

**1.4.19 Optical Wavelength Service over Automatic
Switched Transport Network (OWS over ASTN)
[C.2.5.4.2]**

Agencies can have protocol-transparent, multipoint-to-multipoint connectivity for offices in different regions in the United States and internationally by employing the Optical Wavelength Services (OWS) over ASTN/ASON solution.

1.4.19.a Reserved

1.4.19.a.1 Reserved

1.4.19.a.2 Reserved

1.4.19.a.3 Reserved

1.4.19.b Reserved



1.4.19.c Technical Description [L.34.1.4.6.c]

(c) A technical description of how the service requirements (e.g., capabilities, features, interfaces) are satisfied for all proposed optional services.

AT&T proposes the Optical Networking (ON) Service for Optical Wavelength Service over the ASTN (OWS/ASTN). ON allows Agencies to obtain networked bandwidth in near real time and at varying bandwidths on an as needed basis. [REDACTED]

Gartner

"...By deploying new-generation optical technology, AT&T can compete with legacy-free carriers and has moved ahead of other established carriers."

[REDACTED]

Figure 1.4.19.c-1 shows the optical layer used to transport wavelength services using OWS/ASTN.

Table 1.4.19.c-1 lists the available service types for OWS-ASTN.

SERVICE TYPE	DESCRIPTION	DATA RATE	OPTIONS
2.5 G Wavelength Channel	Point-to-point, bi-directional, single-link high-capacity digital service	2.5 Gbps	[REDACTED]
10 G Wavelength Channel	Point-to-point, bi-directional, single-link high-capacity digital service	10 Gbps	[REDACTED]
40 G Wavelength Channel	Point-to-point, bi-directional, single-link high-capacity digital service	40 Gbps	[REDACTED]

Table 1.4.19.c-1: Service Types for OWS over the ASTN. Available service types and options for AT&T's OWS/ASTN proposed offering.



Table 1.4.19.c-2 summarizes AT&T’s approach to delivering OWS/ASTN to Agencies.

Figure 1.4.19.c-1: AT&T WDM Services Layer. *The WDM services layer provides Agencies the infrastructure to deliver highly reliable global wavelength services utilizing [REDACTED]*

SERVICE APPROACH	TECHNICAL DESCRIPTION
High Reliability	AT&T continuously maximizes the availability of our core network by employing proactive and preventive quality policies and programs. AT&T takes proactive measures to build reliability into the network and to monitor performance on a continuing basis. AT&T utilizes a unique combination of fully diverse Inter-city and Metro WDM systems to offer the highest levels of reliability.
High Survivability	By continually increasing our global presence of fiber optic cable and WDM systems, AT&T has designed a highly survivable network, with diverse routing and protected WDM configurations.
Maximum Security and Information Assurance	The AT&T Security Organization is responsible for the overall security management of the AT&T network. The AT&T Security Organization prepares, oversees, and manages the security plans and processes for AT&T network operations. It supports and enforces physical and system access controls to provide personnel, facility, and information assurance and security.



SERVICE APPROACH	TECHNICAL DESCRIPTION
Full Interoperability	AT&T's OWS services utilize fully compatible communications systems and consistent engineering methods and software platforms, providing seamless interoperations with interfacing networks. AT&T's OWS services are compliant with ANSI and Telcordia (GR-253-Core) standards.
Efficient Provisioning	The AT&T BusinessDirect ® portal is the secure AT&T website that delivers online tools for efficient, effective, convenient e-Servicing capabilities 24x7x365. [REDACTED]
Extensibility and REACH	AT&T has an extensive network that includes: [REDACTED]
Standards Finalization	[REDACTED]
End-to-end Maintenance	[REDACTED]

Table 1.4.19.c-2: Approach in delivering OWS. AT&T's reliable and upgradeable network will deliver OWS to the Agency service location with the highest availability.

Figure 1.4.19.c-2 below illustrates the international coverage of OWS.

Figure 1.4.19.c-2: AT&T International Footprint. [REDACTED]



AT&T's solution proposes OWS services that provide high-capacity bandwidth over a Wavelength Division Multiplexing infrastructure. AT&T's Optical Wavelength service is composed of an end-to-end, integrated Optical Wavelength service that includes the following components:

- Metropolitan Optical Wavelength access service
- Wide-area Optical Wavelength service
- Global Optical Wavelength service

In Metropolitan areas, AT&T has employed WDM optical networking techniques to invent new network architectures for customer access. Our primary emphasis recently has been the development of flexible, cost-effective, broadband architectures for business access. By focusing on the WDM layer,

[REDACTED]

Based on our knowledge of access systems, we are in a unique position to deploy new subsystems that will positively impact network performance.

[REDACTED]

(Figure 1.4.19.c-3). [REDACTED]

[REDACTED]



Figure 1.4.19.c-3: AT&T Baseline Hubbed Ring

Agencies will benefit from an Optical Wavelength service offering that is highly reliable, highly survivable, secure, fully interoperable with other services, easy to provision and fully maintained to serve present and future requirements.

[Redacted content]



Table 1.4.19.c-3 provides a technical description of the adherence to standards that AT&T's OWS offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
ITU G.692 and G.694 frequency grid for DWDM	The Intelligent Optical Network uses GR-253 compliant interfaces as specified in C.2.5.4.2.3.1. These interfaces provide a demarcation between the Agency and AT&T that provides superior reliability and maintainability when compared to approaches where an Agency might use a direct high powered optics into an analog optical network.	Agencies benefit from the support of optical networks with the following features: [Redacted]
ITU G.694.2 frequency grid for CWDM	The Intelligent Optical Network uses GR-253 compliant interfaces as specified in C.2.5.4.2.3.1. These interfaces provide a demarcation between the Agency and AT&T that provides superior reliability and maintainability when compared to approaches where an Agency might use a direct high powered optics into an analog optical network.	Agencies benefit from the support of optical networks with the following features: [Redacted]
ITU G.872, G.709 and G.959.1 defining the Optical Transport Network (OTN) architecture	These standards will be supported in the Ultra-Longhaul network currently being deployed.	Agencies benefit from transmission protection based on forward Error Correction (FEC). [Redacted]
ITU G.807 defining the Automatic Switched Transport Network	[Redacted]	Agencies benefit from control plane functionality of the optical network for advanced provisioning options.
ITU G.8080, G.7712.X, G.7713.X, G.7714.X, G.7715.X, G.7716.X and G.7717.X standard defining the Automatic Switched Optical Transport Network (ASON)	[Redacted]	Agencies benefit from control plane functionality of the optical network for advanced provisioning options.
Telcordia GR-1073, GR-1312, GR2918, GR-2979 and GR-3009 defining DWDM systems	The Intelligent Optical Network uses GR-253 compliant interfaces as specified in C.2.5.4.2.3.1. These interfaces provide a demarcation between the Agency and AT&T that provides superior reliability and maintainability.	Agencies benefit from network compliance to interfaces with single-mode fiber optic switches
Telcordia GR-1230, GR-253 and GR-1044 defining metro protection	The Optical Network is compliant with these standards	Agencies benefit from protection switching capabilities

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Optical Internetworking Forum (OIF) UNI 1.0	The Optical Network is compliant with this standard.	Agencies benefit from improved optical network performance as follows: <ul style="list-style-type: none"> Improved bandwidth efficiency - able to dynamically re-assign bandwidth resources as new bandwidth requests enter the network. Rapid Provisioning - minimizes manual intervention, especially across multi-vendor networks Improved quality of service
OIF RL-01, OIF-TLMSA-01.0 and OIF-ITLA-MSA-01.0 for tunable lasers	The Intelligent Optical Network uses GR-253 compliant interfaces as specified in C.2.5.4.2.3.1. These interfaces provide a demarcation between the Agency and AT&T that provides superior reliability and maintainability.	Agencies benefit from the support of an optical network that will have the ability to provision end-to-end dynamic bandwidth service that include the use of tunable laser that lowers the total cost of operations.
OIF UNI 1.0 Release 2	The Optical Network is compliant with this standard.	Agencies benefit from improved bandwidth management and provisioning functionalities over UNI 1.0
OIF-CDR-01.0 (Call Detail Records), OIF-SEP-01.1 (Security Extension for UNI and NNI), OIF-SMI-01.0 (Security Management Interfaces), OIF-E-NNI-Sig-01.0 (Intra-carrier E-NNI signaling specification)	The Optical Network is compliant with these standards.	Agencies benefit from the support of cross-domain optical connection provisioning (E-NNI) and billing capabilities (call detail records for UNI 1.0).
Very Short Reach Interfaces	Very Short reach interfaces can be provided to the Agency when commercially available.	Agencies benefit from the use of industry standard intra-office optical interfaces once that become commercially available.
Telemanagement Forum (TMF) 814	The Intelligent Optical Network uses GR-253 compliant interfaces as specified in C.2.5.4.2.3.1. These interfaces provide a demarcation between the Agency and AT&T that provides superior reliability and maintainability.	Agencies benefit from the support of the Optical Transport Network (OTN) management plane

Table 1.4.19.c-3: Standards compliance of AT&T's Optical Wavelength Service. OWS complies with required standards.

Table 1.4.19.c-4 provides a technical description of the adherence to the connectivity options that AT&T's OWS offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Point to Point, bi-directional	All Optical Wavelengths are point to point, bi-directional and duplex. Connection from Optical Network to the SDP is achieved via a fiber pair	Agencies benefit from industry standard connectivity to Optical Wavelength Service.
Inter-Agency connectivity	Inter-Agency connectivity to other Agencies optical network can be provided.	Agencies benefit from the ability to interoperate with other Agency's networks

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Shared bandwidth connectivity via NNI	[REDACTED]	Agencies benefit from the ability to maximize the total cost of operations for their network

Table 1.4.19.c-4: Connectivity Options of AT&T's Optical Wavelength Service. *Technical Description of Connectivity Options of AT&T's OWS.*

Table 1.4.19.c-5 provides a technical description of the adherence to the required technical capabilities that AT&T's OWS offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Non-domestic Wavelengths	AT&T provides single point-to-point, bi-directional wavelengths throughout its international optical network in a redundant manner that will allow for high availability of the OWS-WDM service. [REDACTED]	Agencies benefit from global connectivity for Optical Wavelength service.
CONUS Wavelengths	AT&T provides single point-to-point, bi-directional wavelengths throughout its CONUS [REDACTED]	Agencies benefit from point-to-point connectivity between CONUS locations for Optical Wavelength service.
Metro Wavelength Services	AT&T supports the connectivity of two Agency sites in the same city [REDACTED]	Agencies benefit from point-to-point connectivity between locations within a metropolitan area for Optical Wavelength service.
Permanent Connections (PC), Soft Permanent Connections (SPC) and Switched Connections (SC)	The Intelligent optical network supports PC, SPC and SC that are provisioned via the element management systems today.	Agencies benefit from enhanced provisioning options that will lower the total cost of ownership.
Support either Overlay Model or Peer to Peer Model	The Overlay Model, which includes two separate control planes, is supported by the Intelligent Optical Network. [REDACTED]	Agencies benefit from a network that interoperates seamlessly with the IP network for transparent transport of higher layer applications.
Transmission Rates	The current transmission rates supported are 2.5 Gbps, 10 Gbps [REDACTED]	Agencies have the choice of standard available high speed wavelength interfaces for their networks.
Clock Transparency	Clock signals originating from an Agency site will pass through the AT&T optical network without re-clocking the signal.	Agencies benefit from the ability to pass SONET synchronization transparently through the WDM network.
Protocol Transparency	Optical wavelengths provided as part of AT&T's OWS-WDM service is protocol transparent and rate independent.	Agencies benefit from the ability to transport any type of traffic over the WDM network, regardless of the native protocol.



SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Byte Transparency	<p>SONET and SDH overhead bytes are passed through the AT&T optical wavelength network without being overwritten; therefore, byte transparency is offered on the AT&T Optical Network.</p> <ul style="list-style-type: none"> All the SONET/SDH Transport Overhead (TOH) bytes will be transported without being overwritten with the exception of the A1 and A2 bytes, B0 and J1, which will be used to monitor the framing integrity of the incoming SONET/SDH signal. Fully transparent wavelengths at 2.5 Gbps and 10 Gbps will be supported for non-domestic, CONUS, and metro optical wavelength networks. Fully transparent wavelengths at 10 Gbps will be supported for non-domestic, CONUS, and metro optical wavelength networks. 	Agencies benefit from the ability to pass SONET/SDH overhead bytes through the WDM network unaltered.
Concatenation	Standard and non-standard concatenation will be supported for framed wavelengths on the AT&T optical network. Current users of AT&T's Optical Network service use premise equipment to provide concatenation.	Agencies benefit from improved bandwidth efficiency, simplified network control, and improved balance of optical wavelength network load.
Channelization	All mandatory user-to-network interfaces (UNIs) listed in Section C.2.5.4.1.3 are supported in the AT&T optical network.	Interoperation to various UNIs provide the ultimate in network flexibility.
Delivery Methods	Wavelengths will be delivered to the Agency SDP by two fibers over a two-port demarc, typically a fiber distribution panel (FDP) that will be connected to the DWDM equipment collocated at the Agency SDP equipment room.	Agencies benefit from a standard service handoff from AT&T at a clearly defined demarc for service monitoring.
Control Plane a. Logical Interfaces b. Routing and signaling protocols c. Different classes of service d. Quality of Service	[REDACTED]	Agencies benefit from intelligent capacity utilization, automated delivery of value-added services and on-demand circuit provisioning over optimized network paths.
Management Plane a. Point and Click provisioning b. Wavelength management	Point and Click provisioning is supported by the Intelligent Optical Network. Wavelengths can be managed either by the Agency or AT&T.	Agencies benefit from an automated provisioning process that will lower the total cost of ownership
Efficient Transport	Wavelengths provided by AT&T are protocol independent; a single wavelength is capable of transporting different types of traffic. Wavelengths do not need to be separated by the different types of services for which they are used.	Agencies benefit from a transport technology that is truly protocol independent. This helps the Agency to lower the overall network total cost of operations by reducing the number of dedicated networks separated by service type.
Interoperability	AT&T satisfies this requirement in its commercial Optical Networking service, as follows: [REDACTED]	Agencies receive interoperability with existing Agency networks as well as continuity of service for circuits that ride on other carriers' networks.



SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Virtual Rings	AT&T uses a proprietary mesh restoration algorithm that provides predictable and reliable resilience.	Agencies benefit from reliable architecture for highly available service while not increasing the total cost of ownership.
Optical Virtual Private Network (OVPN)	The following functions are supported [REDACTED]	Agencies benefit from the ability to self provision ports, links and bandwidth on the Optical Network
Scalability	The Intelligent Optical Network is fully scalable to meet the Agency's traffic growth requirements. [REDACTED]	Agencies benefit from network flexibility to accommodate present and future bandwidth requirements.

Table 1.4.19.c-5: Technical Capabilities of AT&T's Optical Wavelength Service. *The resilient and feature-rich Optical Network - compliancy to OWS technical capabilities.*

Table 1.4.19.c-6 provides a technical description of the adherence to the required features that AT&T's OWS offer.

SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
[REDACTED]	[REDACTED]	Agency is able to provision dedicated Optical Wavelength service via a web portal with a click of a mouse.
[REDACTED]	[REDACTED]	Agency is able to provision and maintain dedicated Optical Wavelength service via a web portal with a click of a mouse.
Equipment Protection 1:1 CPE	Client side 1:1 protection will be [REDACTED]	Agencies benefit from redundancy of "client side" interfaces to Agency owned equipment.



SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
Equipment Protection 1+1 CPE	Client side 1+1 protection is available [REDACTED]	Agencies benefit from full redundancy of "client side" interfaces to Agency owned equipment for maximum protection from equipment interface failures
Equipment Protection – Network Side	[REDACTED]	[REDACTED]
Geographic Diverse Wavelength – single delivery	Geographical diversity for wavelength delivery from SDP Site Number 1 to SDP Site Number 2 will be supported on different fiber paths that traverse in different geographies. [REDACTED]	Agencies benefit from a resilient OWS architecture that provides high reliability.
Geographic Diverse Wavelength – dual delivery	Geographical diversity for wavelength delivery from SDP Site Number 1 to SDP Sites Numbers 2 and 3 will be supported via different fiber paths that traverse in different geographies. [REDACTED]	Agencies benefit from a resilient, highly reliable OWS architecture that provides high reliability
Multi-tiered protection	The Optical Networking services provides two levels of protection today. [REDACTED]	Agencies benefit from a resilient, highly available network.
Optical Virtual Private Network (OVPN)	Multipoint to Multipoint resources are available on sub-wavelengths of a bulk wavelength interface today.	Agencies benefit from the ability to access ports, links, and bandwidth on the Optical Network to self manage their dedicated network.
Planning Tools Support	Support of connection management, off-line routing and capacity planning [REDACTED]	Aids the Agency in the long term capacity planning of their dedicated optical networks
Reserved bandwidth	Support of reservation of fixed bandwidths and Agency specified routes [REDACTED]	Agencies benefit from dedicated bandwidth allocation in the planning of their network capacities.
Shared protection	The Optical Networking service provides protection via a pool of shared bandwidth today.	Agencies benefit from access to dedicated protection bandwidth shared by other network users. This lowers the network total cost of operations.
Subscription to a multi-user optical network	Agency has access, via subscription, to bandwidth managed by 3 rd party entities such as colo-hotels or tele-houses. [REDACTED]	Agencies benefit from use of bandwidth on an as needed basis only, lowering the total cost of operations for the optical network.
UNI 1.0	This interface is currently supported in the Intelligent Optical Network	Agencies benefit from improved optical network performance as follows: <ul style="list-style-type: none"> Improved bandwidth efficiency - able to dynamically re-assign bandwidth resources as new bandwidth requests enter the network. Rapid Provisioning - minimizes manual intervention, especially across multi-vendor networks Improved quality of service



SERVICE REQUIREMENTS	TECHNICAL DESCRIPTION	BENEFITS TO AGENCY
UNI 1.0, Release 2	This interface is currently supported in the Intelligent Optical Network	Agencies benefit from the ability to set-up and tear-down optical paths across multidomain networks.
UNI 2.0	[REDACTED]	Agencies benefit from improved bandwidth management and provisioning functionalities over UNI 1.0

Table 1.4.19.c-6: Optical Wavelength Service over ASTN Features. AT&T's technical equipment and methodologies provide the required OWS over ASTN performance for Agencies.

1.4.19.c.1 AT&T Intelligent Optical Network

The Optical Networking service is built on AT&T's Intelligent Optical Network, which has a major footprint. It has been deployed in more than 200 cities in the continental U.S., 10 cities in Europe, and is being expanded into the Asia-Pacific region this year (2005).

Table 1.4.19.c-7 summarizes the features of the Intelligent Optical Network.

TYPE OF OPTICAL NETWORK	DESCRIPTION
Current version	[REDACTED]
Future version	[REDACTED]

Table 1.4.19.c-7: Description of AT&T's Intelligent Optical Network. Future version of the AT&T Intelligent Optical Network shows higher bandwidth availability.



1.4.19.c.2 Optical Networking – Transport via Optical Network Connections

Pre-provisioned access to the AT&T Intelligent Optical Network is a prerequisite for the service. The pre-provisioned Agency access terminates on the AT&T Intelligent Optical Network. Agencies who have pre-established access to the AT&T network can completely bypass the traditional ordering and provisioning processes. [REDACTED]

[REDACTED] (Figures 1.4.19.c-4 and 1.4.19.c-5).

Figure 1.4.19.c-4: AT&T [REDACTED]

Figure 1.4.19.c-5: AT&T Optical Network Provisioning. [REDACTED]

Optical Networking connections are pure Layer 1 transport, [REDACTED]



1.4.19.d Service Quality and Performance [L.34.1.4.6.d]

(d) A description of the quality of the services with respect to the performance metrics specified in Section C.2 Technical Requirements for each proposed optional service, and other performance metrics used by the offeror.

AT&T understands that the KPIs chosen by the Government are built around realistic thresholds that represent operational assurance. The critical availability of 99.999% allows for less than 5 minutes and 15 seconds of down time per year. The routine availability of 99.9 percent allows for less than 4 hours and 32 minutes of down time per year. **Table 1.4.19.d-1** summarizes the performance metrics that AT&T adheres to versus the Government’s targets.

KEY PERFORMANCE INDICATOR (KPI)	SERVICE LEVEL	PERFORMANCE STANDARD (THRESHOLD)	PROPOSED SERVICE QUALITY LEVEL
AVAILABILITY (OWS OVER ASTN)	Routine	99.9%	[Redacted]
	Critical	99.999%	[Redacted]
TIME TO RESTORE (TTR)	Without Dispatch	4 hr	[Redacted]
	With Dispatch	8 hr	[Redacted]
GRADE OF SERVICE (RESTORATION TIME) (NON-DOMESTIC)	Routine	4 seconds	[Redacted]
	Critical	1 second	[Redacted]
GRADE OF SERVICE (RESTORATION TIME) (CONUS)	Routine	300 ms	[Redacted]
	Critical	60 ms	[Redacted]
GRADE OF SERVICE (RESTORATION TIME) (METRO)	Routine	100 ms	[Redacted]
	Critical	60 ms	[Redacted]
BIT ERROR RATIO (BER)	Routine	10 ⁻¹² Out of Service Monitoring ***	[Redacted]
LATENCY (DELAY) (NON-DOMESTIC)	Routine	400 ms	[Redacted]
	Critical	200 ms	[Redacted]
LATENCY (DELAY) (CONUS)	Routine	100 ms	[Redacted]

Table 1.4.19.d-1: OWS over ASTN Network Performance Parameters. Agencies will be positioned to better manage telecommunications and information services through performance based contracts that deliver the quality of service required to meet Agency performance objectives.



AT&T will comply with and meet the OWS-ASTN quality performance metrics specified in Section C.2.5.4.2.4.1 , as illustrated in **Table 1.4.19.d-1**.



To maintain our availability and time to restore metrics, AT&T uses a facility architecture that allows the underlying facility infrastructure to maintain connectivity in the face of equipment failure or physical damage. Examples include:

[REDACTED]

1.4.19.e Attributes and Values of Service Enhancements [L.34.1.4.6.e]

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

In addition to the standard services, Agencies will enhance their OWS with additional features and capabilities [REDACTED]. **Table 1.4.19.e-1** highlights additional service features and capabilities available with OWS. AT&T proposes the attributes in **Table 1.4.19.e-1** as service enhancements.

PROPOSED SERVICE REQUIREMENT	TECHNICAL DESCRIPTION	BENEFITS
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.19.e-1: [REDACTED] enhance reliability. [REDACTED]

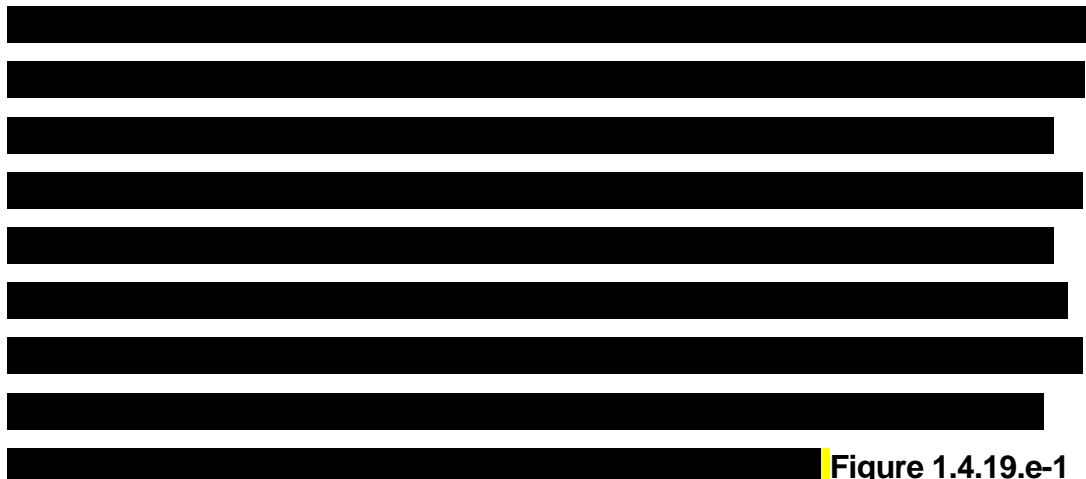


Figure 1.4.19.e-1 illustrates the architectural structure of the Optical control plane.

AT&T's Optical Networking Service provides a superior solution to Agencies looking for a service with the largest footprint, the highest reliability, the

greatest flexibility to manage their Layer 1 bandwidth needs [REDACTED] and the fastest provisioning times.

Figure 1.4.19.e-1: Architecture of Optical Control Plane. [REDACTED]

1.4.19.f Service Delivery Experience [L.34.1.4.6.f]

(f) A description of the offeror's experience (including major subcontractors) with delivering each proposed optional service.

AT&T currently has nearly [REDACTED] WDM systems online with access to [REDACTED] intelligent optical switches. **Tables 1.4.19.f-1 to 1.4.19.f-3** summarizes a deployment of Optical Wavelength Service to various customers.

CLIENT NEED	SOLUTION	CREATED VALUE
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.19.f-1: Optical Wavelength Service value creation [REDACTED] *AT&T provided*



[REDACTED]

CLIENT NEED	SOLUTION	CREATED VALUE
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.19.f-2: Optical Wavelength Service value creation [REDACTED] AT&T provided dedicated Optical Wavelength network [REDACTED]

[REDACTED]

CLIENT NEED	SOLUTION	CREATED VALUE
[REDACTED]	[REDACTED]	[REDACTED]

Table 1.4.19.f.3: Optical Wavelength Service value creation [REDACTED] AT&T provided dedicated Optical Wavelength network [REDACTED]

In 1995, AT&T was the first carrier to use wavelength division multiplexing to dramatically increase the overall capacity of the optical network backbone.

AT&T looks forward to offering OWS to Agencies as part of the Networkx contract. Agencies will enjoy the same high-quality service experienced by the large Wall Street firm, the classified government entity and IBM.

1.4.19.g Approach to Perform Service Verification
[L.34.1.4.6.g]

(g) A description of the offeror's approach to perform verification of individual services delivered under the contract, in particular the testing procedures to verify acceptable performance and Key Performance Indicator (KPI)/Acceptable Quality Level (AQL) compliance.

The first time the service is provided through the Networkx contract, the performance must be verified. The KPIs will be monitored to certify that the service performance complies with the AQL. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



Figure 1.4.19.g-1

illustrates the setup of
the [REDACTED]

The [REDACTED] staff
monitors and
proactively manages
the data and voice

Figure 1.4.19.g-1: The [REDACTED]

traffic flowing across AT&T's domestic and global networks 24x7. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

1.4.19.h Optional Services Network Impact [L.34.1.4.6.h]

(h) A description of how the delivery of any optional services would impact the network architecture (e.g., security, quality and reliability, performance).

Agencies receive a low-risk solution through AT&T's ability to offer OWS upon contract award without any security, quality, reliability or performance impact to the network architecture.

1.4.19.i Approach to Incorporating Optional Services, Enhancements, or Improvements [L.34.1.4.6.i]

(i) A description of the approach for incorporating into the proposed optional services, technological enhancements and improvements that the offeror believes are likely to become commercially available in the timeframe covered by this acquisition, including a discussion of potential problems and solutions.



The Intelligent Optical Network is a constantly evolving network so that Agencies will benefit from the latest in technological enhancements in control plane functionality of optical networking.

Table 1.4.19.i-1 provides details of the features of the current and future releases of the Intelligent Optical Network.

FEATURE RELEASE DATE	DESCRIPTION
Current	[REDACTED]
[REDACTED]	[REDACTED]

Table 1.4.19.i-1: Provisioning features on the Optical Network. *Current and future provisioning features enable Agencies to reconfigure their Optical Networks based on need.*

[REDACTED]

AT&T's approach for incorporation of technological enhancements and emerging technology is covered in detail in Section 1.3.3.d, Network Evolution, Convergence, and Interoperability, in the Network Architecture section of the Technical Volume.



1.4.19.1 Stipulated Deviations [L.34.1.4.6.a]

(a) Stipulated responses to the requirements in Table J.9.1.1.2 (b) Technical Stipulated Requirements for Optional Services.

AT&T complies with all the Stipulated Requirements for the OWS over ASTN service.

1.4.19.1.1 Reserved