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**Introduction**

Pluribus **UNUM™ Unified Management, Automation, and Analytics Platform Software** is an application portal developed by Pluribus Networks.

Pluribus UNUM is an agile, multi-functional web management portal that enhances the intrinsic automation of the Unified Cloud Fabric architecture. It combines an elastic big data database and intelligent analytics engine with an intuitive and consistent user interface that allows seamless navigation across fully integrated management and analysis modules.

Pluribus UNUM liberates network operators from the complexity of provisioning and operating a complex network, or groups of networks, by automating the complete network life cycle from implementation to operation and optimization, enabling intent-based network operations with vastly reduced deployment times.
Introduction (cont'd)

UNUM enables the network administrator to extract analytical value from the telemetry data reported by the network switches powered by the Pluribus Networks Netvisor® ONE network operating system.

Once data is collected, UNUM relies upon a modern search engine database infrastructure to store, aggregate, filter, correlate and visualize vast amounts of data in real-time as well as with a powerful time machine functionality.

The Pluribus UNUM portal provides a collection of feature-rich applications that manages and orchestrates the gathering and presentation of network analytics using various types of collectors and reporting software.

The UNUM applications rely primarily on features of the Netvisor ONE, such as vFLOWs, mirrors, and connections statistics, and can also provide analytics in a non-Pluribus environment.

At a high-level, UNUM supports the following deployment scenarios:

- Netvisor ONE as a mirror switch; an out-of-band Pluribus switch is configured as a mirror in either an existing Pluribus-switched network or a non-Pluribus-switched network.

- Netvisor ONE as an inband switch; stats are pulled directly from configured switches such as connections, vports, ports, tunnels and, vflow-stats.

- Collectors gather network analytics and feed data into the UNUM analytics store(s):
  - The Collector uses the vREST API to gather the analytics data from Netvisor.

UNUM manages the following applications:

- **Common Infrastructure** – a centralized portal launches other applications, provides authentication to the corporate directory (using LDAP), and provides configuration of standard settings.

- **Insight Analytics** – this application provides reporting and Search capabilities on data collected from UNUM collectors.

- **Switch Analytics** – Switch Analytics contains a feature-rich set of management tools providing Traffic Monitoring and Notification services with exceptional drill-down capabilities.

- **Fabric Manager** – Fabric Manager contains a feature-rich set of management tools providing configuration tools for Layer 1, Layer 2, and Layer 3 services as well as Security, Monitoring, Analytical, and Service features.
Specifications

Medium Capacity Appliance Specifications

**Note:** Throughout this document, references to the Dell VEP 4600 platform are examples of configuring a Medium Capacity Appliance. Servers meeting the hardware and software specifications listed below in the specification charts are acceptable.

<table>
<thead>
<tr>
<th>UNUM Medium Capacity Appliance</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNUM on the Medium Capacity Appliance</strong></td>
<td><strong>Hardware</strong></td>
</tr>
<tr>
<td></td>
<td>• Single Server chassis, 1 Rack Unit</td>
</tr>
<tr>
<td></td>
<td>• 8 CPU cores (16 vCPU), 128 GB Ram (96 GB minimum), 960 GB SSD</td>
</tr>
<tr>
<td></td>
<td>• Quad 1G Base-T NIC, dual 10G Base-T NIC</td>
</tr>
<tr>
<td></td>
<td>• IPMI 2.0 + KVM with Dedicated LAN</td>
</tr>
<tr>
<td></td>
<td>• Dual power supply</td>
</tr>
<tr>
<td><strong>Insight Analytics:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ingest up to 1,000 connections/second</td>
</tr>
<tr>
<td></td>
<td>• Retains up to 500 Million connections</td>
</tr>
</tbody>
</table>

**Software Requirements & Specifications**

Specifications provided are operational requirements to use UNUM virtual machines. Values do not include ESXi resource requirements.

<table>
<thead>
<tr>
<th>UNUM Base Capacity VM</th>
<th>vCPU (cores)</th>
<th>RAM</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>8xCPU (4-core)</td>
<td>64 GB</td>
<td>480 GB SSD</td>
<td></td>
</tr>
<tr>
<td>UNUM Base Capacity VM – Archive Viewer</td>
<td>8xCPU (4-core)</td>
<td>64 GB</td>
<td>480 GB SSD</td>
</tr>
<tr>
<td>UNUM Medium Capacity VM</td>
<td>8xCPU (4-core)</td>
<td>64 GB</td>
<td>960 GB SSD</td>
</tr>
<tr>
<td>UNUM Medium Capacity VM – Archive Viewer</td>
<td>8xCPU (4-core)</td>
<td>64 GB</td>
<td>960 GB SSD</td>
</tr>
<tr>
<td>UNUM High Capacity VM Cluster</td>
<td>Special</td>
<td>Special</td>
<td>Special</td>
</tr>
<tr>
<td>UNUM High Capacity VM – Archive Viewer</td>
<td>Special</td>
<td>Special</td>
<td>Special</td>
</tr>
</tbody>
</table>

1. UNUM Archiver requires the Archiver license and a shared NFS SSD storage to store daily analytics snapshots.
2. The High Capacity VM cluster runs on four servers. Direct software download for existing servers is not supported, dedicated hardware needs to be purchased. See the Hardware Requirements and Specifications table.
3. Customers wishing to use UNUM Archiver will require resources for a second VM (provided with the license).
4. All UNUM virtual machines require ESXi 6.7.

**UNUM Virtual Machines - Software Requirement & Specifications**
Medium Capacity Appliance Specifications (cont'd)

Server Hardware Specifications for UNUM Virtual Machines

Specifications provided are the minimum necessary server resources to run the UNUM virtual machine on dedicated hardware. This includes ESXi hardware requirements and resources for planned future expansions of UNUM.

<table>
<thead>
<tr>
<th>Bring Your Own Server</th>
<th>UNUM Base Capacity Virtual Machine</th>
<th>UNUM Medium Capacity Virtual Machine</th>
<th>UNUM High Capacity VM Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>16 vCPU (8-core)²</td>
<td>16 vCPU (8-core)²</td>
<td>32 vCPU (16-core)² per server</td>
</tr>
<tr>
<td>Memory</td>
<td>96 GB</td>
<td>96 GB</td>
<td>256 GB per server</td>
</tr>
<tr>
<td>Local SSD</td>
<td>480 GB²</td>
<td>960 GB³</td>
<td>1920 GB³ per server</td>
</tr>
<tr>
<td>Shared NFS SSD</td>
<td>480 GB required for HA³</td>
<td>960 GB required for HA³</td>
<td>960 GB required for HA³</td>
</tr>
<tr>
<td>VMWare ESXi Hypervisor</td>
<td>Google Chrome (Version 44+)</td>
<td>Google Chrome (Version 44+)</td>
<td>Google Chrome (Version 44+)</td>
</tr>
<tr>
<td>Client Requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NIC</td>
<td>Dual 10G Base-T NIC³</td>
<td>Dual 10G Base-T NIC²</td>
<td>Dual 10G Base-T NIC²</td>
</tr>
<tr>
<td>High Availability (HA)</td>
<td>Yes³,²</td>
<td>Yes³,²</td>
<td>Yes³,²</td>
</tr>
</tbody>
</table>

1 The High Capacity VM cluster can be installed as a cluster on four dedicated DELL R740 servers. Direct software download for existing servers is not supported, dedicated hardware or the appliance needs to be purchased. The Dell configuration requires professional services installation as well as an external 10 Gbps switch is needed to enable internal cluster communication.
2 All versions of UNUM require CPU clock speeds of 2.4GHz CPUs or higher.
3 All High Availability configurations require the following: UNUM 6.0+, the VMware vSphere ESXi Enterprise Plus License, the UNUM base license + any optional UNUM licenses, and a shared NFS SSD storage. Redundant (RAID-1) storage is recommended for the shared storage, as is a minimum of a 10 Gbps connection between the NFS storage and the servers.
4 Solid State Drives are required on all UNUM platforms.
5 No specific VMware license requirements for non-HA environments (ESXi free is OK).
6 In HA deployments, the local storage for the Base VM and Medium Capacity VM must meet recommended VMware hardware requirements. Pluribus recommends a minimum of 480 GB. 960 GB of shared NFS storage is still required.
7 In HA deployments, the local storage for two of the four servers in the High Capacity VM cluster can be reduced to 960 GB. 960 GB of shared NFS storage is still required.
8 UNUM can only support one direct in-band fabric connection via the eth2 interface. Management of multiple in-band fabrics requires the addition of an external switch.

Specifications UNUM High Capacity Appliance

Customers without an ESXi infrastructure or limited compute resources can purchase a Pluribus Networks tested and validated, turnkey appliance with UNUM pre-installed. Simply rack, stack, and power on. UNJM is ready to go.

<table>
<thead>
<tr>
<th>UNUM High Capacity Appliance ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
</tr>
<tr>
<td>Memory</td>
</tr>
<tr>
<td>Local SSD</td>
</tr>
<tr>
<td>Shared NFS SSD</td>
</tr>
<tr>
<td>VMWare ESXi Hypervisor</td>
</tr>
<tr>
<td>Client Requirements</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>NIC</td>
</tr>
<tr>
<td>High Availability (HA)</td>
</tr>
<tr>
<td>Rack Dimensions</td>
</tr>
</tbody>
</table>

¹ The High Capacity appliance is four dedicated nodes of the listed specifications.
Medium Capacity Appliance Specifications (cont'd)

UNUM Fabric Manager Scalability Matrix

<table>
<thead>
<tr>
<th></th>
<th>UNUM Base Capacity VM/Appliance</th>
<th>UNUM Medium Capacity VM/Appliance</th>
<th>UNUM High Capacity VM Cluster/Appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Netvisor One Switches</td>
<td>55</td>
<td>55</td>
<td>140</td>
</tr>
<tr>
<td>Maximum Adaptive Cloud Fabrics</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Maximum Netvisor ONE Switches per Fabric</td>
<td>32</td>
<td>32</td>
<td>128 leaves per super fabric</td>
</tr>
<tr>
<td>Syslog Records 1</td>
<td>Up to 7 Days</td>
<td>Up to 30 Days</td>
<td>Up to 60 Days</td>
</tr>
<tr>
<td>Port Stats 2,4</td>
<td>512</td>
<td>768</td>
<td>1536</td>
</tr>
<tr>
<td>Tunnel Stats 2,5,6</td>
<td>256</td>
<td>384</td>
<td>766</td>
</tr>
<tr>
<td>vFlows Stats 2,3,8</td>
<td>2560</td>
<td>3520</td>
<td>7040</td>
</tr>
</tbody>
</table>

1 Records storage is a rolling first-in-first-out window of both flow (mFlow) and switch analytics records.
2 Numbers provided are aggregate values of active stats captured. To get a per switch value of active stats captured, divide the value provided by the total number of switches being managed by UNUM. For example, if the UNUM Base Capacity VM is managing 24 switches total, then 512 / 24 = 21 port stats per switch (rounding down).
3 Local (switch) vFlows. Divide by number of switches to get fabric level vFlows, for example in an 8-node fabric, 2560 divided by 8 would be 320 fabric wide vFlows.
4 Maximum fabric size of 52 switches is a Netvisor ONE limitation but is listed here for convenience. UNUM supports a number of fabrics and switches, up to the maximum amount of either switches or fabrics. For example, one fabric of 32 nodes, two fabrics of 24 and 26 nodes, three fabrics of 12, 18, and 20 nodes or five fabrics of 11 nodes each for the UNUM Base Capacity virtual machine.
5 Super Fabric can manage up to 4 x pools, up to 128 leaves and up to 12 spines. Without super fabric any combination of leaves and spines are supported up to 140 total, 32 nodes maximum per fabric.
6 Number of simultaneous stats collected every ten seconds.
7 A Tunnel is a virtual connection between two fabric endpoint ports.

UNUM Insight Analytics Scalability Matrix

<table>
<thead>
<tr>
<th></th>
<th>UNUM Base Capacity VM/Appliance</th>
<th>UNUM Medium Capacity VM/Appliance</th>
<th>UNUM High Capacity VM Cluster/Appliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA Maximum Records Stored 2,4,8</td>
<td>100 million</td>
<td>500 million</td>
<td>2 billion</td>
</tr>
<tr>
<td>IA Analytics Records, Maximum days 2,4</td>
<td>Up to 30 Days</td>
<td>Up to 30 Days</td>
<td>Up to 30 Days 4</td>
</tr>
<tr>
<td>IA Peak Ingestion Rate 3</td>
<td>1000 flows/sec</td>
<td>1000 flows/sec</td>
<td>10,000 flows/sec</td>
</tr>
</tbody>
</table>

1 Records storage is a rolling first-in-first-out window of both flow (mFlow) and switch analytics records.
2 Long-term retention of records, up to the value stated (100M, 500M, 2B). Variations based on network traffic can occur.
3 Ingestion rate will affect the number of days of records are stored. This can vary based on fabric size and traffic patterns.
4 Busy environments generating more than 1000 flows per second impact the number of days records are stored. If sustained 10,000 flows per second occur, the maximum days of records stored will be reduced to approximately one week. This environment can be mitigated using the UNUM Archiver license and external SSD storage.

**Note:** All UNUM fabrics are required to have a minimum of one switch with 16 GB of RAM to act as a communication node. Two 16 GB switches will be required if seed switch redundancy is implemented.

UNUM Insight Analytics Scalability
Medium Capacity Appliance Specifications (cont'd)

UNUM 6.3.0 Licensing

Ordering Information

Pluribus UNUM software is available in three flavors: a BASE virtual machine, a medium capacity virtual machine, and a high-capacity option which can be ordered on an appliance or installed on four Dell RX740 servers. Refer to the Hardware Requirements and Scalability tables for more information on the different UNUM options. See the ordering information below for Pluribus UNUM, Insight Analytics, server appliances, and add-on reports/alerts. Support is ordered separately, and subscription options are available.

Pluribus UNUM Software is available in three options.

- UNUM-LIC — Pluribus UNUM BASE license.
- UNUM-MC-LIC — Pluribus medium-capacity license.
- UNUM-HC-LIC — Pluribus high-capacity license. Requires either the appliance option below or four Dell RX740 servers ordered directly from Dell, as well as professional services for deployment.

Insight Analytics Module License is optionally licensed in addition to the Pluribus UNUM software.

- IA-MOD-LIC — Pluribus Insight Analytics module BASE license. Supports up to 100 million flows.
- IA-MC-MOD-LIC — Pluribus Insight Analytics Medium-Capacity (MC) module license. Supports up to 500 million flows.
- IA-HC-MOD-LIC — Pluribus Insight Analytics High-Capacity (HC) module license. Supports up to 2 billion flows. Cannot be deployed on existing customer hardware – HC server appliance or four Dell RX740 are required.
- IA-SC-MOD-LIC — Introductory, low-cost license for Insight Analytics that will enable the storage of 1 million flows.

UNUM Appliance Hardware

- AP-HC-HW — UNUM high capacity hardware server appliance. Hardware only (software licenses are required) – add to order when a high-capacity appliance is needed. Requires professional services deployment.

Other Optional, add-on UNUM Licenses

- UNUM-RPRT-LIC — Pluribus UNUM add-on reporting license.
- UNUM-ALRT-LIC — Pluribus UNUM add-on e-mail alert license.
- UNUM-ARCHIVER-LIC — Archive daily snapshots capturing Insight & Switch Analytics meta data to an NFS repository (network folder) for long term storage. Includes a second UNUM “viewer” virtual machine so that archived data can be loaded and analyzed.

Please refer to the UNUM Supported Features Table for more information.
Physical Installation

Medium Capacity Appliance Installation Guide

**Note:** Please refer to your specific hardware platform installation instructions for installing the Medium Capacity Appliance.

When using a Dell VEP 4600 platform, please refer to the “Dell VEP4600 Installation Guide”, review, and follow all instructions as outlined.

**Pre-requisites**

The following is a list of components required for successful platform installation:

- VEP4600 platform
- AC country- and regional-specific cables to connect the AC power source to each of the platforms’ AC power supplies
- Two-post rail kit mounting brackets for rack installation, included
- Screws for rack installation
- #1 and #2 Phillips screwdrivers, not included
- M2 Philips drive flat head screwdriver, not included
- Ground cable screws (included) for L-bracket—order separately
- M3 ground lug assembly kit screw, depending on your platform
- Copper/fiber cables

Other optional components are:

- UL-certified ground lug assembly kit with bracket
- Extra mounting brackets for the 4-post mount
- Extra power supply unit
- Extra fan module
Hardware Overview

Medium Capacity Appliance Hardware Overview

(based on Dell VEP 4600 platform)

The 1RU Pluribus UNUM Virtual Edge Platform 4600 consists of:

- 8 CPU cores (16 vCPU) - Intel® Xeon® D Skylake Generation processor, with Intel® QuickAssist Technology (Intel® QAT), and Data Plane Development Kit (DPDK)
- Storage - 960GB SSD
- DDR4 ECC 128GB RAM (Medium Capacity Appliance requires a minimum of 96 GB RAM)
- Two 10GbE SFP+ ports
- Four 1000Base-T ports
- One MicroUSB-B console port
- Two USB Type-A ports for more file storage
- One board management controller (BMC)
- Two RJ-45, RS-232 serial-console ports
- One 10/100/1000BaseT RJ-45 Ethernet management port for the processor
- One 10/100/1000BaseT RJ-45 Ethernet management port for the BMC
- One or two AC hot-swappable redundant power supplies, depending on the configuration
- Four or five AC normal hot-swappable fan modules, depending on the configuration
- Standard 1U platform
Hardware Overview (cont'd)

Physical Dimensions

The VEP4600 platform have the following physical dimensions:

- 434 x 381 x 43.6 mm (W x D x H)
- 17.1 x 15 x 1.72 inches (W x D x H)
- PSU/fan tray handle: 1.57 inches (40 mm)
System Interface

Medium Capacity Appliance - System Interface

Dell VEP4600 System Overview

I/O Panel View

1. Platform status Icons LEDs
2. RS-232 console ports (top) and 10/100/1000 Base-T ports (bottom)
3. SFP+ ports
4. Luggage tag
5. 1000Base-T networking ports
6. Processor power on/off button
7. Micro USB-B port
8. USB Type A ports
9. Optional - VEP4600 Expansion Cards
10. Power Supplies
System Interface (cont'd)

Power Supply (PSU) View

1. PSUs
2. Fans

PSU LEDs

- Solid green—Input is OK.
- Flashing yellow (amber)—There is a fault with the PSU.
- Flashing green blink at 1Hz—Platform is in a standby/CR state.
- Off—PSU is off.
Control Panel LEDs

There are several LEDs on the control panel and on the drive carriers to keep you constantly informed of the overall status of the system.

1. Power LED
2. Master LED
3. System LED
4. Locator LED
5. Temperature LED
6. Fan LED
7. SFP+ indicator LED
8. 10/100/1000 BaseT RJ-45 networking link (left) and activity (right) LEDs
9. 10/100/1000 BaseT RJ-45 networking link (left) and activity (right) LEDs for the processor (left) and for the BMC (right)
## System Interface (cont'd)

### LED Behavior

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
</table>
| **System Status/Health LED** | • Off - system off or in standby  
                       | • Solid green—Normal operation  
                       | • Flashing green—Booting  
                       | • Solid yellow (amber)—Critical system error or CPU power off.  
                       | • Flashing yellow—Noncritical system error, fan failure, or power supply failure |
| **Power LED**          | • Off - system off or in standby  
                       | • Solid Green—Normal operation  
                       | • Solid yellow—POST is in process  
                       | • Flashing yellow—Power supply failed |
| **Master LED**         | • Solid green—platform is in stacking Master or Stand alone mode  
                       | • Off - system is slave of the stack or system in standby |
| **FAN LED**            | • Off - system off or in standby  
                       | • Solid green—Normal operation; fan powered and running at the expected RPM  
                       | • Solid yellow—Fan failed |
| **PSU LED**            | • Off—No power  
                       | • Solid green—Normal operation or standby mode  
                       | • Solid yellow—Power supply critical event causing a shutdown  
                       | • Flashing yellow—PSU warning event; power continues to operate |
System Interface (cont'd)

LED Behavior (cont'd)

LOCATOR LED/System Beacon
- Off—Locator function disabled
- FFlashing blue with 1 sec on and 1 sec off – Locator function enabled
- Flashing blue with 2 sec on and 1 sec off – system in standby

Temperature status LED
- Off - system off or in standby
- Solid green—temperature is normal
- Solid yellow—temperature is at the limit
- Flashing yellow—temperature is over the limit

RJ-45 Ethernet LED
- Off—no link and no activity detected
- On—Activity on the port
- Solid yellow—Link operating at a lower speed
- Solid green—Link operating at a maximum speed—1G
- Flashing green—Port activity
System Interface (cont'd)

System Management Ethernet Port LEDs

<table>
<thead>
<tr>
<th>LED Type</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link LED</td>
<td>Off—No link</td>
<td>Link operating at a maximum speed, auto-negotiated/forced or 1G</td>
</tr>
<tr>
<td></td>
<td>Solid green</td>
<td>Link operating at a maximum speed, auto-negotiated/forced or 1G</td>
</tr>
<tr>
<td></td>
<td>Solid yellow</td>
<td>Link operating at a lower speed, auto-negotiated/forced or 10/100M</td>
</tr>
<tr>
<td>Activity LED</td>
<td>Off—No link</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flashing green</td>
<td>Port activity</td>
</tr>
</tbody>
</table>

SFP+ Port LEDs

<table>
<thead>
<tr>
<th>LED Type</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link/Activity</td>
<td>Off—No link</td>
<td></td>
</tr>
<tr>
<td>LED</td>
<td>Solid green</td>
<td>Link operating at maximum speed, 10G</td>
</tr>
<tr>
<td></td>
<td>Solid yellow</td>
<td>Link operating at a lower speed, 1G</td>
</tr>
<tr>
<td></td>
<td>Flashing green</td>
<td>port activity for 10G</td>
</tr>
<tr>
<td></td>
<td>Flashing yellow</td>
<td>port activity for 1G</td>
</tr>
</tbody>
</table>
Luggage Tag

1. SVC tag
2. MAC address
3. PPID
4. Express service code
System Interface (cont'd)

Management Ports

RS-232 Console Port Access

1. RS-232: processor console port (left); BMC console port (right)

Caution: Ensure that any equipment attached to the serial port can support the required 115200 baud rate.

Note: Before starting this procedure, ensure that your PC has a 9-pin serial port and that you have installed a terminal emulation program on the PC.

Note: If your PC's serial port cannot accept a female DB-9 connector, use a DB-9 male-to-male adapter.
System Interface (cont'd)

RS-232 Console Port Access (cont'd)

1. Install the provided RJ-45 connector-side of the provided cable into the platform console port.

2. Install the DB-9 female-side of the provided copper cable into your PC’s serial port. Or install the DB-9 cable into other data terminal equipment (DTE) server hardware.

3. Keep the default terminal settings on the console as follows:
   - 115200 baud rate
   - No parity
   - 8 data bits
   - 1 stop bit
   - No flow control

MicroUSB-B Console Port Access

The MicroUSB-B console port is on the PSU side of the VEP4600.

The terminal settings are the same for the serial console port and the RS-232/RJ-45 console port:
   - 115200 baud rate
   - No parity
   - 8 data bits
   - 1 stop bit
   - No flow control

When you connect the microUSB-B port, it becomes the primary connection and, while connected, all messages are sent to the microUSB-B port.

Note: Before starting this procedure, be sure that you have a terminal emulation program already installed on your PC. Install the appropriate drivers to support the microUSB-B port. To download Dell EMC drivers, see https://www.dell.com/support. If your computer requires non-Dell EMC drivers, contact Dell EMC Technical Support for assistance.
System Interface (cont'd)

MicroUSB-B Console Port Access (cont'd)

1. Power on the PC.
2. Connect the USB-A end of cable into an available USB port on the PC.
3. Connect the microUSB-B end of cable into the microUSB-B console port on the platform.
4. Power on the platform.
5. Install the necessary USB device drivers.
6. To download Dell EMC drivers, see https://www.dell.com/support. If your computer requires non-Dell EMC drivers, contact Dell EMC Technical Support for assistance.
7. Open your terminal software emulation program to access the platform.
8. Confirm that the terminal settings on your terminal software emulation program are as follows:
   - 115200 baud rate
   - No parity
   - 8 data bits
   - 1 stop bit
   - No flow control
Medium Capacity Appliance - UNUM Configuration

The UNUM Medium Capacity (MC) virtual machine is a software download that can be installed on any server running ESXi 6.7 or 7.0 that meets the specifications called out in the UNUM Data Sheet.

Below is an example of deploying the UNUM MC virtual machine on the Dell VEP 6400, which comes with ESXi pre-installed.

General Configuration Steps

1. Download the requisite OVA files from the Pluribus Network Cloud (PNC) and save them to your local PC. Access the PNC using the Pluribus Customer Portal and select the Downloads tab.

You may download software directly from the Customer Portal. Use your provided support credentials.

If you do not have credentials for the Customer Portal, please Contact Support AND fill out the following:

Product Registration - https://www.pluribusnetworks.com/support/product-registration/

Note: The Serial Number is equivalent to UNUM's Machine ID. You may not have a Serial Number if you have not previously installed UNUM. In that event, please indicate "Do Not Have One" in the Serial Number field on the registration form.
Log in to the Customer Portal using the credentials provided.

Access Customer Portal

Access our latest product documentation. View, manage, update your open cases. Interact with the assigned engineer with case note updates, request RMA's, search our knowledge base.

Log in With an Existing Account

Contact Information

Phone Support
+1 650 289 4717
1 855 438 8538 (US and Canada)

Email
Contact Support
Contact Advanced Services

Sign up for a Pluribus Networks Support Account

Pluribus Networks Customer Portal
Upon successfully logging in you are greeted by a welcome screen.

Pluribus Networks Customer Portal Welcome Screen

Select **Software Downloads** and follow the login instructions on the screen. Please verify your support credentials again.

Pluribus Networks Cloud UNUM Login Screen
**PN Cloud Software User Interface**

<table>
<thead>
<tr>
<th>Name</th>
<th>Version</th>
<th>Platform</th>
<th>Checksum</th>
<th>Documentation</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNUM 6.1.1 OVA Image (UNUM-LIC &amp; IA-MCD-LIC (100M Flow Support))</td>
<td>6.1.1-7894</td>
<td>ESXi 6.7</td>
<td>4eb896dc9b875874d8f99dfdaec317f1</td>
<td><img src="image.jpg" alt="Document" /></td>
<td><img src="image.jpg" alt="Download" /></td>
</tr>
<tr>
<td>UNUM 6.1.1 VEP OVA Image (Dell VEP4600: UNUM-LIC &amp; IA-MOD-VEP-LC (500M Flow Support))</td>
<td>6.1.1-7894</td>
<td>ESXi 6.7</td>
<td>f846b78237337a25f1ec66c5535c83</td>
<td><img src="image.jpg" alt="Document" /></td>
<td><img src="image.jpg" alt="Download" /></td>
</tr>
<tr>
<td>UNUM 6.1.1 Upgrade Image (from 5.2.x, 6.0.x, 6.1.x ONLY)</td>
<td>6.1.1-7894</td>
<td>ESXi 6.7</td>
<td>7b7156cc8031d6e15x368cde0e198f16</td>
<td><img src="image.jpg" alt="Document" /></td>
<td><img src="image.jpg" alt="Download" /></td>
</tr>
<tr>
<td>6.1.1 Provisioning OVA (VEP deployments ONLY)</td>
<td>6.1.1-7894</td>
<td>ESXi 6.7</td>
<td>e34a108595576c2b74cc8f398c612c9</td>
<td><img src="image.jpg" alt="Document" /></td>
<td><img src="image.jpg" alt="Download" /></td>
</tr>
</tbody>
</table>

*Pluribus Networks Cloud Welcome Screen and Menu*
Download UNUM Image

The UNUM image is available from the current downloads page. Select **CURRENT** from the **DOWNLOADS** section of the sidebar menu.

Download the software to a local system.

You need to download and have readily available:

- **UNUM Provisioning OVA** - `UNUM-provision-6.3.0-xxxx.xx.ova`
- **UNUM Appliance OVA** - `UNUM-6.3.0-xxxx.xx.-st.ova`
- **Virtual Netvisor OVA** - `VNV-6300315465.ova` (example version number only).

**Note:** The downloaded vNV version has to match your installed switch OS version.
Medium Capacity Appliance Configuration (cont'd)

2. Activate VMware License using the steps illustrated below.

Usage Note: DHCP or Static IP addresses can be assigned. A DHCP server must be running for an automatic IP address assignment during ESXi configuration.

For Static IP addressing, select static from the unum_provision.sh setup script and enter the static IP parameters for UNUM and vNV.

3. Configure ESXi and create a new Virtual Machine (VM) using the configuration examples illustrated below.

4. Connect to the UNUM host via a terminal session using SSH (using the assigned IP address) and run the following script:
   
   ./unum_provision.sh

5. Deploy a standalone VM.
Medium Capacity Appliance Configuration (cont'd)

ESXi Obtain License

From the **ESXi Management Interface**, determine if a license is enabled.

Click the **Licensing** tab to display the current license status.

If a valid license is missing, the following dashboard is displayed.

![ESXi Management Interface - Licensing Tab - No License](image)

Obtain a valid license key from the VMware website using the following steps and as illustrated in the following images.

1. Navigate to [https://www.vmware.com/products/vsphere-hypervisor.html](https://www.vmware.com/products/vsphere-hypervisor.html) and select **Download Now**. You may need to create a free account to continue.

2. Register for the download when prompted.

3. After registration you will be redirected to the license and download page.

4. Make a note of your license key (In this example the license is an evaluation version).

5. Select Manually Download to begin the download process.
vSphere Hypervisor User Interface

What is a vSphere Hypervisor?

vSphere Hypervisor is a bare-metal hypervisor that virtualizes servers; allowing you to consolidate your applications while saving time and money managing your IT infrastructure. Our free vSphere Hypervisor is built on the world’s smallest and most robust architecture: VMware vSphere ESXi, which sets the industry standard for reliability, performance, and support.

License Information

Download Packages

VMware Website - Download License

VMware Website - VMware Licenses
Enter the key using **Assign License**.

![License key is valid for VMware vSphere 6 Hypervisor](image)
Medium Capacity Appliance Configuration (cont'd)

The ESXi dashboard updates with the valid key information.

ESXi Management Interface - Licensing Tab - New License
Configure ESXi and Create VM

From the ESXi Management Interface select **Create / Register VM**.
Select **Creation Type** and click deploy a virtual machine from an OVF or OVA file.
Enter a name for the VM and select the provisioning OVA file.

ESXi Management Interface - VM Name and OVA Installation File
Select Storage

ESXi Management Interface - Select Datastore
Medium Capacity Appliance Configuration (cont'd)

Deployment Options

*Note:* Pluribus Networks recommends using Thin Provisioning
Ready to Complete

ESXi Management Interface - Ready to Complete
Medium Capacity Appliance Configuration (cont'd)

The ESXi Management Interface displays the progress of the VM provisioning status.

![ESXi Management Interface - VM Provisioning Status](image-url)
Upon successfully creating the VM, the ESXi management Interface updates.
Medium Capacity Appliance Configuration (cont'd)

Use the **Console** within the ESXi Management Interface to review and record the assigned IP address.

Enter the UNUM login information:

- **username** - `vcf`
- **password** - `changeme`

and run the command:

```
ifconfig eth0
```

The following screen is displayed. Take note of the assigned IP address.

![ESXi Management Interface - VM Console](image-url)
Medium Capacity Appliance Configuration (cont'd)

From a Terminal session enter the following commands:

```bash
ssh vcf@10.110.3.21 (example only) - Enter the IP address you previously recorded from the steps above.
```

Enter the password: changeme

The following screen displays:

```
ps@Paseo ~ % ssh vcf@10.110.3.21
vcf@10.110.3.21's password:
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.4.0-143-generic x86_64)

* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/advantage

152 packages can be updated.
97 updates are security updates.

New release '18.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Last login: Thu Feb 6 11:02:23 2020 from 10.140.0.167
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

vcf@unum: $ _
```

SSH Terminal - VM Login
Medium Capacity Appliance Configuration (cont'd)

OVA Files

Create a local directory to hold the OVA files.

```
ssh@unum:~$ mkdir ova_files
ssh@unum:~$ cd ova_files
```

SSH Terminal - UNUM Create OVA File Directory

Move the previously downloaded OVA files on your PC to the local OVA directory created above.

```
ssh@unum:~$ ls -lrt
```

SSH Terminal - UNUM OVA File Directory
Medium Capacity Appliance Configuration (cont'd)

 Provision UNUM

To access the requisite installation scripts enter: cd /home/vcf/srv/vcf/bin/tools/cluster at the command prompt.

SSH Terminal - Cluster Directory Scripts

Run the ./unum_provision.sh script.

SSH Terminal - UNUM Provision Script

The following menu displays.

SSH Terminal - Provision Menu
Medium Capacity Appliance Configuration (cont'd)

General Deployment Details and Management Scenarios

UNUM

1. Deploy VM.
2. Eth0 obtains a DHCP IP Address.
3. Login to the VM and set up the Eth1 IP address.
4. Add vnv(s) as a Seed Switch for UNUM. Performed post vNV config/setup.

vNV

1. Deploy VM.
2. Obtain vmgmt0 IP address for vNV from DHCP.
3. Disconnect the Network adapter 1 on the VM.
4. Accept EULA.
5. If fabric name is specified: join fabric and errors out under the following conditions:
   a) fabric doesn’t exist or is not reachable or is running a different version

Provisioning Details and Steps for Inband Scenario

Configuration Steps for VEP

ESXi Configuration:

1. Create a Vswitch on the ESXi host with the following settings:
   a) promiscuous mode enabled
   b) allow forged transmits

2. Portgroup is created (with optional VLAN parameter; defaults to 0 (untagged))

3. Assign a vnic to the vswitch. This vnic is the physical port connected to the switch and needs to be entered correctly by the user for configuration to succeed. Without this is the physical link, the vNV cannot find the fabric to join.
vNV Configuration:

1. vNV's Network Adapter 3 assigned to this port group.

2. vdata0 interface on vNV needs an IP address configured in the same network as the inband IP address of the switch.

3. vNV should have web-enabled on data using: `admin-service-show if mgmt web` (same as the management scenario).
**Medium Capacity Appliance Configuration (cont'd)**

**UNUM Deployment Menu**

Select **Option 1, Deploy Standalone VM**.

Enter the requisite information for each configuration prompt. See details below.

In many cases use the default value by hitting **Enter** or **Return**.

You may use DHCP assigned values or enter static IP parameters as required.

**Static IP Assignment**

Enter static and then follow the onscreen prompts to complete the configuration.

```
UNUM Deployment Menu
0: Exit
1: Deploy standalone VM
2: Manage cluster
(0-2):1
Enter IP provisioning scheme (static/dhcp): [dhcp]: static

Static Inputs
Please note that all additional VMs (vNVS and/or data nodes) will be given successive IP addresses
Enter the first static IP in eth0 IP/mask format: 10.110.1.62/22
Enter the domain name: pluribusnetworks.com
Enter the dns server IP: 10.135.2.13
Enter the gateway IP: 10.110.0.1
Enter number of UNUM VMs [1]: 1

Provisioning new UNUM + vNV
Enter desired eth1 IP/eth1 mask for master [172.16.250.150/24]:
Enter absolute path of OVA: /home/vcf/UNUM-6.2.0-8302.19-st.ova
Enter ESXi server username [root]: root
Enter ESXi server password:

Unum Inputs
Enter UNUM VM Name [unum-vm]:
Enter ESXi server IP: _
```

*SSH Terminal - UNUM Provisioning Static IP Parameters Example*
Medium Capacity Appliance Configuration (cont'd)

DHCP Assignment

Select the default dhcp and follow the onscreen prompts to complete the configuration.

SSH Terminal - UNUM Provisioning DHCP Configuration Example
Medium Capacity Appliance Configuration (cont'd)

Configuration Script

After completing entering either the static or dhcp provisioning continue with the configuration script.

![SSH Terminal - UNUM Provisioning new VEP Inputs](image-url)
ESXi Inputs

- **Enter ESXi server IP:** 10.110.1.61 (example IP address)
- **Enter ESXi server username [root]:** root
- **Enter ESXi server password:** Enter your ESXi server password

UNUM validates the inputs.

- **Available datastores:** datastore1
- **Enter datastore:** [datastore1]:

UNUM Inputs

- **Enter UNUM VM Name [unum-vm]:** Enter a name for the VM or use the default value.
- **Enter UNUM OVA:** /home/vcf/ova_files/UNUM-6.2.0-7217.11-st.ova (example version number only)
- **Enter eth1 IP/ mask for UNUM VM [172.16.250.150/24]:** (default value)

vNV Inputs

- **Enter vNV OVA:** /home/vcf/ova_files/VNV-6100315465.ova (Example version only. The version you use must match the Netvisor ONE OS version running on your switches.)
- **Enter vNV VM Password:** (The selected password must match password used on your switches.)
- **Enter number of vNVs [1]:** 2

**Note:** Switches must exist to create a fabric. Inband management only possible if switches exist.
Medium Capacity Appliance Configuration (cont'd)

Inputs for vNV 1

- **Enter VM name for vnv 1 [vnv-vm_1]:** Enter name or use default value
- **Enter fabric to join on vNV 1 [ ]: mgmt-ureg (example only)**
- **Enter vNV connection mode for vnv-vm_1 - management/inband [management]:**

Inputs for vNV 2

- **Enter VM name for vnv 2 [vnv-vm_2]:** Enter name or use default value
- **Enter fabric to join on vNV 1 [ ]: inband-ureg (example only)**
- **Enter vNV connection mode for vnv-vm_1 - management/inband [management]:** inband
- **Enter vSwitch name for inband_vnv [vnv-switch_2]:**
- **Available vmnics:** vmnic0 vmnic1 vmnic2 vmnic3 vmnic4 vmnic5 vmnic6 vmnic7 vmnic8
- **Enter up to 2 vmnic(s) connected to inband-ureg separated by comma:** vmnic2
- **Enter portgroup for vSwitch vnv-switch_2 [VmDataNet]:**
- **Enter VLAN for port group [0/4095/VLAD-ID]. Note setting VLAN to 0 indicates None; 4095 indicates All (0-4095) [ ]:**
- **Enter inband IP/mask for inband_vnv:** 172.18.201.101/24
Medium Capacity Appliance Configuration (cont'd)

Provisioning

After entering the requisite settings, UNUM begins the provisioning process and reports each configuration step.

SSH Terminal - UNUM Provisioning

```
Enter vNV VM password (to be set):
Enter number of vNVs [1]: 2

Inputs for vNV 1
Enter VM name for vnv 1 [vnv-vm_1]:
Enter fabric to join on vNV 1 [1]: mgmt-ureg
Enter vNV connection mode for vnv-vm_1 - management/inband [management]:

Inputs for vNV 2
Enter VM name for vnv 2 [vnv-vm_2]: inband_vnv
Enter fabric to join on vNV 2 [1]: inband-ureg
Enter vNV connection mode for inband_vnv - management/inband [management]: inband
Enter vSwitch name for inband_vnv [vnv-vswitch_2]:
Available vmnics: vmnic0 vmnic1 vmnic2 vmnic3 vmnic4 vmnic5 vmnic6 vmnic7 vmnic8
Enter upto 2 vmnic(s) connected to inband-ureg separated by comma: vmnic2
Enter portgroup for vSwitch vnv-vswitch_2 [VmDataNet]:
Enter VLAN for port group[0/4095/VLAN-ID]. Note setting VLAN to 0 indicates None; 4095 indicates All(0-4095) []
: Enter inband IP/mask for inband_vnv: 172.18.201.101/24

2020-02-06 11:22:58,800 setupInband INFO Setting up vSwitch vnv-vswitch_2 and portgroup VmDataNet on ESXi 10.110.1.61
2020-02-06 11:23:57,615 setupInband INFO vSwitch vnv-vswitch_2 setup succeeded
2020-02-06 11:23:57,615 vnvProvision INFO Deploying VM unum-vm
2020-02-06 11:23:57,617 vnvProvision INFO Deploying VM vnv-vm_1
2020-02-06 11:23:57,619 vnvProvision INFO Deploying VM inband_vnv
2020-02-06 11:28:32,881 vnvProvision INFO Deploying VM unum-vm successful
2020-02-06 11:28:45,570 vnvProvision INFO Deploying VM vnv-vm_1 successful
2020-02-06 11:28:47,873 vnvProvision INFO Deploying VM inband_vnv successful
2020-02-06 11:29:35,541 vnvProvision INFO eth0 IP for unum-vm on ESXi host 10.110.1.61 is 10.110.3.201
2020-02-06 11:29:47,501 vnvProvision INFO Setting up vNV unum-vm as management
2020-02-06 11:29:49,806 vnvProvision INFO Setting up vNV inband_vnv as inband
2020-02-06 11:32:22,134 vnvProvision INFO eth0 IP for vnv-vm_1 on ESXi host 10.110.1.61 is 10.110.0.216
2020-02-06 11:32:22,163 vnvProvision INFO eth0 IP for inband_vnv on ESXi host 10.110.1.61 is 10.110.3.40
2020-02-06 11:32:34,083 vnvProvision INFO Accepted EULA on 10.110.0.216
2020-02-06 11:32:34,111 vnvProvision INFO Accepted EULA on 10.110.3.40
2020-02-06 11:32:36,490 vnvProvision INFO Setting up vdata0 IP address on 10.110.3.40 for inband connectivity
2020-02-06 11:32:48,221 vnvProvision INFO Joined fabric mgmt-ureg successfully
2020-02-06 11:33:52,404 vnvProvision INFO Joined fabric inband-ureg successfully
2020-02-06 11:34:36,635 vnvProvision INFO Setting up eth1 IP address on UNUM
2020-02-06 11:38:16,733 vnvProvision INFO Setting up eth1 IP address on UNUM complete
2020-02-06 11:40:33,829 addSeedSwitch INFO Ping from UNUM 10.110.3.201 to 10.110.0.216 successful
2020-02-06 11:40:37,558 addSeedSwitch INFO Successfully added VNV vnv-vm_1 as seed switch
```
Medium Capacity Appliance Configuration (cont'd)

Optionally, monitor the provisioning from the ESXi Management Interface.

ESXi Management Interface - Monitor UNUM Provisioning
UNUM logs the provisioning output to the `provision_log` file, which is available for subsequent review.

**Note:** Once provisioning is complete, we recommend powering down the Provisioning VM.
Medium Capacity Appliance Configuration (cont'd)

Autostart Settings for VMs

After deploying the VMs, enable autostart in the event the ESXi host reboots to ensure the UNUM VMs start as well.

From the ESXi Management Interface click Manage and choose Autostart.

Click on Edit Settings and set Enabled to Yes.

![Esxi Management Interface Configure Autostart](image)

![Esxi Management Interface Enable Autostart](image)
Medium Capacity Appliance Configuration (cont'd)

Select the **UNUM VM**, click on **Enable**. Repeat the process for the **vNV VM(s)**.

![Esxi Management Interface Enable Autostart All VMs](image-url)
Medium Capacity Appliance Configuration (cont'd)

vNV Configured Switch

Login to the newly configured seed switch using the mgmt-ip address: 10.110.0.216 (in this example) to review the configuration.

SSH Terminal - UNUM Provisioning Show Switch Setup vNV Seed Switch

Login to the UNUM instance. Refer to the UNUM 6.2.0 Installation & User Guide for more information on using UNUM.
Medium Capacity Appliance Configuration (cont'd)

The Topology dashboard displays the newly configured switches and vNV instances.

![UNUM Topology Dashboard - Post Provisioning](image)

**Note:** Refer to the **UNUM 6.2.0 Installation & User Guide** for more information on using **UNUM**.
Configuring UNUM to use VMware vSphere High Availability (HA)

**Note:** Appropriate VMware licensing required when using vSphere HA. VMware vSphere Enterprise licensing recommended.

To fully utilize high availability for your UNUM instance, the general configuration process is as follows:

- Create a DataCenter on the VMware vCenter, if a datacenter does not currently exist.
- Create a VMWare Cluster.
- Create a shared Datastore.
- Migrate the standalone UNUM instance.
- Migrate the standalone vNV instance.
- Configure HA on the VMware cluster.
- Validate the configuration in VMware and UNUM Database Health.

More detailed instructions are listed below in the Configure High Availability section.

The following series of illustrations are examples of a fully configured UNUM HA instance and using UNUM to monitor cluster health.
High Availability (cont'd)

Summary

The following HA example assumes a configuration of:

- **VEP Server One** - configured on IP address 10.110.1.61.
- **VEP Server Two** - configured on IP Address 10.110.2.29.
- **unum-vm** - UNUM application instance running on Server One and fails over to Server Two as necessary.
- **vnv-vm_1** - Virtual Netvisor instance running on Server Two and fails over to Server One as necessary.

*Fully Configured High Availability UNUM Instance*
High Availability (cont'd)

VEP Cluster ESXi Hosts

- **VEP Server One** - configured on IP address 10.110.1.61
- **VEP Server Two** - configured on IP Address 10.110.2.29

![Fully Configured High Availability UNUM Instance - Hosts](image)

VEP Cluster Virtual Machines

- **unum-vm** - UNUM application instance running on Server One and fails over to Server Two as necessary.
- **vnv-vm_1** - Virtual Netvisor instance running on Server Two and fails over to Server One as necessary.

![Fully Configured High Availability UNUM Instance - Virtual Machines](image)
High Availability (cont’d)

UNUM Instance

The **unum-vm** shown currently running on Server One 10.110.1.61 and in vSphere HA protection mode (High Availability).

Should this instance go down or offline the UNUM application switches over to run on Server Two 10.110.2.29.

*Fully Configured High Availability UNUM Instance - vSphere HA Protection Mode*
High Availability (cont'd)

Datastores

- **Datastore-HC** - shared instance used by UNUM HA and VMware Heartbeat.
- **Datastore2-HC** - shared instance used for VMware Heartbeat.

![Fully Configured High Availability UNUM Instance - Redundant Datastores]

UNUM Database Health

In UNUM, **Settings → Database → Health.**

- **172.81.19.101** represents the health of the UNUM instance.

![Fully Configured High Availability UNUM Instance - Database Health]
High Availability (cont’d)

Configure High Availability (HA)

To configure HA refer to the following steps. The general process involves:

1. Creating a DataCenter on the VMware vCenter, if a datacenter does not currently exit.
2. Creating a VMWare Cluster.
3. Creating an NFS datastore.
4. Migrating the standalone UNUM instance.
5. Migrating the standalone vNV instance.
6. Configuring HA on the cluster.
7. Validating the configuration and Database Health.

Create Data Center on vCenter

If a datacenter does not exit you must create a new datacenter.

Right-click on the vSphere instance and select **New Datacenter**.

![UNUM HA - Add New Datacenter](image)
High Availability (cont'd)

Enter the name for the new datacenter.

New Datacenter

Name: VCFC-Datacenter
Location: vcfc-vcenter6.pluribusnetworks.com

UNUM HA - Add New Name

Click OK to continue.

The new datacenter appears in the dashboard.

UNUM HA - New Datacenter Dashboard
High Availability (cont'd)

**Create VMware Cluster**

Create a VMware cluster under the new datacenter by selecting the datacenter. Right-click and select **New Cluster**.
High Availability (cont'd)

Enter a name for the new cluster.

New Cluster | VCFC-Datacenter

<table>
<thead>
<tr>
<th>Name</th>
<th>VEP-Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>VCFC-Datacenter</td>
</tr>
<tr>
<td>vSphere DRS</td>
<td></td>
</tr>
<tr>
<td>vSphere HA</td>
<td></td>
</tr>
<tr>
<td>VSAN</td>
<td></td>
</tr>
</tbody>
</table>

These services will have default settings - these can be changed later in the Cluster Quickstart workflow.

Click OK to continue. The new cluster appears in the dashboard.
High Availability (cont'd)

Add Primary Hosts

Power off the deployed VMs before processing.

Highlight the new cluster and right-click and select **Add Hosts**.
Add Primary Hosts Servers One & Two.

Enter the **IP Address**, **username** and **password** for each node.

Click **Next** to continue.

Review the **Host Summary**.

Click **Next** to continue and review the entries.
High Availability (cont'd)

Click **Finish** to add the new hosts.

The hosts appear in the dashboard.
High Availability (cont'd)

Add NFS

Configure the **VMWare Cluster** to use the shared datastore.

The example below shows how to configure for **NFS**, the shared medium we have chosen:

Create a new **NFS** datastore under **Cluster → Storage → New Datastore**.

Click on **Next**.
High Availability (cont'd)

Enter **NFS** type and details.

Click on **Next**.
High Availability (cont'd)

Enter the details, including **Name**, **Folder** and **Server**.

![New Datastore](image)

**UNUM HA - Enter Datastore Details**

Click on **Next**.
High Availability (cont'd)

Select all hosts in the cluster.

New Datastore

Select the hosts that require access to the datastore.

Click Next to continue.
High Availability (cont'd)

Review all details and click **Finish** to complete the datastore configuration.

**Note:** Repeat the New Datastore process and create a second datastore for redundancy. For example, **Datastore2-HC**.
High Availability (cont'd)

Migrate UNUM Instance

You must migrate both the `unum-vm` and `vnv-vm_1` instances to the clustered datastore. This is performed in **two** separate steps.

The examples below illustrate migrating the `unum-vm` instance.

![UNUM HA - Dashboard - Ready for Migration](image_url)
High Availability (cont'd)

**Power Off** the **unum-vm** and **vnv-vm_1** instances before proceeding.

Right-click on the **unum-vm** instance and select **Migrate**.
High Availability (cont'd)

Select Migration Type

Choose **Change Storage Only** and click **Next** to continue.

Select the **Datastore** for the migration.

Click **Next** to continue.
High Availability (cont'd)

Ready To Complete

**unum-vm - Migrate**

- **1 Select a migration type**
- **2 Select storage**
- **3 Ready to complete**

Verify that the information is correct and click Finish to start the migration.

<table>
<thead>
<tr>
<th>Migration Type</th>
<th>Change storage. Leave VM on the original compute resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Machine</td>
<td>unum-vm</td>
</tr>
<tr>
<td>Storage</td>
<td>Datastore-HC</td>
</tr>
<tr>
<td>Disk Format</td>
<td>Thin Provision</td>
</tr>
</tbody>
</table>

Click **Finish** to begin the migration.

Progress is monitored in the dashboard.
High Availability (cont'd)

**Repeat** the process to migrate the `vnv-vm_1` instance.

After migrating both the `unum-vm` and the `vnv-vm_1` instances, **Power On** both instances.
High Availability (cont'd)

Configure HA on VMWare Cluster

Setup HA on VMware Cluster (if not previously configured).

Click on **Configure → vSphere Availability → Edit.**
Select **vSphere HA** to **On**.

![Edit Cluster Settings](image)

You can configure how vSphere HA responds to the failure conditions on this cluster. The following failure conditions are supported: host, host isolation, VM component protection (datastore with PDL and APD), VM and application.

**Enable Host Monitoring:**

- **Host Failure Response:** Restart VMs
- **Response for Host Isolation:** Disabled
- **Datastore with PDL:** Disabled
- **Datastore with APD:** Disabled
- **VM Monitoring:** Disabled

**UNUM HA - Configure vSphere HA On**
High Availability (cont'd)

Disable the Admission Control setting.

![Edit Cluster Settings](image)

 Admission control is a policy used by vSphere HA to ensure failover capacity within a cluster. Raising the number of potential host failures will increase the availability constraints and capacity reserved.

Define host failover capacity by

---

UNUM HA - Configure vSphere Admission Control - Disabled
Select **Heartbeat Datastores**.

![Edit Cluster Settings](image)

vSphere HA uses datastores to monitor hosts and virtual machines when the HA network has failed. vCenter Server selects 2 datastores for each host using the policy and datastore preferences specified below.

Heartbeat datastore selection policy:
- Automatically select datastores accessible from the hosts
- Use datastores only from the specified list
- Use datastores from the specified list and complement automatically if needed

<table>
<thead>
<tr>
<th>Name</th>
<th>Datastore Cluster</th>
<th>Hosts Mounting Datastore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Datastore2-HC</td>
<td>N/A</td>
<td>2</td>
</tr>
<tr>
<td>Datastore-HC</td>
<td>N/A</td>
<td>2</td>
</tr>
</tbody>
</table>

Click on **OK**.
High Availability (cont'd)

HA Configuration Validation

The **Recent Tasks** pane shows that **HA** configures successfully on the hosts and when **HA** is configured on the VMware cluster.

![UNUM HA - Configuration Validation](image)

![UNUM HA - Configuration Validation - Complete](image)
High Availability (cont'd)

The VM on **Shared Storage** shows **HA** protected.

![UNUM HA - Configuration Validation - vSphere HA Protection Enabled](image)
High Availability (cont'd)

High Availability Validation after Fail-over

In the following examples, the UNUM unum-vm instance runs on one server while the vnv-vm_1 instance runs on the second server. This instance is HA protected.

Server One running UNUM instance.

Server Two running vNV instance.
High Availability (cont'd)

Server One (10.110.1.61) then becomes unresponsive or is rebooted. The unum-vm instance is now running on Server Two (10.110.2.29) along with the vnv-vm_1 instance.

You can confirm the UNUM instance is running on the second host (10.110.2.29), Server Two, in the same VMWare Cluster.

When Server One returns online, there are now no vm instances running on the server. All instances are running on Server Two.
High Availability (cont'd)

UNUM Database Health - High Availability Validation after Fail-over

In UNUM, Settings → Database → Health monitor the datanode status.

---

**UNUM HA - Configuration Validation - Example - UNUM Datanode Status**
Submitting a Service Request

Pluribus Software Support

For Pluribus software support, you can purchase optional support contracts from your partner, reseller, or Pluribus Networks.

Purchasing a support contract from a local partner is sometimes preferred due to geographical or language requirements.

Please contract your local partner to better understand the available service programs and pricing.

If you purchased a Pluribus FreedomCare maintenance agreement, you can contact Pluribus Networks directly for support requirements.
Appendix A

UNUM Login

1. **Login** - If desired to set a static IP for Pluribus UNUM, log into the VM via the console with the credentials `vcf/changeme`.

   ![UNUM Console Login Screen](image1)

2. **Run** `./UNUM_setup.sh`:

   ![Run UNUM_setup.sh Script](image2)
Appendix A (cont'd)

Configure UNUM IP

You may now configure the Host IP by selecting Option 1. Follow the on-screen instructions for entering the Host IP address.

**Note:** Before you can configure or edit UNUM IP Addresses, you must first stop UNUM using Option 4.
Appendix A (cont'd)

Configure UNUM IP (cont'd)

```
UNUM: Configure UNUM IP Menu

0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network

(0-3): _
```
Appendix A (cont'd)

Configure UNUM IP (cont'd)

UNUM Ethernet Adapters Usage Table

<table>
<thead>
<tr>
<th>Interface</th>
<th>Purpose</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eth0</td>
<td>used for management, GUI (user interaction) and data collection via Netvisor REST. This interface uses DHCP by default.</td>
<td></td>
</tr>
<tr>
<td>Eth1</td>
<td>used for internal system communication is set to IP address 172.16.251.1 by default.</td>
<td></td>
</tr>
<tr>
<td>Eth2</td>
<td>&lt;Optional&gt; used to connect a Seed Switch or Fabric via an inband connection.</td>
<td></td>
</tr>
</tbody>
</table>

WARNING! If you change the IP address of Eth1 in a cluster configuration, you disrupt normal operations. Please contact Pluribus Networks Technical Support if you need or want to change the Eth1 address in a cluster configuration.
Appendix A (cont'd)

**Configure Docker0 IP**

UNUM uses a default docker IP address of **172.17.251.1/24** for internal communication.

**Warning:** In the majority of deployments, there is no need to change this address.

However, if you use the default range as the UNUM management network there could be network conflicts within your network. Therefore, you have the ability to modify the docker0 interface IP address using **Option 2 - Configure docker0 IP**.

Select **Option 2 - Configure docker0 IP**.

Enter the desired IP address range and mask. (Shown below as example only.)

Enter the sudo password.
Appendix A (cont’d)

UNUM updates the **docker0 IP** address, stopping and restarting services.

```
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network

(0-3):2

Enter desired docker0 IP/mask []: 192.17.241.1/24
[sudo] password for vcf:
Updating docker interface ip
2020-01-20 13:53:15 Stopping UNUM 5.2.0-SNAPSHOT ...
2020-01-20 13:53:16 Stopping vcf-elastic ...
2020-01-20 13:53:19 Stopping vcf-collector ...
2020-01-20 13:53:21 Stopping vcf-mgr ...
2020-01-20 13:53:52 Stopping skedler ...
2020-01-20 13:54:04 Stopping vcf-center ...
2020-01-20 13:53:58 Stopping vcf-dhcp ...
2020-01-20 13:53:59 Services have been successfully stopped.
2020-01-20 13:53:59 Starting UNUM 5.2.0-SNAPSHOT ...
2020-01-20 13:53:59 Starting vcf-elastic ...
2020-01-20 13:54:00 Starting vcf-collector ...
2020-01-20 13:54:01 Starting vcf-mgr ...
2020-01-20 13:54:02 Starting skedler ...
2020-01-20 13:54:03 Starting vcf-center ...
2020-01-20 13:54:04 Starting vcf-dhcp ...
2020-01-20 13:54:05 Services have been successfully started.
Press any key to continue ...
```

**UNUM - Configure Docker0 IP**

Press any key to continue.

If required, view the new **docker0 IP** address using `ifconfig` from a command prompt.

```
vcf@unum: ~ — Pluribus Networks UNUM

vcf@unum: $ ifconfig

vcf@unum:

```

**UNUM - New Docker0 IP Address**

**Note:** The **docker0 IP** address has to be a specific host IP address and mask.
Appendix A (cont'd)

Configure VCFnet Network

UNUM uses a default VCFnet IP address of 172.18.251.1/24 for internal communication.

However, if you use the default range as the UNUM management network there could be network conflicts within your network. Therefore, you have the ability to modify the VCFnet interface IP address using Option 3 - Configure vcfnet network.

UNUM - Configure VCFnet Network IP

Select Option 3 - Configure vcfnet Network.

Enter the desired IP address range and mask. (Shown below as example only.)

Enter the sudo password. UNUM updates the vcfnet IP address, stopping and restarting services.

UNUM - Configure VCFnet Network IP

Press any key to continue.
If required, view the new *vcfnet IP* address using `ifconfig` from a command prompt.

```
vcf@unum: $ ifconfig
br-fe5f5daf2a Link encap:Ethernet  HWaddr 02:42:72:4f:2d:bd
inet addr:192.18.251.1  Bcast:0.0.0.0  Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
RX packets:128530  errors:0  dropped:0  overruns:0  frame:0
TX packets:119037  errors:0  dropped:0  overruns:0  carrier:0
collisions:0  txqueuelen:0
RX bytes:32400070 (32.0 MB)  TX bytes:34109215 (34.1 MB)
```

*Note:* The *vcfnet IP* address has to be a specific network IP address and mask.

If no further configuration changes are required, use **Option 3** to restart UNUM otherwise proceed to the next step.
About Pluribus Networks

Pluribus Networks delivers an open, controllerless software-defined network fabric for modern data centers, multi-site data centers, and distributed cloud edge environments.

The Linux-based Netvisor® ONE operating system and the Unified Cloud Fabric™ have been purpose-built to deliver radically simplified networking and comprehensive visibility along with white box economics by leveraging hardware from our partners Dell EMC, Edgecore, Celestica and Champion ONE, as well as Pluribus’ own Freedom™ Series of switches.

The Unified Cloud Fabric provides a fully automated underlay and virtualized overlay with comprehensive visibility and brownfield interoperability and optimized to deliver rich and highly secure per-tenant services across data center sites with simple operations having no single point of failure.

Further simplifying network operations is Pluribus UNUM™, an agile, multi-functional web management portal that provides a rich graphical user interface to manage the Unified Cloud Fabric. UNUM has two key modules - UNUM Fabric Manager for provisioning and management of the fabric and UNUM Insight Analytics to quickly examine billions of flows traversing the fabric to ensure quality and performance.

Pluribus is deployed in more than 275 customers worldwide, including the 4G and 5G mobile cores of more than 75 Tier 1 service providers delivering mission-critical traffic across the data center for hundreds of millions of connected devices. Pluribus is networking, simplified.

For additional information contact Pluribus Networks at info@pluribusnetworks.com or visit www.pluribusnetworks.com

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