alarms are sent from CO elements in real time to the NMS

Verizon has engineered the GES backbone design based on the actual daily average utilization and not on the aggregate bandwidth that is competing for the backbone usage. Verizon's Data Traffic Engineering (DTE) group monitors the GES backbone utilization. Simple Network Management Protocol (SNMP) is used to collect port counters every 15 minutes. When an inter-switch trunk reaches ███ █████ █████████████ (███████ █ ████████), Verizon begins the process of adding additional capacity. This process helps assure a user will not experience decreased performance, which can be possible in shared switching environments. There are two optional features for this service that can enhance a user's experience:

- Protected Access Line (PAL) diversifies the fiber that runs from the Government agency location to the Ethernet switch. This diversity offers protection from a fiber cable cut between the two locations.

- Customer Service Management (CSM) is an optional feature that provides Government agencies with Web-based service reports. The reports give the customer the ability to extract read-only network traffic information, enabling them to monitor and manage network performance. CSM is provided per customer domain.

GIGABIT ETHERNET SERVICE – ELAN XXXXXX XXXXXXX
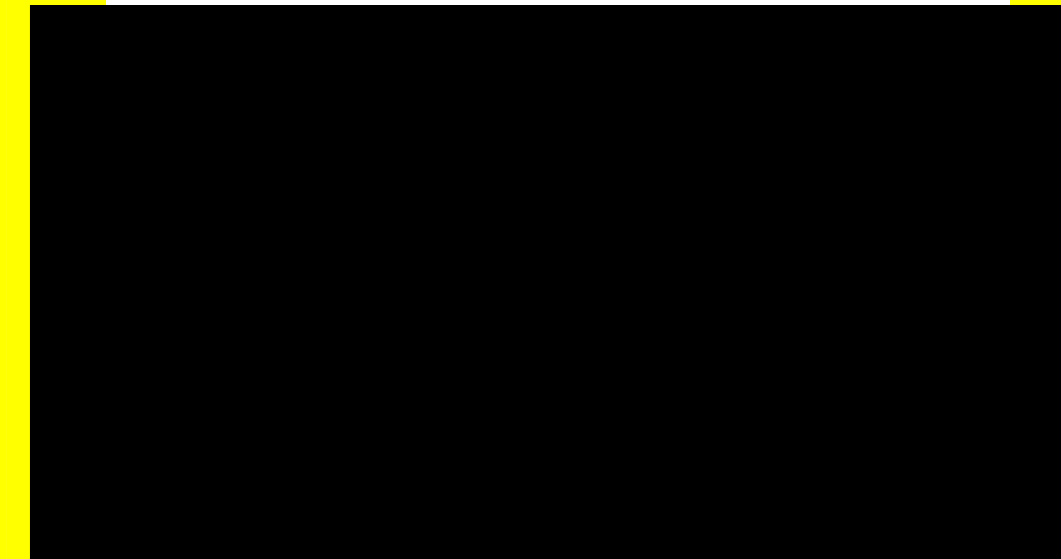
Product Description

Ethernet LAN (E-LAN) Service. E-LAN service offers a transparent, multipoint-to-multipoint service designed for LAN interconnect over a metro area. The basic E-LAN service can be used for agencies with best-effort data applications. The enhanced option of E-LAN, called E-LAN Real-Time (E-LAN RT), allows agencies to add a small amount of bandwidth in a real-time Class of Service (CoS) designed for packet voice applications. Agencies can run basic and packet voice applications over the same multi-point-to-multi-point Ethernet Virtual Connection (EVC). The key characteristics of Verizon E-LAN service are as follows:

- *Multipoint-to-multipoint connectivity.* Agencies can connect any number of sites into a single multipoint-to-multipoint EVC, allowing them to build large networks (potentially having hundreds of sites). Standard MAC address learning is used to efficiently switch a customer's traffic to the intended destination site or sites. Connectivity is simple for customers to use.

- *Transparency.* Government agencies can send and receive "untagged" or "VLAN-tagged" Ethernet frames. The service guarantees preservation of the customer's VLAN tag, which allows customers to administer VLAN domains among their sites. In addition, customer Layer 2 control protocols (i.e., spanning tree) are tunneled through Verizon's E-LAN service, allowing customers to manage their Layer 2 networks independently of Verizon's network.

- *Enhanced CoS option.* Government agencies can choose to add real-time CoS capability at one or more sites in their network. This enables agencies who want to run packet voice applications among sites to do so on the same network with their basic LAN interconnect traffic.

Benefits to the Customer

- Port speeds ranging from 10Mbps to 1000Mbps (GigE) offers scalability; agencies can tailor speed to requirements and grow as necessary
- Native Ethernet handoff for minimal custom training/CPE (no protocol conversion required)
- Connectionless any-to-any switching supports any number of sites/configurations
- Unique VLANs assigned per customer provides security by segmenting customer's traffic over the shared network.
- Full-service monitoring 24x7 to the NID on customer premises
- Customer confidence in network reliability

XXX – XXXXXXXX XXXXXXX XXXXXXX XXXX (XXXX) XXXXXX XXXXXXX

Product Description

Verizon EVPL service offers a virtual point-to-point service, similar to frame relay, designed for customer networks requiring a point-to-point service model. Examples of typical applications well suited for Verizon EVPL are Internet access, IP-VPN access, data center hub-and-spoke networks, and aggregating Ethernet traffic.

The key characteristics of Verizon EVPL service include:

- *Point-to-point connectivity:* Customers can connect numerous sites by using multiple point-to-point EVCs, just like they do with frame relay and ATM services today.

- *Granular bandwidth:* Customers can customize the exact amount of bandwidth they need in each CoS for a given EVC, using the options listed below.
  - Low speed: 1 to 9 Mbps, in 1 Mbps steps
  - Medium speed: 10 to 90 Mbps, in 10 Mbps steps
  - High speed: 100 to 1000 Mbps, in 100 Mbps steps

- *Multiple CoS:* Support for more than one CoS per EVC greatly simplifies the customer router configuration and provides a streamlined solution for enterprise applications and customer access to IP-VPN services.

EVPL service offers customers three CoS options, described below. Customers can order any combination of these CoS on a given Ethernet Virtual Connection (EVC).

- *EVPL-real-time (EVPL-RT)* is designed for packet voice, video, and other customer applications requiring tight guarantees of frame delay, frame jitter, and frame delivery performance. Continuous service Performance Monitoring (PM) of EVPL-RT on each EVC is planned to ensure guarantees of delay, loss, and jitter are met.

- *EVPL-Priority Data (EVPL-PD)* is designed for customer data applications requiring guarantees of frame delivery performance, with looser requirements for frame delay. Continuous service PM of EVPL-PD on each EVC is planned to ensure guarantees of delay and loss are met.

- *EVPL-Basic (EVPL-B)* is designed for customer data applications that require no guarantees of performance, and where cost per megabit per second is the key requirement. Performance monitoring is not planned for EVPL-B.

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Benefits to the Customer:

- Port speeds ranging from 10Mbps to 1000Mbps (GigE) offer scalability; Government agencies can tailor speed to requirements and grow as necessary.
- Native Ethernet handoff for minimal custom training/CPE (no protocol conversion required)
- Connectionless, any-to-any switching supports numerous sites and configurations
- Unique VLANs assigned per customer provides security by segmenting customer's traffic over the shared network
- Full-service monitoring (24x7) to the NID on customer premises
- Customer confidence in network reliability

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