

**APPENDIX 8 TO SCHEDULE 3.3
TO THE
COMPREHENSIVE INFRASTRUCTURE AGREEMENT
DATA NETWORK SERVICES SOW
DETAILED PACKAGE DRAFT**

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This is Appendix 8 (Data Network Services SOW) to Schedule 3.3 (Statements of Work) to the Comprehensive Infrastructure Agreement between the Commonwealth and Vendor (the "Agreement"). Unless otherwise expressly defined herein, the capitalized terms used herein shall have the meaning assigned to them in Appendix 10 (SOW Definitions) to Schedule 3.3 or in the Agreement.

1.0 Data Network Services Overview and Objectives

1.1 Services Overview

This Appendix 8 (Data Network Services SOW) is the Statement of Work (or "SOW") that sets forth the roles and responsibilities of the Parties for the Data Network Services ("Data Network Services") provided under the Agreement as part of the Services. Data Network Services are the Services and activities, as further detailed in this SOW, required to provide and support the Commonwealth's Data Network environment. Vendor responsibilities include, but are not limited to, the provisioning, engineering, operations and administration of the following Data Network Services and Infrastructure:

- Wide Area Network (WAN)/Metropolitan Area Network (MAN)
- Local Area Network (LAN) (Wired and Wireless)
- Remote Access (VPN and Dial-up)
- Network Security (clarifying text to outline services)

In addition to the Services described in this SOW, Vendor is responsible for providing the Services described in Appendix 1 (Cross-Functional Services SOW) to Schedule 3.3.

1.2 Service Objectives

The following are the key high-level Service objectives Vendor shall ensure the Commonwealth achieves through Data Network Services:

- Provide a reliable, scalable and secure Network infrastructure to the Commonwealth
- Operate efficiently and effectively by running on a consolidated Network infrastructure and by simplifying Network management, procurement and budgeting
- Minimize administrative effort by engaging Vendor to provide this management function
- Achieve the Service Levels specified in Section 4 below

2.0 Service Environment

2.1 Scope of Services and Infrastructure to be Supported

This paragraph describes the scope of Services described in Section 2. This includes assets, facilities and locations, personnel, policies and procedures, licenses and agreements and work-in-process. Schedules and attachments are associated with each section to allow for quarterly updates and changes. The following sub-sections and related SOW Addenda further

describe and scope the Data Network Services environment to be supported and/or with which Vendor shall comply. Service Environment addenda are to be maintained by Vendor, reviewed with VITA, updated by Vendor and made available to VITA on a quarterly basis.

2.1.1 Hardware and Software

- a. A listing and description of all supported Network hardware as part of Data Network Services is provided in Addendum 1 - Network Hardware.
- b. A listing and description of the supported Network Software and utilities as part of Data Network Services is provided in Addendum 2 - Network Software.
- c. A listing of supported Network circuits as part of Data Network Services is provided in Addenda 3a and 3b - Network Circuits.
- d. A Network topology diagram describing the supported Network components as part of Data Network Services is provided in Addendum 4 - Network (Logical) Topology.

2.1.2 Service Locations

A description and location of all Commonwealth facilities and office locations requiring Data Network Services is provided in Addendum 5 – VITA Specified Commonwealth Facilities and in Addendum 6 - Eligible Customers currently using Data Network Services, which Eligible Customers receive such services under the existing VITA telecommunications contracts.

2.1.3 Personnel

Vendor will be responsible for providing appropriately skilled staffing for the Data Network Services environment to meet the Roles and Responsibilities and Service Levels set forth in this SOW.

2.1.4 Policies, Procedures and Standards

The policies and procedures with which Vendor will provide Data Network Services in accordance with Section 13 of the Agreement are provided in Schedule 13 (Commonwealth Policies) to the Agreement and the Procedures Manual.

2.1.5 Agreements and Licenses

A list of Data Network Services related agreements and licenses is provided in Schedule 28.23 (Contracts) and Schedule 28.70 (Licenses).

2.1.6 Current Projects

The Commonwealth currently has a number of Current Projects planned or in progress that are included in the scope of this SOW and are the responsibility of Vendor to complete within the time frames specified by the Commonwealth. A list of these Current Projects is provided in Schedule 28.29 (Current Projects).

2.2 Baseline Information

The SOW Baseline data and the seven (7) year volume projections for all applicable Towers that the Vendor shall use for its pricing is located in Schedule 10.1B – Pricing Response Format Microsoft Excel workbook within the worksheet titled “7 Year Volume Projections.”

3.0 Data Network Services Requirements

3.1 Service Descriptions and Roles & Responsibilities

Data Network Services include the following Services, activities, and roles and responsibilities.

3.1.1 Data Network Services Requirements

a. **Wide Area Network (WAN)/Metropolitan Area Network (MAN) Services and Associated Infrastructure**

WAN and MAN Services include the provisioning, engineering, operations and administration of Networks that interconnect two or more separate facilities that span a geographic area that may include a campus or metropolitan area. Transmission facilities include, but are not limited to, point to point circuits, frame relay, ATM, dedicated Internet connections, broadband (DSL/cable modem) Internet connections. Vendor shall work with public carriers and other Commonwealth circuit providers on behalf of the Commonwealth to ensure delivery of WAN Services. Support of any Data Network Services-related work required by designated carriers, to support the Commonwealth's Network, is within the scope of Services and associated Infrastructure.

b. **Local Area Network (LAN) Services and Associated Infrastructure**

LAN Services include the provisioning, engineering, operations and administration of Networks that are usually confined to a single facility or portion of a facility. LAN components include Dynamic Host Configuration Protocol (DHCP)/Domain Name Server (DNS) and wireless LANs supporting all Network traffic originating from desktop devices, local file and print servers, application servers, database servers, peripherals, firewalls/routers, other Network devices and other End-User Devices. This Service does not include the LAN-attached Network Interface Card (NIC) at the desktop. Vendor has operational responsibility for premises distribution system and co-ordination with Commonwealth personnel and third-parties for wiring.

c. **Remote Access Services and Associated Infrastructure**

Remote Access Services include the provisioning, engineering, operations and administration of methods for remote End-Users and Commonwealth business partners to securely connect to the Data Network Services and Data Center Services over the public Internet and dial-up facilities. This Service includes dedicated site-to-site VPN connectivity on a shared public IP Network. It requires industry-/Internet-based standards for security to create and preserve privacy, data integrity, and authenticity. The Remote Access Service must be highly scaleable.

d. **Network Security Services**

Network Security Services include the provision and support of methods that provide security to physical and logical devices connected to the Network. Security Services include firewall, intrusion detection, penetration/vulnerability testing. Responsibility for administration, policies, and standards for Network

Security Services are described in Appendix 3 (Security Services SOW) to Schedule 3.3.

3.1.2 General Responsibilities

The following table identifies the General roles and responsibilities associated with Data Network Services. An “X” is placed in the column under the Party that will be responsible for performing the task. Vendor responsibilities are indicated in the column labeled “Vendor.”

Table 1. General Roles and Responsibilities

General Roles and Responsibilities	Vendor	VITA
1. Recommend WAN, LAN, RAS, Network Security Services, standards and requirements based on industry best practices	X	
2. Review and approve Services, standards and requirements for WAN, LAN, RAS, Network Security services		X
3. Perform business liaison function to Eligible Customers		X
4. Develop and document Network provisioning, engineering, design, requirements and policies, in accordance with Procedures Manual	X	
5. Recommend Network capacity thresholds	X	
6. Approve Network capacity thresholds		X
7. Provide capacity and performance reports on a monthly basis or as needed	X	
8. Procure/provision and maintain all Network components and circuits	X	
9. Report monthly (or as needed by VITA) performance against Service Level	X	
10. Coordinate Service delivery with Help Desks, as well as other support groups within each of the other Towers in coordination with Eligible Customers, VITA, and all appropriate third-parties, as necessary	X	
11. Provide VIP Support Services as necessary	X	

3.1.3 Architecture, Design and Engineering

Architecture, Design and Engineering Services are the activities associated with the engineering and design of the technical infrastructure, tools and utilities to support the Network environment. The following table identifies the Architecture, Design and Engineering roles and responsibilities that Vendor and VITA will perform.

Table 2. Architecture, Design and Engineering Roles and Responsibilities

Architecture, Design and Engineering Roles and Responsibilities	Vendor	VITA
1. Develop of standards and architecture of the Network		X
2. Develop Network design, engineering and security testing and integration procedures that meet requirements and adhere to defined policies	X	
3. Approve Network design, engineering, security testing and integration procedures		X
4. Prepare Network design, engineering and security, plans and schedules to support new and enhanced applications, architectures and standards	X	

Architecture, Design and Engineering Roles and Responsibilities	Vendor	VITA
5. Review and approve Network design, engineering and security plans and schedules		X
6. Develop schedules of impending changes to the Network environment	X	
7. Approve the scheduling of all changes to the Network environment		X
8. Coordinate with VITA, other Eligible Customers, and public carriers, as required	X	

3.1.4 Asset Acquisition and Network Provisioning

Asset Acquisition and Network Provisioning Services are the activities associated with the pricing, evaluation (technical and costing), selection, acquisition, and ongoing management and disposition of new and upgraded Network circuits and components. The following table identifies the Asset Acquisition and Network Provisioning roles and responsibilities that Vendor and VITA will perform.

Table 3. Asset Acquisition and Network Provisioning Services Roles and Responsibilities

Asset Acquisition and Network Provisioning Services Roles and Responsibilities	Vendor	VITA
1. Define networking requirements		X
2. Order and expedite Network Services that conform with VITA's architecture requirements	X	
3. Configure and test Network infrastructure prior to installation	X	
4. Document infrastructure configuration files and IP addressing schemas	X	
5. Approve Network provisioning requirements		X
6. Provide capacity planning assistance to develop Network resource requirements projections	X	
7. Coordinate ordering, procurement and inventory management of Network Services and associated infrastructure	X	
8. Manage the performance of Network Service and associated infrastructure providers to meet defined schedules, project plans, Service Levels, etc.	X	
9. Ensure that all new circuits, devices and software provisioned are included in configuration management system	X	

3.1.5 Network Operations and Administration

- a. Network Operations Services include activities, such as:
 - 1. Network systems management and troubleshooting (e.g. fault, performance, problem, change and capacity management);
 - 2. Bandwidth management;
 - 3. Protocol usage statistics (e.g. identify "top talkers" by protocol);
 - 4. Working with providers of Network Service and associated infrastructure to perform any operations activities (e.g. provisioning, problem management); and

5. Managing and maintaining all Data Network Services resources (e.g. hardware, System Software and Applications Software) that are required to provide the Services.
- b. Administration Services include activities, such as:
1. Manage Network configuration and devices, including IP addresses, DHCP and DNS; and
 2. Physical (e.g. equipment) and logical (e.g. IP address change) IMACs.

The following table identifies the Network Operations and Administration roles and responsibilities that Vendor and VITA will perform.

Table 4. Network Operations and Administration Roles and Responsibilities

Network Operations and Administration Roles and Responsibilities	Vendor	VITA
1. Provide Network Services and associated infrastructure for all Eligible Customers	X	
2. Develop and document Network administration requirements, in accordance with the Procedures Manual	X	
3. Develop and document procedures for administration that meet requirements and adhere to defined policies and procedures, in accordance with the Procedures Manual	X	
4. Approve Network Operations and Administration policies and procedures		X
5. Perform day-to-day Network Operations and Administration activities	X	
6. Manage all Network devices in accordance with VITA and Commonwealth policies	X	
7. Maintain Network Services and associated infrastructure configurations	X	
8. Manage accounts as needed for access and maintaining Network resources (e.g. logon End-User-id and password maintenance)	X	
9. Maintain and provide audit information including access, general logs, application logs in accordance with VITA and Commonwealth policies	X	
10. Ensure that Network Administration activities are coordinated through defined Change Management processes	X	
11. Provide on-site staff at Eligible Customer facilities as necessary to perform maintenance, Incident and Problem resolution activities	X	
12. Coordinate resolution of Network Service and associated infrastructure problems with Network Service providers and Eligible Customers.	X	

3.1.6 Network Monitoring and Reporting

The following table identifies the Network Monitoring and Reporting roles and responsibilities that Vendor and VITA will perform.

Table 5. Network Monitoring and Reporting Roles and Responsibilities

Network Monitoring and Reporting Roles and Responsibilities	Vendor	VITA
1. Develop and document requirements and policies for Network Monitoring and Reporting, in accordance with the Procedures Manual	X	
2. Approve requirements and policies for Network Monitoring and Reporting		X
3. Approve Network Monitoring and Reporting procedures		X
4. Provide and implement tools for monitoring performance, capacity and availability of Network devices and traffic	X	
5. Implement measures for proactive monitoring and self-healing capabilities to prevent Service interruptions	X	
6. Monitor and report the Network Service Levels	X	
7. Identify and report on the resolution of Network Problems in accordance with Incident and Problem Management Services, policies, procedures and Service Levels	X	

3.1.7 Documentation

The following are required document types that are specific to this SOW:

- a. Network System specifications and topologies (e.g., router configurations, firewall policies, routing diagrams/IP addressing tables, hardware/software listings (including a service history))
- b. Detailed circuit location information (e.g. circuit ID including LEC access ID, location, speed)
- c. “As-built” documentation for all Network devices (including firewalls) that are deployed in development, test, QA, production or other technical environments

The following table identifies the Documentation roles and responsibilities that Vendor and VITA will perform.

Table 6. Documentation Roles and Responsibilities

Documentation Roles and Responsibilities	Vendor	VITA
1. Recommend documentation requirements	X	
2. Approve recommended documentation requirements		X
3. Maintain documentation in an electronic format	X	
4. Enable VITA access to documentation contained within electronic format	X	
5. Provide documentation as required by VITA	X	

3.2 Exclusions

The following items are specifically excluded from this SOW:

NONE

3.3 Service Specific Milestones

Milestones specific to the deployment of Data Network Services are listed in the following:

Milestone Description	Milestone Date
TBD – Vendor to provide this as part of its Transition Plan	

4.0 Service Management

4.1 Objectives

A key objective of this Agreement is to attain Service Levels with Performance Credits where business is impacted through failure to meet significant mission critical Systems or Services, Critical Milestones or objectives, or when Service performance requirements are not met. Service Levels are detailed in the following sections and those associated with Performance Credits are identified in Schedule 3.12 (Service Level Methodology) of the Agreement.

Vendor shall provide written reports to VITA regarding Vendor’s compliance with the Service Levels specified in this SOW.

4.2 Definitions

Appendix 10 (SOW Definitions) to Schedule 3.3 (Statements of Work) of the Agreement provides a list of terms that apply to this SOW and the following Service Levels.

4.3 Service Level Requirements

The following minimum Service Levels are required commencing on the Service Commencement Date. Vendor must consistently meet or exceed the following Service Levels. The Service Level methodology and the identification of Service Levels associated with Performance Credits are detailed in Schedule 3.12 (Service Level Methodology) of the Agreement. **All times referenced are in Eastern Time.**

NOTE: Vendor must provide recommended Minimum Performance % for each Service Level type identified in the Tables below.

Table 7. Network Availability Service Levels

DEFINITION	<p>Network Availability is defined as the time during which the Network is fully functioning as specified below and normal business operations can be carried out with no data loss, downtime, or performance degradation.</p> <p>All performance criteria are to be measured on a <i>per circuit and component basis</i> – criteria is <i>not</i> to be aggregated and averaged for all circuits and Network components.</p>
PRE-SCHEDULED DOWNTIME REQUIREMENTS	<p>All pre-scheduled Network downtime (i.e. maintenance), unless otherwise agreed upon in advance by VITA, will occur:</p> <ul style="list-style-type: none"> • For the Systems with 24x7x365 requirements—all pre-scheduled Network maintenance shall be performed based on VITA’s Change Management policy • For Systems having non-24x7x365 requirements—pre-scheduled Network maintenance shall be performed outside of the normal System availability timeframe

Network Availability Service Level Requirements			
Service Type	Service Measure	Performance Target	Minimum Performance %
Circuit —Critical Locations	Availability	Sun-Sat, 0000-2400	
Circuit —Standard Locations	Availability	Mon-Fri, 0700-1900	
Internet Access	Availability	Sun-Sat, 0000-2400	
Router - Critical Locations	Availability	Sun-Sat, 0000-2400	
Router – Standard Locations	Availability	Mon-Fri, 0700-1900	
LAN Switch —Critical	Availability	Sun-Sat, 0000-2400	
LAN Switch—Standard	Availability	Mon-Fri, 0700-1900	
VPN – Remote End-User connection	Availability	Sun-Sat, 0000-2400	
VPN – Branch-to-Branch connection	Availability	Sun-Sat, 0000-2400	
Remote Access – Analog / ISDN Dial	Availability	Sun-Sat, 0000-2400	
Firewall – Critical	Availability	Sun-Sat, 0000-2400	
Firewall – Standard	Availability	Mon-Fri, 0700-1900	
IDS	Availability	Sun-Sat, 0000-2400	
	Formula	Availability (%) = 100% - Unavailability (%) Where Unavailability is defined as: $(\sum \text{Outage Duration} \times 100\%) \div (\text{Schedule Time} - \text{Planned Outage})$	
	Measurement Interval	Monitor Continuously, Measure Monthly, Report Monthly	
	Measurement Tool	TBD	

Table 8. Network Performance Service Levels

DEFINITION	<p>Network Performance includes the ability of the Network components to deliver data timely and accurately.</p> <p>All performance criteria are to be measured on a per circuit and component basis– criteria is not to be aggregated and averaged for all circuits and Network components. Maximum packet size is 128 bytes.</p>
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Network Performance Service Level Requirements			
Performance Type Per Circuit	Service Measure	Performance Target	Minimum Performance %

Network Performance Service Level Requirements			
Performance Type Per Circuit	Service Measure	Performance Target	Minimum Performance %
Network Transit Delay	Elapsed Time – round trip transit delay from ingress and egress ports on End-User Devices.	120 ms	
Packet Delivery Loss	Successful packet transmission	data loss \leq 0.05%	
Jitter (Real-Time Classes of Service)	Variation in timing, or time of arrival, of received packets.	10 ms	
	Formula – Transit Delay	NTD = $t_2 - t_1$ Where: t1 is the time when a packet leaves the ingress premise, and t2 is the times when the packet arrives at the egress premise	
	Formula – Packet Delivery	Packet Delivery Loss = 1 minus PD Where: "PD" = Packets delivered/ packets sent.	
	Formula – Jitter	$J = \Delta T_i - \Delta T_i'$ For two consecutive packets i and i+1: T_i = time 1 st byte of packet i is received by the destination port (ingress time) T_{i+1} = time 1 st byte of packet i+1 is received by the destination port (ingress time) T_i' = time 1 st byte of packet i is sent by the source port (egress time) T_{i+1}' = time 1 st byte of packet i+1 is sent by the source port (egress time) and $\Delta T_i = T_{i+1} - T_i$ (ΔT_i is the time interval between packets at ingress) $\Delta T_i' = T_{i+1}' - T_i'$ ($\Delta T_i'$ is the time interval between packets at egress)	
	Measurement Interval	Monitor Continuously, Measure Monthly, Report Monthly	
	Measurement Tool	TBD	

Table 9. Network Administration Services Service Levels

DEFINITION	Routers and circuits to be managed proactively using either product-specific or proprietary Network monitoring and management tools. Measurement for these Network components is a 24x7x365 requirement. Pre-scheduled maintenance shall be performed according to the published maintenance window schedule, with the ability to reschedule based on Network Availability requirements from the various Eligible Customers.
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Network Administration Services Service Level Requirements			
Administration Task	Service Measure	Performance Target	Minimum Performance %
Network Service capacity reallocation or change	Proactive monitoring and preemptive intervention to advise VITA of need to increase or reduce capacity.	Increase = Sustained avg. daily utilization reaches 65% of installed capacity Reduce = Sustained avg. daily utilization goes below 25% of installed capacity	
IMAC— service addition or change as scheduled under Change Control process	Elapsed Time	Refer to Addendum 7, Table C-2 Install/disconnect intervals for data services in MCI contract	
Notification of Priority 1 outage to Help Desk	Elapsed Time	≤ 10 minutes of discovery	
Notification of Priority 2 and 3 outage to Help Desk	Elapsed Time	≤ 20 minutes of discovery	
Notification of vendor software upgrades and new releases	Response Time	Within 30 days after software vendor announcement	
Implementation of version or major release updates	Response Time	Within 120 days after approved by VITA. Approvals are agreed upon as outlined in the Procedures Manual.	
	Formula	Transactions completed within Performance Target / Total Transactions	
	Measurement Interval	Monitor Continuously, Measure Monthly, Report Monthly	
	Measurement Tool	TBD	

4.4 Reports

The Vendor will provide written reports to VITA regarding Vendor’s compliance with the Service Levels specified in Section 4.3. In addition, the following reports are required:

Table 10. Network Service Reports

Report Description	Timing
TBD– Example reports to be provided by Vendor as part of its response	

5.0 Referenced SOW Addenda

SOW Addenda	Description
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APPENDIX 8 TO SCHEDULE 3.3 TO THE COMPREHENSIVE INFRASTRUCTURE AGREEMENT
DATA NETWORK SERVICES SOW

SOW Addenda	Description
Addendum 1	Network Hardware
Addendum 2	Network Software
Addendum 3	Network Circuits
Addendum 4	Network (Logical) Topology
Addendum 5	VITA Specified Commonwealth Facilities
Addendum 6	Eligible Customers currently using Data Network Services