1.4.1   Voice Services (VS) [C.2.2.1]

Agencies will experience service continuity for Voice Services (VS) over a global network with built-in security, quality, and resilience. High-quality performance under routine and critical conditions is supported by a ▮▮▮▮▮▮▮ investment to broaden and strengthen AT&T's network infrastructure. With access to a full set of VS features and high-performance options, Agencies have the flexibility to design solutions that exceed Government requirements.

1.4.1.1   Technical Approach to Transport Service Delivery [L.34.1.4.1]

1.4.1.1.a   Approach to Service Delivery

(a) Analyze the service requirements specified in this solicitation and describe the approaches to service delivery for each service.

Agencies will gain greater worldwide connectivity with a long-distance network that supports both circuit and packet switching for Voice Services (VS). The AT&T global network connects virtually every country and territory worldwide with service reliability, resilience, and security no other carrier can match. Our long-distance voice network extends to more than 230 countries, recorded 99.995-percent reliability in 2004, and transports more than 300 million long-distance calls on a typical weekday. **Figure 1.4.1.1-1** depicts an overview of the VS access and connectivity that Agencies will receive under Networx.

> *"AT&T is the largest long-distance service provider in the U.S. and is the best-known brand name in telecommunications worldwide. AT&T has one of the most extensive and far-reaching networks in the world, supporting a wide portfolio of business and consumer voice, data and Internet services."*
>
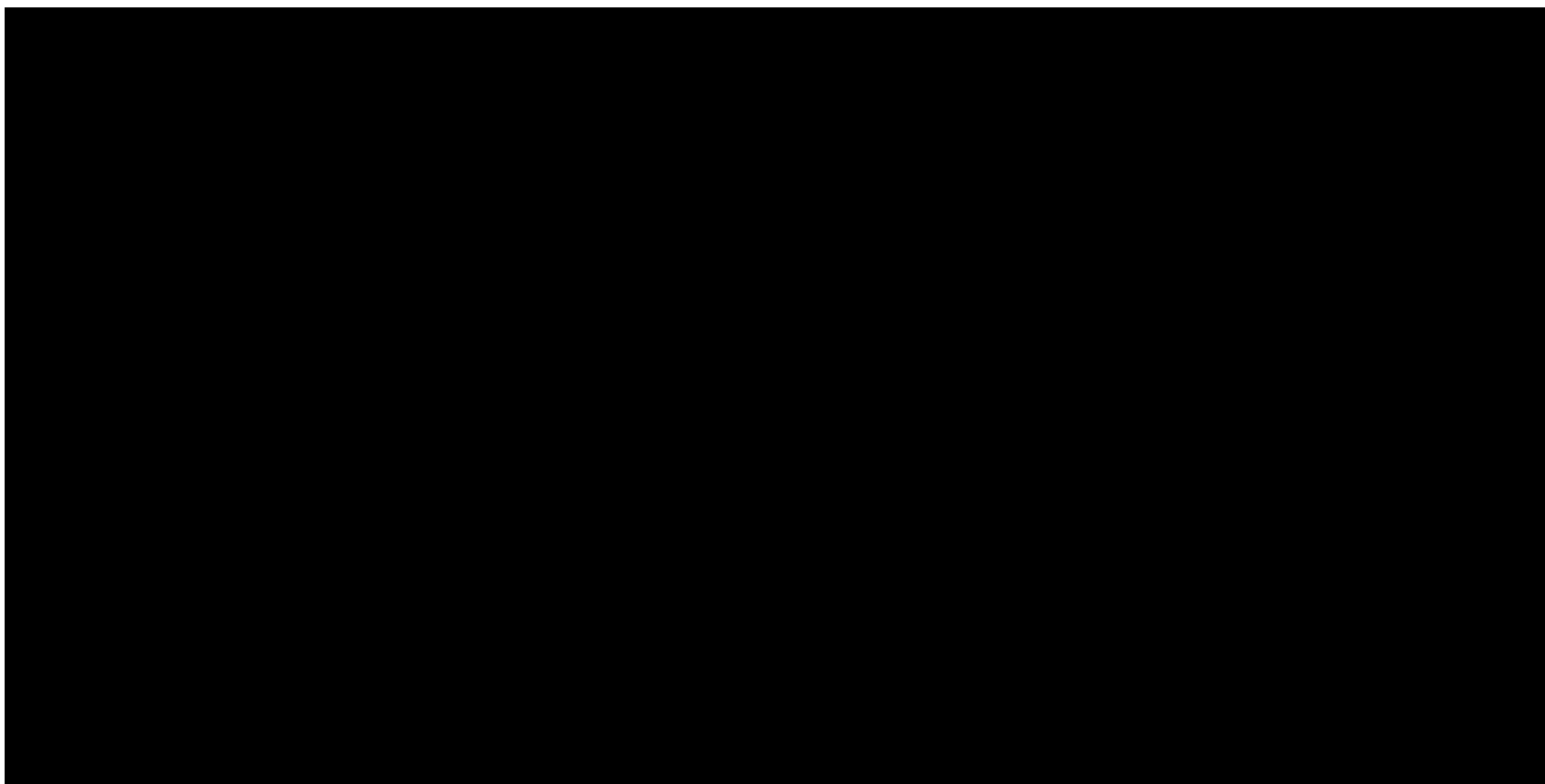> --Current Analysis
> June 30, 2005

Figure 1.4.1.1-1: Voice Services.

Most are circuit-switched calls, but many Government and business customers are beginning to make greater use of voice over IP (VoIP). AT&T's network uses about 395 voice switches, including 156 local circuit switches deployed in 92 cities, ███████████████████████████████████████ ████████████████████████████████████ To expand global reach, AT&T partners with domestic and foreign carriers (Refer to Section 1.3.4, Non-Domestic Services, for additional details).

To strengthen VS reliability and increase availability, congestion and call flow are dynamically managed through a ██████████████████████████████ ████████████████████ expansive network call management controls implemented by AT&T's Global Network Operations Center (GNOC), listed below:

- Restrictive controls are used to limit the effects of network congestion and maintain network traffic at a level as high as possible.
- Protective controls are used to manage the spread of congestion in the network by restricting normal trunk access and overflow.
- Expansive controls allow the routing to expand beyond the normal in-chain routing during failure or overflow conditions.

Table 1.4.1.1-1 lists fundamental aspects of our service delivery approach to meet the service requirements for VS.

SERVICE DELIVERY APPROACH	DESCRIPTION
Service Continuity	• Smoothly transition FTS2001 Voice Services to Networx contractor • Offer service redundancy and diversity to provide critical service performance • Provide reliable, resilient, and global network • Develop continuity of operations plan to provide recovery and business continuity, following natural disaster or other catastrophic event
Voice Communications	• Provide local, long-distance, and international service • Offer feature-rich service options from full-service portfolio • Maintain feature continuity with IP and other forms of access
Business Continuity	• ██ • ██
Standards Compliance	• Comply with applicable American National Standards Institute (ANSI), Telcordia, and International Telecommunications Union (ITU) standards

SERVICE DELIVERY APPROACH	DESCRIPTION
Support for Federal Programs	████████████████ █ █ █
Interoperability	Connect to and interoperate with: • Government-specified terminations • Public Switched Telephone Network (PSTN) • Other Networx contractors' networks • Immarsat terminals • IP networks
Networx Vision for Future Services	• Provide circuit-switched voice network for life of Networx • Migrate with Agencies to take advantage of converged networks and services over IP (SoIP)

Table 1.4.1.1-1: Approach to Service Requirements. *Service continuity, reliability, redundancy, and disaster preparedness mean Agencies can count on meeting voice service requirements now and in the future.*

The foundation of service continuity and quality for a Universal Networx contractor is a reliable, resilient network. As a service provider with a global reach, the AT&T network provides substantial benefits for Networx customers. **Figure 1.4.1.1-2** depicts key assets and performance characteristics of the global network.

AT&T is already migrating toward a common infrastructure, based on IP networking. For additional discussion, refer to Sections

Figure 1.4.1.1-2: AT&T Network Assets and Performance Characteristics. ████████████████████████

1.3.6.2.a, Approach to Optimizing IP-Based Services, and 1.3.6.2.d, Vision for Service Interoperability.

1.4.1.1.b   Benefits to Technical Approach

(b) Describe the expected benefits of the offeror's technical approach, to include how the services offered will facilitate Federal Enterprise Architecture objectives (see http://www.whitehouse.gov/omb/egov/a-1-fea.html).

Networx services and VS, in particular, support the Government's vision of transformation through the use of the Federal Enterprise Architecture (FEA) by providing technologies that contribute to Agency mission objectives. **Table 1.4.1.1-2** lists the benefits of AT&T's service delivery approach in relation to facilitating FEA implementation. AT&T's ███████ ████████████████ is critical to our approach; many of the benefits the Government will realize from our approach to Networx arise from ████

Gartner *The Gartner Group (November 2004) designated AT&T for its Leader Quadrant for Global Network Service Providers: "AT&T has ... a presence in more than 60 countries or approximately 1,500 cities. It has interconnect relationships with carriers in more than 230 countries. AT&T's primary strengths globally include its U.S. presence, its customer base, its international voice business, its ownership of transmission facilities and a common worldwide Multiprotocol Label Switching (MPLS)-based infrastructure. ... Companies typically prefer AT&T when they have a strong coverage requirement in the United States."*

SERVICE DELIVERY APPROACH	BENEFITS	FEA FACILITATION
Service Quality	• Call completion on first try: ██ ████████████████████████ • Superb voice quality: ████████████ ████████████████	AT&T's approach to VS and the ████ that delivers those services will facilitate FEA transformation through: ██ ████████████ ████████████████ ██ ████████████████ ████████████ ██ ████████████████ ████████████████ ████████
Service Continuity	• Seamless transition from FTS2001 to Networx • 97 percent of voice service on optical fiber • Smooth transition to IP-based voice service	
Global Reach	• Outbound calls to more than 230 countries • International toll-free service from more than 150 countries • Circuit-switched data to 73 countries	
Flexibility to meet wide range of Agency needs	• SDN platform can be adapted to meet specific user needs from basic voice communication to high-speed digital transmission • Moves, adds, and changes will be performed quickly with no impact on network design • SDN supports switched, dedicated, and remote access	
Superior call handling and availability	████████████████████████ • ████ reliability • ████ of domestic calls completed on first attempt • Average call setup time of ████████ for point-to-point and toll-free calls	

SERVICE DELIVERY APPROACH	BENEFITS	FEA FACILITATION
Compatibility with existing services and equipment	▇▇ platform operates in conjunction with existing: • Centrex • PBX • Existing Agency dialing plans	
Comprehensive network management capabilities	Through AT&T ▇▇▇▇▇▇ Agencies can monitor, manage, and control their VS resources.	

Table 1.4.1.1-2: Agency Benefits and FEA Facilitation. *Agencies benefit from service quality, service continuity, and global reach of AT&T's network. Operating as a ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇ gives Agencies the capabilities, features, and flexibility for managing VS resources with economy and efficiency.*

From an FEA perspective, AT&T brings ▇▇▇▇▇▇▇▇ to VS, which can support multiple lines of business and subfunctions, defined by the ▇▇▇ Voice Services are regarded as a horizontal and vertical capability of the SRM, which provides a communications infrastructure for Government Agencies and individuals who seek Government support or services.

Voice Services components provide teleconferencing, toll-free, and other communication services in support of Agencies to accomplish citizen-centric service missions. A practical example is AT&T's ▇▇ (Refer to Section 1.4.1.3.d for an example of the ▇▇▇▇▇ in action.) AT&T's Voice Services use industry standards, based on a ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇ In the context of FEA, the ▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇ As this telecommunication discipline and appropriate performance-based parameters evolve, services will be aligned with mutually agreed Service Level Agreements (SLAs) and actions to meet mission requirements that interrelate with strategic outcomes of the Performance Reference Model (PRM).

1.4.1.1.c   Major Issues to Service Delivery

(c) Describe the problems that could be encountered in meeting individual service requirements, and propose solutions to any foreseen problems.

"AT&T not only is the patriarch of today's disaster recovery programs, it also is the kingfish. AT&T has spent more than $300 million on the effort since 1991, and much of that money has been spent on 20-foot semi-tractor trailers that house network equipment, capable of replicating any domestic or international transport scenario."

--Telephony Online
August 2003

Drawing on extensive experience providing voice communications, AT&T has resources in place to provide the quality, continuity, and integrity of VS required under Networx. In this section, we highlight risks of known importance to the Government. **Table 1.4.1.1-3** presents VS risk areas and the steps AT&T is taking to eliminate or mitigate those risks.

RISKS	RISK DESCRIPTION	RISK MITIGATION
Implementation	Incomplete or inaccurate location information	
	Requirements changes	
	Weak or ineffective communications	

RISKS	RISK DESCRIPTION	RISK MITIGATION
Disaster Preparedness, Recovery, and Business Continuity	Fragmented or unresponsive communications	
	Support for GETS during crisis	
	Failure of urban telecommunications nodes	
Fraud Detection	Fraudulent calls: • Long distance • Toll-free • International toll	
	Identification and prevention of new types of fraud	

RISKS	RISK DESCRIPTION	RISK MITIGATION
Calling Card Misuse	• Cardholder misuse • Use by unauthorized individual	███████████████ ███████████████ ███████████████ ███████████████ ███████████████

Table 1.4.1.1-3: Potential Voice Service Risks. *Agencies benefit from substantial investments of funds and staff to maintain the network, recover from network disasters, and prevent losses from fraud and calling card misuse.*

AT&T will identify risks and steps taken to mitigate them through our ███████

███████████. In concert with the Government, we will ████████████

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1.4.1.1.d   Network Architecture Synchronization

(d) Describe the synchronization network architecture to support the offeror's access and transport networks.

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████████████████████████████ More detailed discussion is

provided in Section 1.3.6.1, Network Architecture Synchronization.

1.4.1.2   Satisfaction of Transport Performance Requirements [L.34.1.4.2]

"David Lauderdale, CTO of Worldspan, says that AT&T's eBonding has allowed him to reduce the labor required to manage Worldspan's network by roughly 60 percent without compromising reliability and customer satisfaction. And while network problems used to take up to eight hours to resolve, today the average resolution time is measured in minutes, not hours, says Lauderdale."

--CIO Magazine
February 2005

1.4.1.2.a   Service Quality and Performance

(a) Describe the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each service.

AT&T is committed to offering the Government the highest quality in VS. ■

■   Table 1.4.1.2-1 lists our proposed service quality levels.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
Availability (point-of-presence [POP]- to-POP)	Routine	99.95%	■
Availability (service delivery point [SDP]-to-SDP)	Routine	99.5%	■
	Critical	99.95%	
Time to Restore (TTR)	With Dispatch	8 hr	
	Without Dispatch	4 hr	
Grade of Service (GoS) (Call Blockage)	Routine	0.07 (SDP-to-SDP) 0.01 (POP-to-POP)	
	Critical	0.01 (SDP-to-SDP & POP-to-POP)	

Table 1.4.1.2-1: Voice Service Performance Metrics. *AT&T meets or exceeds GSA requirements for VS KPIs.*

1.4.1.2.b   Approach to Monitoring and Measuring Performance

(b) Describe the approach for monitoring and measuring the Key Performance Indicators (KPIs) and Acceptable Quality Levels (AQLs) that will ensure the services delivered are meeting the performance requirements.

Section 1.3.2.d, Approach to Perform Service Delivery Verification, describes how AT&T monitors and measures network and service performance.

Table 1.4.1.2-2 summarizes AT&T's approach to monitoring and measuring KPIs for Voice Services.

KEY PERFORMANCE INDICATOR (KPI)	APPROACH TO MONITORING AND MEASURING
Availability (POP-to-POP)	■
Availability (SDP-to-SDP)	■

KEY PERFORMANCE INDICATOR (KPI)	APPROACH TO MONITORING AND MEASURING
Time to Restore	████████████████
Grade of Service (Call Blockage)	████████████████

Table 1.4.1.2-2: Monitoring and Measuring Voice Services. *Agencies will easily access performance reports using AT&T BusinessDirect.*

AT&T's performance on these AQLs will be captured by the processes described above and made available to Agencies through AT&T **BusinessDirect** in spreadsheet and graphic displays. The first time the service is provided through the Networx contract, the performance must be verified. The KPIs will be monitored to certify that service performance complies with the AQL. ██. The service verification process is presented in greater detail in Section 1.3.2.d, Approach to Perform Service Delivery Verification.

Additionally, Voice Services requires an SLA with aggregate-based performance metrics that will be monitored and reported on a monthly basis.

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1.4.1.2.c   Performance Level Improvements

(c) If the offeror proposes to exceed the Acceptable Quality Levels (AQLs) in the Key Performance Indicators (KPIs) required by the RFP, describe the performance level improvements.

██

████████████████████████████   **Table 1.4.1.2-3** summarizes the

proposed improvements to the performance thresholds.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	NETWORX AQL THRESHOLD	PROPOSED AQL	PERCENT IMPROVEMENT
Availability (POP-to-POP)	Routine	99.95%	████████	███
Availability (SDP-to-SDP)	Routine	99.5%	████████	███
	Critical	99.95%	████████	███
Time to Restore	Without Dispatch	4 hr	███	███

Note 1: Availability percent improvement = (Networx Yr Outage Time – AT&T Yr Outage Time)/Networx Yr Outage Time

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Table 1.4.1.2-3: Performance Level Improvements. *Agencies will experience substantial performance and quality improvements with the proposed VS performance levels.*

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1.4.1.2.d   Rationale and Benefits for Additional Performance Metrics

(d) Describe the benefits of, rationale for, and measurement of any additional performance metrics proposed.

The Voice Services KPIs, defined by the Government, will provide a comprehensive assessment for service verification and service performance monitoring. ████████████████████████████████████

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1.4.1.3   Satisfaction of Transport/IP/Optical Service Specifications [L.34.1.4.3]

1.4.1.3.a   Service Description

(a) Provide a technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied.

AT&T will satisfy the service requirements for VS by providing the Government with the interfaces, access, connectivity, capabilities, and features required. Most voice calls will be provided through our circuit-switched network for both on-net and off-net communications. As Agencies migrate toward more IP-centric methods, we anticipate that shift will be reflected in greater numbers of VoIP calls. From the user's perspective, calls will seamlessly traverse circuit-switched and IP networks, using a multiplicity of protocols, yet remain transparent. Every call will be completed promptly and reliably, providing high-quality communications.

1.4.1.3.a.1 Technical Capabilities

AT&T's Voice Services will provide the technical capabilities specified in the RFP. **Table 1.4.1.3-1** details our VS capabilities.

CAPABILITY	DESCRIPTION
Uniform Numbering Plan	AT&T supports and will continue to support and comply with ITU-TSS Integrated Services Digital Network (ISDN) E.164 uniform numbering and addressing plan.
Network Intercept	Network will route calls to intercept announcements for disconnected numbers, time-out during dialing, network congestion, denial of access to off-net and on-net calls, denial of access to features, and other conditions.
User-to-User Signaling on ISDN D-Channel	Non-call associated signaling (NCAS) allows users to communicate by means of user-to-user signaling without setting up circuit-switched connection.
Voice Quality	G.711 is an ITU standard, approved in 1965, for converting analog signals, such as voice, into PCM 64 kbps digital signals. AT&T has long met this requirement by providing *toll quality* calls over its circuit-switched network.

Table 1.4.1.3-1: Key ████ Capabilities. *Agencies will receive unparalleled service quality that ensures that the Government receives VS when and where needed.*

1.4.1.3.a.2 Features

AT&T's ████ will provide a VS platform for Federal Agencies under Networx. **Table 1.4.1.3-2** highlights key service components and their value to the Government. To deliver these features, AT&T will build on its AT&T **Business**Direct service portal and provide the Government with a web-based window into our support of required and optional services under Networx.

SERVICE FEATURE OR COMPONENT	SERVICE DESCRIPTION	BENEFITS
Virtual private network (VPN)	███ provides: • Access from customer locations to AT&T switched network • Connection by all-digital electronic switching systems • Customized call handling • Network performance and control by ████████	Flex bility and reliability of AT&T's SDN provides Government with substantial benefits: • Agencies with wide variations in calling volume to geographically dispersed locations can economically include those sites in their VS network. • Agencies can easily add remote locations, large and small, to their network. • ██████ compat bility with existing PBX and private networks will extend life of Government assets. • Programmable features, such as advanced numbering plan, call screening, account codes, and authorization codes, give Agencies exceptional network control. • Agencies can retain in-place private numbering plans. • Government gains additional security from closed environment with private numbering plans, screening provisions, and use of authorization codes to meet Agency accounting and management requirements.
Flexible call-routing functions	Specialized software embedded in AT&T switched network performs routing functions transparently: • Alternate call-routing patterns • Virtually nonblocking network • Features and management capabilities of private network	
Programmable features	Agencies will be able to program: • Call screening • Account codes and authorization codes • Uniform reports showing usage details for all network locations	
████████	██████ operates within ███ to provide: • Centralized database that stores Government's unique ███ definition • Capability to screen outgoing calls • Prompt for authorization codes or other caller-entered digits • Instructions to ███████████████ to play announcement for caller	
████████	This digital switching vehicle provides: • Call information to Agency database stored at NCP • Routing instructions from NCP for each call	
████████	This database provides: • ████████████████ • ████████████████ • ███████	
Common Channel Signaling (CCS) Network	This packet-switched signaling network provides: • Signaling completely separate from call transmission path • Decreases in call completion time of ███████	

Table 1.4.1.3-2: Key SDN Features. *Agencies will receive Voice Services through a network designed to incorporate flexibility in multiple dimensions, including access, connectivity, compatibility, and programmability.*

████████████████████████████████ the Government can tailor its VS choices to meet requirements as well as preferences. Agencies can choose to exercise direct management of many ███ features or have them adapted to Agency requirements by AT&T.

AT&T complies with the requirement for calling cards of durable plastic composition. As an alternative, agencies may choose to have card images emailed in PDF format. The advantages of this approach include:

- Support of Government "green" initiatives
- Agencies receive new calling cards within 2-14 hours
- The potential to irradiate plastic cards that can occur when they pass through some postal facilities is eliminated.

1.4.1.3.a.3   Interfaces

Table 1.4.1.3-3 presents the interfaces required for Voice Services under Networx. These are similar to those that AT&T provides to Agencies under its FTS2001 Crossover and other Federal contracts.

UNI TYPE	INTERFACE TYPE AND STANDARD	PAYLOAD DATA RATE OR BANDWIDTH	SIGNALING TYPE
1	Analog Line: Two-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Line – Loop Signaling
2	Analog Line: Four-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Line – Loop Signaling
3	Analog Trunk: Two-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk – Loop Signaling (loop and ground start)
4	Analog Trunk: Four-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk – Wink Start Signaling
5	Analog Trunk: Four-Wire (Std: Telcordia SR-TSV-002275)	4 kHz Bandwidth	Trunk – E&M Signaling
6	Digital Trunk: T1 (Std: Telcordia SR-TSV-002275 and ANSI T1.102/107/403)	Up to 1.536 Mbps	T1 Robbed-Bit Signaling
7	Digital Trunk: ISDN PRI T Reference Point (Std: ANSI T1.607 and 610)	Up to 1.536 Mbps	ITU-TSS Q.931
8	Digital: T3 Channelized (Std: Telcordia GR-499-CORE)	Up to 43.008 Mbps	SS7, T1 Robbed-Bit Signaling
9 (Non-U.S.)	Digital Trunk: E1 Channelized (Std: ITU-TSS G.702)	Up to 1.92 Mbps	SS7, E1 Signaling
10 (Non-U.S.)	Digital: E3 Channelized (Std: ITU-TSS G.702)	Up to 30.72 Mbps	SS7, E1 Signaling
11	Digital Line: ISDN BRI S and T Reference Point (Std: ANSI T1.607 and 610)	Up to 128 kbps (2x64 kbps)	ITU-TSS Q.931

Table 1.4.1.3-3: Key VS Interfaces. *Agencies will receive a wide variety of network interfaces to meet the Government's Voice Services needs.*

1.4.1.3.b   Attributes and Values of Service Enhancements

(b) If the offeror proposes to exceed the specified service requirements (e.g., capabilities, features, interfaces), describe the attributes and value of the proposed service enhancements.

AT&T's ▮▮▮ reduces the administrative burden that the Government would experience if it selected a contractor whose VS platform was more ▮▮▮ The flexibility of this platform and SDN features are described in Section 1.4.1.1.b, Benefits to Technical Approach, and Section 1.4.1.3.a, Service

Description. **Table 1.4.1.3-4** highlights service enhancements in addition to those described in **Table 1.4.1.3-2**.

SERVICE ENHANCEMENT	DESCRIPTION	BENEFIT
Internal Agency ███████	█████████████████████ ███████████████ ████████	■ ███████████████████ ■ █████████████
██████████ ████	██████████████████ ██████████████████ ████████████	■ ████████████ ■ ███████████████ ■ █████████████████ ■ ████████████
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Table 1.4.1.3-4: VS Enhancements. *Agencies will gain added flexibility and control from VS enhancements.*

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> "AT&T establishes the industry standard for online customer service and support with AT&T **Business**Direct. ... The level of feature support and integration, as well as AT&T's use of e-bonding tools, sets them apart from the rest."
>
> --Yankee Group
> Research Note: Telecommunication Strategies United States
> January 3, 2005

1.4.1.3.c   Service Delivery Network Modifications

(c) Describe any modifications required to the network for delivery of the services. Assess the risk implications of these modifications.

Agencies will receive a low-risk solution through AT&T's ability to offer VS upon contract award, ███████████████████████████████████ █████████████

1.4.1.3.d   Transport/IP/Optical Service Experience

(d) Describe the offeror's experience with delivering the mandatory Transport/IP/ Optical Services described in Section C.2, Technical Requirements.

AT&T has extensive experience providing VS for Government Agencies and commercial customers. Because voice communications are central to daily activities, the Government must have high-quality service. During 2004,

AT&T's network averaged █████████████████████████████████████ ██ ██

The resilience and reliability of AT&T's network for routine and critical communications have led many Agencies to choose AT&T for VS. Examples of services provided to Agencies are listed in **Table 1.4.1.3-5**.

Client Need	Solution	Created Value
████████████	████████████	████████████

Client Need	Solution	Created Value
████████████	████████████	████████████

Client Need	Solution	Created Value
████████████	████████████	████████████

Table 1.4.1.3-5: Experience Delivering Voice Services. *Agencies will receive feature-rich VS* ███████ ████████████████████████████████

When a crisis occurs, VS reliability is paramount. That was certainly the case in the wake of the 9/11 attacks when the PSTN was overwhelmed. Yet, AT&T provided ████████████████████████

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████████████████ **Figure 1.4.1.3-1** shows the switch equipment that was deployed to provide communications for Lower Manhattan following the destruction of the World Trade Center.

Figure 1.4.1.3-1: Network Disaster Recovery Site in Jersey City, NJ, September 2001.

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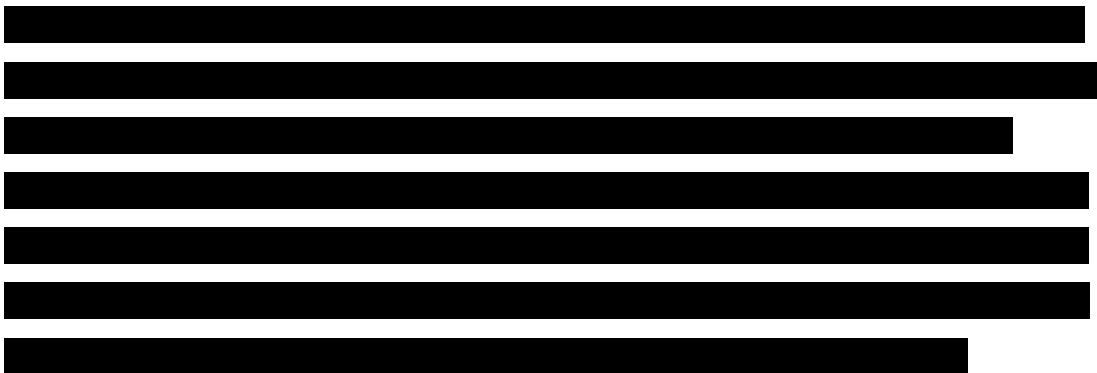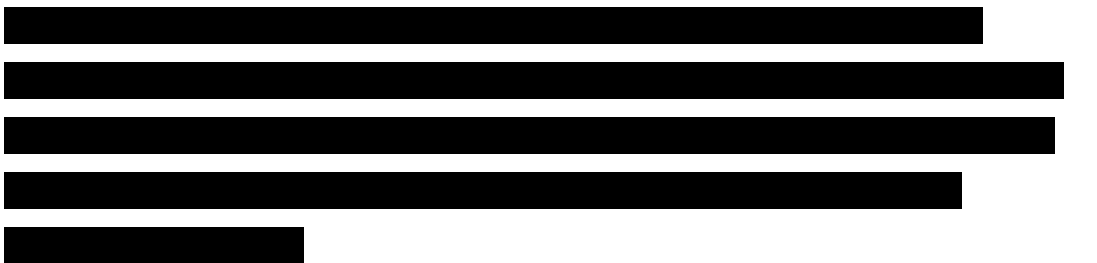
[REDACTED]

AT&T received a Gold Award for "Installation Not Disrupting," which Telemark defines as "competence in setting up and establishing network access without disturbing customers' routine activities" – a vital factor in service continuity when an Agency transitions to Networx.

--Telemark Managed Data Network Services
Voice of the Customer Benchmarking Study

## 1.4.1.4 Robust Delivery of Transport/IP/Optical Services [L.34.1.4.4]

1.4.1.4.a Network Traffic Utilization

(a) Given the offeror's current network capacity and utilization, explain how the offeror will support the Government requirements specified in the traffic model. Describe the impact on capacity and utilization, as well as any infrastructure build- out contemplated.

[REDACTED]

Figure 1.4.1.4-1 depicts the number of spare switch ports that can be assigned to support VS through 2016.
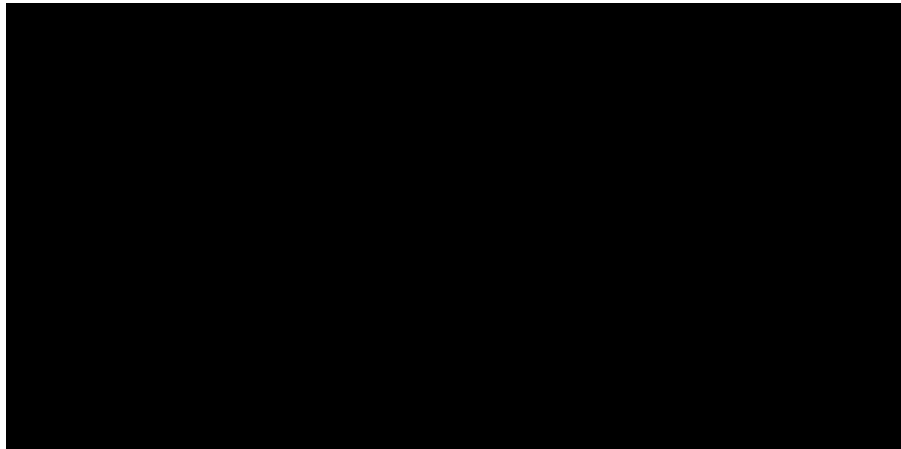
AT&T monitors switch usage on

Figure 1.4.1.4-1: Spare Switch Capacity.

a daily basis and continually refines demand forecasts to provide availability. We can redirect traffic to preclude overbooking demand and initiate asset recovery to make stranded switch ports available. Capacity for Voice over IP is addressed in Section 1.4.14.4.A, VoIPTS.

1.4.1.4.b   System Robustness and Resiliency

(b) Describe the measures and engineering practices designed to provide robustness of the access and backbone networks, ensure resiliency, and plan for growth.

- Long distance network comprising ▉▉

- Local network of Lucent ▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉▉

Circuit-switched calls are managed through ▉▉ In overload conditions, AT&T's ▉▉▉▉ uses various tools (**Table 1.4.1.4-1**) and controls over long distance, edge, and local end-office switches to route traffic around affected areas and optimize performance.

VS TOOL	FUNCTION
███	██████████████
██████████	███████████████
████████████	█████████████
██████████	██████████████
██████████	█████████████
██████	████████████
██████	████████████

Table 1.4.1.4-1: Voice Service Tools. *The circuit-switched network detects congestion and overloads and instantaneously reroutes traffic to maintain availability and high service quality.*

Additional measures and engineering practices for TDM and IP networks are described throughout Section 1.3, Network Architecture, particularly in Section 1.3.2.c, Congestion and Flow Control Strategy.

1.4.1.5 Transport/IP/Optical Service Optimization and Interoperability [L.34.1.4.5]

1.4.1.5.a Approach to Optimizing IP-Based and Optical Services

(a) Describe the offeror's approach for optimizing the engineering of IP-Based and Optical Services.

Engineering optimization of the IP-based and optical services is described in Section 1.3.6.2.a.

1.4.1.5.b Network Architecture Optimization

(b) Describe how the offeror will utilize methods such as remote concentration, switching/routing capabilities, and high bandwidth transmission facilities to optimize the network architecture.

Optimization of the network architecture through the use of remote concentration, switching/routing capabilities, and high bandwidth transmission facilities is described in Section 1.3.6.2.b.

1.4.1.5.c Optimizing Engineering Techniques

(c) Describe the engineering techniques for optimizing access for improved performance or increased efficiency in areas where large concentrations of diverse customer applications exist (e.g., the use of multi-service edge platforms).

Optimization of the access for improved performance or increased efficiency through multiservice edge (MSE) platforms is described in Section 1.3.6.2.c.

1.4.1.5.d   Vision to Implement Service Internetworking

(d) Describe the offeror's vision for implementing service internetworking over a common infrastructure (e.g., IP-centric architecture). Include a view on network interoperability, control plane integration, and optical infrastructure support for IP-Based Services. Describe the benefits and rationale of the offeror's approach.

The implementation of service internetworking over a common infrastructure, including network interoperability, control plane integration and optical infrastructure support, is described in Section 1.3.6.2.d.

1.4.1.6   Narrative Responses

RFP Table J.9.1.1.2 (b) lists no technical narrative requirements for VS.

1.4.1.7   Stipulated Deviations

AT&T complies with all the Stipulated Requirements for Voice Services.

1.4.1.7.1   Reserved

1.4.1.7.2   Reserved

1.4.1.7.3   Reserved

1.4.1.7.4   Reserved