1.4.12 Premises-Based IP-Virtual Private Network Service (PBIP-VPNS) [C.2.7.2]

Agencies establish low-risk, highly secure, and highly reliable intranet, extranet, and remote access connectivity solutions on a global basis with Premises-Based Internet Protocol-Virtual Private Network Service (PBIP-VPNS). Agencies are provided with multiple levels of management and support, a full spectrum of leading privacy and security standards, flexible access arrangements, and the industry's most recognized monitoring and management portal.

1.4.12.1 Technical Approach to Transport/IP/Optical Service Delivery [L.34.1.4.1]

1.4.12.1.a Approach to Service Delivery

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

With geographically dispersed locations, an increasing number of remote workers, and the need to establish secure connectivity with external partners, Agencies need to provide secure and reliable communications through public and private networks supporting a wide range of access speeds and access options.

> *AT&T offers the complete package-plenty of IP VPN choices, a rock solid backbone, tier one operations and management support and a new set of SLAs that are the best in the industry.*
> --Forrester Research
> September, 2004

To effectively and efficiently accomplish these mission and business goals, the industry is transitioning away from complex and inflexible legacy networks, and is instead adopting virtual private networking capabilities. VPNs support traditional private network requirements and applications over a shared and public carrier infrastructure. VPNs will help Agencies capitalize on the cost effectiveness and ubiquity of public networks, such as the Internet

*Use or disclosure of data contained on this sheet
is subject to the restriction on the title page of this proposal*   **AT&T Proprietary**   **Page 516 of 1474**
December 13, 2006

and the public switched telephone network (PSTN). Through AT&T's leadership in the VPN space in general and the PBIP-VPNS space in particular, Agencies are provided with solutions for access, reach, reliability, performance, and security that best meet Agency requirements for intranet, extranet, and remote access applications.

> *AT&T ranked as the top provider for VPN sales, with almost double the percentage of its nearest competitor.*
> --Forrester Research
> September, 2004

In an effort to set new industry standards for the efficiencies and performance capabilities gained through the use of IP-based VPN technologies, AT&T designed and deployed its PBIP-VPN service as a component of a comprehensive converged VPN framework. This framework is shown in **Figure 1.4.12.1-1.**

Presenting PBIP-VPN within a larger VPN framework helps Agencies seamlessly and efficiently establish enterprise-wide IP-based networking and security solutions that maximize connectivity and information sharing, while minimizing waste and information barriers. This becomes especially true over the lifetime of Networx, as IP becomes the networking protocol of choice, and IP-based VPNs become the means by which communication and security services are established. Of equal importance to the networking aspects of VPN convergence, Agencies also realize significant benefits through the integration of back office and operational support systems as well.

Agency networks that operate a number of VPN technologies should be operationally supported through a single set of ordering, billing, inventory, and performance management Agency-facing systems. This will support the Agency's ability to cost effectively and efficiently align its networking technologies with its business and mission goals and Federal mandates.

Figure 1.4.12.1-1:   IP

The AT&T approach of integrating specific VPN technologies under a single VPN framework (**Figure 1.4.12.1-1**) provides Agencies with the means of providing its end users with a unified experience, regardless of how and where they access Agency resources. As **Figure 1.4.12.1-2** shows, AT&T will provide Agencies with a comprehensive PBIP-VPN service that is inclusive of a number of critical network and service elements that are all provided and managed by a single, full-service provider. AT&T's approach (**Table 1.4.12.1-1**) to delivery of PBIP-VPNS is based on a number of broad factors that reflect AT&T's experience, providing large-scale enterprise networking solutions to Government entities and enterprises.

Figure 1.4.12.1-2: Approach to Service Delivery. *PBIP-VPNS can provide Agencies with comprehensive end-to-end managed solutions with global coverage and industry-leading performance and quality.*

AT&T Proprietary
Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal

Page 519 of 1474
December 13, 2006

SERVICE DELIVERY APPROACH	DESCRIPTION
Comprehensive end-to-end managed solutions	• Complete PBIP-VPN infrastructure management: ███████████████████████████████████ • Design, configuration, installation, and testing for Agency custom solution components • Online service and lifecycle management: provisioning • Moves, adds, changes, deletes (MACD), trouble ticketing, monitoring, and reporting
Flexible Network Access	• Analog voice • Integrated Services Digital Network (ISDN) • Broadband (xDSL and cable) • Dedicated private line: DS0 to OC-48 • Wireless Fidelity (WiFi) and broadband wireless • Satellite
Support for complete set of Agency site types	• Remote access—Traveling employees and teleworkers • Intranet (small sites)—Site-to-site Single Office Home Office (SOHO) • Intranet (large sites) and Extranet—Site-to-site High End
Double-Prong Security Model	• *Integrated Network Security*: ██ • *Dedicated Security Services*: AT&T provides dedicated security services, such as managed firewall and managed intrusion detection to provide Agencies with maximum security protection.
High Reliability PBIP-VPN Services	AT&T PBIP-VPNS support a wide range of redundancy and resiliency options: ███
Service Metrics	Comprehensive set of proactive and reactive performance metrics: ███
Support for Service convergence	• PBIP-VPN can be integrated with AT&T voice over Internet protocol (VoIP) services • Customer premises equipment (CPE) devices managed to support traffic classification based on Class of Service (CoS) • Backbone IP network, based on MPLS core with support for multiple traffic types
Standards Compliance	Applicable NIST, FIPS and IETF RFC Standards.

Table 1.4.12.1-1: Service Approach. *Agencies receive greater flexibility, connectivity, and productivity with high-quality PBIP-VPN services and a comprehensive service delivery approach.*

As discussed in **Table 1.4.12.1-1**, AT&T's PBIP-VPN service is designed and deployed with the goal of providing high-quality, secure, flexible, and technologically superior solutions to a diverse user base on a global basis. This approach has granted AT&T the industry's leadership position in IP VPN enterprise networking solutions.

AT&T was rated as "Top Global Service Provider" of IP VPNs.
--Telemark Research
2004, 2003, and 2002

1.4.12.1.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).

AT&T's Networx services in general and PBIP-VPN services in particular support the Government's vision of transformation through the use of the Federal Enterprise Architecture (FEA) to verify technologies contribute to mission performance. **Table 1.4.12.1-2** describes each service delivery approach element, in relation to FEA, and summarizes its contribution and/or provides an example of how it facilitates FEA implementation. AT&T is aligning its product and service components to be easily integrated, commonly manageable, and usable. This applies across Government functions, horizontally and vertically, as well as between levels of Government.

SERVICE DELIVERY APPROACH	BENEFIT	FEA FACILITATION
Comprehensive end-to-end managed solutions	Agencies relieved of daily device management activities	As a component of TRM/Component Framework/Data Management, allows Agencies to minimize waste and duplication by dedicating more of valuable internal resources to their core missions.
Flexible Network Access Support for complete set of Agency site types, connectivity methods, and remote access	Agency workers, teleworkers, and mobile users all gain flexible, secure, and efficient access to Agency critical data	As a component of TRM/Service Access and Delivery/Access Channels, allows increased sharing and collaboration between same Agency employees and between Agencies. Agencies also realize significant cost savings through reduced infrastructure due to a larger population of teleworking employees.
Double-throng Security Model	Agencies receive a highly secure PBIP-VPN service with continuous and real-time visibility of threats	As a component of TRM/Component Framework/Security, allows Agency e-commerce and e-business functions to remain intact in the event of major threats to the Internet.
High Reliability PBIP-VPN Services	Ability to design and deploy mission critical IP-based networking solutions	As a component of TRM/Service Access and Delivery/Access Channels, allows Agencies to increase communication and collaboration, while minimizing service delivery costs.

SERVICE DELIVERY APPROACH	BENEFIT	FEA FACILITATION
Strict Service Performance Guarantees	End-to-end service assurance for access into Agency critical resources	As a component of TRM/Service Access and Delivery/Service Transport, allows Agencies to maximize communication and collaboration, while minimizing service interruption.
Support for Service convergence	Agencies can easily and reliably migrate to VoIP-based services and SoIP.	As a component of TRM/Service Interface and Integration/Integration, allows Agencies to better share information and reduce duplication as many functions and services become available over a common and open IP-based architecture.

Table 1.4.12.1-2: Agency Benefits and FEA Facilitation. *Agencies can receive products and services components that are easily integrated, commonly manageable, and aligned to support FEA objectives and meet FEA guidelines.*

AT&T's development of net-centric technologies supports solutions based on service oriented architecture (SOA) that uses standardized, web-adapted components. Our approach provides that:

- Technical Reference Model (TRM) capabilities are fully met and linked to the Service Component Reference Model (SRM) and Data Reference Model (DRM).

- These links are structured to support Business Reference Model (BRM) functions and provide Performance Reference Model (PRM) line-of-sight linkage to mission performance and ultimate accomplishment.

- AT&T operates as an innovative partner through Networx to help achieve the vision of the FEA to enhance Agency mission performance.

In addition to the benefits and FEA facilitations cited earlier, AT&T can provide Agencies with additional services that complement PBIP-VPNS. These services include hosting, content delivery, managed security, and storage services. Agencies are provided with comprehensive end-to-end enterprise networking solutions that maximize end-to-end service performance and security.
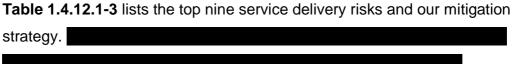
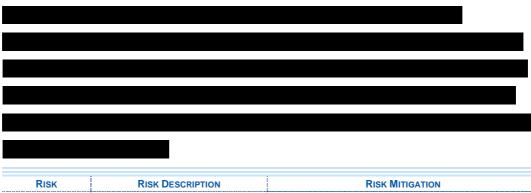### 1.4.12.1.c   Major Issue to Service Delivery

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

In transitioning into any new service delivery model, whether it be task-based or fully outsourced, unforeseen issues can always arise. Therefore, it is important that GSA selects a service provider, such as AT&T, which brings the depth and background that minimize an Agency's risk during transition. Our experience has enabled us to develop proven methods, processes, and procedures applicable to the simplest or the most complex projects.

Table 1.4.12.1-3 lists the top nine service delivery risks and our mitigation strategy. ███████████████████████████████████

██

██

██

██

██████████████████████

RISK	RISK DESCRIPTION	RISK MITIGATION
Business disruption	Business disruption associated with outsourcing key Information Technology (IT) and networking functions to a managed services provider.	████████████████████████
PBIP-VPNS integration with Networx Services	Offering Agencies integrated solutions, such as Internet protocol service (IPS), dedicated hosting services (DHS), and managed security services on a global basis for thousands of sites.	████████████████████████
Requirements changes	Requirements changes before and after service delivery contribute to budget overruns and missed expectations.	████████████████████████
Incomplete and inaccurate location information	Location information often is not accurate and site POCs are no longer valid.	████████████████████████

*Use or disclosure of data contained on this sheet
is subject to the restriction on the title page of this proposal*
AT&T Proprietary
Page 523 of 1474
December 13, 2006

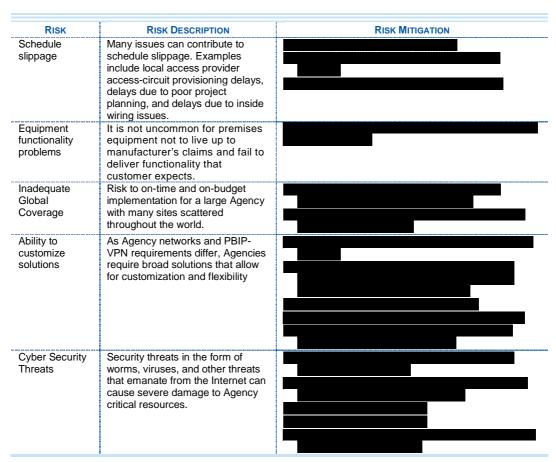| RISK	RISK DESCRIPTION	RISK MITIGATION
Schedule slippage	Many issues can contribute to schedule slippage. Examples include local access provider access-circuit provisioning delays, delays due to poor project planning, and delays due to inside wiring issues.	████████████████
Equipment functionality problems	It is not uncommon for premises equipment not to live up to manufacturer's claims and fail to deliver functionality that customer expects.	████████████████
Inadequate Global Coverage	Risk to on-time and on-budget implementation for a large Agency with many sites scattered throughout the world.	████████████████
Ability to customize solutions	As Agency networks and PBIP-VPN requirements differ, Agencies require broad solutions that allow for customization and flexibility	████████████████
Cyber Security Threats	Security threats in the form of worms, viruses, and other threats that emanate from the Internet can cause severe damage to Agency critical resources.	████████████████

Table 1.4.12.1-3: AT&T Service Delivery Lessons Learned and Risk Mitigation Strategies. *Agencies benefit from lessons learned and experience implementing PBIP-VPN services, which ultimately minimize service delivery risks.*

As evidenced from **Table 1.4.12.1-3**, several program, implementation, and network risks exist that can hinder an Agency's ability to deliver high-quality and low-risk PBIP-VPN services to its users. Agencies can build on AT&T's capabilities as a full service network provider to mitigate these risks and provide uncompromised PBIP-VPNS to Agency end users.

1.4.12.1.d   Network Architecture Synchronization

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

AT&T is a leader in the area of network synchronization, by virtue of our active role in the international and domestic standards organizations. We

have an existing industry-unique dedicated timing and synchronization network for distributing Stratum 1 traceable timing to our own national and international telecommunications networks.

Synchronization for access and transport networks begins with the Federal Government's cesium-based standard signal, which is distributed to a series of global positioning satellites (GPS) systems. AT&T derives synchronization from those GPS systems as the primary clock source. ██████████████

██

██

██

████████████████

██

██

██

████████████ A more detailed discussion on network synchronization is provided in Section 1.3.6.1, Network Architecture Synchronization.

1.4.12.2 Satisfaction of Transport/IP/Optical Performance Requirements [L.34.1.4.2]

1.4.12.2.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.

High-quality PBIP-VPNS requires deployment over a robust and high-performance IP network. Agencies are able to deploy quality PBIP-VPN solutions because AT&T strives to lead the industry in the quality of the IP network, as all AT&T service types converge onto a common IP/MPLS backbone network. **Table 1.4.12.2-1** depicts the service performance metrics Agencies will obtain for PBIP-VPNS.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICES QUALITY LEVEL
VPN Availability	Routine	99.9%	███
Latency (contiguous U.S. [CONUS])	Routine	120 ms	
Latency (outside contiguous U.S. [OCONUS])	Routine	300 ms	███
Time to Restore (TTR)	Without Dispatch	4 hr	
	With Dispatch	8 hr	██

Table 1.4.12.2-1: Performance Metrics for PBIP-VPN. *Agencies gain access to a high-quality PBIP-VPNS designed to meet all required KPIs and AQLs.*

Agency PBIP-VPNS will build on a high-quality IP service provided through the combination of the following three network and service attributes that directly affect the quality delivered to Agency PBIP-VPN applications: scale, low packet latencies, and industry-leading AQLs.

1. ██
███
███
██
██
██
████████████████████ **Figure 1.4.12.2-1** shows how AT&T compares with other service providers in the number of network points of presence (POPs).[1] A higher number of POPs translates into improved performance levels as access lines become shorter, and the access network is minimized. ██████████████
██████████████████████████████████████ By minimizing this access and interconnecting with the high-speed POP directly, Agencies receive much better performance levels and reliabilities.

██

Figure 1.4.12.2-1: Network Reach Comparison. *With the highest number of high-speed POPs in the underlying backbone network, Agencies interconnect with the network globally and achieve much improved performance levels.*
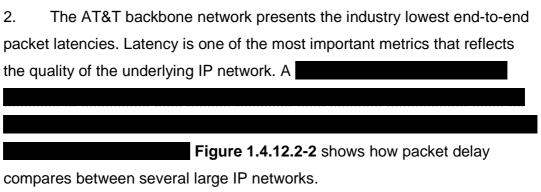
2.   The AT&T backbone network presents the industry lowest end-to-end packet latencies. Latency is one of the most important metrics that reflects the quality of the underlying IP network. A ████████████████████

██

██

████████████████████████ **Figure 1.4.12.2-2** shows how packet delay compares between several large IP networks.

Use or disclosure of data contained on this sheet
is subject to the restriction on the title page of this proposal   **AT&T Proprietary**   **Page 527 of 1474**
                                                                           December 13, 2006

Figure 1.4.12.2-2: IP Network Latency Comparison. *A lower and consistent latency translates to improved end-to-end quality for Agency applications and is the basis for successfully converging Agency applications onto a common IP infrastructure.* **Reference: each company's website**.

3.   AT&T offers the following AQLs for performance, provisioning, and maintenance. **Table 1.4.12.2-2** lists how the AT&T AQLs compare with competitors.
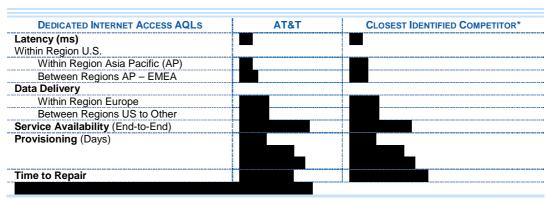
DEDICATED INTERNET ACCESS AQLS	AT&T		CLOSEST IDENTIFIED COMPETITOR*	
Latency (ms)				
Within Region U.S.	■		■	
Within Region Asia Pacific (AP)	■		■	
Between Regions AP – EMEA				
Data Delivery				
Within Region Europe				
Between Regions US to Other				
Service Availability (End-to-End)				
Provisioning (Days)				
Time to Repair				

Table 1.4.12.2-2: AT&T AQLs versus Competition. ██████████████████████████████

Best-in-industry AQLs will allow AT&T to deliver superior PBIP-VPNS solutions.

AT&T is really raising the bar with these SLAs. This is a comprehensive and aggressive move to challenge the industry's traditional methods of measuring performance in a way that is meaningful to customers and meeting their business objectives. It will be harder for competitors to be vague about their SLA commitments when AT&T's are out there in bold print"

--Kate Gerwig
Current Analysis

1.4.12.2.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.

Of equal importance to identifying the KPIs for a service is the method by which the KPIs are captured, measured, and monitored. Every element of the PBIP-VPNS, including the infrastructure components of the underlying AT&T Internet backbone, is monitored using a task-specific element management system (EMS) shown in **Figure 1.4.12.2-3.**

AT&T performs comprehensive multilayer monitoring and reporting of service KPIs. The PBIP-VPNS monitoring and management systems perform the additional tasks listed below:

- Pushing central configuration to Agency software clients and VPN CPE devices and collecting performance data
- Proactively calling devices to identify busy/no carrier/telco intercept/authentication problems
- Proactively managing and monitoring VPN gateways and tunnel servers
- Proactively monitoring VPN CPE devices and automatically informing AT&T operators to initiate trouble resolution process
- Providing simple network management protocol (SNMP) read-only access for tunnel servers to Agency personnel to view a wide range of specific performance and configuration parameters.

Figure 1.4.12.2-3: Management Network ██████████████████████████████████
██
█████████████████████████████████

Table 1.4.12.2-3 lists the methods used to measure PBIP-VPNS KPIs.

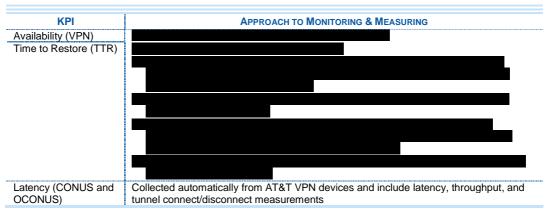| KPI	APPROACH TO MONITORING & MEASURING
Availability (VPN)	███
Time to Restore (TTR)	██████████████████████████
	███
	███
	███
	██
	████████████████████████████████████
Latency (CONUS and OCONUS)	Collected automatically from AT&T VPN devices and include latency, throughput, and tunnel connect/disconnect measurements

Table 1.4.12.2-3: PBIP-VPNS Performance Measurements. *KPIs monitored and measured through advanced and reliable data collection and processing systems.*

The first time the service is provided through the Networx contract, the performance must be verified. The KPIs will be monitored to certify that the

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.

1.4.12.2.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.

Agencies will benefit from enhanced service performance when the KPI performance thresholds are exceeded. **Table 1.4.12.2-4** summarizes the proposed improvements to the KPI performance thresholds.

KPI	NETWORX AQL THRESHOLD	AT&T PROPOSED AQL THRESHOLD	IMPROVEMENT PERCENTAGE
████████	████	████	██
████████	████	████	██

Table 1.4.12.2-4: Performance Level Improvements ██████████████████
██████████

██

██

██

1.4.12.2.d   Rationale and Benefits for Additional Performance Metrics

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

AT&T proposes the additional KPIs listed in **Table 1.4.12.2-5** as enhancements to the Government's set of PBIP-VPNS KPIs. ██████

██

██

PROPOSED KPI (NOTE 1)	DESCRIPTION OF PROPOSED KPI	BENEFIT OF PROPOSED KPI
████████	████████	████████
████████	████████	████████
████████	████████	

PROPOSED KPI (NOTE 1)	DESCRIPTION OF PROPOSED KPI	BENEFIT OF PROPOSED KPI
██████████████	████████████████████	████████████
████████	██████████████████	████████████████
██████████████	████████████████████	████████████
██████████████	████████████████████	████████████
████████████	████████████	████████████████
████████████	████████████	████████████
██████████████		

Table 1.4.12.2-5: Additional KPIs. *Agency end users experience much improved performance and quality through additional key performance level metrics.*

████████████████████ **Table 1.4.12.2-5** ████████████████

██

██

██

████████████████████████████████████

████████████

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

1.4.12.3.a Service Description

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

AT&T will satisfy all the service requirements through the technological capabilities of the backbone IP/MPLS network, the geographic reach and access flexibility of PBIP-VPN solutions, and a host of network-based services and applications. In addition, PBIP-VPNS requirements will be satisfied through gateway services between the IP/MPLS network and other public networks, strong layered security, complementary managed services

that augment PBIP-VPNS, and superior support services backed by AQL guarantees. **Table 1.4.12.3-1** provides a detailed description of the elements of the AT&T PBIP-VPNS and their associated Agency benefits.

SERVICE REQUIREMENTS	DESCRIPTION	BENEFIT TO AGENCY
Tunneling	IPSec, Secure Sockets Layer (SSL), Layer 2 Tunneling Protocol (L2TP), Point-to-Point Tunneling Protocol, virtual network routing and forwarding (VRF)-aware IPSec, general routing encapsulation (GRE) over IPSec	• Highly secure solutions • Solutions based on latest security standards • Business-level encryption as well as National Security Agency (NSA) Type-1 encryption • Support for SSL allows Agencies greater implementation flexibility • VRF-aware IPSec allows multiple Agencies to leverage common infrastructure
Encryption	DES, 3DES, AES	
Authentication	• X.509 certificates, RADIUS, SecureID, lightweight directory access protocol (LDAP), SafeWord, Defender, others on a custom basis • Support AT&T provided or Agency provided authentication servers	
Collocation	Collocation can be designed based on each Agency's specific requirements for equipment, space, and security. AT&T's collocation options include: • AT&T POP Space – Provide highest levels of security • AT&T Internet Data Center (IDC) – Provides access to managed hosting services and high-speed Internet access	• Highly secure and reliable infrastructure • High bandwidth Internet access without the need for costly access circuits
Network Access	AT&T PBIP-VPNS support wide range of network access methods, including the following: • Dial-up (Traditional POTS 56k or ISDN 128k) • Broadband (DSL and Cable) • Dedicated Leased Line (T1/E1, T3/E3, OC-X) • Ethernet • Wireless (WiFi) • Third-Party ISP	Support for various Agency site types, end devices, and remote worker deployments.
Layered Security Services	Inherent security of the AT&T IP backbone network (integrated network security) can be optionally enhanced with managed security services, such as managed firewall, intrusion detection, network scanning, denial of service (DoS) protection, network address translation, port address translation, and virus scanning.	• Defense in-depth • Maximum security protection • Ability for Agencies to tailor security solutions, according to needs and budgets
Proactive Management	AT&T's PBIP-VPNS are managed 24x7 by two fully redundant NOCs. The key network management functions performed by these NOCs include the following: • Fault Management • Configuration Management • Accounting Management • Performance Management • Security Management	Higher levels of service availability and reliability
Design and Engineering	Agencies can receive customized PBIP-VPN solutions that meet Agency-specific requirements: • Design, configure, install, and test solution components • Integration consulting services and proof of concept service • AT&T Labs and AT&T Government Solutions offer extensive expertise	Agencies will be able to deploy highly customized solutions that best meet Agency networking and mission needs

SERVICE REQUIREMENTS	DESCRIPTION	BENEFIT TO AGENCY
Secure Routing	Support for dynamic or static routing to provide full routing capability on VPN platform	Unrestricted Agency site-connectivity
Traffic Classification and Quality of Service (QoS) Support	PBIP-VPNS can be provided with CoS option, allowing for per tunnel CoS. ███████████ ███ ██ ██ ███	Agency delay-sensitive applications (e.g., voice and video) securely and reliably traverse the network with performance and quality assurances and guarantees.
High Availability, Redundancy, and Diversity Options	PBIP-VPNS can be configured with several different redundancy options: ███████ █████████ ██████ ████	Highly reliable and available PBIP-VPN solutions
Internet Gateway Services	Network-based firewall service to allow Agencies to access the Internet efficiently and securely. ████████ ██████████████████	Secure and efficient access to the Internet
Interworking Services	Gateway services to other AT&T networks, such as Frame Relay, ATM, and private line	Allows Agencies to establish a single networking construct that maximizes Agency connectivity requirements
Key Management	- Support for X.509 digital certificates - Complex multi-level Certificate Authorities (CA) architectures - Customized CA infrastructure operated to specific Agency requirements - AT&T managed token security service for full management of token servers - More sophisticated token management provided through the AT&T Government Solutions public key infrastructure (PKI) center	Customized token management services and security solutions

Table 1.4.12.3-1: PBIP-VPNS Description. *Agency end users provided with a compliant AT&T solution for all technical, feature, and interface requirements.*

As indicated in **Table 1.4.12.3-1**, Agencies receive fully compliant PBIP-VPNS with a range of capabilities that can be used to construct sophisticated and customized VPN solutions with varying levels of technical and operational requirements.

1.4.12.3.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.

In addition to the standard services, Agencies can enhance their PBIP-VPNS with additional features and capabilities. **Table 1.4.12.3-2** highlights additional service features and capabilities available with PBIP-VPNS.

SERVICE ENHANCEMENT	DESCRIPTION	BENEFIT
████	████████████	██████████

Table 1.4.12.3-2: Service Enhancements. *Agencies can supplement their PBIP-VPNS with available service enhancements.*

In 2004, AT&T and Intel established joint R&D efforts to design, test, and deploy access solutions based upon the new Wi-Max standard which promises to be a breakthrough access technology over the next 2-3 years. AT&T is currently conducting customer trials using Wi-Max. "We've been very enthusiastic of the results."

Hussain Eslambolchi

AT&T's Technology Chief and presIdent of AT&T Labs.

1.4.12.3.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.
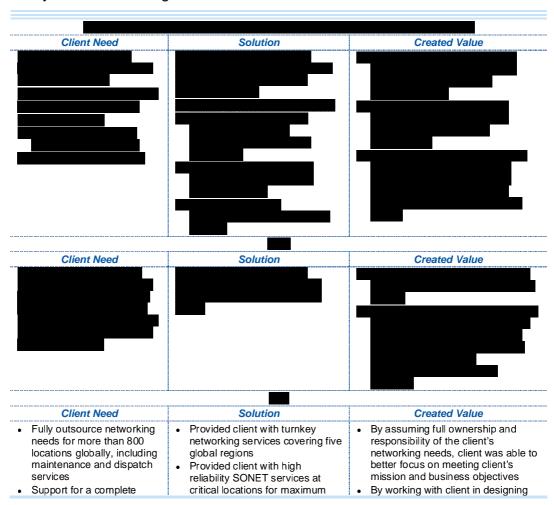
Agencies receive a low-risk solution by being able to use AT&T's PBIP-VPNS on Day One of the contract because there are no modifications required to the AT&T network or systems to provide PBIP-VPNS to the Government.

1.4.12.3.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.

The AT&T Networx Team offers Agencies extensive experience providing services that create value to our Government customers. This experience provides the ability to engineer and deliver PBIP-VPNS. Examples of AT&T's ability to deliver managed services are listed in **Table 1.4.12.3-3**.

Client Need	Solution	Created Value
■■■■■■■■■■■■■■■■■■■ ■■■■■■■■■■■ ■■■■■ ■■■■■■■ ■■■■■■■ ■■■■■■■■	■■■■■■■■■■■■■■■■■■■ ■■■■■■■■■■■■■■■■■ ■■■■■■■■ ■■■■■■ ■■■■■■■■■■■■ ■■■■■■■■ ■■■■■■■■	■■■■■■■■■■■■■■ ■■■■■■■■■■■■■■■■ ■■■■■■■■■■ ■■■■■■■■■■■■ ■■■■■■■■■■■
Client Need	Solution	Created Value
■■■■■■■■■■■■ ■■■■■■■ ■■■■■■	■■■■■■■■■■■■ ■■■■■■■	■■■■■■■■■■■ ■■■■■■■■■■■■■ ■■■■■■■■
Client Need	Solution	Created Value
• Fully outsource networking needs for more than 800 locations globally, including maintenance and dispatch services • Support for a complete	• Provided client with turnkey networking services covering five global regions • Provided client with high reliability SONET services at critical locations for maximum	• By assuming full ownership and responsibility of the client's networking needs, client was able to better focus on meeting client's mission and business objectives • By working with client in designing

| spectrum of telecommunication and networking services
- Design and planning for disaster recovery and continuity of WAN | reliability
- Managed complex inside wiring projects for client
- Provided network design and planning services in support of client's continuity and recovery needs | and deploying highly robust networking solutions, client is better suited to adapt to critical infrastructure failures |

Table 1.4.12.3-3: Experience Delivering PBIP-VPNS. *Success is measured by the ability to deliver solutions to Agencies that create value to their business.*

AT&T's vast experience in providing broad and large-scale PBIP-VPNS will help Agencies meet their PBIP-VPNS needs regardless of Agency size, location base, or mission requirements.

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

1.4.12.4.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.
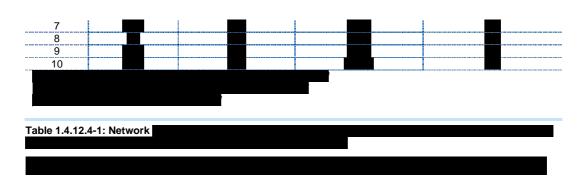
To assess the impact of the Agencies PBIP-VPNS traffic on the AT&T network, the forecasted PBIP-VPNS traffic in the Networx hosting model has been compared against the scale of AT&T's IP/MPLS network. As listed in **Table 1.4.12.4-1**,

Contract Year	Traffic Model Total IPS Traffic (Gbps)	Traffic Model Total Traffic (TB/day) @ 100% Utilization—(Notes 1 & 2)	AT&T Total IP/ MPLS Network Traffic (TB/day)—(Note 3)	Traffic Model to AT&T Traffic Ratio (%)
1				
2				
3				
4				
5				
6				

7				
8				
9				
10				

Table 1.4.12.4-1: Network

1.4.12.4.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.

Network access robustness and resiliency is provided through access circuit redundancy, device (CPE) redundancy, and access POP redundancy. POP redundancy includes physical POP diversity (i.e., Agency sites receive dual-access circuits to two AT&T POPs) as well as redundancy access within the POP itself (i.e., two access circuits terminate within the same POP but at two separate edge devices).

IP network backbone robustness and resiliency are provided through superb network reliability and availability measures and by adhering to a rigorous network design process. **Table 1.4.12.4-2** summarizes these two points.
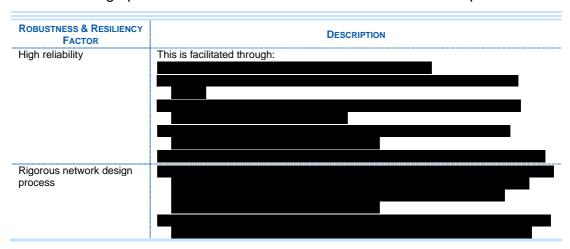
ROBUSTNESS & RESILIENCY FACTOR	DESCRIPTION
High reliability	This is facilitated through:
Rigorous network design process	

ROBUSTNESS & RESILIENCY FACTOR	DESCRIPTION
	███████████████████████

Table 1.4.12.4-2 Robustness and Resilience in AT&T Backbone. *AT&T relies on sophisticated network design and superior operational standards to deliver PBIP-VPNS.*

Another key component of the AT&T backbone network and its resiliency is the fact that the MPLS core network does not contain any Internet routes (Internet-route free core). As routing tables grew in size in recent years, following tremendous growth of the Internet, routers became increasingly unstable. This included core, high-performance routers. AT&T recognized this problem early and designed a tiered structure with the intention of having the *core* carry no Internet routes. This has added significantly to the stability and performance predictability of the AT&T core MPLS network.

Agencies will also benefit through AT&T's rigorous capacity planning process, which allows AT&T to maintain the IP/MPLS network flexible to planned and sudden increased traffic loads. A description of the AT&T capacity planning process is provided in Section 1.4.12.4-1.

1.4.12.4.b.1 Capacity Planning

Backbone capacity planning within the backbone IP/MPLS network is a result of three main drivers, as summarized in **Table 1.4.12.4-3.**
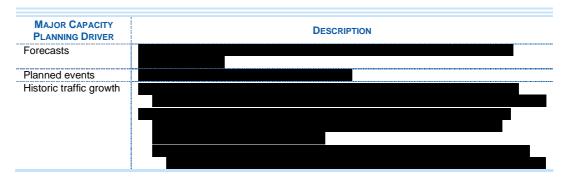
MAJOR CAPACITY PLANNING DRIVER	DESCRIPTION
Forecasts	████████████████
Planned events	████████
Historic traffic growth	███████████████████

MAJOR CAPACITY PLANNING DRIVER	DESCRIPTION
████	██████████████████████████ ███████████████████████████████ ████████████████

Table 1.4.12.4-3: Capacity Planning. *Agencies benefit from a comprehensive capacity planning framework.*

The scale and size of the AT&T IP network is testimony to the successful capacity planning process used by AT&T.

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

1.4.12.5.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

1.4.12.5.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.

1.4.12.5.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 the use of multiservice edge (MSE) platforms is described in Section 1.3.6.2.c.

1.4.12.5.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.

1.4.12.6   Narrative Text Requirement [C.2.7.2.3.1 (1 - 7)]

As previously indicated in **Table 1.4.12.1-1** that describes our overall service approach, AT&T PBIP-VPNS incorporates a vast array of access options.

Table 1.4.12.6-1 presents the interfaces supported by AT&T. Interfaces and access types are tested and certified by AT&T Labs before deployment on any AT&T network to verify performance and feature capabilities. This directly benefits Agencies by providing network access through interfaces operating seamlessly and preventing performance difficulties.

SUBSECTION	INTERFACE/ ACCESS TYPE	NETWORK-SIDE INTERFACE	PROTOCOL TYPE (NOTE 1)	COMPLY
C.2.7.2.3.1 (1)	Ethernet Access	1. 1 Mbps up to 1 GbE (Gigabit Ethernet) 2. 10 GbE (Optional)	IPv4/v6 over Ethernet	✔
C.2.7.2.3.2 (1)	Voice Service	Analog dialup at 56 kbps	Point-to-Point Protocol, IPv4/v6	✔
C.2.7.2.3.2 (2)	DSL Service	xDSL access at 1.5 to 6 Mbps	Point-to-Point Protocol, IPv4/v6	✔
C.2.7.2.3.2 (3)	Cable high speed access	320 kbps up to 10 Mbps	Point-to-Point Protocol, IPv4/v6	✔
C.2.7.2.3.2 (4)	Multimode/Wireless Local Area Network (LAN) Service	1. Up to 11 Mbps for Institute of Electrical and Electronics Engineers (IEEE) 802.11b 2. Up to 54 Mbps for IEEE 802.11g 3. Up to 54 Mbps for IEEE 802.11a	IPv4/v6	✔
C.2.7.2.3.2 (5)	Wireless Access	1. Up to 1.92 Mbps for International Telecommunications Union-Telecommunications Service Sector (ITU-TSS) V.35 (specific to broadband wireless) 2. Up to 1.92 Mbps for Electronic Industries Alliance (EIA) RS-449 (specific to broadband wireless) 3. Up to 19.2 kbps for EIA RS-232 (specific to broadband wireless) 4. Up to 1.92 Mbps for EIA RS-530 (specific to broadband wireless) 5. Up to 1.536 Mbps for T1 (w/ ESF) [Std: Telcordia SR-TSV-002275; ANSI T1.403] (specific to broadband wireless) 6. Up to 43.008 Mbps for T3 [Std: Telcordia GR-400-CORE] (specific to broadband wireless) 7. Up to 1.92 Mbps for E1 (Std: ITU-TSS G.702)(Non-domestic) 8. Up to 30.72 Mbps for E3 (Std: ITU-TSS	Transparent	✔

SUBSECTION	INTERFACE/ ACCESS TYPE	NETWORK-SIDE INTERFACE	PROTOCOL TYPE (NOTE 1)	COMPLY
		G.702)(Non-domestic)		
C.2.7.2.3.2 (6)	Satellite Access	1. Up to 1.92 Mbps for ITU-TSS V.35 2. Up to 1.92 Mbps for EIA RS-449 3. Up to 19.2 Kbps for EIA RS-232 4. Up to 1.92 Mbps for EIA RS-530 5. Up to 1.536 Mbps for T1 [Std: Telcordia SR-TSV-002275; ANSI T1.403] 6. Up to 43.008 Mbps for T3 [Std: Telcordia GR-400-CORE] 7. Up to 1.92 Mbps for E1 (Std: ITU-TSS G.702) 8. Up to 43 Mbps (Note: maximum serial bus speed is limited to 480 Mbps) for USB 2.0 (high speed) (optional) 9. Up to 43.008 Mbps for Air link interface (C-band, Ku-band, and Ka-band earth station)	Transparent	✔
C.2.7.2.3.2 (7)	Circuit Switched Data Service	1. ISDN at 64 kbps 2. ISDN at 128 kbps 3. ISDN dial backup at 64 kbps 4. ISDN dial backup at 128 kbps	Point-to-Point Protocol, IPv4/v6	✔

Note 1: IPv6 when commercially available by the offeror.

Table 1.4.12.6-1: Interfaces for Intranet and Extranet PBIP-VPNS. *Agencies have the flexibility with network interfaces that they can use legacy equipment on the PBIP-VPNS.*

Agencies will benefit from the value provided by AT&T Labs in verifying interoperability of access types and interfaces with Agency SED and CPE to provide inter-device and inter-vendor compliance.

1.4.12.7   Stipulated Deviations

AT&T takes neither deviation nor exception to the stipulated requirements.