From: WVNET
837 Chestnut Ridge Road
Morgantown WV 26505

To: Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130
Charleston, WV 25305-0130

Sealed Proposal Buyer: Krista Ferrell

Solicitation No: ISCN0035

Proposal Opening Date: October 9, 2012

Proposal Opening Time: 1:30 pm

Fax Number: (304) 293-5540

West Virginia NETWORK

Enhancing Education through Technology

Proposal For:

REQUEST FOR INFORMATION # ISCN0035

ENHANCEMENTS FOR
BROADBAND TECHNOLOGY OPPORTUNITES PROJECT ("BTOP")

"GENI Racks Solution"

WEST VIRGINIA
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION

WVNET

837 Chestnut Ridge Road
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October 5, 2012

Krista Ferrell, Buyer Supervisor
Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130
Charleston, WV 25305-0130

Re: Request for Information # ISCN0035 – Broadband Enhancements

Dear Ms. Ferrell:

West Virginia Network (WVNET) is pleased to respond to the West Virginia's Request for Information #ISCN0035 – Broadband Enhancements.

Founded in 1975, WVNET has evolved to address changing needs of West Virginia's IT community. WVNET's vision is to be a nationally recognized statewide infrastructure, providing worldwide connectivity through Internet2 tie-ins.

Today, WVNET has formed partnerships with the Three Rivers Optical Exchange ("*3ROX*"), Ohio Academic Resources Network ("OARnet"), the Quilt and Internet2. We believe these strong relationships enable us to pursue opportunities to enhance our network.

WVNET looks forward to working with you on this project. Should you have any questions, concerns or request for additional information, please do not hesitate to contact Barbara Long, Proposal Manager at 304-293-5192 ext 274, blong@mail.wvnet.edu

Thank you.

Judge Dan O'Hanlon
Director
WVNET

Table of Contents

INTRODUCTION

Executive Summary

WVNET is pursuing additional BTOP funding via this request in order to expand our existing data center to accommodate enhanced connectivity to Internet2.

In order to provide the ability to bring together higher education, research facilities, K12, and other WV state agencies, WVNET needs to build 3 GENI Racks. GENI (Global Environment for Network Innovations) Racks are a series of components (Servers, Networking, and Storage) that deliver a flexible virtual networking topology solution that incorporates OpenFlow which delivers a powerful platform for multi-site cloud applications, leveraging Software Defined Networking (SDN). These racks are typically deployed as an integrated part of a campus network which is in line with WVNET's core business competency as the Service Provider (SP) and Internet2 Connector for the State of West Virginia.

All GENI Racks have Layer 3 connections to the internet and Layer 2 connections to the GENI core networks (currently NLR and Internet2). The racks use commodity Internet for control access to rack resources, and shared VLANS for the application and experiment data connections. The racks may also use Layer 3 Internet connections for some experiments, particularly IP cloud experiments. The concept of GENI is based on an extended Infrastructure-as-a-Service (IaaS) cloud model with coordinated provisioning across multiple sites and a high degree of control over intra- and inter-site networking functions. Most researchers will use a standard cloud computing stack to instantiate and manage virtual machines.

WVNET has GENI Bill of Materials from Cisco, which leverages not only WVNET's existing network and data center, but most of the existing State of West Virginia's network funded previously by BTOP. Leveraging the existing network provides the opportunity to rapidly move to deploying critical and transformative applications such as Distance Education, Workforce Development Training, and TeleHealth. These applications create successful use cases for the BTOP network, and will move West Virginia's areas of critical need forward at a more rapid pace.

West Virginia Department of Administration, Purchasing Division Guidelines

This document was formatted based on guidelines provided by the West Virginia Department of Administration, Purchasing Division Guidelines.

- See Addendum 2 – Signed Solicitation Form by WVNET's Deputy Director
- See Addendum 3 - RFI Number # ISCN0035

WVNET GOALS AND OBJECTIVES

WVNET and the Next Generation of the Internet

Business Goals and Objectives

WVNET's goals and objectives for this project are to expand the capability of the network and chart new territory by getting GENI-enabled.

- Advance the frontiers of science and engineering
- Provide access to unique expertise, facilities, phenomena and data
- Build and strengthen effective collaborations, networks and institutional partnerships
- Leverage resources

WVNET Challenge

The Global Environment for Network Innovations — GENI — is a suite of research infrastructure rapidly taking shape in prototype form across the United States. It is sponsored by the National Science Foundation, with the goal of providing a national testbed for exploring the networks of the future.

GENI supports the US Ignite initiative[1] that seeks to lead the development of virtualized, ultra-fast broadband networks and "ignite" the expansion of next-generation Internet services for societal benefit.

The purpose of US Ignite and GENI is to provide increased flexibility and utilization of the Internet in key areas such as education, medicine, engineering, manufacturing, energy and public safety.

For WVNET to participate in GENI, it must be "GENI-enabled." Being GENI-enabled means installing GENI racks so that our clients can take advantage of new software defined networks for application development efforts.

INTRODUCTION TO GENI RACKS

GENI Racks Essentials

GENI Racks extend broadband networking capability in BTOP networks in at least the following ways:

1. GENI Racks contain one or more OpenFlow switches. OpenFlow is a new protocol which will extend the life of the BTOP network, permit greater flexibility in routing, performs end-to-end optimization, isolate sensitive traffic, and reduce the cost of switching dramatically as speeds increase in the future.

2. GENI Racks contain one or more virtual processors and storage used to provide:
   a. More responsive network services on the BTOP network by cutting out latency and hop counts

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[1] http://us-ignite.org

b. Hyper-local content caching to offload backbone traffic and extend the effective capacity of the BTOP network
c. On-the-fly transcoding of information (e.g. converting high-def video to cell-phone video over WiFi), again to extend the effective capacity of the BTOP network
d. More granular network monitoring and management capabilities to help pinpoint any network problems

GENI Racks are all about future-proofing the BTOP network, extending its effective capacity, and allowing it to run emerging and future protocols.

GENI Racks Benefits

According to the US Ignite Initiative*, GENI Racks will provide these key benefits:

- Enable direct manipulation of applications over the local network
- Cost-effective virtualization of public-benefit applications
- Enable responsive evaluation of complex models, such as AutoCAD
- Home users can work with "big data" models without expensive scientific workstations
- Platform for integrating big data from local sensors (such as multiple video feeds) to make more informed decisions (e.g. transportation signals; emergency evaluation and response)
- Improved application response time
- Lower upstream ISP costs
- Local cloud resources are likely to be unaffected by natural disasters
- Cost effective way of provisioning public services

US Ignite is an initiative to promote US leadership in developing applications and services for ultra-fast broadband and software-defined networks. It will foster the creation of novel applications and digital experiences that will transform healthcare, education and job skills training, public safety, energy, and advanced manufacturing. By serving as a coordinator and incubator of this ecosystem, US Ignite will accelerate the adoption of next-generation networks.

Projected Budget

The projected budget for this project is **$3,721,365.59**

GENI Racks List of Materials Pricing

Exhibit 1 outlines the technical components of the Cisco GENI Rack Configuration.

Exhibit 2 details the Bill of Materials pricing for one GENI Rack. This quote was obtained from Cisco. Please note that we are requesting funding for 3 (three) GENI Racks. Plus, the N7K and 1 PK has been added for $360,135.00. The total for this quote is: $1,611,990.

Pricing of GENI Racks	Per Unit	Total
Configuration of a GENI Rack	$417,285	3 racks - $1,251,855
– N7K - Cisco Nexus 7000 Switch – 1 PK Cisco Open Network Environment programming kit		$360,135.00
		Materials Total: $1,611,990

GENI Racks Storage Pricing

Exhibit 3 details pricing of the storage component of the GENI Rack configuration outlined in Exhibit 1. This quote was obtained from NetApp.

Pricing of Storage for GENI Racks - Configuration	Details	Total
Configuration of storage for 3 GENI Racks	Price quoted includes both hardware and services	Total: $1,778,775.59

Training Credits for GENI Racks Configuration

For the successful installation/implementation of the GENI Rack configuration (3 GENI Racks), training credits have been projected at $200,000.

Training Credits	Total
Training Credits necessary for the implementation of 3 GENI Racks	Total: $200,000.00

Professional Services for GENI Racks Configuration

For the successful installation/implementation of the GENI Rack configuration (3 GENI Racks), professional services have been projected at $130,600.

Professional Services	Total
Professional Services necessary for the installation/implementation of GENI Racks	Total: $130,600.00

Budget Summary

Cisco Hardware Quote: $1,611,990.00
NetApp Storage Quote: $1,778,775.59
Training Credits: $200,000.00
Professional Services: $130,600.00
Total for the GENI Rack RFI Application:.. $3,721,365.59

Cisco B200 UCS Service Technical Data Sheet

The Cisco® Unified Computing System™ (Cisco UCS™) combines Cisco UCS B-Series Blade Servers and C-Series Rack Servers with networking and storage access in a single converged system that simplifies management and delivers greater cost efficiency and agility with increased visibility and control. The latest server expansion of the Cisco UCS portfolio includes the new Cisco UCS B200 M3 Blade Server along with the new Cisco UCS C220 M3 Rack Server (one rack unit [1RU]) and Cisco UCS C240 M3 Rack Server (2RU). These three new servers increase compute density through more cores and cache balanced with more memory capacity and drives and with faster I/O. Together these server improvements and complementary Cisco UCS system advancements deliver the best combination of features and cost efficiency to support IT's diverse needs.

The Cisco UCS B200 M3 Blade Server delivers performance, versatility, and density without compromise. It addresses the broadest set of workloads, from IT and web infrastructure, through distributed database. Building on the success of the Cisco UCS B200 M2 Blade Server, the enterprise-class Cisco UCS B200 M3 Blade Server further extends the capabilities of the Cisco UCS portfolio in a half-width blade form factor. The Cisco UCS B200 M3 harnesses the power of the latest Intel® Xeon® processor E5-2600 product family, with up to 768 GB of RAM (using 32-GB DIMMs), two disk drives, and up to dual 4x 10 Gigabit Ethernet throughput. In addition, Cisco UCS has the architectural advantage of not having to power and cool excess switches in each blade chassis. With a larger power budget per blade server, Cisco can design uncompromised expandability and capabilities in its blade servers, as evidenced by the new Cisco UCS B200 M3, with its leading memory slot and drive capacity.

The Cisco UCS B200 M3 provides:

- Two, multi-core, Intel® Xeon® processor E5-2600 product family CPUs, for up to 16 processing cores
- 24 DIMM slots for industry-standard double-data-rate 3 (DDR3) memory running up to 1600 MHz and up to 768 GB of total memory (using 32-GB DIMMs)
- Two optional, hot-pluggable SAS or SATA hard disk drives (HDDs) or solid-state drives (SSDs)
- Remote management through a Cisco Integrated Management Controller (CIMC) that implements policy established in Cisco UCS Manager
- Out-of-band access by remote keyboard, video, and mouse (KVM) device, Secure Shell (SSH) Protocol, and virtual media (vMedia) as well as the Intelligent Platform Management Interface (IPMI)

In addition, the Cisco UCS B200 M3 is a half-width blade. Up to eight of these high-density, two-socket blade servers can reside in the 6RU Cisco UCS 5108 Blade Server Chassis, offering one of the highest densities of servers per rack unit in the industry.

Another Cisco innovation, the Cisco UCS Virtual Interface Card (VIC) 1240 is a 4-port 10 Gigabit Ethernet, Fibre Channel over Ethernet (FCoE)-capable modular LAN on motherboard (LOM) designed exclusively for the M3 generation of Cisco UCS B-Series Blade Servers. When used in combination with an optional I/O expander, the Cisco UCS VIC 1240 capabilities can be expanded up to eight ports of 10 Gigabit Ethernet. The Cisco UCS VIC 1240 enables a policy-based, stateless, agile server infrastructure that can present up to 256 PCI Express (PCIe) standards-compliant interfaces to the host that can be dynamically configured as either network interface cards (NICs) or host bus adapters (HBAs). In addition, the Cisco UCS VIC 1240 supports Cisco® Data Center Virtual Machine Fabric Extender (VM-FEX) technology, which extends the Cisco UCS fabric interconnect ports to virtual machines, simplifying server virtualization deployment.

Exhibit 2: Bill of Materials Pricing for One GENI Rack

Line Number	Item Name	Description	Service Duration	Lead Time	Included Item	Quantity	ListPrice	Extended ListPrice	Discount %	Selling Price
1.0	N20-Z0001	Cisco Unified Computing System	N/A	10 days	No	1	0.00	0.00	0	0.00
1.1	N20-C6508	UCS 5108 Blade Svr AC Chassis/0 PSU/8 fans/0 fabric extender	N/A	10 days	No	1	5,999.00	5,999.00	0	5,999.00
1.1.0.1	CON-OSP-2C6508	ONSITE 24X7X4 5108 Blade Server Chassis	12 month(s)	N/A	No	1	217.00	217.00	0	217.00
1.1.1	UCSB-B200-M3	UCS B200 M3 Blade Server w/o CPU, memory, HDD, mLOM/mezz	N/A	10 days	No	8	3,154.00	25,232.00	0	25,232.00
1.1.1.0.1	CON-OSP-B200M3	ONSITE 24X7X4 UCS B200 M3 Blade Se	12 month(s)	N/A	No	8	256.00	2,048.00	0	2,048.00
1.1.3	UCS-CPU-E5-2690	2.90 GHz E5-2690/135W 8C/20MB Cache/DDR3 1600MHz	N/A	10 days	No	16	6,103.00	97,648.00	0	97,648.00
1.1.4	UCS-MR-1X082RY-A	8GB DDR3-1600-MHz RDIMM/PC3-12800/dual rank/1.35v	N/A	10 days	No	192	359.00	68,928.00	0	68,928.00
1.1.5	UCS-HDD300GI2F105	300GB 6Gb SAS 15K RPM SFF HDD/hot plug/drive sled mounted	N/A	10 days	No	8	1,279.00	10,232.00	0	10,232.00
1.1.6	UCSB-MLOM-40G-01	Cisco UCS VIC 1240 modular LOM for M3 blade servers	N/A	10 days	No	8	1,499.00	11,992.00	0	11,992.00
1.1.7	N20-BBLKD	UCS 2.5 inch HDD blanking panel	N/A	10 days	Yes	8	0.00	0.00	0	0.00
1.1.8	UCSB-HS-01-EP	CPU Heat Sink for UCS B200 M3 and B420 M3	N/A	10 days	Yes	16	0.00	0.00	0	0.00
1.1.2	UCSB-PSU-2500ACPL	2500W Platinum AC Hot Plug Power Supply for UCS 5108 Chassis	N/A	10 days	No	4	936.00	3,744.00	0	3,744.00
1.1.9	CAB-C19-CBN	Cabinet Jumper Power Cord, 250 VAC 16A, C20-C19 Connectors	N/A	10 days	No	4	0.00	0.00	0	0.00
1.1.10	N20-I6584	UCS 2104XP Fabric Extender/4 external 10Gb ports	N/A	10 days	No	2	3,749.00	7,498.00	0	7,498.00
1.1.11	N01-UAC1	Single phase AC power module for UCS 5108	N/A	10 days	Yes	1	0.00	0.00	0	0.00
1.1.12	N20-CAK	Access. kit for 5108 Blade Chassis incl Railkit, KVM dongle	N/A	10 days	Yes	1	0.00	0.00	0	0.00
1.1.13	N20-FAN5	Fan module for UCS 5108	N/A	10 days	Yes	8	0.00	0.00	0	0.00
1.1.14	N20-FW010	UCS 5108 Blade Server Chassis FW package	N/A	10 days	No	1	0.00	0.00	0	0.00
1.2	N20-C6508	UCS 5108 Blade Svr AC Chassis/0 PSU/8 fans/0 fabric extender	N/A	10 days	No	1	5,999.00	5,999.00	0	5,999.00
1.2.0.1	CON-OSP-2C6508	ONSITE 24X7X4 5108 Blade Server Chassis	12 month(s)	N/A	No	1	217.00	217.00	0	217.00
1.2.1	UCSB-B200-M3	UCS B200 M3 Blade Server w/o CPU, memory, HDD, mLOM/mezz	N/A	10 days	No	2	3,154.00	6,308.00	0	6,308.00
1.2.1.0.1	CON-OSP-B200M3	ONSITE 24X7X4 UCS B200 M3 Blade Se	12 month(s)	N/A	No	3	256.00	768.00	0	768.00
1.2.4	UCS-CPU-E5-2690	2.90 GHz E5-2690/135W 8C/20MB Cache/DDR3 1600MHz	N/A	10 days	No	4	6,103.00	24,412.00	0	24,412.00
1.2.5	UCS-MR-1X082RY-A	8GB DDR3-1600-MHz RDIMM/PC3-12800/dual rank/1.35v	N/A	10 days	No	48	359.00	17,232.00	0	17,232.00
1.2.6	UCS-HDD300GI2F105	300GB 6Gb SAS 15K RPM SFF HDD/hot plug/drive sled mounted	N/A	10 days	No	2	1,279.00	2,558.00	0	2,558.00
1.2.7	UCSB-MLOM-40G-01	Cisco UCS VIC 1240 modular LOM for M3 blade servers	N/A	10 days	No	2	1,499.00	2,998.00	0	2,998.00
1.2.8	N20-BBLKD	UCS 2.5 inch HDD blanking panel	N/A	10 days	Yes	2	0.00	0.00	0	0.00
1.2.9	UCSB-HS-01-EP	CPU Heat Sink for UCS B200 M3 and B420 M3	N/A	10 days	Yes	4	0.00	0.00	0	0.00
1.2.2	UCSB-B200-M3	UCS B200 M3 Blade Server w/o CPU, memory, HDD, mLOM/mezz	N/A	10 days	No	1	3,154.00	3,154.00	0	3,154.00
1.2.10	UCS-CPU-E5-2690	2.90 GHz E5-2690/135W 8C/20MB Cache/DDR3 1600MHz	N/A	10 days	No	2	6,103.00	12,206.00	0	12,206.00
1.2.11	UCS-MR-1X041RY-A	4GB DDR3-1600-MHz RDIMM/PC3-12800/single rank/1.35v	N/A	10 days	No	6	275.00	1,650.00	0	1,650.00
1.2.12	UCS-HDD300GI2F105	300GB 6Gb SAS 15K RPM SFF HDD/hot plug/drive sled mounted	N/A	10 days	No	2	1,279.00	2,558.00	0	2,558.00
1.2.13	UCSB-MLOM-40G-01	Cisco UCS VIC 1240 modular LOM for M3 blade servers	N/A	10 days	No	1	1,499.00	1,499.00	0	1,499.00
1.2.14	UCSB-HS-01-EP	CPU Heat Sink for UCS B200 M3 and B420 M3	N/A	10 days	Yes	2	0.00	0.00	0	0.00
1.2.3	UCSB-PSU-2500ACPL	2500W Platinum AC Hot Plug Power Supply for UCS 5108 Chassis	N/A	10 days	No	4	936.00	3,744.00	0	3,744.00
1.2.15	CAB-C19-CBN	Cabinet Jumper Power Cord, 250 VAC 16A, C20-C19 Connectors	N/A	10 days	No	4	0.00	0.00	0	0.00
1.2.16	N20-I6584	UCS 2104XP Fabric Extender/4 external 10Gb ports	N/A	10 days	No	2	3,749.00	7,498.00	0	7,498.00
1.2.17	N01-UAC1	Single phase AC power module for UCS 5108	N/A	10 days	Yes	1	0.00	0.00	0	0.00
1.2.18	N20-CAK	Access. kit for 5108 Blade Chassis incl Railkit, KVM dongle	N/A	10 days	Yes	1	0.00	0.00	0	0.00
1.2.19	N20-CBLKB1	Blade slot blanking panel for UCS 5108/single slot	N/A	10 days	Yes	5	0.00	0.00	0	0.00
1.2.20	N20-FAN5	Fan module for UCS 5108	N/A	10 days	Yes	8	0.00	0.00	0	0.00
1.2.21	N20-FW010	UCS 5108 Blade Server Chassis FW package	N/A	10 days	No	1	0.00	0.00	0	0.00
1.3	UCS-FI-6248UP	UCS 6248UP 1RU Fabric Int/No PSU/32 UP/ 12p LIC	N/A	10 days	No	2	32,000.00	64,000.00	0	64,000.00
1.3.0.1	CON-OSP-FI6248UP	ONSITE 24X7X4 UCS 6248UP 1RU Fabrc Intercnnct/2 PSU/2	12 month(s)	N/A	No	2	803.00	1,606.00	0	1,606.00
1.3.1	SFP-10G-SR	10GBASE-SR SFP Module	N/A	14 days	No	8	1,495.00	11,960.00	0	11,960.00
1.3.2	SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	N/A	14 days	No	8	210.00	1,680.00	0	1,680.00
1.3.3	UCS-ACC-6248UP	UCS 6248UP Chassis Accessory Kit	N/A	10 days	No	2	0.00	0.00	0	0.00
1.3.4	UCS-PSU-6248UP-AC	UCS 6248UP Power Supply/100-240VAC	N/A	10 days	No	4	1,400.00	5,600.00	0	5,600.00
1.3.5	N10-MGT010	UCS Manager v2.0	N/A	10 days	No	2	0.00	0.00	0	0.00
1.3.6	CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 2 Meter Length	N/A	10 days	No	4	0.00	0.00	0	0.00
1.3.7	UCS-BLKE-6200	UCS 6200 Series Expansion Module Blank	N/A	10 days	Yes	2	0.00	0.00	0	0.00
1.3.8	UCS-FAN-6248UP	UCS 6248UP Fan Module	N/A	10 days	Yes	4	0.00	0.00	0	0.00
1.3.9	UCS-FI-DL2	UCS 6248 Layer 2 Daughter Card	N/A	10 days	Yes	2	0.00	0.00	0	0.00
								SubTotal		411,185.00
2.0	A03-D500GC3=	500GB 6Gb SATA 7.2K RPM SFF hot plug/drive sled mounted	N/A	10 days	No	10	610.00	6,100.00		6,100.00
								SubTotal		6,100.00
								Configset Total		417,285.00

N7K - Cisco Nexus 7000 Switch & 1 PK Cisco Open Network Environment programming kit

Total: $360,135.00 for GENI Rack Confirguation

Price Quotation   10150187

NetApp

Quote Name:	Quote for Wvnet - 10150187		
Quote Date:	Oct-05-2012	Quote Valid Until:	Nov-07-2012
Sales Rep Name:	McDaniel, Keith James	Phone:	804-935-8568
E-Mail:	kjm@netapp.com	Fax:	
Quote To:	Arrow Enterprise Computing Solutions Inc.	7459 S Lima St,Englewood,CO,80112,United States	
Quote From:	NetApp Inc.	495 E. Java Drive,Sunnyvale,CA,94089,United States	
End Customer:	Wvnet	Quote Status:	Configured
Incoterm:	EXW Olive Branch, MS	Payment Terms:	1% 10, NET 30
Contingency:	None		
Do Not Ship Before:			
Comments:			

FAS6210-R5
Hardware

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
FAS6210A-SAS-BASE-R6	FAS6210 HA System With SAS IO	2	$71,415.00	39.40	$86,554.98
X6212-R6-C	Chassis,62XX/SA620 2 CNTRL/EXP Slots,AC PS,-C	1	$0.00	0.00	$0.00
X870D-R6-C	Cab,DS448x,Empty,No PDU,No Rails,-C	1	$3,895.00	39.40	$2,360.37
X8712C-R6-C	PDU,1-Phase,12 Outlet,30A,NEMA,-C,R6	4	$550.00	39.40	$1,333.20
X1049B-R6-C	NIC 4-Port Copper GbE II PCIe,-C	2	$1,250.00	39.40	$1,515.00
X6561-R6-C	Cable,Ethernet,2m RJ45 CAT6,-C	4	$0.00	0.00	$0.00
X6560-R6-C	Cable,Ethernet,0.5m RJ45 CAT6,-C	8	$0.00	0.00	$0.00
X6558-R6-C	Cable,SAS Cntlr-Shelf/Shelf-Shelf/HA,2m,-C	8	$125.00	39.40	$606.00
X6557-R6-C	Cable,SAS Cntlr-Shelf/Shelf-Shelf/HA,0.5m,-C	6	$0.00	0.00	$0.00
X6553-R6-C	Cable,Cntlr-Shelf/Switch,2m,LC/LC,Op,-C	4	$125.00	39.40	$303.00
X877B-R6-C	Rail Kit II, Cab,-C,R6	6	$0.00	0.00	$0.00
X8773-R6-C	Mounting Bracket,Tie-Down,Multiple,-C,R6	1	$0.00	0.00	$0.00
X800-42U-R6-C	Cabinet Component Power Cable,-C,R6	12	$0.00	0.00	$0.00
DOC-62XX-C	Documents,62xx,-C	1	$0.00	0.00	$0.00
X1972A-R5-C	Flash Cache 1TB PCIe Module,-C	2	$98,000.00	39.40	$118,776.00
DS4243-0748-24A-R5-C	DSK SHLF,24x2.0TB,7.2K,-C	5	$74,047.00	39.40	$224,362.40

Software

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
SW-6210A-ONTAP8-C	SW,Data ONTAP Essentials,6210A,-C	2	$0.00	0.00	$0.00
SW-FLASH-CACHE-C	SW,Flash Cache,-C	2	$0.00	0.00	$0.00
SW-6210A-COMP-BNDL-C	SW,Complete BNDL,6210A,-C	2	$273,800.00	39.40	$331,845.60

All amounts are in USD

Services

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
CS-O2-4HR	SupportEdge Premium 4hr Onsite **Service Address:** 837 Chestnut Ridge Rd Morgantown 26505 WV **Service Duration:** 36 Months	1	$350,486.79	25.40	$261,463.15

DS4243-R5
Hardware

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
X800E-R6	Power Cable North America,R6	2	$0.00	0.00	$0.00
X5526A-R6	Rackmount Kit,4-Post,Universal,R6	1	$100.00	39.40	$60.60
DS4243-SL01-12A-QS-R5	SSD SHLF,12x100GB,QS	1	$79,056.00	39.40	$47,907.94

Services

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
CS-O2-4HR	SupportEdge Premium 4hr Onsite **Service Address:** 837 Chestnut Ridge Rd Morgantown 26505 WV **Service Duration:** 36 Months	1	$350,486.79	25.40	$261,463.15

DS4243-R5
Hardware

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price
X800E-R6	Power Cable North America,R6	2	$0.00	0.00	$0.00
X5526A-R6	Rackmount Kit,4-Post,Universal,R6	1	$100.00	39.40	$60.60
DS4243-SL01-12A-QS-R5	SSD SHLF,12x100GB,QS	1	$79,056.00	39.40	$47,907.94

Services

Part Number	Product Description	Ext. Qty	List Price	Disc%	Ext. Net Price

All amounts are in USD

Price Quotation   10150187

NetApp

| Quote Date: | Oct-05-2012 | | | | Quote Valid Until: | Nov-07-2012 | |

Part Number	Product Description	Ext. Qty	List Price			Disc%	Ext. Net Price
CS-O2-4HR	SupportEdge Premium 4hr Onsite **Service Address:** 837 Chestnut Ridge Rd Morgantown 26505 WV **Service Duration:** 36 Months	1	$11,512.21			25.40	$8,588.11

| **Grand Total:** | | | **$1,778,775.59** | | | **$1,131,025.10** | |

Terms and Conditions

No variations to a quote shall be effective unless approved in writing by NetApp and any PVR requires prior written approval by NetApp. Amounts quoted are before all applicable local transaction taxes.
For US sales: Applicable sales tax will be charged to shipments in the United States unless a valid certificate of tax is submitted to and accepted by NetApp.
For International sales: Applicable VAT, GST, consumption tax, or other transaction tax will be charged to international sales.

This price quotation is valid until the expiration date identified above. Orders submitted hereunder are subject to NetApp's Standard Terms and Conditions published at: www.netapp.com/us/how-to-buy/stc.html, unless a written agreement governing purchasing between the parties for the applicable products and/or services listed above is otherwise current and valid. Additional or conflicting terms or conditions included on or within any purchase order or similar purchase authorization submitted by purchaser shall have no force or effect and NetApp's acknowledgment of an order, commencement of performance, delivery of product or other conduct shall not be deemed or constitute acceptance of any additional or different terms and conditions in any manner whatsoever.

SUMMARY

Looking Forward

This project is high reward; it proposes a strategy for enhancing connectivity to Internet2.

The broader impacts of this project are considerable. Campuses across the state will have access to this GENI Rack technology, allowing their researchers to carry out experiments not possible anywhere else on the globe. There is great potential for new technologies of significant scientific and societal importance to be developed. The students on these campuses will be able to 'live in the future' taking computer science and engineering courses that require use of the GENI Rack technology to build distributed cloud systems, new security architectures, or large-scale applications, for example.

WVNET OVERVIEW

WVNET is the **West Virginia Network**, a dynamic service organization providing telecommunications and computing services within West Virginia. WVNET was created in 1975 to provide central computing facilities and wide-area network communications linking its "central site" computing resources in Morgantown with the campus computing systems at most of the colleges and universities throughout the state. We have since grown to provide services for K-12 schools, government and non-profit agencies.

> *"WVNET was the first statewide research & education network in the nation"*
> *David Lambert, I2 CEO*

Our driving principles are to:

- Improve Quality of Service to WVNET constituents.
- Facilitate enhanced collaboration capabilities between WVNET and WVNET constituents such as video conferencing point-to-point and multipoint in meetings and distance learning.
- Enhance West Virginia's access to national networks such as Internet2 and NLR that will provide unprecedented opportunity for our Colleges, Universities and K-12.
- Provide high levels of data security.

Read more about WVNET's history at: www.wvnet.edu

To learn about our present and future, see our new *Partnerships* below.

WVNET's Partnership with Internet2

In 2011, WVNET began its partnership with **Internet2**, the foremost U.S. advanced networking consortium led by the research and higher education community, as a research and education member. Internet2 networking is an incredibly exciting tool for researchers, technologists and many others interested in developing new technologies, policies and business models for the next generation. WVNET's membership reflects the organization's ongoing commitment to the help fuel the next phase of Internet development within the state.

About Internet 2

Led by more than 200 U.S. universities working with industry and government, Internet2 develops and deploys advanced network applications and technologies for research and higher education, accelerating the creation of tomorrow's Internet. Internet2 recreates the partnerships among academia, industry, and government that helped foster today's Internet in its infancy. For more information, visit: http://www.internet2.edu

WVNET Joins The Quilt

On July 13, 2012 – **The Quilt**, the national coalition of advanced regional networks for research and education, welcomed the West Virginia Network (WVNET) as its newest member. WVNET joins 29 other regional and state networks from around the country participating in The Quilt.

"WVNET views The Quilt as the best national forum for the exchange of ideas between regional education networks," according to Dan O'Hanlon, director, WVNET. "As a Quilt member, WVNET will be able to more effectively join with other education networks in shaping the evolution of networks to enhance the service that all of us are able to provide to our constituents."

"…WNET is highly regarded, not only for its research and education networking leadership in its respective geography, but also for its contributions to economic development and public service," said Jen Leasure, president and CEO, The Quilt. "We are thrilled to have WVNET join The Quilt and look forward to a long and productive collaboration towards our shared goals."

About The Quilt

The Quilt is the national coalition of advanced regional networks for research and education, representing 29 networks across the country. Participants in The Quilt provide advanced network services and applications to over 200 universities and thousands of other educational institutions. Please visit www.thequilt.net to learn more about The Quilt.

WVNET's Partnership with 3ROX

In June 2012, WVNET joined the **Three Rivers Optical Exchange (3ROX)**, the high-performance Internet hub operated and managed by the Pittsburgh Supercomputing Center (PSC), giving our clients a significant bandwidth upgrade as well as access to expanded research and education resources.

At the same time, 3ROX upgraded the link between PSC and West Virginia University (WVU). This new

"This is big win for West Virginia we're now able to collaborate with people who are involved in supercomputing and have world-class experience in running a research and education network."

Dan O'Hanlon, director of WVNET

3ROX link to WVU increased bandwidth 64-fold — from 155 megabits per second (Mbps) to 10 gibabits per second (Gbps). "This is a big step forward for research and education connectivity to WVU," says Wendy Huntoon, PSC director of networking. The upgrade enhances support for clean-energy related research at the National Energy Technology Laboratory (NETL), a U.S. Department of Energy national laboratory with campuses in Morgantown and Pittsburgh. NETL researchers use the 3ROX link to access supercomputing resources at PSC.

By joining as a participant in 3ROX, WVNET upgrades connectivity from West Virginia K-20 schools to research and education networks such as Internet2 — from eight 155 Mbps links (aggregating to about five Gbps) to two 10 Gbps connections (one from Morgantown and another from Huntington).

Among other education and government facilities, the upgraded WVNET bandwidth will link the National Radio Astronomy Observatory (NRAO) facility in Greenbank, West Virginia, with WVU and the WVU Astrophysics program. From WVU, the 3ROX/WVU high-bandwidth link will then connect NRAO Greenbank with the global astronomy community.

"PCS's partnership with WVU, WVNET and Federal Research Facilities is transforming West Virginia's Internet landscape"

Wendy Huntoon, PSC director of networking

The catalyst for the collaboration and the upgrades, says Huntoon, was the 10 Gbps connection that 3ROX provided last year for the National Oceanic and Atmospheric Administration (NOAA) Environmental Security Computing Center in Fairmont, West Virginia. "The NOAA grant was stimulus funding," says Huntoon, "and because we had infrastructure in place, we've been able to provide these expanded services very competitively from a cost perspective. We formed an effective partnership with WVNET, WVU, NETL and NOAA and these upgrades — to a total of 40 Gbps within a year — transform the West Virginia Internet landscape."

About the Three Rivers Optical Exchange

Three Rivers Optical Exchange (3ROX) is a regional network aggregation point providing high speed commodity and research network access to sites in western and central Pennsylvania. The primary focus for the Exchange staff is providing cost effective, high capacity, state-of-the-art network connectivity to the university community. They also provide well defined network services to both community (K-12, government) and commercial entities in western Pennsylvania. For more information about 3ROX visit: http://www.psc.edu/networking

Addendum 1: GENI Project Director's Letter of Support

October 6, 2012

Subject: Letter of support for the West Virginia Network (WVNET) proposal

On behalf of the GENI Project Office (GPO), I am writing to support the West Virginia Network (WVNET) proposal that will enable universities and colleges in West Virginia to participate in the United States GENI project.

GENI is a new, nationwide suite of infrastructure supporting "at scale" research in networking, distributed systems, security, and novel applications. It is supported by the National Science Foundation, and available without charge for research and classroom use.

GENI is currently being built out through more than 40 university campuses across the United States, ranging from Stanford and the University of Washington on the west coast, through the Universities of Illinois, Wisconsin, and Houston in the central states, through Georgia Tech and Princeton on the east coast. It also encompasses a growing number of regional research networks, including CENIC, LEARN, OARNET, NYSERNET, and MERIT, as well as Internet2 and National LambdaRail.

By acquiring GENI racks and OpenFlow-capable switches, WVNET will be strongly positioned for enabling colleges and universities in West Virginia to participate in the GENI project, and join in the community of advanced computer science researchers who are building and using GENI for their research and classroom teaching.

I give my full support to the WVNET proposal, as I am confident that the project activities will provide added value to both the West Virginia academic community and to participants across the United States in the nationwide GENI project. If WVNET's proposal is funded, the GENI Project Office engineering staff will work closely with WVNET staff to ensure that West Virginia is fully integrated into the nationwide GENI system and academic community.

Sincerely,

Chip Elliott

GENI Project Director

Addendum 2: Signed Solicitation Form

Addendum 3: RFI Number ISCN0035 – IS&C Number 2012-073

TABLE OF CONTENTS:

1. Table of Contents
2. Section One: General Information
3. Section Two: Instructions to Vendors Submitting Proposals
4. Section Three: Project Specifications
5. Section Four: Terms and Conditions
6. Certification and Signature Page

SECTION ONE: GENERAL INFORMATION

1. PURPOSE: The Acquisition and Contract Administration Section of the Purchasing Division ("Purchasing Division") is soliciting proposals through a Request for Information ("RFI") that will allow the WV Office of Technology ("Agency"), to quickly identify additional enhancements or projects that can be added to the Broadband Technology Opportunities Project ("BTOP") stimulus grant, subject to NTIA approval, that must be completed by January 31, 2013.   Procurement of goods and services will not occur through this RFI, but identified proposals may be used to assist in developing additional solicitations to procure the needed goods and services.

2. PROJECT: The State of WV received authorization from the National Telecommunications Information Administration (NTIA) to proceed with the build out associated with the Broadband Technology Opportunities Project (BTOP) stimulus grant to be completed by the end of January 2013. The purpose of the grant is to:

    a.   Provide improved access to broadband service to consumers residing in underserved areas of the State of West Virginia;

    b.   Provide broadband education, awareness, training, access, equipment and support to: Schools, health care, public safety, libraries, court houses, jails and other community support organizations by or through these organizations:

          1.   Organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by low-income, unemployed, aged, and otherwise vulnerable populations.

          2.   Strategic facilities designed to create employment opportunities, within a State designated economic zone, Economic Development District designated by the Department of Commerce, Renewal Community, or Empowerment Zone designated by the Department of Housing and Urban Development, or Enterprise Community designated by the Department of Agriculture.

    c.   Provide improved access to, and use of, broadband service by public safety agencies;

    d.   Stimulate the demand for broadband, economic growth and job creation.

The mission or purpose of this RFI is to seek project proposals to provide and implement broadband projects that fit within the scope and further the BTOP grant purposes outlined above, by utilizing funds awarded and governed by the State's BTOP Grant award conditions. The proposals will be

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funded by BTOP funding that is not otherwise committed. The total of that funding at this time is estimated to be approximately $9,000,000. That funding level is subject to change. No additional funding will be available for this purpose. The vendor should be prepared to provide a 20% in-kind or cash match per the Notice of Funding Available (NOFA) associated with the original grant along with documentation clearly detailing the match portion. All proposals are subject to approval by the NTIA and must comply with all terms and conditions of the current State of West Virginia BTOP grant, including being environmentally compliant, financially feasible and/or economically sustainable. Any cost associated with the proposal such as engineering, environmental assessments and construction must not exceed the estimated remaining funding.

Information associated with the BTOP grant that may be useful can be found at the following websites:
- Broadband USA Website www2.ntia.doc.gov
- General Information on WV Grant to date www.recovery.wv.gov
- Recipient handbook
  http://www2.ntia.doc.gov/files/Recipient_Handbook_v1.1_122110.pdf
- Notice of Funding Availability (NOFA)
  http://www.ntia.doc.gov/files/ntia/publications/fr_bbnofa_090709.pdf

3. SCHEDULE OF EVENTS:

Release of the RFI........ ....9/27/12
Request for Information Opening Date............................10/9/12

SECTION TWO: INSTRUCTIONS TO VENDORS SUBMITTING PROPOSALS

1. REVIEW DOCUMENTS THOROUGHLY: The attached documents contain a solicitation for proposals. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements. All proposals should be submitted in accordance with the provisions contained in these instructions and the Solicitation. All proposals must adhere to Section 6.3.1 of the BTOP Recipient Handbook - "Post-Award Modification Requirements: Applicable To All Requests"

2. MANDATORY TERMS: The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall."

3. PRE-PROPOSAL MEETING: The item identified below shall apply to this Solicitation.

[x] A pre-proposal meeting will not be held prior to proposal opening.

5. VERBAL COMMUNICATION: Any verbal communication between the Vendor and any State personnel is not binding, including that made at the mandatory pre-proposal conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.

6. PROPOSAL SUBMISSION: All proposals must be signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the proposal opening. Any proposal received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The proposal delivery address is:

Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130,
Charleston, WV 25305-0130

The proposal should contain the information listed below on the face of the envelope or the proposal may not be considered:
SEALED PROPOSAL
BUYER: _____
SOLICITATION NO.: _____
PROPOSAL OPENING DATE: _____
PROPOSAL OPENING TIME: _____
FAX NUMBER: _____

7. PROPOSAL OPENING: Proposals submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a proposal after the proposal opening date and time will result in proposal disqualification. For purposes of this Solicitation, a proposal is considered delivered when time stamped by the official Purchasing Division time clock.

Proposal Opening Date and Time: 10/09/2012 at 1:30 p.m.
Proposal Opening Location: Department of Administration, Purchasing Division
2019 Washington Street East
P.O. Box 50130,
Charleston, WV 25305-0130

8. ADDENDUM ACKNOWLEDGEMENT: Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in proposal disqualification. The addendum acknowledgement should be submitted with the proposal to expedite document processing.

SECTION THREE: PROJECT SPECIFICATIONS

1. **Location:** Agency is located at 1900 Kanawha Boulevard, East Capitol Complex - Building 5, 10th Floor, Charleston, WV 25305 and the Project will be completed January 31, 2013.

2. **Background:** This RFI seeks input on technology deployment strategies that fit within the scope of the State of West Virginia's current BTOP grant award and would enhance the state's current broadband endeavors and encourage economic development. See Section One of this RFI for additional information.

3. **Project and Goals:** Submitted proposals should focus on projects that can be completed between now and January 31, 2013 and should be related to the following areas.

      3.1.1 Middle Mile Network Enhancement
          A project design of fiber segments which will provide new infrastructure to extend network middle mile deeper into rural areas of West Virginia. These new fiber routes will be open access and should allow service providers to interconnect at connection points and extend network infrastructure to rural areas throughout the state.

      3.1.2 Wireless Facility Deployment Strategy
          A project design consisting of an open access, wireless solution, which extends broadband Internet access to rural areas within the State of West Virginia.

      3.1.3 Other proposals that fall clearly within the original scope of the grant.

SECTION FOUR: TERMS AND CONDITIONS

By signing and submitting the RFI, the successful vendor(s) agrees to be bound by all the terms contained in this RFI.

1. Certifications Related to Lobbying:

Vendor(s) certifies that no federal appropriated funds have been paid or will be paid, by or on behalf of the company or an employee thereof, to any person for purposes of influencing or attempting to influence an officer or employee of any Federal entity, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment or modification of any Federal contract, grant, loan, or cooperative agreement.

If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee or any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the vendor(s) shall complete and submit a disclosure form to report the lobbying.

2. Governing Law:

This RFI shall be governed by the laws of the State of West Virginia. The vendor(s) further agrees to comply with the Civil Rights Act of 1964 and all other applicable laws (Federal, State or Local Government) regulations.