

Addenda to the Broadband Network Services Agreement between Virginia Tech and Bell Atlantic

This addenda is being entered into pursuant to section 5.14 of the Broadband Network Services Agreement between Virginia Tech and Bell Atlantic dated June 12, 1996. The services contained in this addenda are in addition to and support the existing services contained in the Broadband Network Services Agreement.

The following shall be added to Appendix A:

ATM Consulting Services (ACS)

Contractor shall offer a range of ATM consulting services, which include consultation and implementation for Local Area Network (LAN) services, intracampus and intercampus Backbone Network services, and the Wide Area Network (WAN) services. These services include:

- Network Architecture Design & Implementation
 1. Network Planning Support
 2. Network Configuration Support
 3. Network Implementation & Project Management
- Network Management Service
 1. Network Management Planning Service
 2. Performance Analysis Service
 3. Security Planning Service
 4. Capacity Planning Service
 5. Audit & Discovery Services
- Messaging & Internet Services
 1. Messaging Architecture & Design
 2. Internet & Intranet Planning Services
 3. Security Planning & Implementation Services.
 4. Internet Implementation Services
 5. Firewall Design Service
 6. Firewall Implementation Services
 7. Web Server Design

The aforementioned areas of consulting are to be provided at the hourly rate specified in Appendix B. Contractor will develop a mutually agreeable, (between the Contractor and the Ordering Party), Statement of Work (SOW) which will detail specific activities and deliverables for a particular job. Once the SOW has been agreed to, and executed by the Contractor and the Ordering Party, services will commence. The SOW will be sent to Virginia Tech for record keeping purposes only. Mutually agreeable progress payments may be required and itemized within the SOW. Should the Ordering Party require any equipment (i.e.: servers, PC's, etc.) as a result of the aforementioned consulting services, the equipment will be estimated and be purchased separately from this agreement in accordance with any applicable state purchasing procedures.

Enhanced Network Management Services (ENMS)

Contractor will provide two types of remote monitoring services: Enhanced Network Management Services - Fault Management (ENMS-Fault Management) and Enhanced Network Management Services - Performance Management (ENMS-Performance Management). These services may be purchased separately or in combination.

A network operations center (NOC) provided by the Contractor will be the responsible entity for all customer reporting, management and repair coordination requirements. This center will be fully staffed with networking personnel and available 24 hours a day, 7 days a week. Response level agreements for ENMS-Fault Management and Performance Management Services will comply with the commitments as defined in Appendix A: Description of Services, Trouble Reporting of the Broadband Network Services Agreement previously defined and executed between Contractor and Virginia Tech. The NOC will coordinate with all entities, including, but not limited to, Virginia Tech, the Ordering Party, the Bell Atlantic MCC, the Bell Atlantic Data Network Control Centers (DNCCs), all participating LECs and Interexchange Carriers (IXCs), to ensure adequate restoration and network performance.

This center will provide support for the Ordering Party's customer premises networking equipment (CPE) which interface to the ATM Wide Area Network, or other such networks as directed. This CPE equipment includes: routers, CSU/DSUs, multiplexers, bridges, LAN hubs and switches which are capable of being remotely managed.

Prior to commencement of ENMS, a mutually agreed upon Statement of Work (SOW) will be executed between the Contractor and Ordering Party describing in detail the services and coverage to be provided, including reports and report format. With Contractor-provided monitoring equipment, Contractor will remotely examine the SNMP agents to verify the condition of the network. In the event of a monitoring alarm, Contractor personnel would implement procedures, previously and mutually agreed to by the Ordering Party and Contractor, to work to restore the network to its desired performance level.

The following describes the two available ENMS Network Management services:

- ENMS-Fault Management Services:** ENMS-Fault Management Services are intended to provide reactive network restoration services, via dedicated, on-line support for the customer's LAN or WAN environment on a 24 hours per day, 7 days per week basis. ENMS-Fault Management Services provides coverage for the Ordering Party's data communications routers, data switches and data hubs. ENMS-Fault Management Services cover a variety of Ordering Party equipment, including equipment manufactured by Bay Networks, Cisco, Cabletron, 3COM and Fore. Other manufacturer's equipment may also be considered on a case-by-case basis. Additional management functions such as capacity management, resource accounting, downloads of patches/fixes/upgrades, device configuration/reconfiguration, and monitoring for network file servers and operating systems are also available at an additional cost subject to execution of a contract addendum form.

| FAULT MANAGEMENT-REACTIVE NETWORK MONITORING & VENDOR COORDINATION | |
|---|------------------------------|
| <i>Available Services</i> | <i>Monthly Reports</i> |
| Call Tracking | Call Center Activity |
| Problem Solving-Event Based | Problem Resolution Summary |
| Multiple Vendor Coordination | Mean Time to Respond |
| On-line Remote Diagnostics | Contract Summaries |
| Router Software Support | Product/Device Configuration |
| Configuration Verification | Site Configuration |
| Automatic Notification & Escalation | Customized Reports |
| Required Customer Database Information | |
| Customer Contact Information | Company & Site Information |
| IXC / Local Communication Contact Lists | Previous Case History |
| Product Configuration | Problem/Solution Library |
| Service Contracts & Contact Lists | Letter of Agency |

- ENMS-Performance Management:** Performance Management and Proactive Network Monitoring program is also available to Ordering Parties. Through a previously defined network performance agreement contained in a mutually agreed Statement of Work (SOW), Contractor will analyze the overall performance of the Ordering Party's WAN or LAN segments and make proactive recommendations to improve network performance. Contractor will gather the predefined data collection, polling, and probe information for SNMP device performance information and MIB variables, which then will be used to develop daily, weekly, and monthly network trend analysis reports. With these reports, the Contractor's ENMS-Performance Management engineering staff can deliver a network status report that will include observations, recommendations and suggestions to enhance overall network performance, including WAN segments and LAN segments.

Upon an Ordering Party's request, all configuration parameters which enable the functioning, monitoring, and management of a device can be delivered to a properly equipped Ordering Party owned and maintained premises workstation for local viewing. The collected data will represent near real-time network activity. Reports, charts and graphs can show weekly, monthly, and/or quarterly trend analysis for a particular monitored device as required. Intermittent information, known as pings, can be established to collect information for very short time intervals (up to a five (5) minute interval). Additional performance data can be collected every fifteen (15) minutes over extended periods to provide data in report format to meet customer predefined requirements.

| ENMS-PERFORMANCE MANAGEMENT- PROACTIVE NETWORK MONITORING/ANALYSIS |
|--|
| <i>Network Performance Capabilities</i> |
| Simultaneous data collection from multiple network devices |
| Data collection 24 hours a day, 7 days a week |
| Data retrieval, reduction, & post-processing analysis daily |
| Data post-processing analysis using proven performance evaluation techniques |
| High-volume data summary |
| 1-year retention of reduced data (at Contractor's location) |
| Performance Management |
| <ul style="list-style-type: none"> Assist Customer in establishing performance baseline Identify causes of performance abnormalities Assist Customer in balancing activity across routers, hubs & servers |
| Capacity Planning |
| <ul style="list-style-type: none"> Track performance & workload against baseline for resource upgrades Identify cost-effective means to increase capacity |

| ENMS-PERFORMANCE MANAGEMENT MONTHLY REPORTS-EXAMPLES | |
|---|-------------------------------------|
| <i>Report</i> | <i>Category</i> |
| Weekly Reach Failure Summary | Network Device Availability |
| Prime Shift Reach Failure Trend | Network Device Availability |
| Daily Reach Failure Summary | Network Device Availability |
| Trend Analysis on Select Devices | Network Device Availability |
| Top 10 Busiest Devices by Month | Network Device Utilization Analysis |
| Router Port Trend Analysis (composite) | Network Device Utilization Analysis |
| Router Port Trend Analysis (single) | Network Device Utilization Analysis |
| Top 10 Busiest LAN Ports by Month | Network Device Utilization Analysis |
| Detail Router Port Activity Profile | Network Device Utilization Analysis |
| Detail Concentrator Activity Trend | Network Device Utilization Analysis |
| LAN Segment Error Trend Profile | Error Analysis |
| Router Interface Error Trend Profile | Error Analysis |

Contractor will support and deploy selected network management platforms. These platforms include and are limited to, SunNet Manager, HP Openview, and Netview 6000. A number of other software platforms which operate on these systems can be deployed to support a variety of applications. A list of element management systems deployed or used include but are not limited to:

- Cisco Works
- Bay Networks Site Manager
- Bay Networks Optivity
- Cabletron Spectrum
- ForeView
- All required element managers

Full Service User Network Interface (FS-UNI)

Contractor will provide a Full Service User Network Interface (FS-UNI) to Ordering Parties. These services, described below, facilitate the connection of an Ordering Party to the ATM network, including necessary configuration to support one or several applications. Ordering Parties may utilize the FS-UNI to support the network services described in Appendix A. The FS-UNI will be provided with all the necessary components to provide Ordering Parties connectivity with serial, router or switch interfaces. The FS-UNI will also include maintenance on all network components and services.

Contractor will offer the following ATM Full Service UNI connectivity options with ATM access speeds of DS-1, DS-3 and -OC3c. These offerings are provided in conjunction with the ATM access facility in the required locations.

DS-1 Offering Options

- ***Universal Serial Connection:*** This service provides up to two (2) *Universal Serial Connections* for connecting Ordering Party provided customer premises equipment (CPE). Interfaces may be configured as V.35, RS-366, DS-1, or FT-1. This service will be provided using an ATM cell multiplexor.
- ***Ethernet or Token Ring LAN Connection Plus Serial:*** This service provides one (1) local area network (LAN) Connection, plus one (1) *Universal Serial Connection* for connecting Ordering Party provided CPE. Interfaces may be configured as routed Ethernet (10 Mbps AUI) or routed Token Ring (4 or 16 Mbps) for the LAN Connection, and as V.35, RS-366, DS-1, or FT-1 for the *Universal Serial Connection*. This service will be provided using an ATM cell multiplexor and a router capable of supporting an Ethernet or Token Ring LAN connection as required.
- ***Ethernet or Token Ring LAN Connection Plus Dual Serial:*** This service provides one (1) LAN Connection, plus two (2) *Universal Serial Connections* for connecting Ordering Party provided CPE. Interfaces may be configured as routed Ethernet (10 Mbps AUI) or routed Token Ring (4 or 16 Mbps) for the LAN Connection, and as two (2) V.35, RS-366, DS-1, or FT-1 for the *Universal Serial Connection*. This service will be provided using an ATM cell multiplexor and a router capable of supporting an Ethernet or Token Ring LAN connection and multiple serial connections.
- ***Premises Switched ATM Connection:*** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections* for connecting Ordering Party provided CPE. These interfaces may provide connectivity for data or video applications. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (unshielded twisted pair (UTP), multimode (MM) and single mode (SM) fiber optic (F/O)) interfaces. This service will be provided using an ATM switch.
- ***Premises Switched ATM Connection Plus Serial:*** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus two (2) *Universal Serial Connections* for connecting Ordering Party provided CPE. Interfaces may be configured as V.35, RS-366, DS-1, or FT-1. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. This service will be provided using an ATM switch and multiple serial connections.
- ***Premises Switched ATM Connection Plus Serial/ Ethernet LAN:*** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus one (1) *Universal Serial Connection*, plus one (1) LAN Connection, for connecting Ordering Party provided CPE. Interfaces may be configured as V.35, RS-366, DS-1, or FT-1 for the *Universal Serial Connection*, and as routed Ethernet (10 Mbps AUI) or routed Token Ring (4 or 16 Mbps) for the LAN Connection. These interfaces may provide connectivity for data, video, or voice applications. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. This service will be provided using an ATM switch, a router capable of supporting an Ethernet LAN connection, and multiple serial connections.

DS-3 Offering Options

- ***Universal Serial Connection:*** This service provides up to four (4) *Universal Serial Connections* for connecting Ordering Party provided CPE. Interfaces are provided as a base of three (3) V.35, and one (1) DS-1. The number and type of *Universal Serial Connections* may be upgraded to

include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using an ATM cell multiplexor.

- **Ethernet/Fast Ethernet/Token Ring LAN Connection:** This service provides one (1) *LAN Connection* for connecting Ordering Party provided CPE. Interfaces may be configured as routed Ethernet (10 Mbps AUI, or 100BASE-TX) or routed Token Ring (4 or 16 Mbps), which may provide connectivity for data or video applications. This service will be provided using a router capable of supporting a DS-3 ATM connection and the required LAN interface.
- **Fast Ethernet LAN Connection Plus Serial:** This service provides one (1) *LAN Connection*, plus four (4) *Universal Serial Connections*, for connecting Ordering Party provided CPE. Interfaces may be configured as routed Ethernet (10 Mbps AUI, or 100BASE-TX) or routed Token Ring (4 or 16 Mbps) for the *LAN Connection*, and as three (3) V.35, and one (1) DS-1 for the *Universal Serial Connections*. The number and type of *Universal Serial Connections* may be upgraded to include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using a router capable of supporting a DS-3 ATM connection, the required LAN interface and serial connections.
- **Premises Switched ATM Connection:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections* for connecting Ordering Party provided CPE. Upon request, IP or ATM Forum LANE services will also be provided. Upon request, the number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing DS-3 and 25 Mbps ATM connections.
- **Premises Switched ATM Connection Plus Serial:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus four (4) *Universal Serial Connections* for connecting Ordering Party provided CPE. Upon request, IP or ATM Forum LANE services may also be provided. Interfaces are provided as a base of three (3) V.35, and one (1) DS-1 for the *Universal Serial Connections*. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. The number and type of *Universal Serial Connections* may be upgraded to include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing DS-3 and 25 Mbps ATM connections and an ATM cell multiplexor.
- **Premises Switched ATM Connection Plus Fast Ethernet LAN:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus one (1) *LAN Connection*, for connecting Ordering Party provided CPE. Upon request, IP or ATM Forum LANE services may also be provided. Interfaces may be configured as routed Ethernet (10 Mbps AUI, or 100BASE-TX) or routed Token Ring (4 or 16 Mbps) for the *LAN Connection*. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing DS-3 and 25 Mbps ATM connections and a router capable of supporting DS-3 ATM connection and the required LAN connection.

OC-3c Offering Options

- **Universal Serial Connection:** This service provides one (1) *Universal Serial Connections* for connecting Ordering Party provided CPE. Interfaces are provided as a base of one (1) HSSI, which may provide connectivity for data applications. The number and type of *Universal Serial Connections* may be upgraded to include V.35, DS-3, DS-1, and OC-3c (MM & SM F/O) interfaces. This service will be provided using an ATM cell multiplexor capable of supporting a high speed ATM connection.
- **Fast Ethernet LAN Connection:** This service provides one (1) *LAN Connection* for connecting Ordering Party provided CPE. Interfaces may be configured as routed Ethernet (100BASE-TX), which may provide connectivity for data applications. This service will be provided using a router capable of supporting a DS-3 ATM connection and the required LAN interface.
- **Fast Ethernet LAN Connection Plus Serial:** This service provides one (1) *LAN Connection*, plus four (4) *Universal Serial Connections*, for connecting Ordering Party provided CPE. Interfaces are provided as routed Ethernet (100BASE-TX) for the *LAN Connection*, and as three (3) V.35, and one (1) DS-1 for the *Universal Serial Connections*. The number and type of *Universal Serial Connections* may be upgraded to include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using a ATM cell multiplexor and a router capable of supporting a DS-3 ATM connection and the required LAN interface.

- **Premises Switched ATM Connection:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections* for connecting Ordering Party provided CPE. Upon request, IP or ATM Forum LANE services may also be provided. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing OC-3 and 25 Mbps ATM connections.
- **Premises Switched ATM Connection Plus Serial:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus four (4) *Universal Serial Connections* for connecting Ordering Party provided CPE. IP or ATM Forum LANE services may also be provided. Interfaces are provided as a base of three (3) V.35, and one (1) DS-1 for the *Universal Serial Connections*. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. The number and type of *Universal Serial Connections* may be upgraded to include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing OC-3 and 25 Mbps ATM connections and an ATM cell multiplexor.
- **Premises Switched ATM Connection Plus Fast Ethernet LAN/Serial:** This service provides six (6) 25 Mbps ATM *Premises Switched ATM Connections*, plus four (4) *Universal Serial Connections*, plus one (1) LAN Connection, for connecting Ordering Party provided CPE. Upon request, IP or ATM Forum LANE services may also be provided. Interfaces are provided as a base of three (3) V.35, and one (1) DS-1 for the *Universal Serial Connections*, and as routed Ethernet (10 Mbps AUI, or 100BASE-TX) or routed Token Ring (4 or 16 Mbps) for the LAN Connection. The number and type of *Premises Switched ATM Connections* may be upgraded to include TAXI, and OC-3c (UTP, MM & SM F/O) interfaces. The number and type of *Universal Serial Connections* may be upgraded to include DS-3, HSSI, and OC-3c (MM & SM F/O) interfaces. This service will be provided using a backbone ATM switch providing OC-3 and 25 Mbps ATM connections, an ATM cell multiplexor, and a router capable of supporting an OC-3 ATM connection and the required LAN connection..

FS-UNI Service Provisions:

The following are the additional terms and conditions only applicable to the FS-UNI service:

1. Prior to commencement of FS-UNI service, a mutually agreed upon Statement of Work (SOW) will be executed between the Contractor and the Ordering Party describing in detail the services to be provided.
2. All offerings include complete configuration and installation of equipment to provide the aforementioned connectivity requirements;
3. End-to-end testing will be performed as required and test results conveyed to the Ordering Party and the MCC as normal testing requirements;
4. All offerings include Monday - Friday, 8AM - 5PM, four (4) hours response for maintenance/repair. This maintenance includes replacement of defective parts, all on-site technician labor, software corrections and updates as required to resolve problems. Optional extended twenty four (24) hour by seven (7) day per week maintenance is available at an additional charge.
5. All offerings include ENMS-Fault Management Services, (as described herein), and any required configuration services for adequate implementation.
6. All routed ethernet and token ring offerings will include, upon request, and at no extra charge, direct IP layer access to the NET.WORK.VIRGINIA Internet gateway. Contractor will configure CPE to support IP using specifications stipulated by Virginia Tech that are generally accepted in the industry (currently either the RFC-1483 or RFC-1577, Classical IP specifications).
7. An appropriately sized Uninterruptible Power Supply (UPS) will be engineered for the equipment to be located at the Ordering Party's premises to ensure continuity of service for a maximum of thirty (30) minutes during a power outage;
8. FS-UNI equipment and software will be upgraded as mutually agreed to between the Ordering Party and the Contractor. Contractor will make a good faith effort to deploy and support revisions of software that are mutually acceptable to both the Contractor and Ordering Party and that are

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compliant with specifications and or standards issued by the ATM Forum and other generally recognized industry standards groups.

9. Pursuant to paragraph two (2) of this Appendix A, any extension of the service beyond the existing recognized Contractor network demarcation point will be the responsibility of the Ordering Party and will be subject to additional installation charges at prevailing rates.
10. The Ordering Party acknowledges that in order to provide the FS-UNI Services contained herein, that the Contractor will need to place certain equipment and software ("Equipment"), for the purpose of providing this service, on the Ordering Party's premises. The Ordering Party shall have the right and license only to use the Equipment for this purpose. The Ordering Party agrees not to remove or relocate the Equipment. The Ordering Party further acknowledges that placement of such Equipment, or the payment by the Ordering Party of the monthly Service fee, does not convey or transfer any title or interest to the Equipment to the Ordering Party, including any software provided in connection therewith; such title remains with the owner of the Equipment. The Ordering Party shall not allow any liens or any other such encumbrances to be placed against the Equipment. The Ordering Party shall not represent to anyone that it has any right to title or interest in said Equipment beyond the right to use such Equipment, for the purpose of providing the FS-UNI service, as set forth in this Agreement. The Ordering Party agrees to use all reasonable care to protect such Equipment from harm, misuse, damage or loss of any kind. The Ordering Party shall use the Equipment only for the purpose intended in this agreement. Should the Ordering Party abuse or misuse the Equipment, the Ordering Party shall be responsible for the repair or replacement of the Equipment. If the Ordering Party fails to pay for FS-UNI services and such failure continues for a period of thirty (30) days after written notice, the Ordering Party shall immediately cease using the Equipment, and Contractor or its designee shall have the right immediately to enter the Ordering Party's premises and repossess the Equipment provided in connection with the FS-UNI services, without limiting its other remedies. Contractor shall have the right from time to time to assign monies due or to become due for FS-UNI services to affiliates or third parties on a case by case basis subject to the agreement of Contractor and Ordering Party.
11. Custom configurations to meet specific Ordering Party application requirements will be handled on a case by case basis as required subject to execution of a contract addendum form.

The following shall be added to Appendix B:

ATM Consulting Services (ACS)

| | |
|-----------------|--|
| Consulting Fees | <u>Hourly Rate</u> \$150.00 per hour |
|-----------------|--|

Enhanced Network Management Services (ENMS)

ENMS-Fault Monitoring and Performance Management pricing is based on the number and types of elements and devices in the network (i.e. multiple SNMP agents in a single device is counted as one unit). The following provides pricing for the various ENMS elements.

ENMS-Fault Management Services Establishment Fee: This is a non-recurring one-time charge to establish a fault monitoring for an Ordering Party. This includes the establishment of a customer profile, network database, and required elements to effectively manage the customer network.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|---------------------------|---|-----------------------|-------------------|
| Fault-Setup | Fault Monitoring Setup fee (1) per client | n/a | \$3,200 |

ENMS -Fault Management Service Device Establishment Fee: This is a non-recurring charge to add a new network device into the customer profile and updating of network maps.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|---------------------------|--------------------------------------|-----------------------|-------------------|
| Fault-Device Setup | Device setup fee (1) per SNMP Device | n/a | \$50 |

ENMS -Fault Management Service Access-Device Monthly Fee: This is a monthly charge to monitor a LAN or WAN device that provides access connectivity for a group of users, generally at a remote site. An access class router will have a single WAN port no greater than a DS-1 interface such as a Cisco 2500 or a Bay AN class of routers. An access class hub or switch is primarily a workgroup hub or switch, such as a Fore Workgroup switch.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|---------------------------|---|-----------------------|-------------------|
| Access Device | Fault Monitoring - Access Device (SNMP Device/Month) | \$50 | n/a |

ENMS -Fault Management Service Backbone-Device Monthly Fee: This is a monthly charge to monitor a LAN or WAN device that provides connectivity at the Ordering Party's main site, such as the data center. These devices have more than one interface. The WAN interface is typically a DS-1 or higher and the LAN interfaces have multiple LAN segments both switched and shared and provide dedicated connections to servers and data repositories. Examples of such devices include but not limited to the Cisco Lightstream 1010, the Fore BX-200, Cisco 7000 or Bay Networks BCN series routers.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|---------------------------|---|-----------------------|-------------------|
| Backbone Device | Fault Monitoring - Departmental Device (SNMP Device/Month) | \$175 | n/a |

ENMS-Performance Management Establishment Fee: This is a non-recurring one-time charge to establish performance management services for an Ordering Party. This includes the establishment of a customer profile, network database, and required elements to effectively manage the customer network. For performance management services, it also includes setup for SNMP data collection, collation, analysis and

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recommendations. An Ordering Party who initially buys ENMS-Fault Management can add ENMS-Performance Management Services and is required to only pay the for ENMS-Fault Management Establishment fees plus the difference between the ENMS-Fault Management and ENMS-Performance Management Services establishment charges.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|--|--|----------------|------------|
| Performance Setup (1) per client (database) | Performance Management Initial Setup fee | n/a | \$5,500 |

ENMS-Performance Management: Device Establishment Fee: This is a non-recurring charge to add a new network device into the customer profile, data analysis manager and updating of network maps.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|--------------------------|--------------------------------------|----------------|------------|
| Performance Device Setup | Device Setup Fee (1) per SNMP Device | n/a | \$75 |

ENMS-Performance Management: Access-Device Monthly Fee: This is a monthly charge to manage the performance of a LAN or WAN device that provides access connectivity for a group of users, generally at a remote site. An access class router will have a single WAN port no greater than a DS-1 interface such as a Cisco 2500 or a Bay AN class of routers. An access class hub or switch is primarily a workgroup hub or switch, such as a Fore Workgroup switch.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|--------------------|---|----------------|------------|
| Access Device | Performance Management - Access Device (SNMP Device/Month) | \$100 | n/a |

ENMS-Performance Management: Backbone-Device Monthly Fee: This is a monthly charge to manage the performance of a LAN or WAN device that provides connectivity at the customer's main site, such as the data center. These devices have more than 1 interface. The WAN interface is typically a DS-1 or higher and the LAN interfaces have multiple LAN segments both switched and shared and provide dedicated connections to servers and data repositories. Examples of such devices include the Cisco Lightstream 1010, the Fore BX-200, Cisco 7000 or Bay BCN series routers.

| <u>Part Number</u> | <u>Description</u> | <u>Monthly</u> | <u>NRC</u> |
|--------------------|--|----------------|------------|
| Backbone Device | Performance Monitoring - Device (SNMP Device/Month) | \$400 | n/a |

Full Service User Network Interface (UNI) Pricing:

| Service Identification Number | Service Description | FS-UNI Prem./mo. Charge | Standard Circuit/mo. Charge | Discounted Circuit/mo. Charge *1 | Circuit NRC Charge | FSU NRC Charge | Total Std. FS-UNI Charge | Total Disc. FS-UNI Charge *1 | TOTAL NRC Charge | 24x7 Mntn. Upgrade/mo Charge *2 |
|-------------------------------|--|-------------------------|-----------------------------|----------------------------------|--------------------|----------------|--------------------------|------------------------------|------------------|---------------------------------|
| DS-1 Based Services | | | | | | | | | | |
| FS-ATM-DS1-001 | Universal Serial Connection (KIT) | \$279 | \$420 | \$350 | \$500 | \$500 | \$699 | \$629 | \$1,000 | \$45 |
| FS-ATM-DS1-002 | Ethernet LAN Connection PLUS Serial | \$600 | \$420 | \$350 | \$500 | \$500 | \$1,020 | \$950 | \$1,000 | \$106 |
| FS-ATM-DS1-003 | Token Ring LAN Connection PLUS Serial | \$621 | \$420 | \$350 | \$500 | \$500 | \$1,041 | \$971 | \$1,000 | \$110 |
| FS-ATM-DS1-004 | Ethernet LAN/Serial Connection PLUS Serial | \$734 | \$420 | \$350 | \$500 | \$500 | \$1,154 | \$1,084 | \$1,000 | \$130 |
| FS-ATM-DS1-005 | Token Ring LAN/Serial Connection PLUS Serial | \$755 | \$420 | \$350 | \$500 | \$500 | \$1,175 | \$1,105 | \$1,000 | \$134 |
| FS-ATM-DS1-006 | Premises Switched ATM | \$753 | \$420 | \$350 | \$500 | \$500 | \$1,173 | \$1,103 | \$1,000 | \$131 |
| FS-ATM-DS1-007 | Premises Switched ATM PLUS Serial | \$972 | \$420 | \$350 | \$500 | \$500 | \$1,392 | \$1,322 | \$1,000 | \$174 |
| FS-ATM-DS1-008 | Premises Switched ATM PLUS Serial/Ethernet LAN | \$1,294 | \$420 | \$350 | \$500 | \$500 | \$1,714 | \$1,644 | \$1,000 | \$235 |
| DS-3 Based Services | | | | | | | | | | |
| FS-ATM-DS3-001 | Universal Serial Connection | \$1,043 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$4,443 | \$4,243 | \$2,000 | \$186 |
| FS-ATM-DS3-002 | Fast Ethernet LAN Connection | \$1,449 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$4,849 | \$4,649 | \$2,000 | \$273 |
| FS-ATM-DS3-003 | Token Ring LAN Connection | \$1,349 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$4,749 | \$4,549 | \$2,000 | \$253 |
| FS-ATM-DS3-004 | Fast Ethernet LAN Connection PLUS Serial | \$2,762 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$6,162 | \$5,962 | \$2,000 | \$521 |
| FS-ATM-DS3-005 | Premises Switched ATM Connection | \$1,345 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$4,745 | \$4,545 | \$2,000 | \$242 |
| FS-ATM-DS3-006 | Premises Switched ATM Connection PLUS Serial | \$2,325 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$5,725 | \$5,525 | \$2,000 | \$427 |
| FS-ATM-DS3-007 | Premises Switched ATM Connection PLUS Fast Ethernet LAN | \$2,731 | \$3,400 | \$3,200 | \$1,000 | \$1,000 | \$6,131 | \$5,931 | \$2,000 | \$513 |
| OC-3 Based Services | | | | | | | | | | |
| FS-ATM-OC3-001 | Universal Serial Connection | \$1,267 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$8,467 | \$8,107 | \$3,200 | \$229 |
| FS-ATM-OC3-002 | Fast Ethernet LAN Connection | \$1,405 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$8,605 | \$8,245 | \$3,200 | \$264 |
| FS-ATM-OC3-003 | Fast Ethernet LAN Connection PLUS Serial | \$2,624 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$9,824 | \$9,464 | \$3,200 | \$493 |
| FS-ATM-OC3-004 | Premises Switched ATM Connection | \$1,217 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$8,417 | \$8,057 | \$3,200 | \$217 |
| FS-ATM-OC3-005 | Premises Switched ATM Connection PLUS Serial | \$2,198 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$9,398 | \$9,038 | \$3,200 | \$402 |
| FS-ATM-OC3-006 | Premises Switched ATM Connection PLUS Serial/Fast Ethernet LAN | \$3,449 | \$7,200 | \$6,840 | \$2,000 | \$1,200 | \$10,649 | \$10,289 | \$3,200 | \$646 |

NOTES: *1 Discounted circuit prices will apply as defined in Appendix B: Prices for Services of the Broadband Network Services Agreement between Virginia Tech and Bell Atlantic, dated June 12, 1996.

*2 Ordering parties requiring 7 days a week, 24 hours a day coverage should add the upgrade price in this column to the Total FS-UNI price to obtain the cumulative total monthly service price.