1.4.5 Asynchronous Transfer Mode Services (ATMS) [C.2.3.2]

Agencies will benefit from a secure, high-quality Asynchronous Transfer Mode Service (ATMS), built on a wholly owned and operated global network that offers demonstrated reliability, performance, and wide geographic coverage.

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

1.4.5.1.a Approach to Service Delivery

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

The dynamic nature of business today demands a data networking solution that can rapidly be changed in size, location and capabilities. Asynchronous Transfer Mode Services (ATMS) provide the flexibility and performance needed now while allowing an evolution to newer networking technologies. Agency investments in ATM should be preserved by facilitating, where possible, service interoperability with FRS and IP, as well as a clear migration path to emerging Multiprotocol Label Switching (MPLS) network infrastructures.

Agencies need ATM services as a convenient, field proven, and scalable means of interconnecting their geographically dispersed sites at high speeds and with highly standardized classes of service to support their mission critical applications. **Figure 1.4.5.1-1** illustrates our ATM service network features, capabilities, and interfaces for delivering services to our customers.

Figure 1.4.5.1-1: AT&T's Global Approach to Service Delivery. *Agencies benefit from a comprehensive ATM service that provides service continuity from FTS Crossover and functionality to smoothly migrate to a MPLS-based service offering.*

For the IPeATM feature, AT&T uses a three-tiered architecture that consists of: 1) Mutiprotocol Labeled switching (MPLS) at the core; 2) Asynchronous Transfer Mode (ATM) cell relay packet technology at the edge; and 3) ATM interworking at the edge.

The MPLS layer consolidates traffic from various services (IP, data, voice, and video) and provides traffic engineering, rerouting capabilities, and expanded class of service support. As AT&T continues its network migration to MPLS, more traffic will be migrated onto MPLS as shown in **Figure 1.4.5.1-1,** and the Frame/ATM layer will increasingly become an access (rather than a core) network layer. This design will continue to allow AT&T to be agile at the edge of its network, not only by deploying additional service nodes, but also by providing for additional protocols and value-added services as customers' needs evolve.

Robust interoperability between ATM, FRS, and MPLS provides Agencies scalability to interconnect their low-speed sites (e.g., remote offices) by using Frame Relay while high-speed sites (e.g. headquarters) can access the network using ATM or the flexibility of MPLS. Agencies will have the ability to connect to the ATM network and interconnect to other services such as Frame Relay, IP-enabled FR/ATM, and Internet, services. As shown in **Figure 1.4.5.1-1** above, AT&T ATM provides Agencies with the ability to interconnect their geographically dispersed sites.

By using virtual paths and virtual circuits, which are logical connections between locations, Agencies can interconnect their various locations through the ATM network. A committed information rate (CIR) defines the steady-state attainable data rate between two locations logically connected by the permanent virtual circuit PVC. CIR speeds range from 64 Kbps to 600 Mbps. [redacted]. Port speeds range from fractional T1 (1.5 Mbps) to OC12 (622 Mbps). Classes of

service provide Agencies the ability to prioritize their traffic based on each application's tolerance to delay, delay variation (jitter), and cell loss.

ATM-to-Frame Relay Interworking Service allows ATM end-points to communicate seamlessly with Frame Relay end-points. Neither the ATM CPE nor the Frame Relay CPE must be replaced or modified, since all mappings and protocol conversions are done inside the network. This will enable Agencies to keep smaller sites on Frame Relay and only upgrade sites with higher traffic demands, thereby providing a smooth migration path from ATM to Frame Relay. often while preserving Agency technology investment.

Table 1.4.5.1-1 summarizes AT&T's approach to delivery of ATM services that provide high quality, reliable, flexible and exceed Agency requirements.

SERVICE DELIVERY APPROACH	DESCRIPTION
Standards compliance	Support the following standards as applicable: • ANSI T1 • ITU TSS Recommendation • ATM Forum • Internet Engineering Task Force (IETF) • North American ISDN Users' Forum (NIUF) .
Wholly owned and operated ATM network infrastructure	• For Native ATM service, an ATM switch based infrastructure is used at the core of the network • For the IPeATM feature, a three-tiered architecture using MPLS at the core, ATM cell relay packet technology at the edge and ATM interworking at the edge • Interconnect to other services such as Frame Relay, IP-enabled FR/ATM, Internet, Dial and DSL • High performance and reliability, since AT&T has full control over network design and operation parameters, as well as end-to-end network visibility • Extensive feature set and capabilities • ATM services available in [redacted]
Service continuity	• Interoperability between services(FR, ATM, IP, DSL ,etc.) allows increased collaboration among Government Agencies, a key objective of FEA (Federal Enterprise Architecture) • Easy transition from existing MAA contract to new Networx contract. • Disaster recovery (COOP)- allows reroute of traffic from a primary site to a backup data center.
Clear migration path to the future	• Smooth, non-disruptive migration to enhanced capabilities, MPLS IP-based services, and IPv6 • Interworking Services- preserves Agencies investment in FR and ATM service enabling device (SED) technology
Scalable backbone network	AT&T ATM services are available in [redacted] Agencies have the ability to easily scale bandwidth as demand grows for FR,ATM, and IP-based services
Network integrated security	• Agencies receive a highly secure service with continuous and real-time visibility into threats. • Network-based firewalls and IDS services can be integrated with FR service to enhance network security. • Inherent security of Layer 2

SERVICE DELIVERY APPROACH	DESCRIPTION
Service integration with at&t hosting and data centers	• Agencies realize their continuity of operations/disaster recovery (COOP/DR)needs as critical applications are relocated and backed up in bandwidth intensive data centers. • ATM PVC to Internet Gateway with existing port.
Diverse, flexible and resilient access solutions	• ATM, DSL, Dial ,and IP interworking services allow Agency teleworkers and mobile users equal access to Agency critical data resources securely and efficiently. AT&T Inverse multiplexing to bundle a number of physical T1 access lines into a single logical connection • Integrated Network Connection Service is a complete offer that allows connectivity to the voice network, using bandwidth allocation between voice and data. • Disaster recovery options (MPLS, Switch Diversity, etc.) allow Agencies greatly increased network availability and reliability and thereby reduced outages.
Backbone network architecture designed for convergence	• Agencies may easily and reliably migrate to MPLS-based services with low risk • [redacted] are offered to prioritize traffic and select the most appropriate ones to carry each category of traffic for optimal performance.
Support of standards	Agencies are not locked into technologies and solutions that are vendor specific or inflexible
E-servicing	Agencies easily and efficiently procure and receive updates on provisioning and servicing requests at the AT&T **Business**Direct web portal. Agencies also receive better visibility into inventory and ticketing systems.

Table 1.4.5.1-1: AT&T's Approach to Service Delivery. *High performance and reliability, enhanced security, robust interoperability, and expected preservation of Agency investments.*

This service provides Agencies with seamless interconnections to multiple networks now and in the future as well as the ability to help them consolidate and simplify their network infrastructures.

1.4.5.1.b Benefits of 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 ATM services, in particular, support the Government's vision of transformation through the use of the Federal Enterprise Architecture (FEA) by providing the technologies that contribute to the Agency's mission objectives. **Table 1.4.5.1-2** describes each service in relation to FEA, summarizes its contribution, and/or provides an example of how it facilitates FEA implementation.

SERVICE DELIVERY APPROACH	BENEFITS	FEA FACILITATION
Wholly owned and operated ATM network infrastructure	• High performance and reliability, since AT&T has full control over network design and operation parameters, as well as end-to-end network visibility • Enhanced security, as data is not "handled" by multiple parties • Extensive feature set and capabilities – not the lowest common denominator of networks patched together with NNIs (Network-to-Network Interfaces)	Agencies will be able to increase productivity, access, and security in fulfilling citizens' requests.

SERVICE DELIVERY APPROACH	BENEFITS	FEA FACILITATION
Service continuity	• Robust iteroperability between services should allow increased collaboration among Government Agencies, a key objective of FEA (Federal Enterprise Architecture) • Common feature sets and metrics simplify billing, performance reporting, etc.	Agencies will realize cost savings by eliminating duplication of efforts.
Clear migration path to the future	• Graceful, non-disruptive migration to enhanced capabilities, IP-based services • Expacted preservation of Agency investment in ATM technology	Even as the network changes, Agencies continue to meet business and mission demands.
Scalable backbone network	Agencies have the ability to easily scale bandwidth as demand grows for IP-based services	During periods of uncertainty and threats, Agencies can easily upgrade to remain citizen centric as demand grows for information sources and web sites.
Network integrated security	Agencies receive a highly secure service with continuous and real-time visibility into threats	Agency e-commerce and e-business functions internally and externally should remain intact in the event that major worms, viruses, etc. are released onto the Internet.
Service integration with AT&T hosting and data centers	Agencies realize their continuity of operations/disaster recovery (COOP/DR) needs as critical applications are relocated and backed up in bandwidth intensive data centers.	Agencies are provided with superior protection and backup of critical data that enables Agencies to cross communicate in times of national emergency.
Diverse, flexible and resilient access solutions	Agency teleworkers and mobile users gain equal access to Agency critical data resources securely and efficiently	Agencies realize infrastructure cost savings costs due to a larger population of teleworking employees.
Backbone network architecture designed foe convergence	Agencies may easily and reliably migrate to MPLS based services	Agencies better share information and reduce duplication as many functions and services become web-available over a common and open IP-based architecture.
Reliance on open standards	Agencies are not locked into technologies and solutions that are vendor specific or inflexible	Allows Agencies to tear down information barriers internally as well as externally with other Agencies.
E-servicing	Agencies easily and efficiently procure and receive updates on provisioning and servicing requests. Agencies also receive better visibility into inventory and ticketing systems.	Data that is relevant for planning, prioritizing, or executing becomes easily available allowing Agencies to meet their mission functions more effectively.

Table 1.4.5.1-2: Agency Benefits and FEA Facilitation. *Agencies will realize the benefits of AT&T's ATM service, which supports the guidelines and goals of FEA.*

AT&T's development of net-centric technologies supports solutions is based on service-oriented architecture (SOA), which uses standardized, web-adapted components. Our approach will meet the criteria listed below:

- Technical Reference Model 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 line-of-sight linkage to mission performance and ultimate accomplishment per the Performance Reference Model (PRM)
- AT&T operates as an innovative partner through Networx to help achieve the vision of the FEA to enhance mission performance.

In addition to the benefits and FEA facilitations cited earlier, AT&T will assist specific departments and Agencies to meet mission and business objectives through a comprehensive ATMS offering.

1.4.5.1.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 that brings the depth and background necessary to 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 1.4.5.1-3 lists the top seven service delivery risks and our mitigation strategy. [redacted]

RISK ITEM	RISK DESCRIPTION	RISK MITIGATION
Program management	No technical establishment of customer expectations. Service outages or late installations	[redacted]

RISK ITEM	RISK DESCRIPTION	RISK MITIGATION
Schedule slippage	Many issues can contribute to schedule slippage.	
Lack of service continuity	Agencies must migrate away from existing ATM features or capabilities when transitioning to Networx.	
Service reliability and performance	Agencies could experience service interruptions and/or slow performance, resulting in user dissatisfaction and loss of productivity.	
No migration path to mpls	Incompatible service offerings (forklift upgrade): Providing a migration path from one service to another creates expensive designs.	
Security	Hacking, attacks, tampering	
Limited service coverage	Extensive backhaul circuits/failures in networks. Few ATM switches.	

Table 1.4.5.1-3: Major Risk Assessment. *Agency risks associated with transition and life cycle support of ATM Services are mitigated through AT&T risk mitigation processes.*

AT&T has taken steps to identify risk and provide risk mitigation associated with delivering ATMS services. AT&T is committed to service excellence and will work with the Agency to identify and resolve potential problems that might occur during service delivery.

1.4.5.1.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 and our

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. [redacted]

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

1.4.5.2.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.

Agencies are provided a ATM service that meets [redacted] the performance standards of the government defined KPIs. The AT&T performance levels represent the minimum level of service that Agencies will be provided. [redacted] Key performance indicators (KPIs) for ATM and AT&T's proposed service quality levels are shown in **Table 1.4.5.2-1**.

KEY PERFORMANCE INDICATOR (KPI)		SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
Availability (PVC)		Routine	99.925%	[redacted]
GOS(Max Cell Transfer Delay) (CONUS)	CBR	Routine	50 ms	
	VBRrt	Routine	55 ms	
	VBRnrt	Routine	60 ms	
GOS(Max Cell Loss Ratio)	CBR	Routine	1.00E-09	
	VBRnrt	Routine	1.00E-06	
	VBRrt	Routine	1.00E-07	
GOS(Max Cell Delay Variation)	CBR	Routine	1 ms	
	VBRrt	Routine	1.5 ms	
Time to Restore		Without dispatch	4 hours	
		With dispatch	8 hours	

Table 1.4.5.2-1: ATMS Key Performance Indicators. *Agencies will receive high-quality ATM service [redacted] in service performance.*

AT&T will comply with and meet [redacted] the ATMS quality performance metrics specified in Section C.2.3.2.4.1, as illustrated in **Table 1.4.5.2-1.** Agencies will receive a set of performance and service quality metrics that will support the government requirements and provide exceptional performance, security, and reliability.

1.4.5.2.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. Agencies will receive the most accurate assessment of the service when the KPI measurement and monitoring methodology replicates the real performance that Agency personnel experience. To provide the Agencies with the most accurate representation of the service performance, AT&T has deployed a separate performance measurement infrastructure to collect network performance information. AT&T's measurement methodology, therefore, more closely captures the real performance that end users experience by measuring the data path that is very similar to the paths that the end user data would follow.

Table 1.4.5.2-2 outlines the methods used to measure the various ATMS key performance indicators.

KPI	MONITORING & MEASURING APPROACH
Availability (PVC)	[redacted]

KPI	MONITORING & MEASURING APPROACH
[redacted]	[redacted]
Max Cell Transfer Delay [redacted]	[redacted]
Max Cell Loss Ratio	[redacted]
Max Cell Delay Variation	[redacted]
Time to Restore	[redacted]

Table 1.4.5.2-2: ATM Service Monitoring and Measuring. *Agencies can closely track the performance of their ATMS because AT&T follows an automated and systematic monitoring and measuring approach.*

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 [redacted]

[redacted] The service verification process is presented in greater detail in Section 1.3.2.d, Approach to Perform Service Delivery Verification.

Additionally, ATMS is a Service Level Agreement (SLA) with aggregate-based performance metric(s) that will be monitored and reported on a monthly basis. [redacted] refer to Section 1.3.2.d, Approach to Perform Service Delivery Verification.

Agencies will be assured that the service that is required for critical communications will be verified measured and monitored. AT&T will provide users with KPIs that capture real performance that Agencies are expecting and a rich feature set of online tools to verify those measurements.

1.4.5.2.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 [redacted]. **Table 1.4.5.2-3** summarizes the proposed improvements to the KPI performance thresholds, and the benefits that Agencies will experience through the higher service performance.

KEY PERFORMANCE INDICATOR (KPI)	ACCEPTABLE QUALITY LEVEL (AQL)	PROPOSED AQL	IMPROVEMENT PERCENTAGE
[redacted]	[redacted]	[redacted]	[redacted]

Table 1.4.5.2-3: ATMS Key Performance Indicators. [redacted]

The improvements are in the following area:

[redacted]

1.4.5.2.d Rationale and Benefits for Additional Performance Metrics

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

The KPIs defined by the Government for the ATMS will provide a comprehensive assessment for service verification and service performance monitoring. Agencies will benefit from additional service performance when the KPI performance thresholds are exceeded. **Table 1.4.5.2-4** [redacted]

[redacted]

KEY PERFORMANCE INDICATOR (KPI)	ACCEPTABLE QUALITY LEVEL (AQL)	[redacted]	[redacted]
GOS(Max Cell Transfer Delay) (CONUS) CBR (SDP to SDP)	50 ms	[redacted]	[redacted]
VBR – Rt (SDP to SDP)	55 ms	[redacted]	
VBR – nrt (SDP to SDP)	60 ms		

Table 1.4.5.2-4: ATMS Key Performance Indicators. *Agencies will experience substantial performance and quality improvements with the proposed KPIs and AQLs.*

[redacted]

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

1.4.5.3.a Service Description

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

1.4.5.3.a.1 Overview

AT&T will satisfy all the service requirements detailed through the following ATMS network technological capabilities [redacted]

[redacted]

1.4.5.3.a.2 Technical Capabilities

Table 1.4.5.3-1 provides a detailed description of the elements [redacted] of the service and their associated Agency benefits.

SERVICE REQUIREMENTS	DESCRIPTION	BENEFITS TO AGENCY
Port Speeds	• T1/DS1 (1.54 Mbps) • FT1 (Fractional T1) • E1 (2.048 Mbps) • T3/DS3 (45 Mbps) • Sub-rate T3/DS3 (5,10,15,20,25,30 Mbps) • FT3/DS3 (Fractional T3) • E3 (34 Mbps) • IMA (Inverse Multiplexing over ATM) providing n x T1/DS1 where n = 1 to 8 • OC-3 (155 Mbps) • OC-12 (622 Mbps)	Agencies will have the flexibility and scalability to address their diverse application needs and bandwidth requirements
Provide PVC between SDPs	AT&T provides PVCs from 64kbps to OC-12	Allows flexible bandwidth sizing and cost savings for burst capabilities.
Support bandwidth on demand via scalable class of service (CoS)	• AT&T offers [redacted] on the ATM network. • Agencies can prioritize their traffic and select the most appropriate Class of Service to carry each category of traffic for optimal performance. • [redacted] Assures high sustained throughput of traffic above CIR up to port speed for no additional cost. [redacted]	• Efficient use of existing bandwidth • Cost savings on network design
Provision point-to-point virtual connections	AT&T provides point-to-point PVCs in 2 types: Virtual Path (VP); Virtual Channel (VC)	Allows for effective design implementations
Provide local access/local loops	AT&T provides all local loops/access to SDPs from DS1 to OC-12	Total end-to-end service responsibility
Provide Simple Network Management Protocol (SNMP) to Agency NOCs on performance statistics	AT&T **Business**Direct offers read-only access to: • Network status • Fault detection • Performance statistics • Equipment configuration	• Allows up-to-date performance reports • Near real-time performance specs.
Support multiple PVC speeds from 64kbps to OC-12	• ATM supports point-to-point PVCs. • ATM supports CIR speeds from 64kbps to OC-12	Flexible bandwidth choices
Support symmetrical/ asymmetrical PVCs	AT&T supports symmetrical and asymmetrical PVCs	Allows cost-effective design when required

Table 1.4.5.3-1: Service Requirements. *Agencies will be provided with a compliant and low-risk solution because AT&T offers all technical capabilities that meet all requirements.*

1.4.5.3.a.3 Features

Table 1.4.5.3-2 describes how the feature service requirements will be satisfied.

SERVICE REQUIREMENT	DESCRIPTION	BENEFIT TO AGENCY
ATM Network	• For Native ATM service, an ATM switch based infrastructure is used at the core of the network • For the IPeATM feature, AT&T has a three-tiered architecture using MPLS in the in the core and ATM cell relay packet technology and ATM interfaces at the edge. • Core/Edge architecture allows AT&T to be agile at the edge of its network by deploying additional service nodes, and providing for additional protocols and value-added services as customers needs evolve. • AT&T ATM network has reliability rerouting capabilities. [redacted]	• Cost effective network solution. • Global network • Excellent reroute capabilities. • Disaster recovery • MPLS enabled • Diversity options • Multiple access options
Quality of Service	AT&T ATM customers can choose from [redacted] •	• Provides efficient use of bandwidth resources • Allows prioritization of traffic per PVC • Cost savings
Disaster Recovery PVCs	Designates a primary (before failure) and secondary (after failure) network configuration.	• Provides the capability to reroute traffic to alternate customer site or data center in case of disaster or threat. • Easy to implement
Diversity	Protects customers in case of a failure at an ATM switch or ATM POP. Diversity is achieved through these options: • Standard Card Diversity - (provided as a standard option whenever customers have more than one port in a given ATM POP) – Distributes ports across ATM cards within the same switch, providing alternate routing in case of failure • Switch Diversity - distributes ports across ATM cards in different switches within the same POP, providing alternate routing in case of failure [redacted]	• Provides increased reliability of network • Protects against access failures
Frame Relay-to-ATM interworking services	• Frame Relay-to-ATM Service Interworking is offered between all Frame Relay endpoints and all ATM endpoints, with protocol conversion occurring in the network. • Supports Virtual Channel Connections (VCC), Variable Bit Rate - Non-Real Time (VBR-NRT) Connection Oriented Data (COD) traffic • Offers all data rates currently supported by AT&T Frame Relay Service	• Allows for most efficient use of bandwidth choices. • No upgrade required of customer equipment – translation done in network. • Allows for aggregation on small locations into a large data location.
Inverse Multiplexing over ATM (IMA)	• AT&T Inverse Multiplexing to ATM bundles up to 8 physical DS1/ T1/E1 access lines into a single logical connection. • IMA functionality provides access flexibility where DS3/T3/E3 lines are not readily available or economical.	• Provides a cost effective solution for access rates between DS1/T1/E1 and DS3/T3/E3. • Access alternative if DS3/T3/E3 is not available
IP-enabled ATM	• IP Enabled ATM Services (IPeATM) is a Network-based IP VPN solution utilizing MPLS	• Native ATM and IP-enabled ATM coexist on

SERVICE REQUIREMENT	DESCRIPTION	BENEFIT TO AGENCY
	• IPeATM is transport and access independent, and is able to provide secure any-to-any connectivity using MPLS technology. • The MPLS-based VPN enforces traffic separation among IPeATM customers by assigning customer ports to a unique Virtual Network Routing and Forwarding table (VRF). Only pre-assigned ports are allowed to participate in the VPN. • Leveraging MPLS QoS, IPeATM offers [redacted] Classes of Service (COS) to support real-time and non-real-time services.	the same port for cost savings. • Provides any-to-any connectivity for a meshed network without the cost of multiple PVC's. • Provides Class of Service for different traffic types.

Table 1.4.5.3-2: Service Requirements/Features. *Agencies will be provided a low-risk full service to meet or exceed Networx requirements.*

1.4.5.3.a.4 Disaster Recovery

Agencies can design their disaster recovery configurations and prioritize which PVCs or subsets of PVCs are moved first. This will allow critical applications to brought up as quickly as possible. [redacted]

In addition to our disaster recovery solution, Agencies may select dial backup and/or a backup PVC option that is designed to provide a secondary connection from a primary to a secondary location. Backup PVCs are inactive during normal network conditions, Backup PVCs are activated during disaster recovery to back up your primary network with your pre-determined secondary network configuration.

1.4.5.3.a.5 IPeATM

AT&T's IP-enabled ATM Service essentially is an Network-based IP Virtual Private Network (NBIP VPN). AT&T's IP-enabled ATM Services uses ATM to access the NBIP VPN and provides an evolutionary migration path to a NBIP VPN network.

AT&T IP-Enabled ATM services are considered an add-on feature to AT&T's ATM networks. They bring to the marketplace an efficient, scalable way for businesses to incorporate critical applications in their existing networks. They address the growing importance of IP-based networking and the increasingly distributed communications needs of enterprises, while providing the service and security level expected of ATM. These services provide customers with the following capabilities and performance:

- Establish any-to-any connectivity through a single Permanent Virtual Circuit (PVC), called Enterprise Permanent Virtual Circuit (EPVC), from the IP Enabled Frame Relay/ATM network to each customer location. There is often no need to order additional PVCs at each site for fully meshed communications.
- Same security as existing ATM. Security is absolute, since IP-enabled ATM Enterprise EPVCs use the same core transport and congestion management as traditional ATM.
- Similar performance (i.e., throughput and slightly higher latency) as existing ATM.
- VPN redirection, which is an automatic rerouting capability offering primary site disaster recovery.

AT&T IP-enbled ATM Services address two critical VPN business networking needs: any-to-any connectivity and Quality of Service (QoS). **Table 1.4.5.3-3** illustrates the class of service that is supported on IPeATM. They provide the high performance of ATM and the ubiquity of IP, making it easy to integrate the two, eventually migrating over to all IP networks. This new capability also simplifies routing and supports customers' existing IP addressing plans without the need for tunneling or

address translation. AT&T customers with existing ATM service simply add an Enterprise Permanent Virtual Circuit (EPVC) and avoid the time-consuming task of a major network upgrade.

TRAFFIC CLASS	MANAGED SERVICES CLASS NAME	TRAFFIC TYPE	SUGGESTED EXAMPLES
[redacted]			

Table 1.4.5.3-3: Class of Service Categories. *Agency traffic can be prioritized* [redacted] *based on time sensitivity and critical need.*

1.4.5.3.a.6 Interfaces

Table 1.4.5.3-4 outlines how the interface service requirements will be satisfied.

INTERFACE REQUIREMENT	AT&T CAPABILITY/CAPABILITY
UNI at the SDP	AT&T supports User-to Network-Interfaces (UNI) at the Government SDPs
Interface types	AT&T supports all the interface types and rates specified in table C.2.3.1.3.1
IPv6	AT&T will support when commercially available

Table 1.4.5.3-4: Service Requirements/Interfaces. *Agency requirements will be satisfied with a compliant AT&T interface solution.*

Agencies will benefit from the geographic reach of and access flexibility into the AT&T ATM/IP/MPLS network. A host of network- based services and applications along with strong security features, complementary managed services, and superior support services backed by SLAs will help Agencies meet the demanding requirements of day to day business needs.

1.4.5.3.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 ATM services with additional features and capabilities [redacted]. **Table 1.4.5.3-5** highlights enhanced service features and capabilities available with ATMS.

SERVICE ENHANCEMENT	DESCRIPTION	BENEFIT
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

SERVICE ENHANCEMENT	DESCRIPTION	BENEFIT
	[redacted]	

Table 1.4.5.3-5: Recommended ATM Service Enhancements. *Using the proposed service enhancements, Agencies can customize and enhance their ATM service to match their specific requirements.*

Agencies will benefit from the service enhancements and service flexibility of the AT&T ATM network. A host of network-based services and applications along with complementary managed services, and superior diversity services backed by SLAs will help Agencies meet the demanding requirements of day-to-day business needs.

1.4.5.3.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 through AT&T's ability to offer ATM service upon contract award without modifications to the network or operational support systems.

1.4.5.3.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 Networx Team offers Agencies extensive experience providing managed services that create value to our customers. Examples of AT&T's ability to to engineer and deliver ATMS are listed in **Table 1.4.5.3-6**. AT&T has been providing ATM services since 1995. Our customers currently include a wide range of Government Agencies and commercial entities. Our Frame Relay/ATM network is one of the largest in the world, and supports over 500,000 active customer ports.

[redacted]

CLIENT NEED	SOLUTION	CREATE VALUE
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Table 1.4.5.3-6: AT&T Past Experience. *Agencies can leverage past experience of AT&T's team to effectively address their ATM requirements.*

AT&T Networx Team offers Agencies extensive experience providing managed services that create value to our customers. This experience has given us the ability to engineer and deliver low-risk services and that will meet the stringent requirements of Government Agencies with low risk involved.

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

1.4.5.4.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]

[redacted] (**Table 1.4.5.4-1**). [redacted]

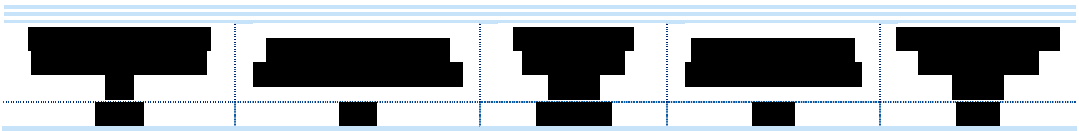

Table 1.4.5.4-1: Traffic Utilization. [redacted]

1.4.5.4.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.

To achieve the high reliability expectations of our customers, AT&T's ATM Service provides multiple layers of reliability and restoration (**Table 1.4.5.4-2**).

[redacted]

[redacted]

ROBUSTNESS/RESILIENCY CAPABILITY	AT&T NETWORK CAPABILITY	CUSTOMER BENEFITS
Wholly owned network	Full control over the design parameters, performance targets, and capacity planning.	Facilitates trouble resolution, and therefore offers better reliability to Agencies.
[redacted]	[redacted]	[redacted]
Capacity planning process	[redacted]	Capacity will be available for growth and in emergency situations
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Table 1.4.5.4-2: ATM Network System Robustness/Resiliency. *AT&T provides numerous engineering practices for access and backbone networks' survivability.*

Table 1.4.5.4-3 displays the details of AT&T's measures and engineering practices to provide robustness and resiliency and to plan for growth.

FACTOR	CAPABILITY

FACTOR	CAPABILITY
Practices to provide network robustness and resiliency	• AT&T's data backbone network is designed to survive a single logical link or a single router failure, i.e., there should be no congestion on any access or backbone links under the failure of any single link or router. • The network design process also takes into account other factors such as diversity of Layer 1 routing, internal routing protocol, network latency and performance, network robustness under network failures, Quality of Services (QoS), and planned network technology insertion and migration planning. • The result of the network design process is a rolling 12-month view of network capacity deployment and associated network vulnerabilities. This view is continually monitored and adjusted to reflect changes in the network, either in traffic growth or planned network activities. • AT&T developed sophisticated network design and simulation capabilities to predict network behavior under various network failures such as router, link, and fiber span failures, or even more catastrophic failure such as of an entire Service Node Routing Complex (SNRC).
Plan for Growth	• Historical traffic growth of existing services is measured over time. This traffic reflects changes in the usage patterns of existing customers as well as of the Internet at large, which has become the dominant driver of capacity deployment. • To anticipate traffic growth trends, AT&T developed a comprehensive program to instrument the backbone network across all edge devices as well as backbone routers. Capabilities such as Netflow, Packet Sampling and SNMP polling help identify early traffic trends and potential congestion in the network. • AT&T also developed a highly sophisticated mathematical model (a technique called Tomo-gravity approach) to accurately predict the aggregated demand traffic matrix that imposes on the backbone network.

Table 1.4.5.4-3: System Robustness and Resiliency. *AT&T practices due diligence to provide a robust network and plan for future growth of the network.*

These two factors, along with planned network technology migrations and insertions, drive the development of AT&T's backbone network capacity plan.

[redacted]

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

1.4.5.5.a Engineering Optmization

(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.b.

1.4.5.5.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.c.

1.4.5.5.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.d.

1.4.5.5.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.e.

1.4.5.6 Narrative Text Requirement

1.4.5.6.1 Reserved

1.4.5.6.2 CBR Performance Metrics [C.2.3.2.4.1]

The performance levels and acceptable quality level (AQL) of key performance indicators (KPIs) for ATMS in Section C.2.3.2.4.1 below are mandatory unless marked optional. All KPI measurements shall be SDP-to-SDP. The CBR performance metrics in Section C.2.3.2.4.1 are a mandatory requirement for native ATMS. The CBR performance metrics in Section C.2.3.2.4.1 are only mandatory for emulated ATMS if CBR is provided by the contractor.

AT&T will offer native ATMS for use by the agencies. As part of the native ATMS offer, AT&T will support the Constant Bit Rate (CBR) Quality of Service (QoS) category. As described in Section 1.4.5.2.a of this document, AT&T will adhere to the performance levels and acceptable quality level (AQL) of key performance indicators (KPIs) for the CBR performance metrics defined in Section C.2.3.2.4.1 of the Networx Universal RFP.

1.4.5.7 Stipulated Deviations

AT&T complies with all the Stipulated Requirements for the ATMS.

1.4.5.7.1 Reserved

1.4.5.7.2 Reserved

1.4.5.7.3 Reserved

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