

1.4.4 Frame Relay Service [C.2.3.1]

Agencies will benefit from a secure, high-quality Frame Relay Service (FRS), built on a wholly owned and operated global network offering with demonstrated reliability, performance, and wide global coverage.

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

1.4.4.1.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 demands a data networking solution that can rapidly be changed in size, location, and capability. Frame Relay Service (FRS) provides the flexibility and performance needed now, and for a seamless evolution to networking technologies of the future. Agency investments in FRS will be preserved by allowing service interoperability with asynchronous transfer mode (ATM) and Internet protocol (IP), as well as a clear migration path to emerging multiprotocol label switching (MPLS) network infrastructure through our IP-enabled FRS.

AT&T's FRS is fast, secure, flexible, reliable, and scalable. This service provides Agencies with interconnections to multiple networks now, and in the future, as well as the ability to help them consolidate and simplify their network infrastructures (**Figure 1.4.4.1-1**).

For the IPeFR feature, AT&T uses a three-tiered architecture as follows: (1) MPLS at the core, (2) ATM cell relay packet technology at its next layer, and (3) frame relay interfaces 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 (CoS) support.



Figure 1.4.4.1-1: AT&T's Approach to Service Delivery. Agencies benefit from a comprehensive FRS that provides service continuity from FTS Crossover and functionality to smoothly migrate to an MPLS-based service offering.

As AT&T continues its network migration to MPLS, more traffic will be migrated onto MPLS, as shown in **Figure 1.4.4.1-1**. The frame/ATM layer will increasingly become an access rather than a core network layer. This design will 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 Agency's needs evolve.

Robust interoperability between FRS, asynchronous transport mode services (ATMS), and MPLS provides Agencies with the flexibility to interconnect their low-speed sites (e.g., remote offices) using Frame Relay. High-speed sites (e.g., Headquarters) can access the network using ATM or the packet over synchronous optical network (SONET) on MPLS. As shown in **Figure 1.4.4.1-1**, Agencies will have the ability to connect to the Frame Relay network and interconnect to other services, such as ATMS, IP-enabled FR/ATM, Internet, dial-up, and digital subscriber line (DSL) services.

By using permanent virtual circuits (PVCs), which are logical connections between locations, Agencies can interconnect their various locations through the Frame Relay network. A committed information rate (CIR) defines the steady-state attainable data rate between two locations logically connected by the PVC. CIR speeds range from 0 kbps to 40 Mbps. Agencies can burst above their contracted CIR up to the port speed. Port speeds range from fractional T1 (64 kbps to 1.5 Mbps) to T3 (45 Mbps).

Table 1.4.4.1-1 summarizes AT&T's approach to the delivery of FRS that provides a high-quality, reliable, flexible approach, exceeding Agency requirements.

SERVICE DELIVERY APPROACH	DESCRIPTION
Standards Compliance	<ul style="list-style-type: none"> American National Standards Institute (ANSI) T1 International Telecommunications Union-Telecommunications Service Sector (ITU-TSS) Recommendation Frame Relay Forum Internet Engineering Task Force (IETF)
Wholly Owned and Operated Global Frame Relay Network Infrastructure	<ul style="list-style-type: none"> A three-tiered architecture using MPLS at the core, ATM cell relay packet technology at its next layer and Frame Relay interfaces at the edge Interconnect to other services, such as ATMS, IP-enabled FR/ATM, Internet, dial-up, and DSL AT&T's FRS is available [REDACTED] and in [REDACTED], and still growing
Service Continuity	<ul style="list-style-type: none"> Interoperability between services (FR, ATM, IP, DSL, etc.) allows increased collaboration among Government Agencies, a key objective of Federal Enterprise Architecture (FEA) Easy transition from existing metropolitan area acquisition (MAA) contract to new Networx contract Disaster recovery (DR) and continuity of operations (COOP) allow rerouting of traffic from primary site to backup data center
Clear Migration Path to Future	Smooth, nondisruptive migration to enhanced capabilities, MPLS IP-based services, and Internet protocol Version 6 (IPv6)
Scalable Backbone Network	Agencies have the ability to easily scale bandwidth, as demand grows for FR, ATM, and IP-based services [REDACTED]
Network Integrated Security	<ul style="list-style-type: none"> With network-based firewalls and intrusion detection systems (IDS) solutions, the security of Frame network is maintained Inherent security of Layer 2 provides separation of customer's traffic and traffic types
Service Integration with AT&T Hosting and Data Centers	<ul style="list-style-type: none"> Agencies realize their COOP/ DR needs as critical applications are relocated and backed up in bandwidth data centers Frame relay PVC to Internet gateway with existing port
Flexible and Resilient Access Solutions	<ul style="list-style-type: none"> ATM, DSL, dial-up, and IP interworking services allow Agency teleworkers and mobile users to gain equal access to Agency critical data resources securely and efficiently AT&T multilink frame inverse multiplexing bundles a number of physical T1 access lines into a single logical connection Integrated network connection service is a complete offer that allows connectivity to voice network, using bandwidth allocation between voice and data
Backbone Network Architecture Designed for Convergence	<ul style="list-style-type: none"> Agencies can easily and reliably migrate to MPLS-based services with very low risk [REDACTED] CoS are offered to prioritize traffic and select most appropriate ones to carry each category of traffic for optimal performance
E-servicing	Agencies easily and efficiently procure and receive updates on provisioning and servicing requests on AT&T BusinessDirect [®] . Agencies also receive better visibility into inventory and ticketing systems.

Table 1.4.4.1-1: AT&T's Approach to Service Delivery. Agencies will receive high performance and reliability, enhanced security, interoperability, and preservation of Agency investments.

Agencies will benefit from AT&T's FRS that is fast, secure, flexible, highly reliable, and scalable. This service provides Agencies with flexible interconnections to multiple networks now, and in the future, as well as the ability to help them consolidate and simplify their network infrastructures.



1.4.4.1.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 Networkx services, in general, and FRS, in particular, support the Government’s vision of transformation through the use of the FEA by providing the technologies that contribute to the Agency’s mission objectives. **Table 1.4.4.1-2** 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 Global Frame Relay Network Infrastructure	<ul style="list-style-type: none"> 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 network-to-network interfaces (NNIs) 	Agencies will be able to increase productivity, access, and security in fulfilling citizens’ requests.
Service Continuity	<ul style="list-style-type: none"> Interoperability between services allows increased collaboration among Government Agencies, a key objective of FEA Common feature sets and metrics ease transition to Networkx contract 	Agencies will realize cost savings by eliminating duplication of efforts.
Clear Migration Path to Future	<ul style="list-style-type: none"> Graceful, nondisruptive migration to enhanced capabilities, IP-based services Preservation of Agency investment in FR 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 websites.
Network Integrated Security	Agencies receive a highly secure service with continuous visibility into threats.	Agency e-commerce and e-business functions internally and externally remain intact in the event that major worms, viruses, etc. are released onto Internet.
Service Integration with AT&T Hosting and Data Centers	Agencies address their COOP/DR needs as critical applications are relocated and backed up in bandwidth intensive data centers.	Agencies are provided with ultimate 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 significant cost savings in infrastructure due to a larger population of teleworking employees.



SERVICE DELIVERY APPROACH	BENEFITS	FEA FACILITATION
Backbone Network Architecture Designed for Convergence	Agencies can 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 1.4.4.1-2: Agency Benefits and FEA Facilitation. Agencies will realize the benefits of FEA, through AT&T's FRS that supports the goals and objectives of the FEA.

AT&T's development of net-centric technologies supports solutions based on service oriented architecture (SOA) that uses standardized, web-adapted components. In doing this, the following will be achieved:

- Technical Reference Model capabilities that fully meet and link to the Service Component Reference Model (SRM) and Data Reference Model (DRM).
- Links are structured to support Business Reference Model (BRM) functions and provide Performance Reference Model (PRM) line-of-sight linkage to mission performance and results.
- As a partner with the Government, help achieve the vision of the FEA to enhance mission performance.

AT&T's FRS will help the Governmental Agencies meet their core networking needs, which, in turn, will allow them to be more successful in meeting their FEA objectives.

1.4.4.1.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 1.4.4.1-3 lists the top seven service delivery risks and our mitigation strategy so that services will exceed the Government's requirements. [REDACTED]

[REDACTED]

RISK ITEM	RISK DESCRIPTION	RISK MITIGATION
Program Management	No technical establishment of customer expectations. Service outages or late installations.	[REDACTED]
Schedule Slippage	Many issues can contribute to schedule slippage; having detailed project schedule can minimize this risk.	[REDACTED]
Lack of Service Continuity	Agencies must migrate away from existing Frame Relay features or capabilities when transitioning to Networx.	[REDACTED]
Service Reliability and Performance	Agencies could experience service interruptions and/or slow performance, resulting in user dissatisfaction and loss of productivity.	[REDACTED]
No Migration Path to MPLS	Incompatible service offerings (forklift upgrade); providing a migration path from one service to another creates expensive designs.	[REDACTED]
Security	Hacking, attacks,	[REDACTED]



RISK ITEM	RISK DESCRIPTION	RISK MITIGATION
	tampering.	[REDACTED]
Limited service Coverage	Extensive backhaul circuits/failures in networks. Few Frame Relay switches.	[REDACTED]

Table 1.4.4.1-3: Major Risk Assessment. Agency risks associated with transition and lifecycle support of FRS are mitigated through AT&T risk mitigation processes.

AT&T has taken steps to identify risk and provide risk mitigation associated with delivering FRS. 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.

1.4.4.1.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. AT&T has 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 satellite (GPS) systems. AT&T derives synchronization from those GPS systems as the primary clock source. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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

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

1.4.4.2.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 an FRS that meets or exceeds 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]

[REDACTED]

[REDACTED] Key performance indicators for FRS and AT&T's performance are listed in **Table 1.4.4.2-1**.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
GoS (Data Delivery Rate [DDR])	Routine	99.90%	[REDACTED]
	Critical	99.99%	[REDACTED]
Latency (contiguous United States [CONUS])	Routine	120 ms	[REDACTED]
	Critical	90 ms	[REDACTED]
Av (PVC)	Routine	99.925%	[REDACTED]
Time to Restore (TTR)	Without Dispatch	4 hr	[REDACTED]
	With Dispatch	8 hr	[REDACTED]

[REDACTED]

Table 1.4.4.2-1: FRS Key Performance Indicators. Agencies will receive high quality FRS that [REDACTED]

Agencies will receive a set of performance and service quality metrics that will [REDACTED] provide exceptional performance, security, and reliability.

1.4.4.2.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 experienced by Agency personnel. 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 1.4.4.2-2 lists the methods used to measure the various Frame Relay performance indicators.

KEY PERFORMANCE INDICATOR (KPI)	MONITORING & MEASURING APPROACH
Data Delivery Rate Latency	<ul style="list-style-type: none"> Intelligent channel service unit/data service unit (CSU/DSU) at Agency site collect performance and fault management information, including data delivery rate, latency, and availability Performance and fault management information is aggregated, correlated, and sent to AT&T’s Performance Management and Operations Support System (PMOSS) Performance and fault information is made available for viewing through AT&T BusinessDirect Authorized Agency personnel securely access AT&T BusinessDirect to view PVC-specific information on DDR, latency, and availability
Availability	<ul style="list-style-type: none"> Agency opens a trouble ticket using secure access to AT&T BusinessDirect Trouble ticketing system logs the trouble, including the time the ticket was generated AT&T personnel start trouble resolution cycle Upon trouble resolution, the Agency is notified, and the resolution time is logged. TTR is calculated AT&T maintains detailed statistics on TTR to verify performance requirements are met
Time to Restore (TTR)	

Table 1.4.4.2-2: FRS Monitoring and Measuring. Agencies can closely track the performance of their FRS 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]

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

1.4.4.2.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 1.4.4.2-3** 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)	NETWORX (AQL) (THRESHOLD)	AT&T PROPOSED AQL (THRESHOLD)	IMPROVEMENT PERCENTAGE
GoS (DDR)	≥99.90%	[REDACTED]	[REDACTED]
Latency (CONUS)	≤120 ms	[REDACTED]	[REDACTED]
Av (PVC)	≥99.925%	[REDACTED]	[REDACTED]

[REDACTED]

Table 1.4.4.2-3: FRS Key Performance Indicators. Metrics are built around realistic thresholds, leading to greater customer trust and confidence, as SLAs represent an operational assurance.

1.4.4.2.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 FRS will provide a comprehensive assessment for service verification and service performance monitoring. We understand the importance of Agencies needing more comprehensive KPIs. [REDACTED]

[REDACTED]

[REDACTED]

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

1.4.4.3.a Service Description

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

1.4.4.3.a.1 Overview

AT&T will satisfy all the service requirements detailed through the technological capabilities of the Frame Relay network, geographic reach, and access flexibility into the AT&T IP/MPLS network, network-based services and applications, gateway services between the IP/MPLS network, and other public networks, strong security features, complementary managed services that augment Frame Relay, and superior support services.

1.4.4.3.a.2 Technical Capabilities

Table 1.4.4.3-1 provides a detailed description of the capabilities of the service and their associated Agency benefits.

SERVICE REQUIREMENT	DESCRIPTION	BENEFITS TO AGENCY
PVCs provisioned between service delivery points (SDPs)	<ul style="list-style-type: none"> Provide PVCs from 0 to DS3 rates Burstable to port speed 	Allows flexible bandwidth sizing and cost savings for burst capabilities
Max Frame Relay size of 4096 bytes	<ul style="list-style-type: none"> Maximum frame size supported is 4096 for efficient transport of data Minimum overhead 	More efficient transport of data frames with less overhead for cost savings
Variable length frames	<ul style="list-style-type: none"> Variable Frame sizes up to 4096 bytes Flexibility for applications 	Allows for efficient transport of different latency requirements of applications
Single or multiple point-to-point virtual connection	<ul style="list-style-type: none"> Support of single or multiple PVCs in a single port 	<ul style="list-style-type: none"> More efficient use of ports provides increased efficiency to Agency Allows connections to several locations from one port
CIR options 0-DS3	<ul style="list-style-type: none"> CIR options in 64 kbps from 0-DS3 PVCs use full capacity of access circuit if port capacity is available Ports support multiple PVCs 	<ul style="list-style-type: none"> Allows flexible bandwidth sizing and cost savings for burst capabilities Guaranteed bandwidth will be available

Table 1.4.4.3-1: Service Requirements – Technical Capabilities. Agencies will be provided with a compliant and low-risk solution because AT&T complies with all technical capabilities that meet all requirements.

1.4.4.3.a.3 Features

Table 1.4.4.3-2 lists how the feature service requirements will be satisfied.



SERVICE REQUIREMENTS	DESCRIPTION	BENEFITS TO AGENCY
Frame Relay Network	<ul style="list-style-type: none"> • AT&T has a three-tiered architecture using MPLS, ATM cell relay packet technology at Tier 2, and Frame Relay interfaces at the edge. • AT&T Frame Relay network has reliability rerouting capabilities. [REDACTED] • Drain rates of PVCs are controlled and adjusted on a real-time [REDACTED] 	<ul style="list-style-type: none"> • Cost-effective network solution • Global network • Excellent reroute capabilities • Disaster recovery • MPLS-enabled • Diversity options • Multiple access options
Frame-to-ATM Interworking	<ul style="list-style-type: none"> • Frame Relay to ATM service interworking is offered between all Frame Relay end points and all ATM end points with protocol conversion occurring in network. • Supports virtual channel connections (VCC) and variable bit rate-non-real time (VBR-NRT) connection oriented data (COD) traffic • Offers all data rates currently supported by AT&T's FRS • Offers transparent and translation modes on a virtual connection basis 	<ul style="list-style-type: none"> • 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 large data location
Class of Service (CoS)	<p>Three CoS categories are supported with our Native Frame Relay Network</p> <ul style="list-style-type: none"> • Variable Frame Rate-real time (VFRrt) • Variable Frame Rate-non-real time (VFRnrt) • Unspecified Frame Rate (UFR) <p>[REDACTED] CoS, each with a specific committed data rate (CDR) are provided with our IP-enabled Frame Relay (IPeFR) Service.</p>	<ul style="list-style-type: none"> • Allows for various types of traffic over a single port • Prioritization of different classes of data
Mutilink Frame Relay	<ul style="list-style-type: none"> • Provides capability to link several separate DS1 facilities (NxT1) into a single communications path for a more economical connection when DS3 is too large. [REDACTED] 	<ul style="list-style-type: none"> • Provides cost-effective solution for access rate between DS1 and DS3 • Access alternative if DS3 is not available
Disaster Recovery PVCs	<p>Designates a primary (before failure) and secondary (after failure) network PVC configurations.</p>	<ul style="list-style-type: none"> • Provides capability to reroute traffic to alternate customer site or data center in case of disaster or threat • Easy to implement
Frame-to-Internet	<ul style="list-style-type: none"> • AT&T Frame Relay to Internet PVCs is an additional access arrangement that interconnects existing Frame Relay networks seamlessly to Internet. • Optional security services, such as integrated network-based firewall solution maintain security within Frame Relay network. 	<ul style="list-style-type: none"> • Provides cost-effective use of existing Frame Relay port • One access to Internet can be shared by entire network • Security of optional network-based firewall



SERVICE REQUIREMENTS	DESCRIPTION	BENEFITS TO AGENCY
IP-enabled Frame Relay	<ul style="list-style-type: none"> • IPeFR is a network-based IP virtual private network (VPN) solution using MPLS. • IPeFR is transport and access independent and is able to provide secure any-to-any connectivity using MPLS technology. • Leveraging MPLS QoS, IPeFR offers [REDACTED] CoS to support real-time services. • MPLS-based VPN enforces traffic separation among IPeFR customers [REDACTED] 	<ul style="list-style-type: none"> • Frame Relay and IP-enabled Frame Relay coexist on same port for cost savings • Provides any-to-any connectivity for meshed network without cost of multiple PVCs • Provides CoS for different traffic types
Platform for Convergence and Support for IPv6	AT&T supports IPv6 within its IP backbone network. [REDACTED]	Will provide additional IP address space

Table 1.4.4.3-2: Service Requirements/Features. Agencies will be provided a low risk and full service offers to exceed Networx requirements.

1.4.4.3.a.4 Disaster Recovery

Agencies can design their disaster recovery (DR) configurations and prioritize which PVCs or subsets of PVCs are moved first. This will allow critical applications to be brought up as quickly as possible. Our DR solution uses [REDACTED]

[REDACTED]

In addition to our DR solution, Agencies can select dial backup and/or a backup PVC option, which is designed to provide secondary connections from a primary to a secondary location. Backup PVCs are inactive during normal network



conditions. Backup PVCs are activated during DR to back up the primary network with the predetermined secondary network configuration.

1.4.4.3.a.5 Congestion Management

A distinct feature of AT&T's Frame Relay implementation is individual buffer space for each PVC derived from each port. [REDACTED]

[REDACTED]

Drain rates of PVCs are controlled and adjusted on a real-time basis through a closed-loop scheme (ReliaBURST®). Each provisioned PVC within the AT&T network is monitored along the path of all facilities and switches that are traversed. [REDACTED]

[REDACTED]

1.4.4.3.a.6 IPeFR

AT&T's IPeFR feature essentially is a NBIP-VPN, which uses Frame Relay as its access method into the VPN. It also provides an evolutionary migration path to a NBIP-VPN network.

The IPeFR is considered an add-on feature to AT&T's native Frame Relay network, and brings to the marketplace an efficient, scalable way for agencies to incorporate critical applications into existing networks. This service addresses the growing importance of IP-based networking, and the increasingly distributed communications needs of agencies. The service and security level expected of Frame Relay is also provided. The IPeFR provides Agencies with the following features:

- Ability to establish any-to-any connectivity through a single PVC, the enterprise permanent virtual circuit (EPVC), from the IPeFR network to each Agency location. There is no need to order additional PVCs at each site for fully meshed communications.
- Same security as existing Frame Relay. Security is absolute, as IPeFR/ATM EPVCs use the same core transport and congestion management as traditional Frame Relay.
- Similar performance (i.e., throughput and slightly higher latency) as existing Frame Relay.
- VPN redirection, which is an automatic rerouting capability offering primary site disaster recovery.

AT&T IPeFR addresses two critical VPN business networking needs: any-to-any connectivity and QoS. **Table 1.4.4.3-3** lists the CoS that is supported on IPeFR, which provides the high performance of Frame Relay or ATM, and the ubiquity of IP. This makes it easy to integrate the two services, eventually migrating over to all IP networks. This new capability also simplifies routing and supports Agencies' existing IP addressing plans. There is no need for tunneling or address translation. AT&T customers with existing Frame Relay/ATMS simply add an EPVC and avoid the time-consuming task of a major network upgrade.



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

Table 1.4.4.3-3: Class of Service Categories. [REDACTED]

1.4.4.3.a.7 Interfaces

Table 1.4.4.3-4 lists how the interface service requirements will be satisfied.

INTERFACE REQUIREMENT	AT&T CAPABILITY
User-to-network-interface (UNI) at SDP	Supports UNI at Government SDPs
Interface Types IPv6	Supports all interface types and rates specified in Table C.2.3.1.3.1 of the RFP [REDACTED]

Table 1.4.4.3-4: Service Requirements/Interfaces. Agencies will be provided with AT&T interfaces that are low-risk and high-quality.

Agencies will benefit from the geographic reach and access flexibility into the AT&T Frame Relay/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 daily business needs.

1.4.4.3.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 FRS with additional features and capabilities [REDACTED] **Table 1.4.4.3-5** highlights additional service features and capabilities available with FRS.

SERVICE ENHANCEMENTS	DESCRIPTION	BENEFIT
[REDACTED]	[REDACTED]	[REDACTED]



SERVICE ENHANCEMENTS	DESCRIPTION	BENEFIT
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.4.3-5: Recommended FRS Enhancements. *Using the proposed service enhancements, Agencies can customize and enhance their FRS to match their specific requirements.*

Agencies will benefit from the service enhancements and service flexibility of the AT&T Frame Relay network. [REDACTED]

[REDACTED]



[REDACTED]

1.4.4.3.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 FRS, upon contract award, without modifications to the network or operational support systems.

1.4.4.3.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 in Government and commercial entities. This experience has given us the ability to engineer and deliver services. Examples of AT&T's ability to deliver FRS are listed in **Table 1.4.4.3-6**. AT&T has been providing FRS since 1991; our customers include a wide range of Government Agencies and commercial organizations. Our Frame Relay/ATM network is one of the largest in the world and supports over [REDACTED] active customer ports.

[REDACTED]

CLIENT NEED	SOLUTION	CREATE VALUE
Required integrated solution that was capable of data and video in CONUS and outside contiguous United States (OCONUS). Needed to interoperate with cryptographic devices.	<ul style="list-style-type: none"> Design, integrate, and install data and video network Program management International requirement solved with interworking services 	<ul style="list-style-type: none"> Allowed military to receive required photographic data to facilitate operational maneuvers Provided flexible bandwidth options in various theaters of operation Increased operational data processing

[REDACTED]

CLIENT NEED	SOLUTION	CREATE VALUE
[REDACTED]	[REDACTED]	[REDACTED]



CLIENT NEED	SOLUTION	CREATE VALUE
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.4.3-6: AT&T Past Experience. Agencies can leverage past experience of AT&T's team to effectively address their FRS requirements.

AT&T Networkx Team offers Agencies extensive experience providing managed services that create value to our customers in Government and commercial entities.

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

1.4.4.4.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' Frame Relay traffic on the AT&T network, the forecasted traffic in the Networkx model has been compared against the growth of AT&T's network. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] (Table 1.4.4.4-1). [REDACTED]
[REDACTED]
[REDACTED]



[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.4.4-1: Traffic Usage. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

1.4.4.4.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 FRS provides multiple layers of reliability and restoration (Table 1.4.4.4-2). [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]



ROBUSTNESS/RESILIENCY CAPABILITY	AT&T NETWORK CAPABILITY	CUSTOMER BENEFITS
Wholly owned network	Full control over 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 always be available in emergency situations
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.4.4-2: Frame Relay System Robustness/Resiliency. Agencies choose the capabilities and features to match their requirements for increasing the robustness and resiliency of the FRS access and backbone network.

Table 1.4.4.4-3 displays the details of AT&T’s measures and engineering practices to provide robustness and resiliency and plan for growth.

FACTOR	CAPABILITY
Practices to Provide Network Robustness and Resiliency	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]

FACTOR	CAPABILITY
Plan for Growth	<div style="background-color: black; width: 100%; height: 100%; min-height: 80px;"></div>

Table 1.4.4.4-3: System Robustness and Resiliency. AT&T has due diligence practices to provide Agencies a robust network and plan for future growth of the network.

The factors discussed in **Table 1.4.4.4-3** above, along with planned network technology migrations and insertions, drive the development of AT&T's backbone network capacity plan. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

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

1.4.4.5.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.

1.4.4.5.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.

1.4.4.5.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.

1.4.4.5.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.

1.4.4.6 Stipulated Deviations

AT&T complies with all the stipulated requirements for the FRS.

1.4.4.6.1 Reserved

1.4.4.6.2 Reserved