

# Pluribus UNUM™ Management Platform

Medium Capacity Appliance

Getting Started Guide

Version 6.3.1

July 2022



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## Introduction

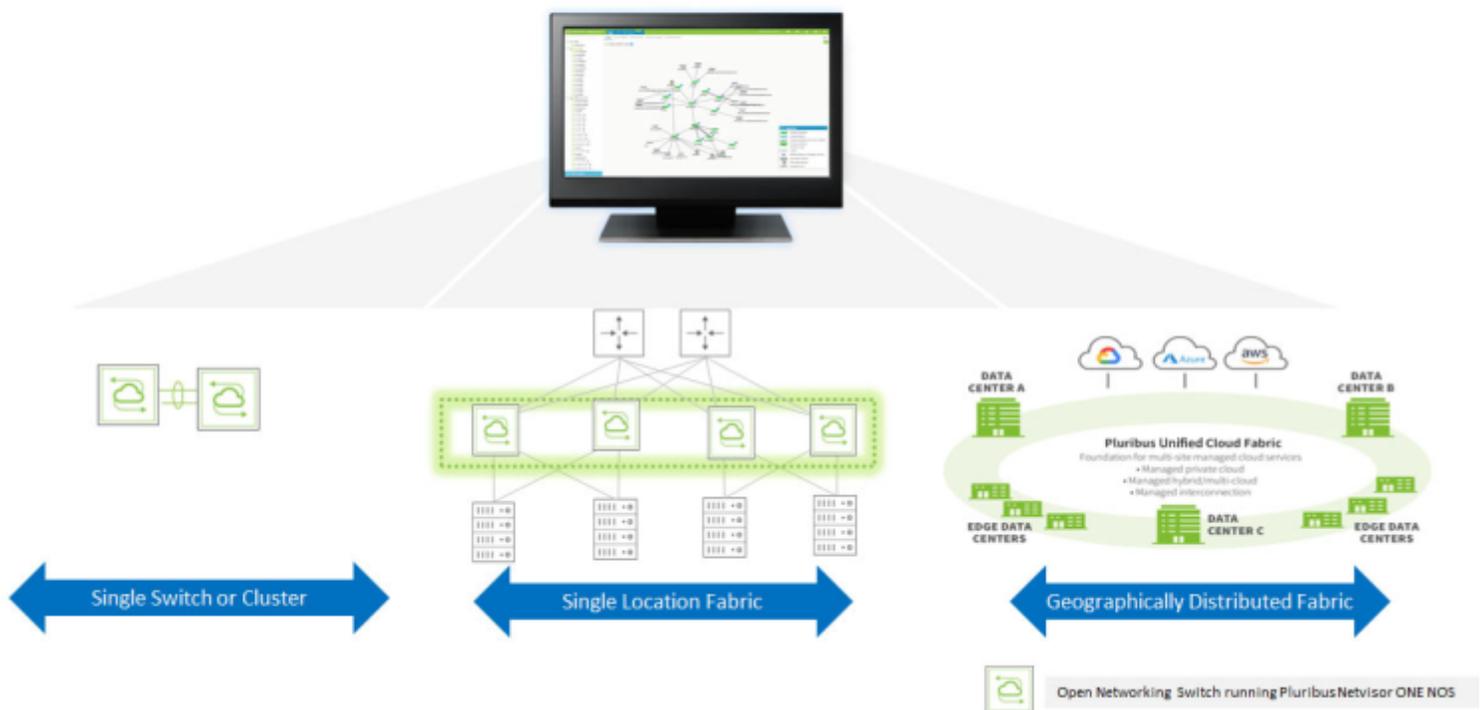
**Pluribus UNUM™ Unified Management, Automation, and Analytics Platform Software** is an application portal developed by Pluribus Networks.

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.

## Pluribus UNUM™ – Unified Automation, Management and Analytics

Deploy, Manage, Visualize Multiple Sites from ONE Pane of Glass



*Pluribus UNUM Management Platform*

## Introduction (cont'd)

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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.

## Glossary

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### Glossary of UNUM and Netvisor ONE® Terms

To review the Glossary of UNUM and Netvisor ONE® Terms, please refer to to the [HTML](#) document.

## Specifications

### Provisioning Virtual Machine Specifications

When using the Pluribus Networks Provisioning Virtual Machine (VM) to run Ansible scripts the following VM minimum specifications are required.

- **CPU** - 4 vCPU (2 core hyper threaded)
- **Memory** - 8 GB
- **Storage** - 60 GB SSD

### 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.

UNUM Medium Capacity Appliance	Features
<b>UNUM on the Medium Capacity Appliance</b>	<b>Hardware</b> <ul style="list-style-type: none"> <li>• Single Server chassis, 1 Rack Unit</li> <li>• 8 CPU cores (16 vCPU), 128 GB Ram (96 GB minimum), 960 GB SSD</li> <li>• Quad 1G Base-T NIC, dual 10G Base-T NIC</li> <li>• IPMI 2.0 + KVM with Dedicated LAN</li> <li>• Dual power supply</li> </ul> <b>Insight Analytics:</b> <ul style="list-style-type: none"> <li>• Ingest up to 1,000 connections/second</li> <li>• Retains up to 500 Million connections</li> </ul>

UNUM Standard Appliance Specifications

## Medium Capacity Appliance Specifications (cont'd)

### Software Requirements & Specifications

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

	<b>vCPU (cores)</b>	<b>RAM</b>	<b>Storage</b>
<b>UNUM Base Capacity VM</b> <sup>4</sup>	8vCPU (4-core)	64 GB	480 GB SSD
<i>UNUM Base Capacity VM — Archive Viewer</i> <sup>1,2,4</sup>	8vCPU (4-core)	64 GB	480 GB SSD
<b>UNUM Medium Capacity VM</b> <sup>4</sup>	8vCPU (4-core)	64 GB	960 GB SSD
<i>UNUM Medium Capacity VM — Archive Viewer</i> <sup>1,2,4</sup>	8vCPU (4-core)	64 GB	960 GB SSD
<b>UNUM High Capacity VM Cluster</b> <sup>2,4</sup>	Special	Special	Special
<i>UNUM High Capacity VM — Archive Viewer</i> <sup>1,2,4</sup>	Special	Special	Special

<sup>1</sup> UNUM Archiver requires the Archiver license and a shared NFS SSD storage to store daily analytics snapshots.

<sup>2</sup> 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.

<sup>3</sup> Customers wishing to use UNUM Archiver will require resources for a second VM (provided with the license).

<sup>4</sup> 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.

Bring Your Own Server	UNUM Base Capacity Virtual Machine <sup>5</sup>	UNUM Medium Capacity Virtual Machine <sup>5</sup>	UNUM High Capacity VM Cluster <sup>1,5</sup>
<b>CPU</b>	16 vCPU (8-core) <sup>2</sup>	16 vCPU (8-core) <sup>2</sup>	32 vCPU (16-core) <sup>2</sup> per server
<b>Memory</b>	96 GB	96 GB	256 GB per server
<b>Local SSD</b>	480 GB <sup>4,6</sup>	960 GB <sup>4,6</sup>	1920 GB <sup>1,7</sup> per server
<b>Shared NFS SSD</b>	480 GB required for HA <sup>3,4</sup>	960 GB required for HA <sup>3,4</sup>	960 GB required for HA <sup>3,4</sup>
<b>VMWare ESXi Hypervisor</b>	6.7, 7.0	6.7, 7.0	6.7, 7.0
<b>Client Requirements</b>	Google Chrome (Version 44+) Mozilla Firefox (Version 39+)	Google Chrome (Version 44+) Mozilla Firefox (Version 39+)	Google Chrome (Version 44+) Mozilla Firefox (Version 39+)
<b>NIC</b>	Dual 10G Base-T NIC <sup>8</sup>	Dual 10G Base-T NIC <sup>8</sup>	Dual 10G Base-T NIC <sup>8</sup>
<b>High Availability (HA)</b>	Yes <sup>3,7</sup>	Yes <sup>3,7</sup>	Yes <sup>3,7</sup>

<sup>1</sup> The High Capacity VM cluster can be installed as a cluster on four dedicated DELL RX740 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.

<sup>2</sup> All versions of UNUM require CPU clock speeds of 2.4 GHz CPU's or higher.

<sup>3</sup> All High Availability configurations require the following: UNUM 6.0+, the VMware vSphere 6 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.

<sup>4</sup> Solid State Drives are required on all UNUM platforms.

<sup>5</sup> No specific VMware license requirements for non-HA environments (ESXi free is OK).

<sup>6</sup> 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.

<sup>7</sup> 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.

<sup>8</sup> 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.

#### UNUM Virtual Machines - Server Hardware Specifications

### 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. UNUM is ready to go.

#### UNUM High Capacity Appliance<sup>1</sup>

<b>CPU</b>	32 vCPU (16-core) per server
<b>Memory</b>	256 GB per server
<b>Local SSD</b>	1920 GB per server
<b>Shared NFS SSD</b>	960 GB required for HA
<b>VMWare ESXi Hypervisor</b>	6.7, 7.0
<b>Client Requirements</b>	Google Chrome (Version 44+) Mozilla Firefox (Version 39+)
<b>NIC</b>	Dual 10G Base-T NIC
<b>High Availability (HA)</b>	Yes
<b>Rack Dimensions</b>	1ru Base/Medium, 2ru High Capacity

<sup>1</sup> The High Capacity appliance is four dedicated nodes of the listed specifications.

#### UNUM High Capacity Appliance Specifications

## Medium Capacity Appliance Specifications (cont'd)

### UNUM Fabric Manager Scalability Matrix

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

<sup>1</sup> Records storage is a rolling first-in first-out window of both flow (nvFlow) and switch analytics records.  
<sup>2</sup> 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).  
<sup>3</sup> 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.  
<sup>4</sup> Maximum fabric size of 32 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.  
<sup>5</sup> Super Fabric can manage up to four pods, up to 128 leafs and up to 12 spines. Without super fabric any combination of leafs and spines are supported up to 140 total, 32 nodes maximum per fabric.  
<sup>6</sup> Number of simultaneous stats collected every ten seconds.  
<sup>7</sup> A Tunnel is a virtual connection between two fabric end points.

UNUM Fabric Manager Scalability

### UNUM Insight Analytics Scalability Matrix

	UNUM Base Capacity VM/Appliance	UNUM Medium Capacity VM/Appliance	UNUM High Capacity VM Cluster/Appliance
IA Maximum Records Stored <sup>1,2,3</sup>	100 million	500 million	2 billion
IA Analytics Records, Maximum days <sup>1,3</sup>	Up to 30 Days	Up to 30 Days	Up to 30 Days <sup>4</sup>
IA Peak Ingestion Rate <sup>3</sup>	1000 flows/sec	1000 flows /sec	10,000 flows/sec

<sup>1</sup> Records storage is a rolling first-in first-out window of both flow (nvFlow) and switch analytics records.  
<sup>2</sup> Long-term retention of records, up to the value stated (100M, 500M, 2B). Variations based on network traffic can occur.  
<sup>3</sup> Ingestion rate will affect the number of days of records are stored. This can vary based on fabric size and traffic patterns.  
<sup>4</sup> 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.

#### *UNUM Licensing Information*

Please refer to the [UNUM Supported Features Table](#) for more information.

## Physical Installation

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### 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

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### Medium Capacity Appliance Hardware Overview

(based on Dell VEP 4600 platform)



*UNUM Dell Virtual Edge Platform 4600*

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)

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### 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)

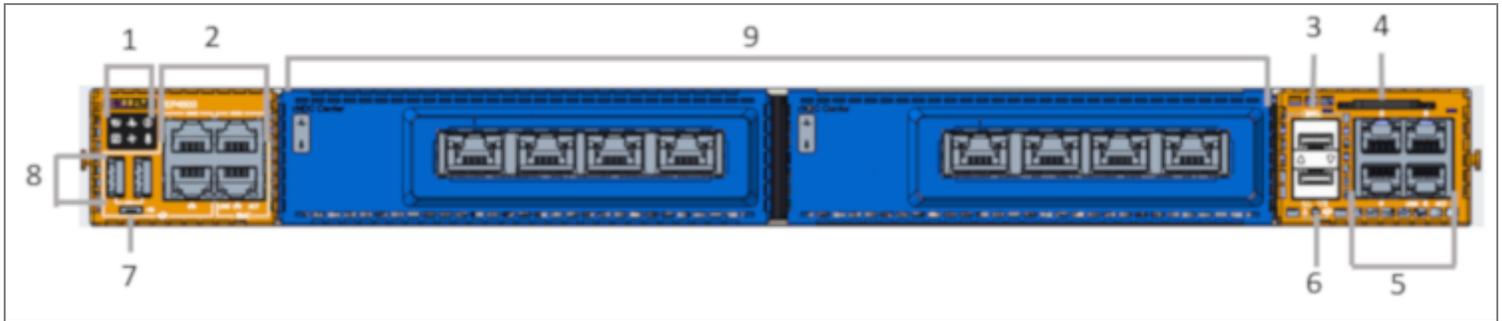
## System Interface

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### Medium Capacity Appliance - System Interface

#### Dell VEP4600 System Overview

#### I/O Panel View

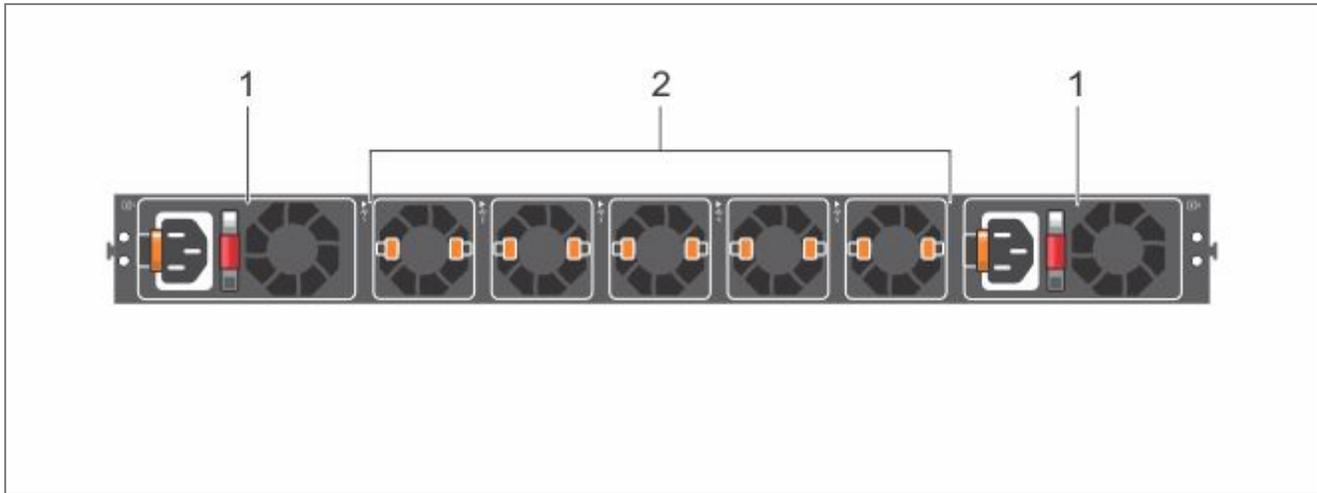


*I/O Panel View*

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)

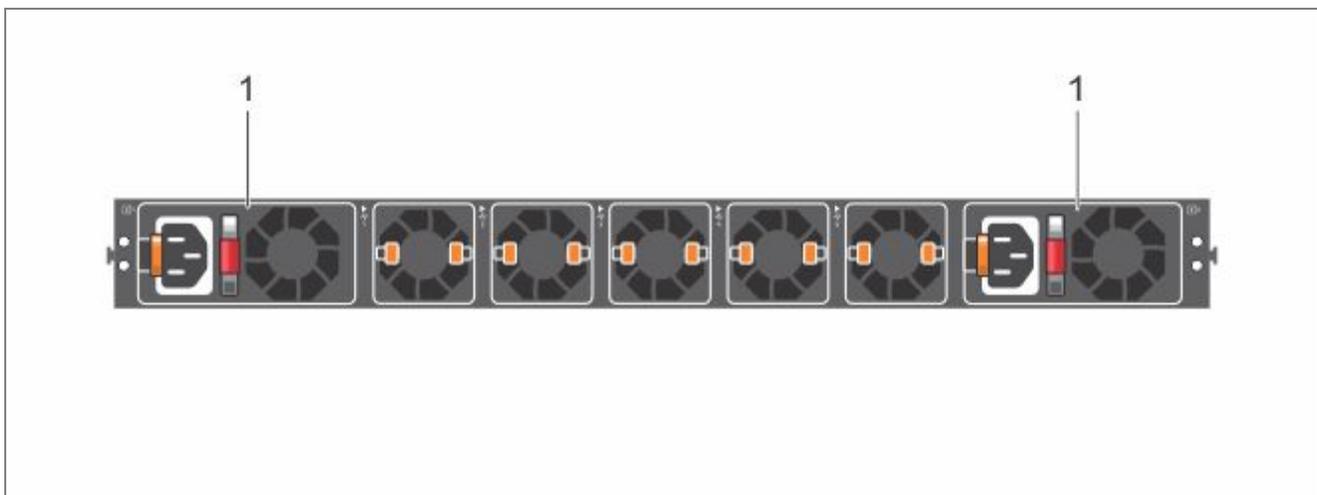
### Power Supply (PSU) View



Power Supply View

1. PSUs
2. Fans

### PSU LEDs



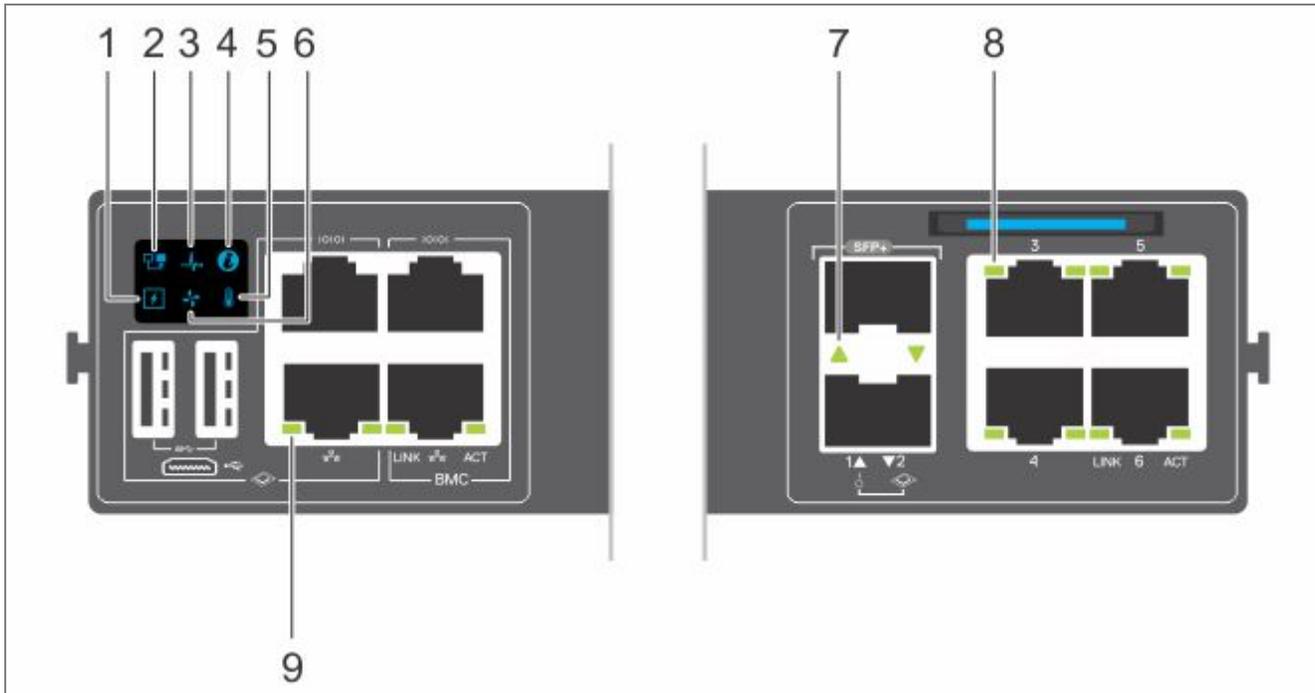
Power Supply LEDs

- 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.

## System Interface (cont'd)

### 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.



Control Panel LEDs

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)

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### LED Behavior

<b>LED</b>	<b>Description</b>
System Status/Health LED	<ul style="list-style-type: none"> <li>• Off - system off or in standby</li> <li>• Solid green—Normal operation</li> <li>• Flashing green—Booting</li> <li>• Solid yellow (amber)—Critical system error or CPU power off.</li> <li>• Flashing yellow—Noncritical system error, fan failure, or power supply failure</li> </ul>
Power LED	<ul style="list-style-type: none"> <li>• Off - system off or in standby</li> <li>• Solid Green—Normal operation</li> <li>• Solid yellow—POST is in process</li> <li>• Flashing yellow—Power supply failed</li> </ul>
Master LED	<ul style="list-style-type: none"> <li>• Solid green—platform is in stacking Master or Stand alone mode</li> <li>• Off - system is slave of the stack or system in standby</li> </ul>
FAN LED	<ul style="list-style-type: none"> <li>• Off - system off or in standby</li> <li>• Solid green—Normal operation; fan powered and running at the expected RPM</li> <li>• Solid yellow—Fan failed</li> </ul>
PSU LED	<ul style="list-style-type: none"> <li>• Off—No power</li> <li>• Solid green—Normal operation or standby mode</li> <li>• Solid yellow—Power supply critical event causing a shutdown</li> <li>• Flashing yellow—PSU warning event; power continues to operate</li> </ul>

## System Interface (cont'd)

---

### LED Behavior (cont'd)

- |                                 |   |
|---------------------------------|---|
| LOCATOR<br>LED/System<br>Beacon | <ul style="list-style-type: none"><li>• Off—Locator function disabled</li><li>• FFashing blue with 1 sec on and 1 sec off – Locator function enabled</li><li>• Flashing blue with 2 sec on and 1 sec off – system in standby</li></ul>  |
| Temperature<br>status LED       | <ul style="list-style-type: none"><li>• Off - system off or in standby</li><li>• Solid green—temperature is normal</li><li>• Solid yellow—temperature is at the limit</li><li>• Flashing yellow—temperature is over the limit</li></ul>   |
| RJ-45 Ethernet<br>LED           | <ul style="list-style-type: none"><li>• Off—no link and no activity detected</li><li>• On—Activity on the port</li><li>• Solid yellow—Link operating at a lower speed</li><li>• Solid green—Link operating at a maximum speed—1G</li><li>• Flashing green—Port activity</li></ul> |

## System Interface (cont'd)

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### System Management Ethernet Port LEDs

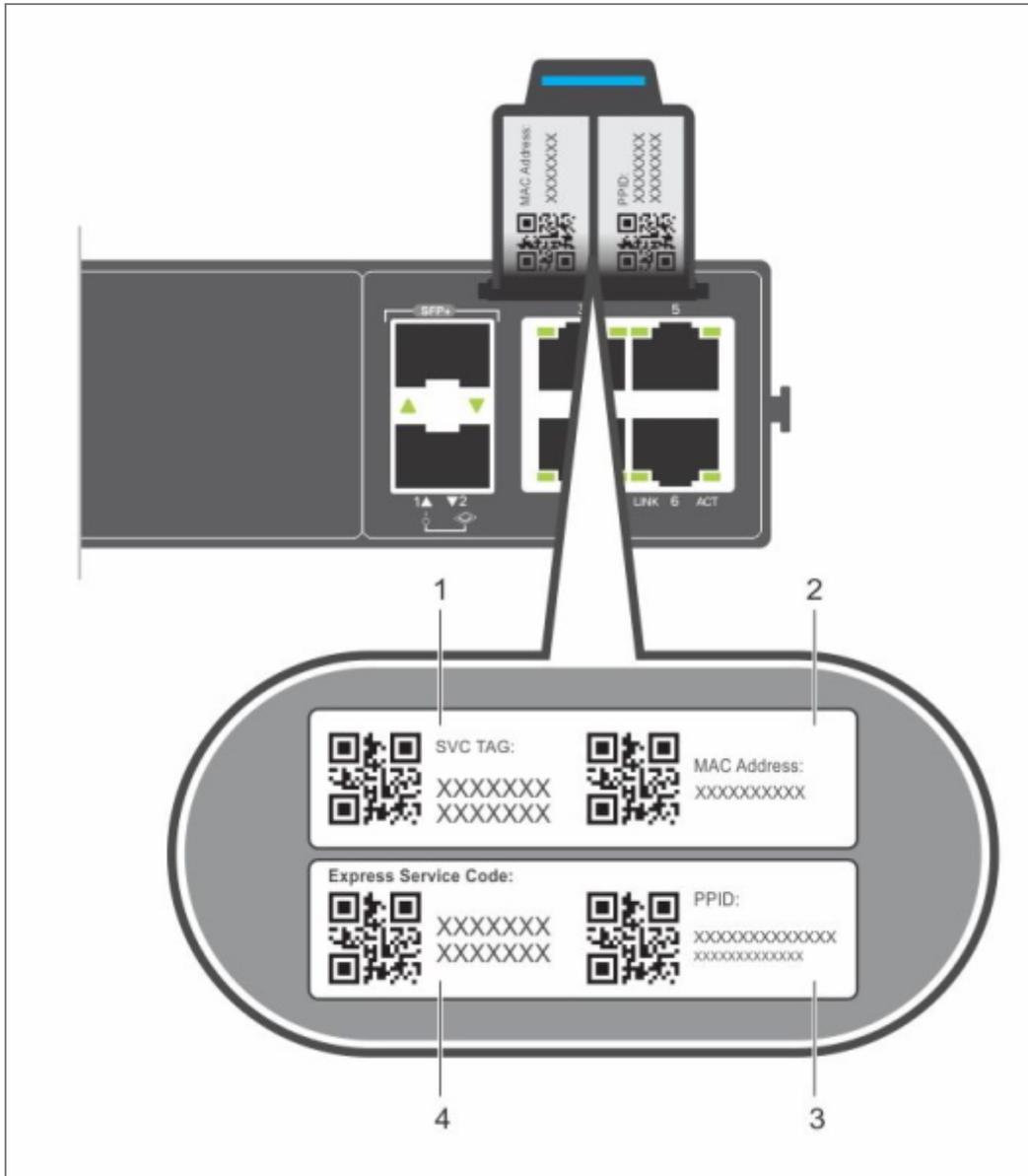
- |              |   |
|--------------|---|
| Link LED     | <ul style="list-style-type: none"><li>• Off—No link</li><li>• Solid green—Link operating at a maximum speed, auto-negotiated/forced or 1G</li><li>• Solid yellow—Link operating at a lower speed, auto-negotiated/forced or 10/100M</li></ul> |
| Activity LED | <ul style="list-style-type: none"><li>• Off—No link</li><li>• Flashing green—Port activity</li></ul>  |

### SFP+ Port LEDs

- |                   |   |
|-------------------|---|
| Link/Activity LED | <ul style="list-style-type: none"><li>• Off—No link</li><li>• Solid green—Link operating at maximum speed, 10G</li><li>• Solid yellow—Link operating at a lower speed, 1G</li><li>• Flashing green—port activity for 10G</li><li>• Flashing yellow—port activity for 1G</li></ul> |
|-------------------|---|

## System Interface (cont'd)

### Luggage Tag



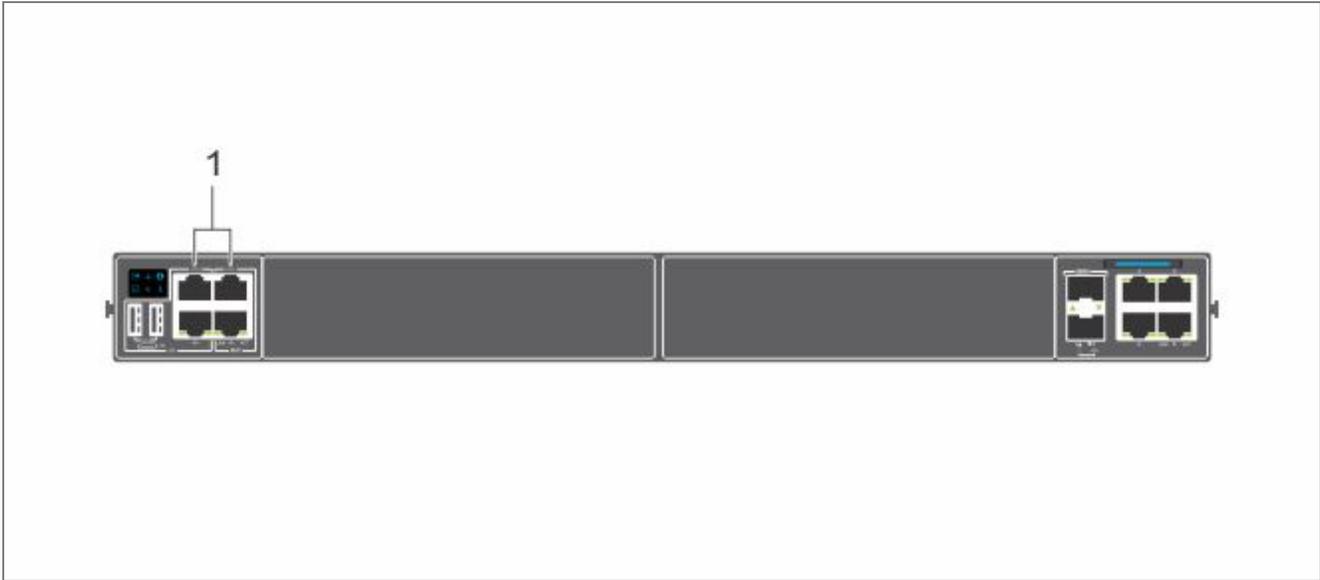
*Luggage Tag*

1. SVC tag
2. MAC address
3. PPID
4. Express service code

## System Interface (cont'd)

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### Management Ports



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)

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### 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

## UNUM Medium Capacity Appliance Configuration

---

### 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.

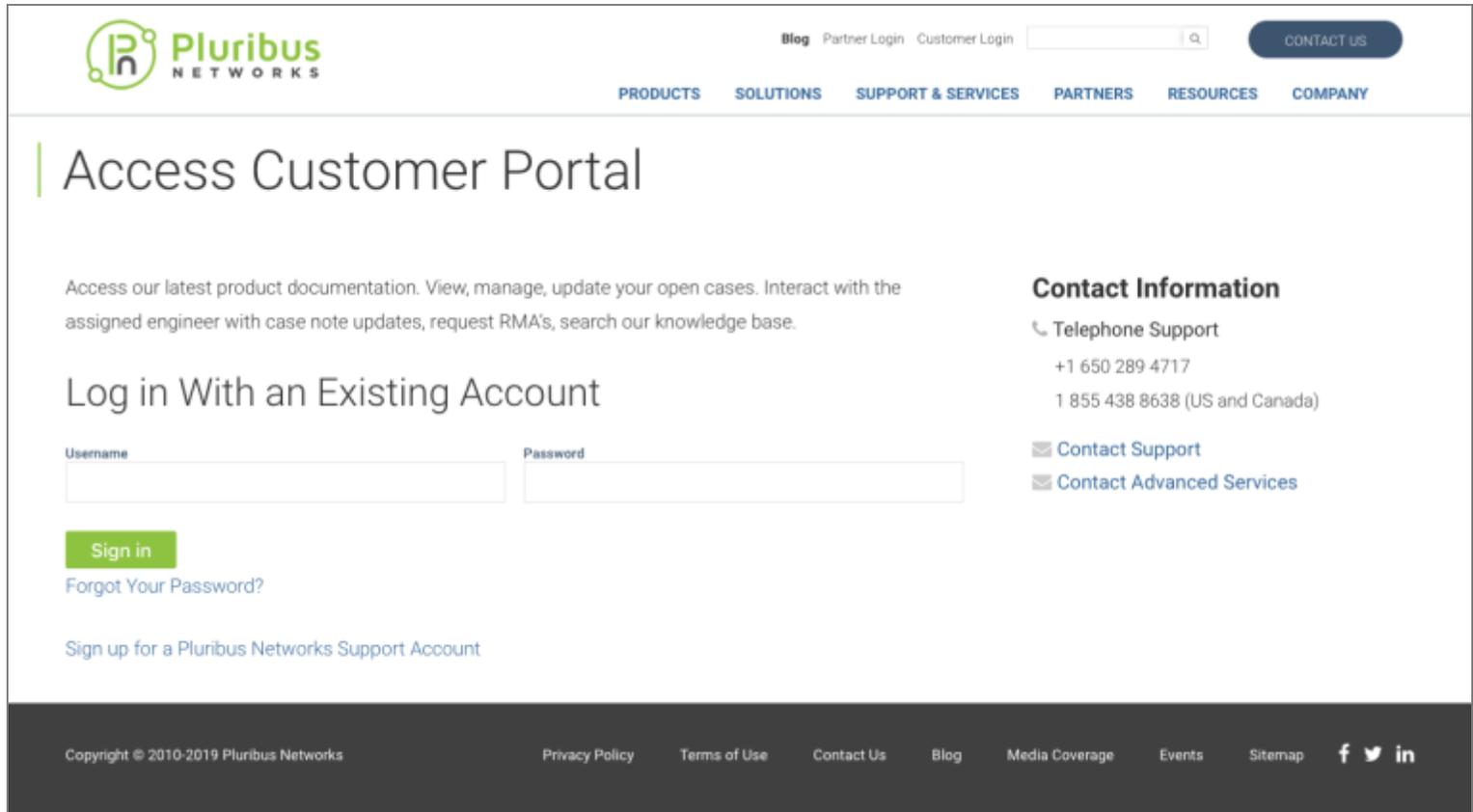
If you do not have credentials for the Customer Portal, please [Contact Support](#) **AND** fill out the following:

**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.

## Medium Capacity Appliance Configuration (cont'd)

Log in to the Customer Portal using the credentials provided.

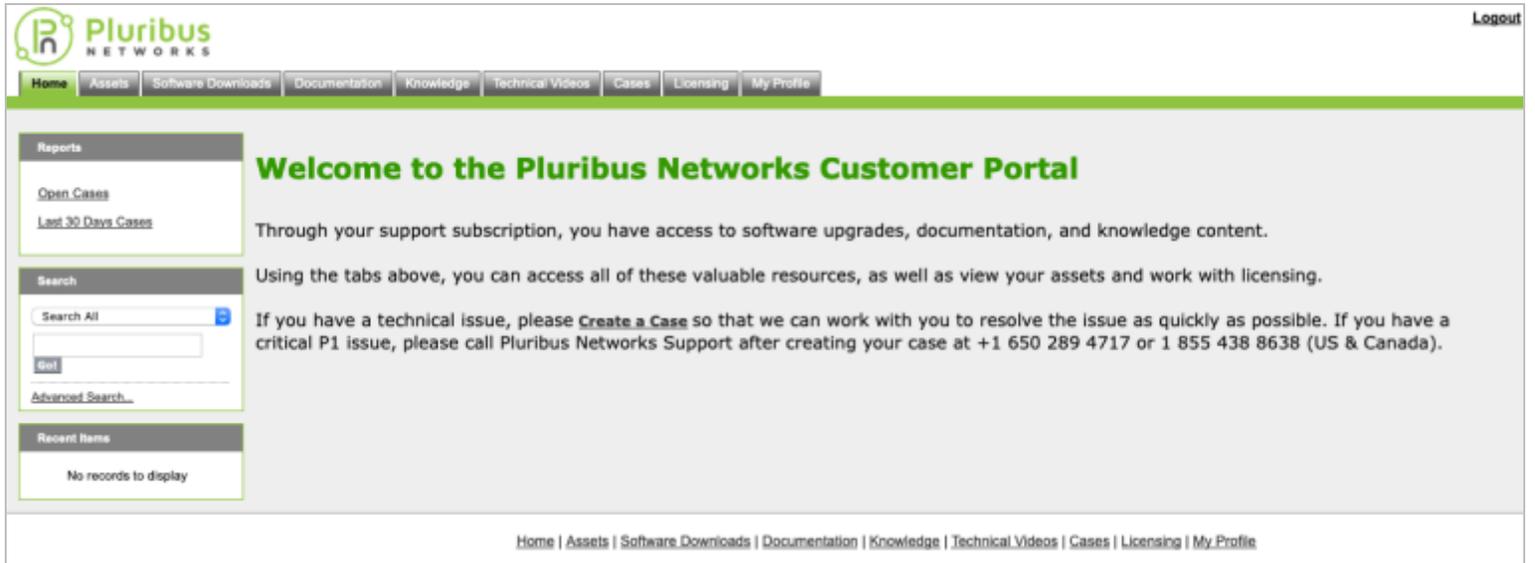


The screenshot shows the Pluribus Networks Customer Portal login page. At the top left is the Pluribus Networks logo. To the right are links for 'Blog', 'Partner Login', and 'Customer Login', followed by a search bar and a 'CONTACT US' button. A navigation menu below the header includes 'PRODUCTS', 'SOLUTIONS', 'SUPPORT & SERVICES', 'PARTNERS', 'RESOURCES', and 'COMPANY'. The main heading is 'Access Customer Portal'. Below this is a paragraph: '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.' The primary action is 'Log in With an Existing Account', which includes a 'Sign in' button and a 'Forgot Your Password?' link. To the right, under 'Contact Information', there are details for 'Telephone Support' (+1 650 289 4717, 1 855 438 8638) and checkboxes for 'Contact Support' and 'Contact Advanced Services'. At the bottom, there is a footer with copyright information (© 2010-2019 Pluribus Networks) and various links: Privacy Policy, Terms of Use, Contact Us, Blog, Media Coverage, Events, Sitemap, and social media icons for Facebook, Twitter, and LinkedIn.

*Pluribus Networks Customer Portal*

## Medium Capacity Appliance Configuration (cont'd)

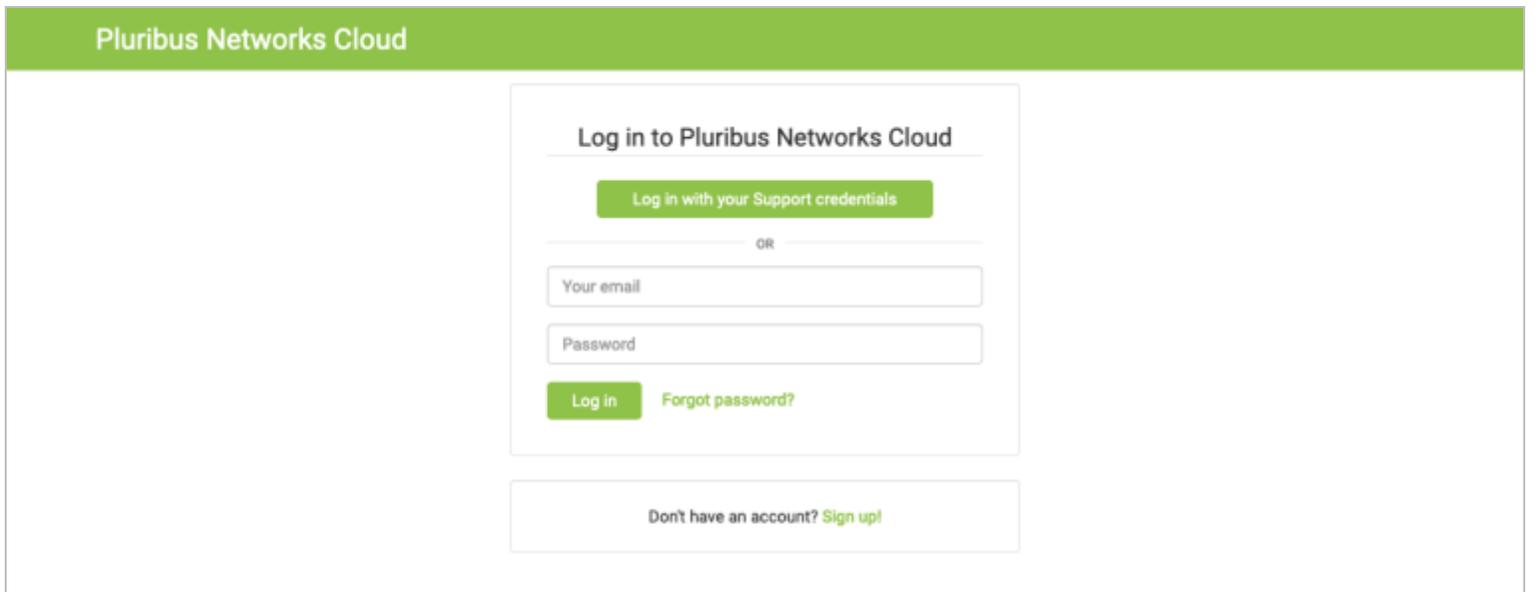
Upon successfully logging in you are greeted by a welcome screen.



The screenshot shows the Pluribus Networks Customer Portal. At the top left is the Pluribus Networks logo. A navigation bar contains links for Home, Assets, Software Downloads, Documentation, Knowledge, Technical Videos, Cases, Licensing, and My Profile. On the right is a Logout link. The main content area features a 'Reports' sidebar with 'Open Cases' and 'Last 30 Days Cases' links. The central heading is 'Welcome to the Pluribus Networks Customer Portal'. Below this, a message states: 'Through your support subscription, you have access to software upgrades, documentation, and knowledge content. Using the tabs above, you can access all of these valuable resources, as well as view your assets and work with licensing. If you have a technical issue, please [Create a Case](#) so that we can work with you to resolve the issue as quickly as possible. If you have a critical P1 issue, please call Pluribus Networks Support after creating your case at +1 650 289 4717 or 1 855 438 8638 (US & Canada)'. A search box is located on the left, and a 'Recent Items' section shows 'No records to display'. A footer navigation bar repeats the links from the top navigation bar.

Pluribus Networks Customer Portal Welcome Screen

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



The screenshot shows the 'Pluribus Networks Cloud' login screen. The header is 'Pluribus Networks Cloud'. The main heading is 'Log in to Pluribus Networks Cloud'. There is a green button labeled 'Log in with your Support credentials'. Below this is an 'OR' separator. There are two input fields: 'Your email' and 'Password'. A green 'Log in' button and a 'Forgot password?' link are positioned below the password field. At the bottom, there is a box containing the text 'Don't have an account? [Sign up!](#)'.

Pluribus Networks Cloud UNUM Login Screen

## Medium Capacity Appliance Configuration (cont'd)

### PN Cloud Software User Interface

Pluribus Networks Cloud
Welcome  
Pluribus Customer

- DASHBOARD
- ACTIVATIONS
- DEVICES
- DOWNLOADS
  - CURRENT
  - ARCHIVES
- LOGOUT
- SUPPORT CENTER

**UNUM**

Pluribus UNUM is a Unified Management, Automation and Analytics Platform. Its a web application portal that enables network administrators to configure features and view telemetry data, of the Pluribus Networks Adaptive Cloud Fabric.

Name	Version	Platform	Checksum	Documentation	Download	
UNUM 6.1.1 OVA Image (UNUM-LIC & IA-MOD-LIC (100M Flow Support))	6.1.1-7894	ESXi 6.7	48a896dcb9075874d8899dfdaec317f1		<a href="#">Download</a>	
UNUM 6.1.1 VEP OVA Image (Dell VEP4600: UNUM-LIC & IA-MOD-VEP-LIC (500M Flow Support))	6.1.1-7894	ESXi 6.7	fc84b782371337a25df1ec6da5593c83		<a href="#">Download</a>	
UNUM 6.1.1 Upgrade Image (from 5.2.x, 6.0.x, 6.1.x ONLY)	6.1.1-7894	ESXi 6.7	7b7156ac00331d8e15e368cded198f16		<a href="#">Download</a>	
6.1.1 Provisioning OVA (VEP deployments ONLY)	6.1.1-7894	ESXi 6.7	e34a188595f576c2b74c8f398cf62ec9		<a href="#">Download</a>	

Pluribus Networks Cloud Welcome Screen and Menu

## Medium Capacity Appliance Configuration (cont'd)

### Download UNUM Image

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

Pluribus Networks Cloud
Welcome  
Pluribus Customer

- DASHBOARD
- ACTIVATIONS
- DEVICES
- DOWNLOADS
- CURRENT
- ARCHIVES
- LOGOUT
- SUPPORT CENTER

**UNUM**

Pluribus UNUM is a Unified Management, Automation and Analytics Platform. Its a web application portal that enables network administrators to configure features and view telemetry data, of the Pluribus Networks Adaptive Cloud Fabric.

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UNUM 6.1.1 VEP OVA Image (Dell VEP4600: UNUM-LIC & IA-MOD-VEP-LIC (500M Flow Support))	6.1.1-7894	ESXi 6.7	fc84b782371337a25df1ec6da5593c83		Download	
UNUM 6.1.1 Upgrade Image (from 5.2.x, 6.0.x, 6.1.x ONLY)	6.1.1-7894	ESXi 6.7	7b7156ac00331d0e15e368cded198f16		Download	
6.1.1 Provisioning OVA (VEP deployments ONLY)	6.1.1-7894	ESXi 6.7	e34a188595f576c2b74c8f398cf62ec9		Download	

*Pluribus Networks Cloud UNUM Download*

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.

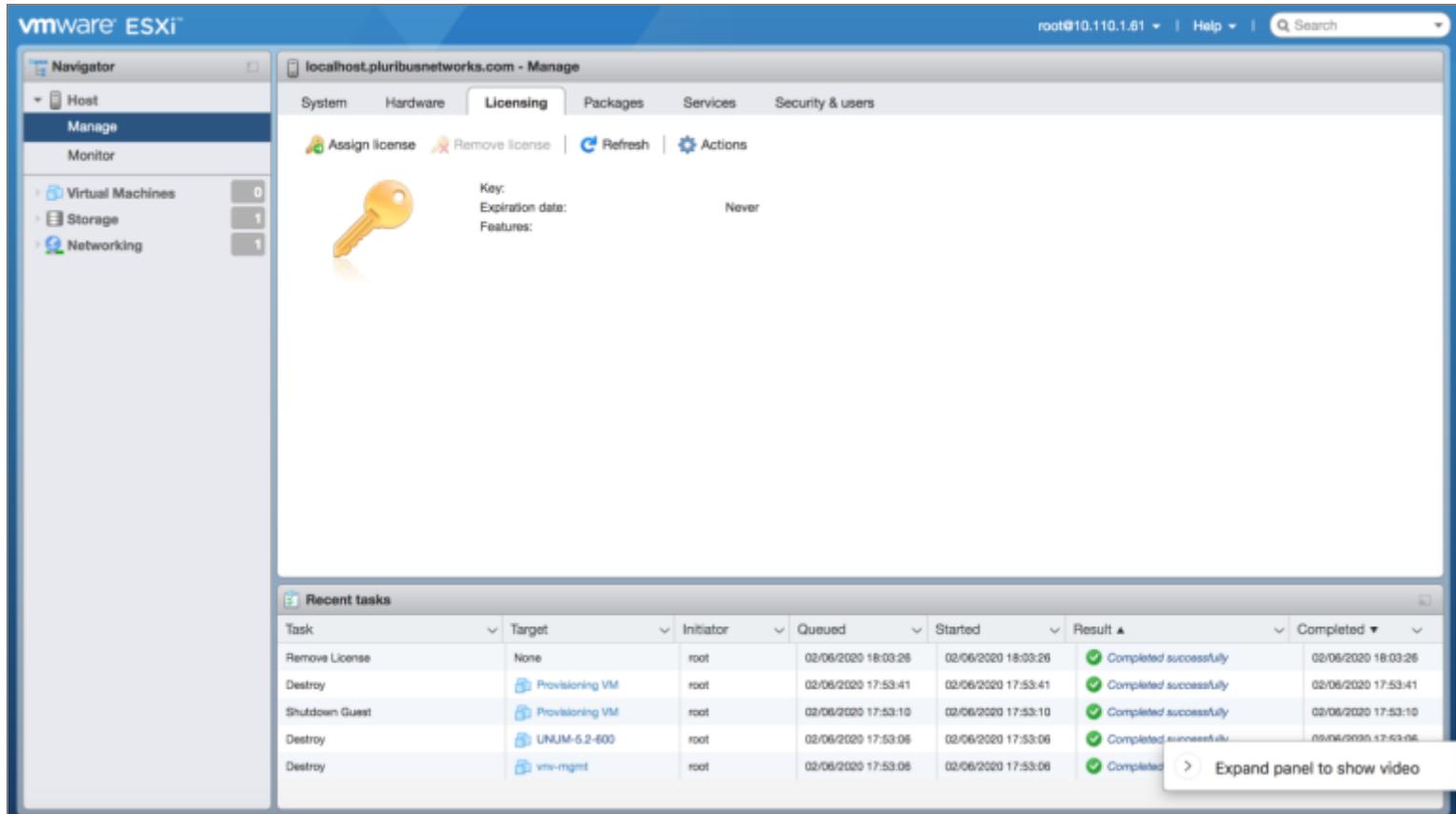
## Medium Capacity Appliance Configuration (cont'd)

### 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.



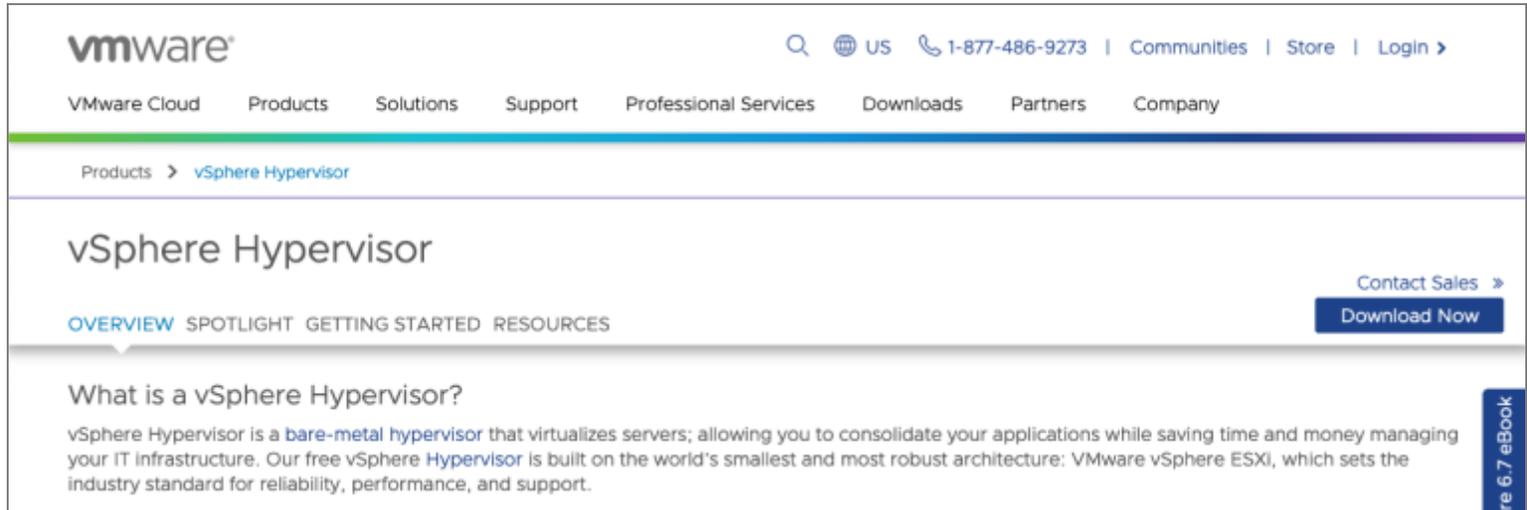
ESXi Management Interface - Licensing Tab - No License

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> 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.

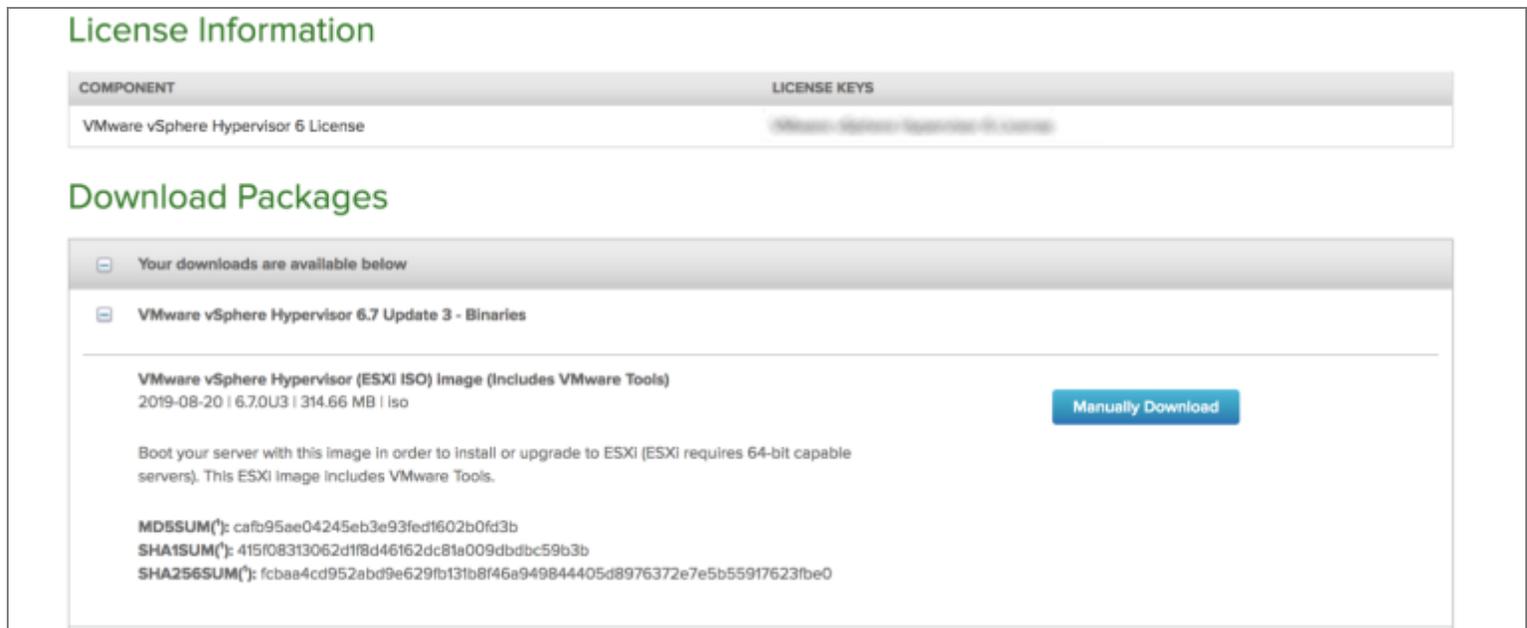
## Medium Capacity Appliance Configuration (cont'd)

### vSphere Hypervisor User Interface



The screenshot shows the VMware website's product page for vSphere Hypervisor. The VMware logo is in the top left, and navigation links for US, phone number, and other services are in the top right. A secondary navigation bar includes links for VMware Cloud, Products, Solutions, Support, Professional Services, Downloads, Partners, and Company. The breadcrumb trail shows 'Products > vSphere Hypervisor'. The main heading is 'vSphere Hypervisor', with a 'Contact Sales' link and a 'Download Now' button. Below the heading are tabs for 'OVERVIEW', 'SPOTLIGHT', 'GETTING STARTED', and 'RESOURCES'. The main content area starts with the question 'What is a vSphere Hypervisor?' followed by a paragraph describing it as a bare-metal hypervisor that virtualizes servers. A vertical 'eBook' label is visible on the right side of the page.

VMware Website - Download License



The screenshot displays the 'License Information' and 'Download Packages' sections of the VMware website. The 'License Information' section contains a table with two columns: 'COMPONENT' and 'LICENSE KEYS'. The table lists 'VMware vSphere Hypervisor 6 License' with a corresponding license key. Below this, the 'Download Packages' section is titled 'VMware vSphere Hypervisor 6.7 Update 3 - Binaries'. It features a 'Manually Download' button and provides details for the 'VMware vSphere Hypervisor (ESXI ISO) Image (Includes VMware Tools)', including the date (2019-08-20), version (6.7.0U3), size (314.66 MB), and format (iso). A paragraph explains that booting the server with this image is required for installation or upgrade to ESXi. At the bottom, three checksums are listed: MD5SUM(\*), SHA1SUM(\*), and SHA256SUM(\*) with their respective values.

VMware Website - VMware Licenses

## Medium Capacity Appliance Configuration (cont'd)

Enter the key using **Assign License**.

 **Assign license**

 License key

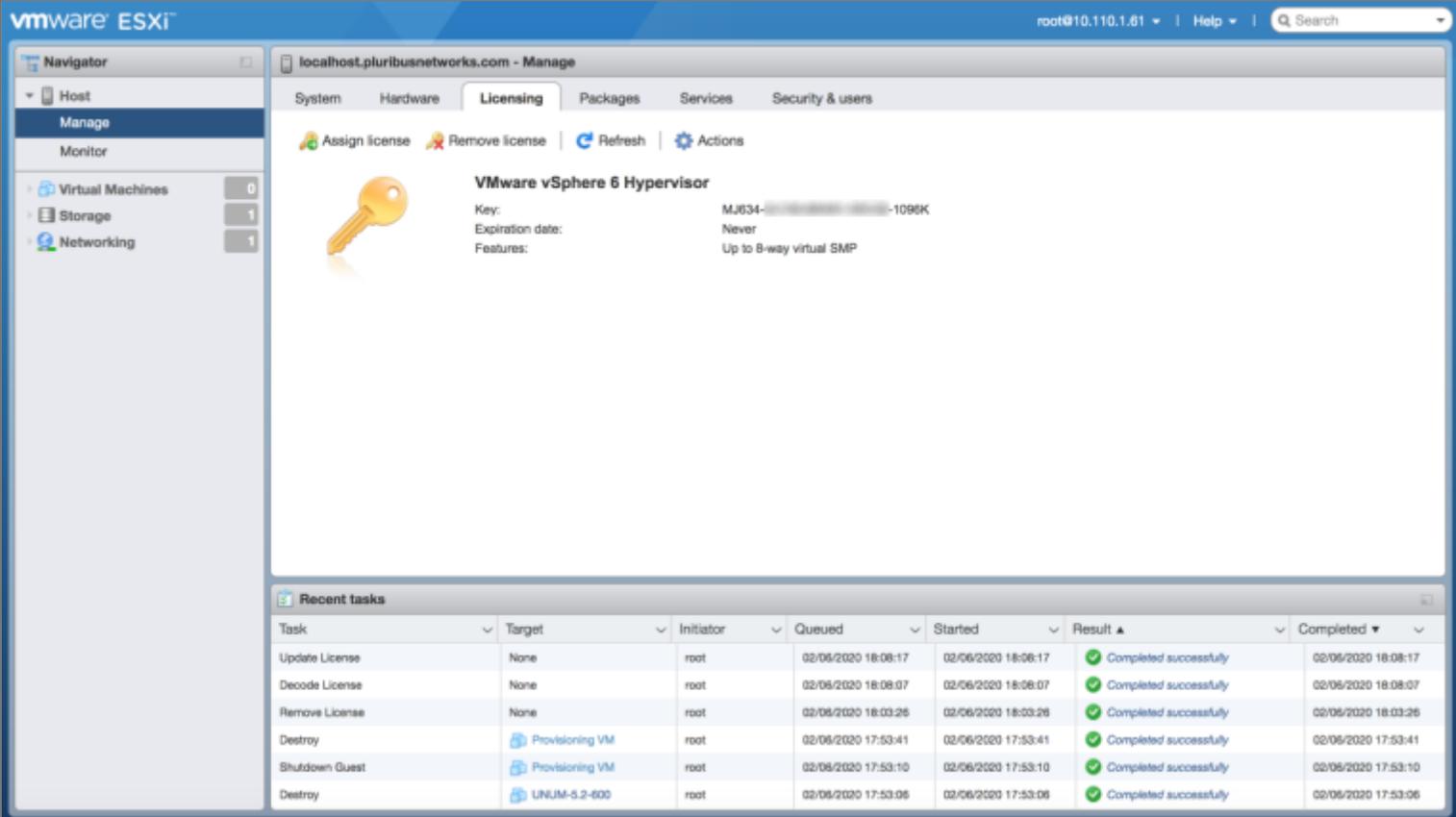


License key is valid for **VMware vSphere 6 Hypervisor**

*ESXi Management Interface - Licensing Tab - Assign License*

## Medium Capacity Appliance Configuration (cont'd)

The ESXi dashboard updates with the valid key information.



The screenshot shows the VMware ESXi Management Interface, specifically the Licensing tab. The interface displays the license information for the VMware vSphere 6 Hypervisor. The license key is MJ634-...-1096K, with an expiration date of Never and features including Up to 8-way virtual SMP. Below the license details, a table of recent tasks is visible, showing several tasks completed successfully, including Update License, Decode License, Remove License, Destroy, Shutdown Guest, and Destroy.

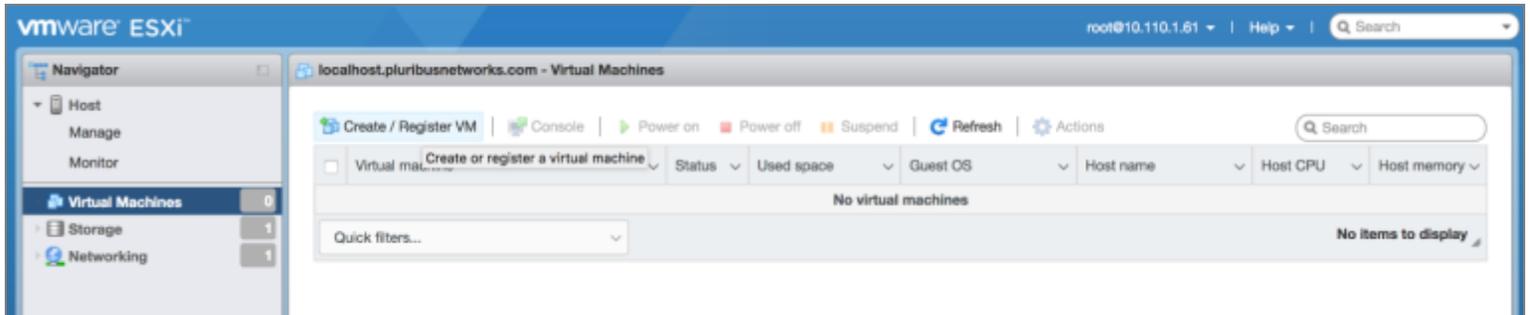
Task	Target	Initiator	Queued	Started	Result	Completed
Update License	None	root	02/06/2020 18:08:17	02/06/2020 18:08:17	Completed successfully	02/06/2020 18:08:17
Decode License	None	root	02/06/2020 18:08:07	02/06/2020 18:08:07	Completed successfully	02/06/2020 18:08:07
Remove License	None	root	02/06/2020 18:03:26	02/06/2020 18:03:26	Completed successfully	02/06/2020 18:03:26
Destroy	Provisioning VM	root	02/06/2020 17:53:41	02/06/2020 17:53:41	Completed successfully	02/06/2020 17:53:41
Shutdown Guest	Provisioning VM	root	02/06/2020 17:53:10	02/06/2020 17:53:10	Completed successfully	02/06/2020 17:53:10
Destroy	UNUM-5.2-600	root	02/06/2020 17:53:06	02/06/2020 17:53:06	Completed successfully	02/06/2020 17:53:06

ESXi Management Interface - Licensing Tab - New License

## Medium Capacity Appliance Configuration (cont'd)

### Configure ESXi and Create VM

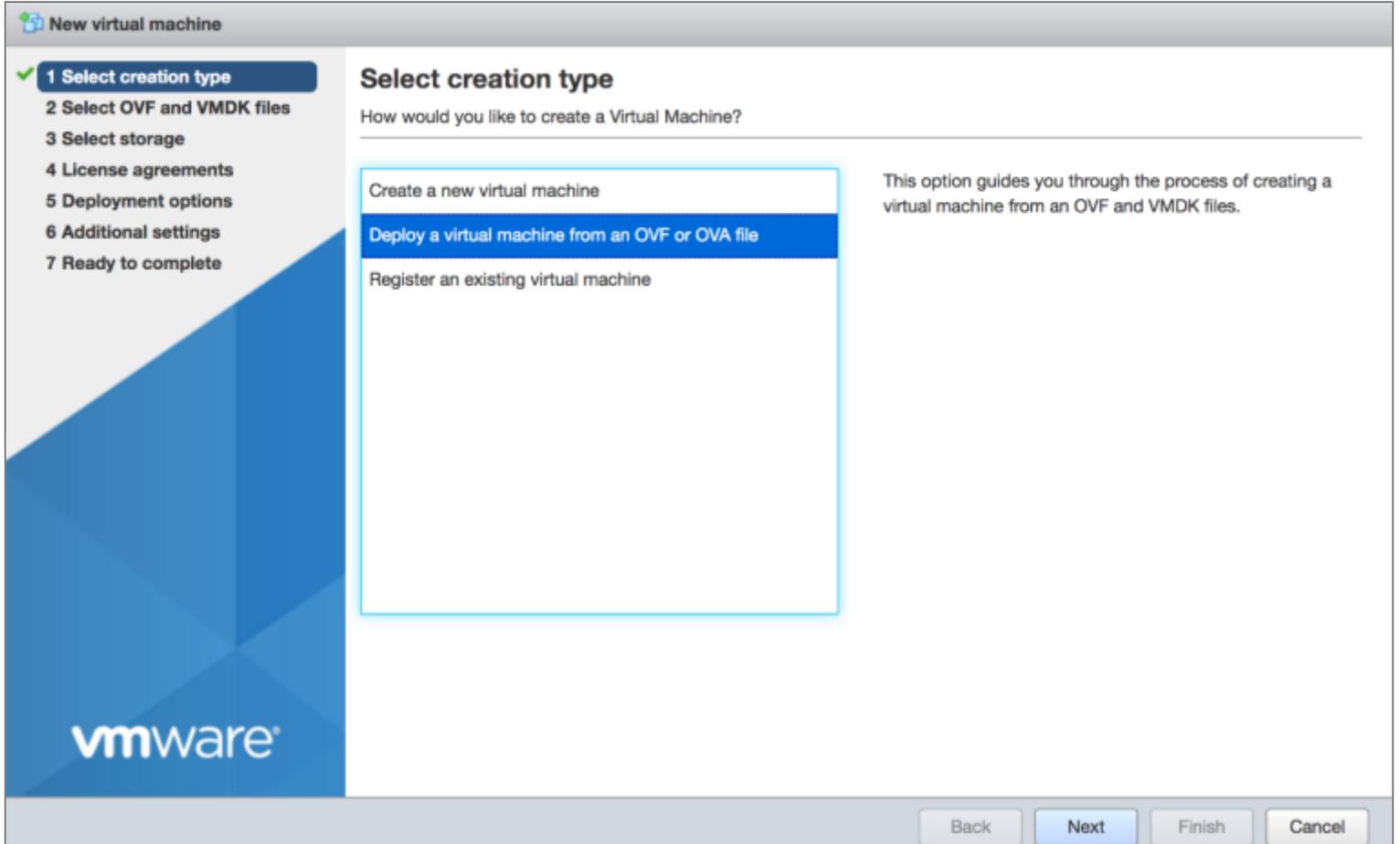
From the ESXi Management Interface select **Create / Register VM**.



ESXi Management Interface - Create VM

## Medium Capacity Appliance Configuration (cont'd)

Select **Creation Type** and click deploy a virtual machine from an OVF or OVA file.



New virtual machine

- 1 Select creation type
- 2 Select OVF and VMDK files
- 3 Select storage
- 4 License agreements
- 5 Deployment options
- 6 Additional settings
- 7 Ready to complete

### Select creation type

How would you like to create a Virtual Machine?

- Create a new virtual machine
- Deploy a virtual machine from an OVF or OVA file**
- Register an existing virtual machine

This option guides you through the process of creating a virtual machine from an OVF and VMDK files.

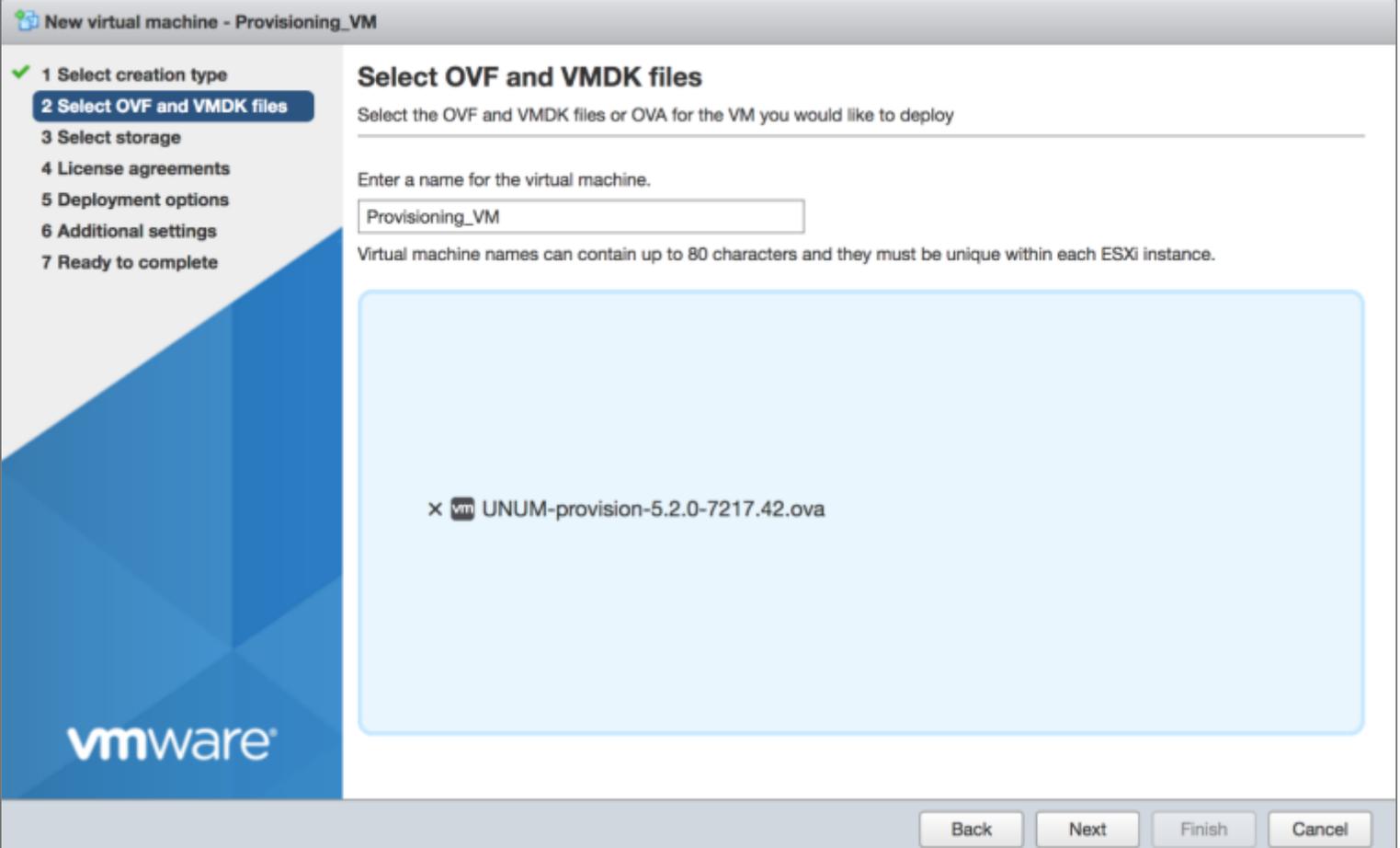
vmware

Back Next Finish Cancel

ESXi Management Interface - Deploy OVA

## Medium Capacity Appliance Configuration (cont'd)

Enter a name for the VM and select the provisioning OVA file.



New virtual machine - Provisioning\_VM

- 1 Select creation type
- 2 Select OVF and VMDK files**
- 3 Select storage
- 4 License agreements
- 5 Deployment options
- 6 Additional settings
- 7 Ready to complete

### Select OVF and VMDK files

Select the OVF and VMDK files or OVA for the VM you would like to deploy

Enter a name for the virtual machine.

Virtual machine names can contain up to 80 characters and they must be unique within each ESXi instance.

x  UNUM-provision-5.2.0-7217.42.ova

vmware

Back Next Finish Cancel

ESXi Management Interface - VM Name and OVA Installation File

## Medium Capacity Appliance Configuration (cont'd)

### Select Storage

**New virtual machine - Provisioning\_VM**

- ✓ 1 Select creation type
- ✓ 2 Select OVF and VMDK files
- ✓ 3 Select storage**
- 4 License agreements
- 5 Deployment options
- 6 Additional settings
- 7 Ready to complete

#### Select storage

Select the storage type and datastore

Standard
  Persistent Memory

Select a datastore for the virtual machine's configuration files and all of its' virtual disks.

Name	Capacity	Free	Type	Thin pro...	Access
datastore1	916.5 GB	915.08 GB	VMFS6	Supported	Single

**1 items**

ESXi Management Interface - Select Datastore

## Medium Capacity Appliance Configuration (cont'd)

### Deployment Options

New virtual machine - Provisioning\_VM

- ✓ 1 Select creation type
- ✓ 2 Select OVF and VMDK files
- ✓ 3 Select storage
- ✓ 4 **Deployment options**
- 5 Ready to complete

#### Deployment options

Select deployment options

Network mappings	VM Network	VM Network
Disk provisioning	<input checked="" type="radio"/> Thin <input type="radio"/> Thick	
Power on automatically	<input checked="" type="checkbox"/>	

vmware

Back Next Finish Cancel

ESXi Management Interface - Deployment Options

**Note:** Pluribus Networks recommends using Thin Provisioning

## Medium Capacity Appliance Configuration (cont'd)

### Ready to Complete

New virtual machine - Provisioning\_VM

- ✓ 1 Select creation type
- ✓ 2 Select OVF and VMDK files
- ✓ 3 Select storage
- ✓ 4 Deployment options
- ✓ 5 Ready to complete



### Ready to complete

Review your settings selection before finishing the wizard

Product	UNUM-provision-5.2.0-jenkins-7217
VM Name	Provisioning_VM
Disks	UNUM-provision-5.2.0-7217-disk1.vmdk
Datastore	datastore1
Provisioning type	Thin
Network mappings	VM Network: VM Network
Guest OS Name	Ubuntu Linux (64-bit)



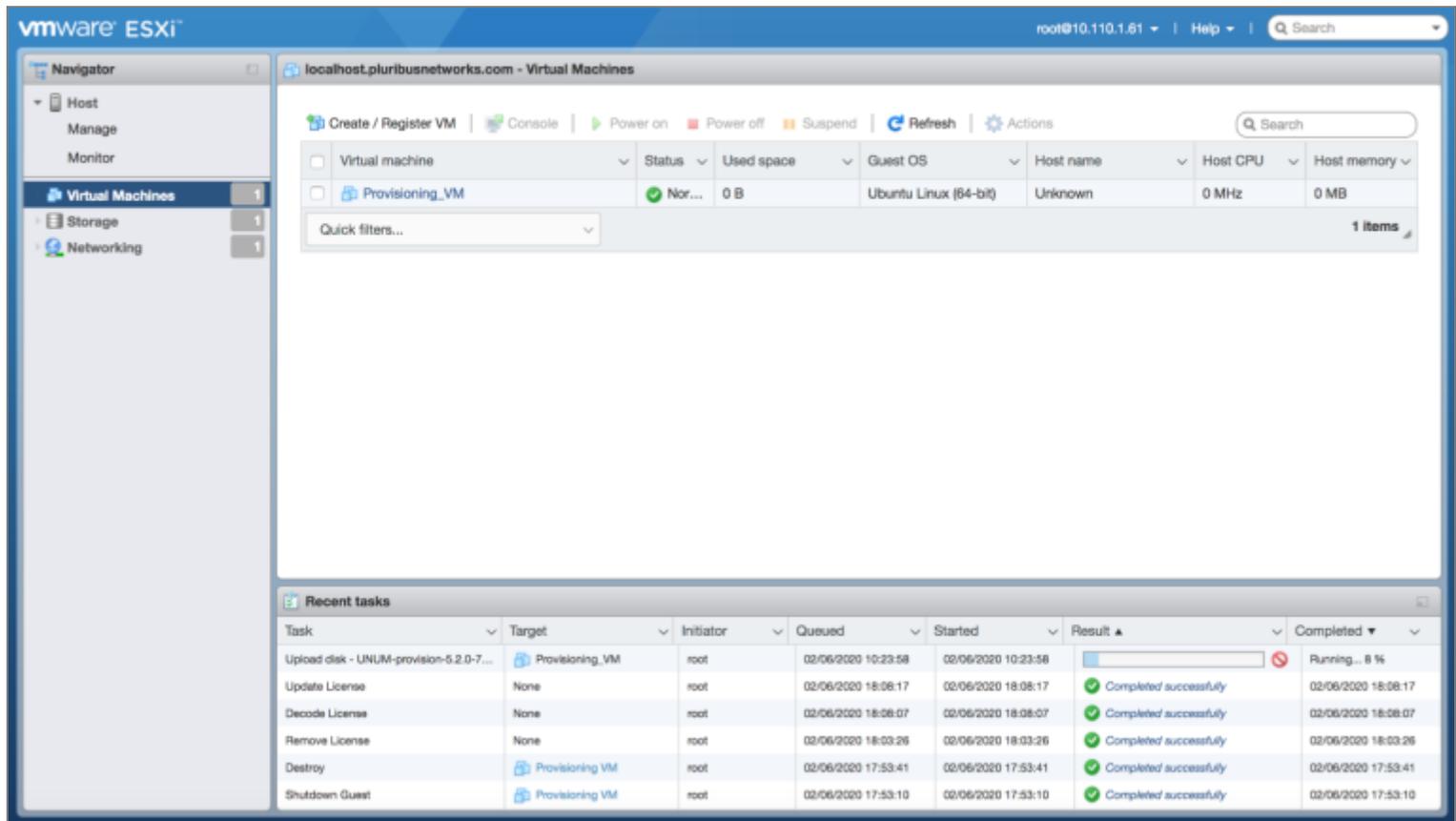
Do not refresh your browser while this VM is being deployed.

Back
Next
Finish
Cancel

ESXi Management Interface - Ready to Complete

## Medium Capacity Appliance Configuration (cont'd)

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



The screenshot shows the VMware ESXi Management Interface. The left-hand navigation pane has 'Virtual Machines' selected. The main area displays a table of virtual machines:

Virtual machine	Status	Used space	Guest OS	Host name	Host CPU	Host memory
Provisioning_VM	Normal	0 B	Ubuntu Linux (64-bit)	Unknown	0 MHz	0 MB

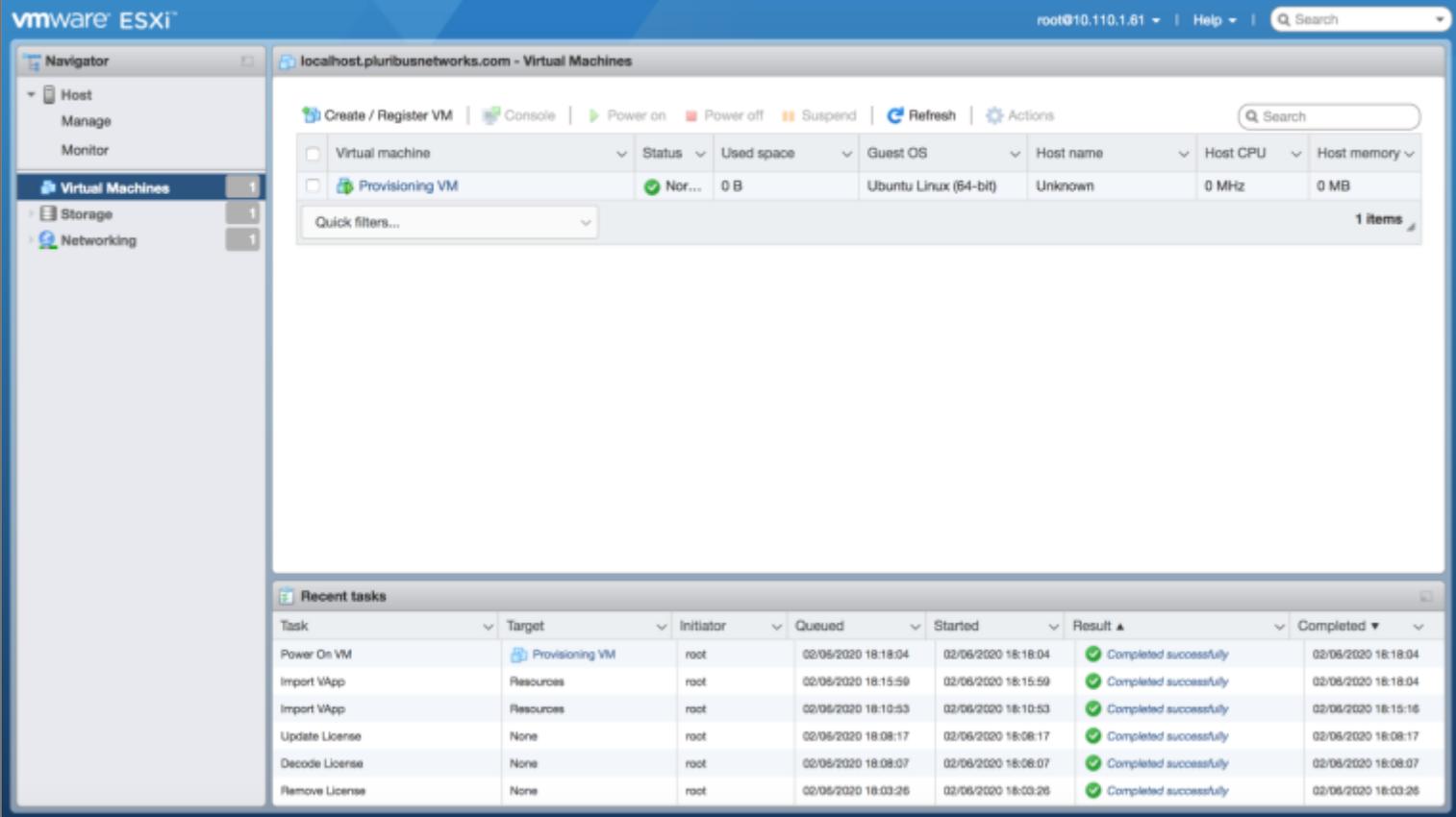
Below the table is a 'Recent tasks' section with the following data:

Task	Target	Initiator	Queued	Started	Result	Completed
Upload disk - UNUM-provision-5.2.0-7...	Provisioning_VM	root	02/06/2020 10:23:58	02/06/2020 10:23:58	Running... 8 %	
Update License	None	root	02/06/2020 18:08:17	02/06/2020 18:08:17	Completed successfully	02/06/2020 18:08:17
Decode License	None	root	02/06/2020 18:08:07	02/06/2020 18:08:07	Completed successfully	02/06/2020 18:08:07
Remove License	None	root	02/06/2020 18:03:26	02/06/2020 18:03:26	Completed successfully	02/06/2020 18:03:26
Destroy	Provisioning VM	root	02/06/2020 17:53:41	02/06/2020 17:53:41	Completed successfully	02/06/2020 17:53:41
Shutdown Guest	Provisioning VM	root	02/06/2020 17:53:10	02/06/2020 17:53:10	Completed successfully	02/06/2020 17:53:10

ESXi Management Interface - VM Provisioning Status

## Medium Capacity Appliance Configuration (cont'd)

Upon successfully creating the VM, the ESXi management Interface updates.



The screenshot shows the VMware ESXi management interface. The top navigation bar includes the ESXi logo, user 'root@10.110.1.61', and search options. The left sidebar shows a 'Navigator' with categories: Host, Manage, Monitor, Virtual Machines (1), Storage (1), and Networking (1). The main area is titled 'localhost.pluribusnetworks.com - Virtual Machines' and contains a table of virtual machines. Below the table is a 'Recent tasks' section with a table of task history.

Virtual machine	Status	Used space	Guest OS	Host name	Host CPU	Host memory
Provisioning VM	✓ Nor...	0 B	Ubuntu Linux (64-bit)	Unknown	0 MHz	0 MB

Task	Target	Initiator	Queued	Started	Result	Completed
Power On VM	Provisioning VM	root	02/06/2020 18:18:04	02/06/2020 18:18:04	✓ Completed successfully	02/06/2020 18:18:04
Import VApp	Resources	root	02/06/2020 18:15:59	02/06/2020 18:15:59	✓ Completed successfully	02/06/2020 18:18:04
Import VApp	Resources	root	02/06/2020 18:10:53	02/06/2020 18:10:53	✓ Completed successfully	02/06/2020 18:15:16
Update License	None	root	02/06/2020 18:08:17	02/06/2020 18:08:17	✓ Completed successfully	02/06/2020 18:08:17
Decode License	None	root	02/06/2020 18:08:07	02/06/2020 18:08:07	✓ Completed successfully	02/06/2020 18:08:07
Remove License	None	root	02/06/2020 18:03:26	02/06/2020 18:03:26	✓ Completed successfully	02/06/2020 18:03:26

ESXi Management Interface - VM Provisioning Complete

## Medium Capacity Appliance Configuration (cont'd)

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

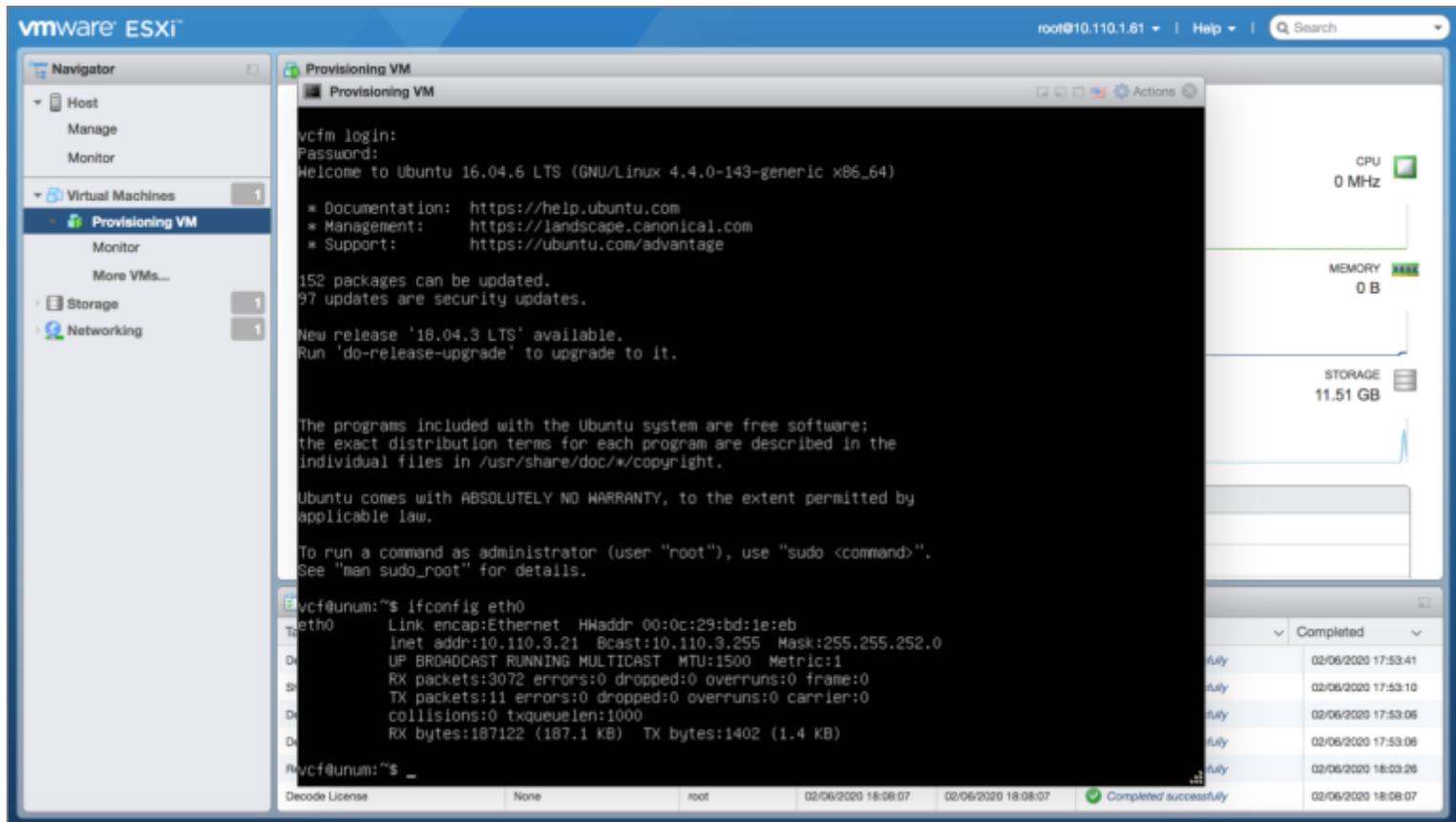
Enter the UNUM login information:

- **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

## Medium Capacity Appliance Configuration (cont'd)

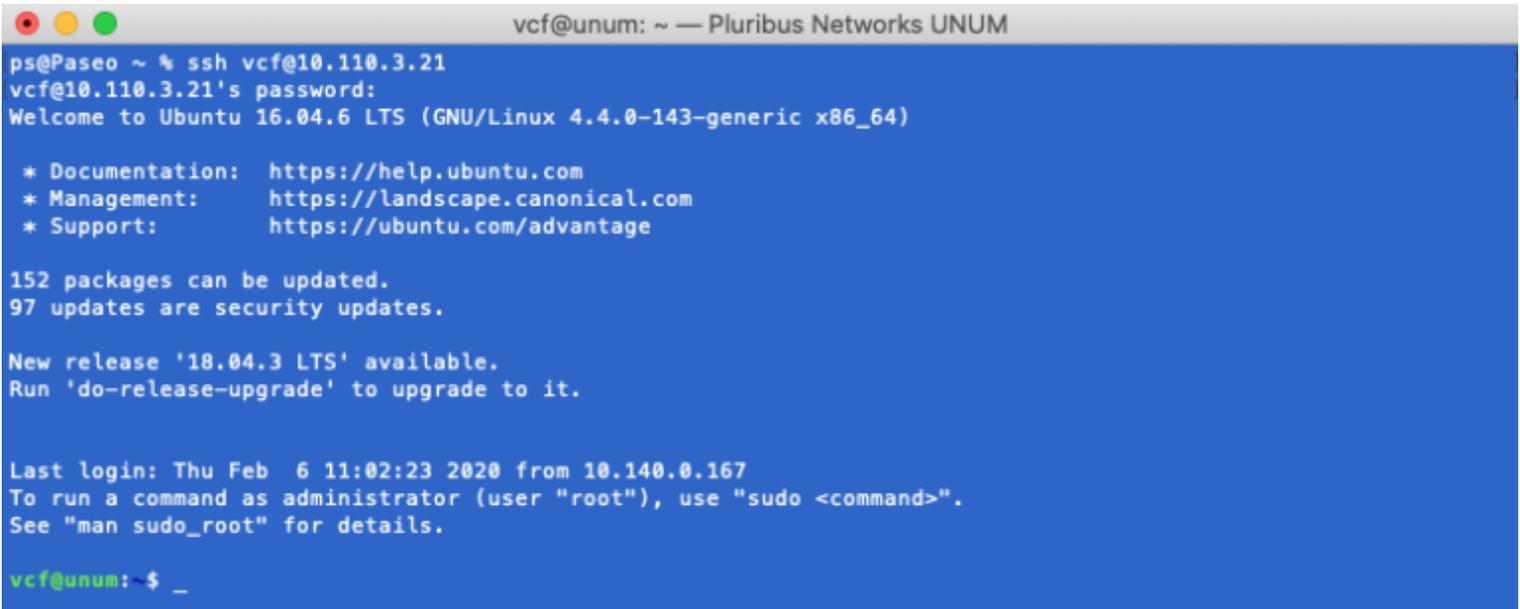
---

From a Terminal session enter the following commands:

`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:



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

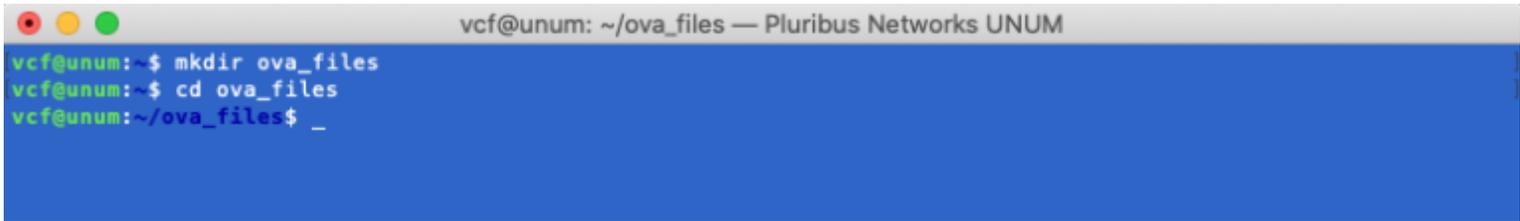
SSH Terminal - VM Login

## Medium Capacity Appliance Configuration (cont'd)

---

### OVA Files

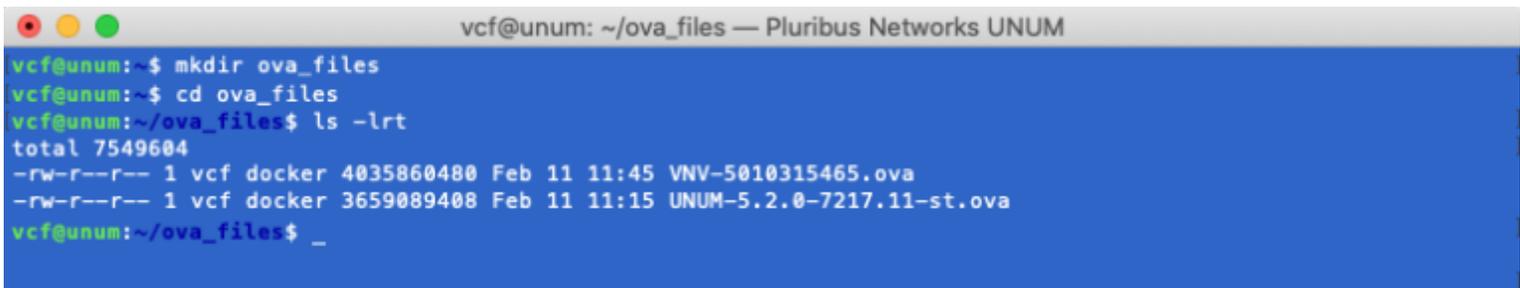
Create a local directory to hold the OVA files.



```
vcf@unum: ~/ova_files — Pluribus Networks UNUM
vcf@unum:~$ mkdir ova_files
vcf@unum:~$ cd ova_files
vcf@unum:~/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.



```
vcf@unum: ~/ova_files — Pluribus Networks UNUM
vcf@unum:~$ mkdir ova_files
vcf@unum:~$ cd ova_files
vcf@unum:~/ova_files$ ls -lrt
total 7549604
-rw-r--r-- 1 vcf docker 4035860480 Feb 11 11:45 VNV-5010315465.ova
-rw-r--r-- 1 vcf docker 3659089408 Feb 11 11:15 UNUM-5.2.0-7217.11-st.ova
vcf@unum:~/ova_files$ _
```

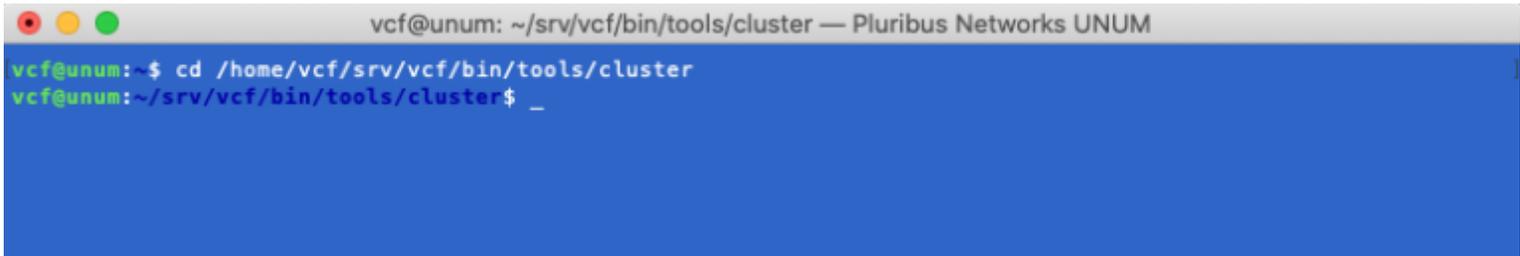
*SSH Terminal - UNUM OVA File Directory*

## Medium Capacity Appliance Configuration (cont'd)

---

### Provision UNUM

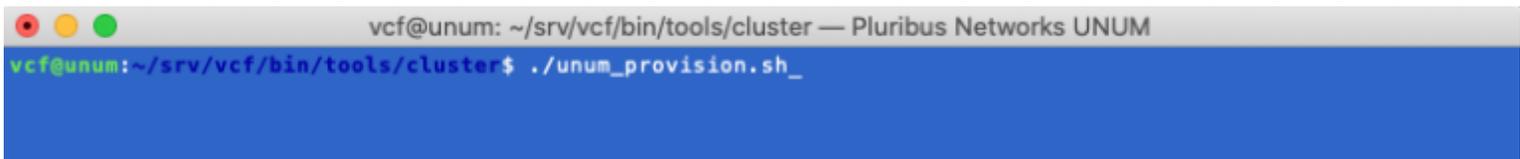
To access the requisite installation scripts enter: `cd /home/vcf/srv/vcf/bin/tools/cluster` at the command prompt.



```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM
vcf@unum:~$ cd /home/vcf/srv/vcf/bin/tools/cluster
vcf@unum:~/srv/vcf/bin/tools/cluster$ _
```

SSH Terminal - Cluster Directory Scripts

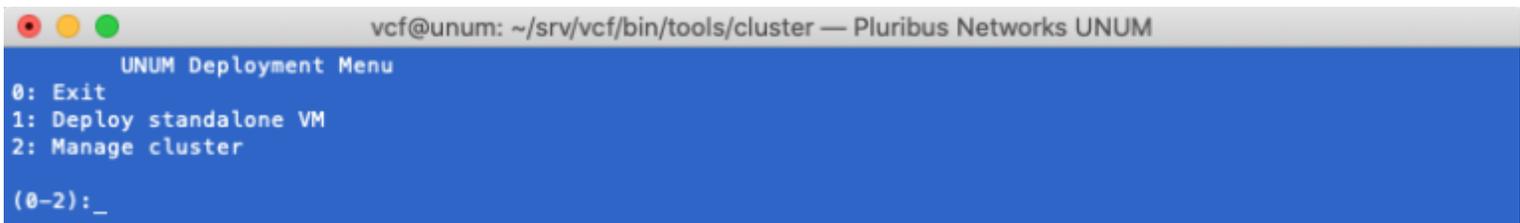
Run the `./unum_provision.sh` script.



```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM
vcf@unum:~/srv/vcf/bin/tools/cluster$ ./unum_provision.sh_
```

SSH Terminal - UNUM Provision Script

The following menu displays.



```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM
UNUM Deployment Menu
0: Exit
1: Deploy standalone VM
2: Manage cluster
(0-2):_
```

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.

## Medium Capacity Appliance Configuration (cont'd)

---

### 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.

```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks
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.

```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks
UNUM Deployment Menu
0: Exit
1: Deploy standalone VM
2: Manage cluster

(0-2):1

Enter IP provisioning scheme (static/dhcp): [dhcp]:
Enter number of UNUM VMs [1]:

Provisioning new UNUM + vNV
Enter desired eth1 IP/eth1 mask for master [172.16.250.150/24]:
Enter absolute path of OVA: _
```

*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.

```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM

ESXi inputs
Enter ESXi server IP: 10.110.1.61
Enter ESXi server username [root]: root
Enter ESXi server password:
Validating inputs..
Available datastores: datastore1
Enter datastore: [datastore1]:

UNUM inputs
Enter UNUM VM Name [unum-vm]:
Enter UNUM OVA: /home/vcf/ova_files/UNUM-5.2.0-7217.11-st.ova
Enter eth1 IP/ mask for UNUM VM [172.16.250.150/24]:

vNV inputs
Enter vNV OVA: /home/vcf/ova_files/VNV-5010315465.ova
Enter vNV VM password (to be set):
Enter number of vNVs [1]: 2

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

Inputs for vNV 2
Enter VM name for vnv 2 [vnm-vm_2]: inband_vnv
Enter fabric to join on vNV 2 []: inband-ureg
Enter vNV connection mode for inband_vnv - management/inband [management]: inband
Enter vSwitch name for inband_vnv [vnm-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 vnm-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
```

SSH Terminal - UNUM Provisioning new VEP Inputs

## Medium Capacity Appliance Configuration (cont'd)

---

### 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 [vnm-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 [vnm-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 [vnm-switch\_2]:**
- **Available vmnics:** vmnico vmnico1 vmnico2 vmnico3 vmnico4 vmnico5 vmnico6 vmnico7 vmnico8
- **Enter up to 2 vnic(s) connected to inband-ureg separated by comma:**vmnic2
- **Enter portgroup for vSwitch vnm-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.

```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM
Enter vNV VM password (to be set):
Enter number of vNVs [1]: 2

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

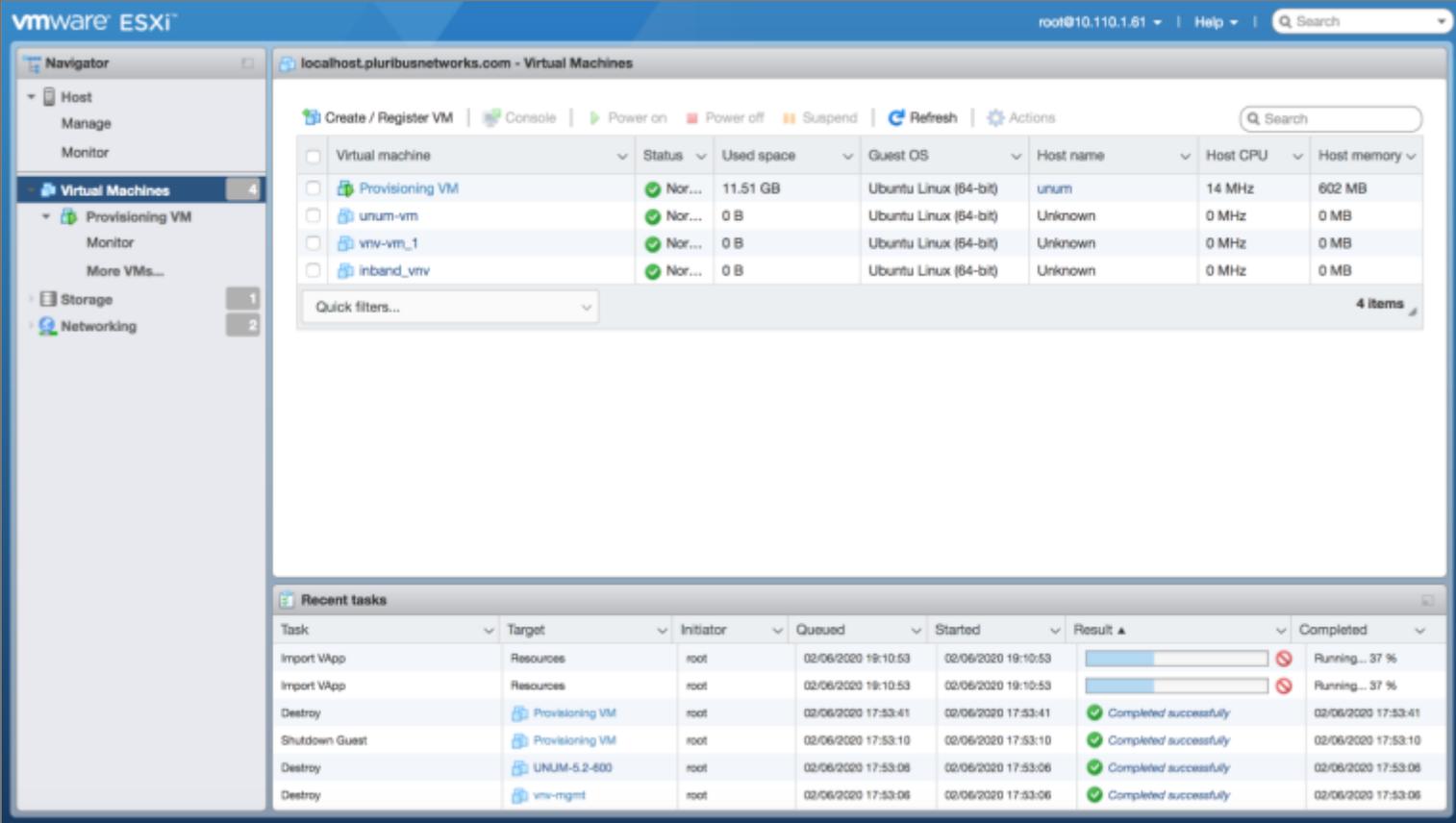
Inputs for vNV 2
Enter VM name for vnv 2 [vnm-vm_2]: inband_vnv
Enter fabric to join on vNV 2 []: inband-ureg
Enter vNV connection mode for inband_vnv - management/inband [management]: inband
Enter vSwitch name for inband_vnv [vnm-vswitch_2]:
Available vmnics: vmnic0 vmnic1 vmnic2 vmnic3 vmnic4 vmnic5 vmnic6 vmnic7 vmnic8
Enter upto 2 vmnic(s) connected to inband-ureg separated by comma: vmnic2
Enter portgroup for vSwitch vnm-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

Thu Feb 6 11:22:50 PST 2020: Invoking provisioning script. Please wait
2020-02-06 11:22:50,800 setupInband INFO Setting up vSwitch vnm-vswitch_2 and portgroup VmDataNet on ESXi
10.110.1.61
2020-02-06 11:23:57,615 setupInband INFO vSwitch vnm-vswitch_2 setup succeeded
2020-02-06 11:23:57,615 vnmProvision INFO Deploying VM unum-vm
2020-02-06 11:23:57,617 vnmProvision INFO Deploying VM vnm-vm_1
2020-02-06 11:23:57,619 vnmProvision INFO Deploying VM inband_vnv
2020-02-06 11:28:32,881 vnmProvision INFO Deploying VM unum-vm successful
2020-02-06 11:28:45,570 vnmProvision INFO Deploying VM vnm-vm_1 successful
2020-02-06 11:28:47,873 vnmProvision INFO Deploying VM inband_vnv successful
2020-02-06 11:29:35,541 vnmProvision 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 vnmProvision INFO Setting up vNV vnm-vm_1 as management
2020-02-06 11:29:49,806 vnmProvision INFO Setting up vNV inband_vnv as inband
2020-02-06 11:32:22,134 vnmProvision INFO eth0 IP for vnm-vm_1 on ESXi host 10.110.1.61 is 10.110.0.216
2020-02-06 11:32:22,163 vnmProvision 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 vnmProvision INFO Accepted EULA on 10.110.0.216
2020-02-06 11:32:34,111 vnmProvision INFO Accepted EULA on 10.110.3.40
2020-02-06 11:32:36,498 vnmProvision INFO Setting up vdata0 IP address on 10.110.3.40 for inband connectiv
ity
2020-02-06 11:32:40,221 vnmProvision INFO Joined fabric mgmt-ureg successfully
2020-02-06 11:33:52,404 vnmProvision INFO Joined fabric inband-ureg successfully
2020-02-06 11:34:39,635 vnmProvision INFO Setting up eth1 IP address on UNUM
2020-02-06 11:38:18,733 vnmProvision 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 vnm-vm_1 as seed switch
```

SSH Terminal - UNUM Provisioning

## Medium Capacity Appliance Configuration (cont'd)

Optionally, monitor the provisioning from the ESXi Management Interface.



The screenshot displays the VMware ESXi Management Interface. The top navigation bar shows the host name 'localhost.pluribusnetworks.com' and the 'Virtual Machines' section. The left sidebar contains a 'Navigator' with options for Host, Manage, Monitor, Virtual Machines (4), Provisioning VM, Storage (1), and Networking (2).

The main area shows a table of Virtual Machines:

Virtual machine	Status	Used space	Guest OS	Host name	Host CPU	Host memory
Provisioning VM	Normal	11.51 GB	Ubuntu Linux (64-bit)	unum	14 MHz	602 MB
unum-vm	Normal	0 B	Ubuntu Linux (64-bit)	Unknown	0 MHz	0 MB
vmv-vm_1	Normal	0 B	Ubuntu Linux (64-bit)	Unknown	0 MHz	0 MB
inband_vmv	Normal	0 B	Ubuntu Linux (64-bit)	Unknown	0 MHz	0 MB

Below the VM table is a 'Recent tasks' section with the following data:

Task	Target	Initiator	Queued	Started	Result	Completed
Import VApp	Resources	root	02/06/2020 19:10:53	02/06/2020 19:10:53	Running... 37 %	
Import VApp	Resources	root	02/06/2020 19:10:53	02/06/2020 19:10:53	Running... 37 %	
Destroy	Provisioning VM	root	02/06/2020 17:53:41	02/06/2020 17:53:41	Completed successfully	02/06/2020 17:53:41
Shutdown Guest	Provisioning VM	root	02/06/2020 17:53:10	02/06/2020 17:53:10	Completed successfully	02/06/2020 17:53:10
Destroy	UNUM-5.2-600	root	02/06/2020 17:53:06	02/06/2020 17:53:06	Completed successfully	02/06/2020 17:53:06
Destroy	vmv-mgmt	root	02/06/2020 17:53:06	02/06/2020 17:53:06	Completed successfully	02/06/2020 17:53:06

ESXi Management Interface - Monitor UNUM Provisioning

## Medium Capacity Appliance Configuration (cont'd)

UNUM logs the provisioning output to the `provision_log` file, which is available for subsequent review.

```
vcf@unum: ~/srv/vcf/bin/tools/cluster — Pluribus Networks UNUM
Inputs for vNV 1
Enter VM name for vnv 1 [vnv-vm_1]:
  UNUM Deployment Menu
0: Exit
1: Deploy standalone VM
2: Manage cluster

(0-2):0

vcf@unum:~/srv/vcf/bin/tools/cluster$ ls
assign_eth1.sh          esxi_configs.py      pn_cl_provision.py   unum_vnv_st_deploy.py
cluster_12node_template.json  esxi_configs.pyc    pn_cl_provision.pyc  utils
cluster_6node_template.json  input_files          provision.log
cluster_menu.sh         interfaces            unum_provision.sh
vcf@unum:~/srv/vcf/bin/tools/cluster$ cat provision.log
2020-02-06 11:22:50,800 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 vnv-vm_1 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 11:32:36,498 vnvProvision INFO Setting up vdata0 IP address on 10.110.3.40 for inband connectiv
ity
2020-02-06 11:32:40,221 vnvProvision INFO Joined fabric mgmt-ureg successfully
2020-02-06 11:33:52,404 vnvProvision INFO Joined fabric inband-ureg successfully
2020-02-06 11:34:39,635 vnvProvision INFO Setting up eth1 IP address on UNUM
2020-02-06 11:38:18,733 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 11:40:33,832 urllib3.connectionpool DEBUG Starting new HTTPS connection (1): 10.110.3.201:443
2020-02-06 11:40:37,556 urllib3.connectionpool DEBUG https://10.110.3.201:443 "POST /vcf-center/api/switch
HTTP/1.1" 201 None
2020-02-06 11:40:37,558 addSeedSwitch INFO Successfully added VNV vnv-vm_1 as seed switch
2020-02-06 11:41:49,073 addSeedSwitch INFO Ping from UNUM 10.110.3.201 to 10.110.3.40 successful
2020-02-06 11:41:49,076 urllib3.connectionpool DEBUG Starting new HTTPS connection (1): 10.110.3.201:443
2020-02-06 11:41:50,760 urllib3.connectionpool DEBUG https://10.110.3.201:443 "POST /vcf-center/api/switch
HTTP/1.1" 201 None
2020-02-06 11:41:50,761 addSeedSwitch INFO Successfully added VNV inband_vnv as seed switch
2020-02-06 11:41:51,264 vnvProvision INFO Provisioning completed successfully
```

SSH Terminal - UNUM Provisioning Log Output

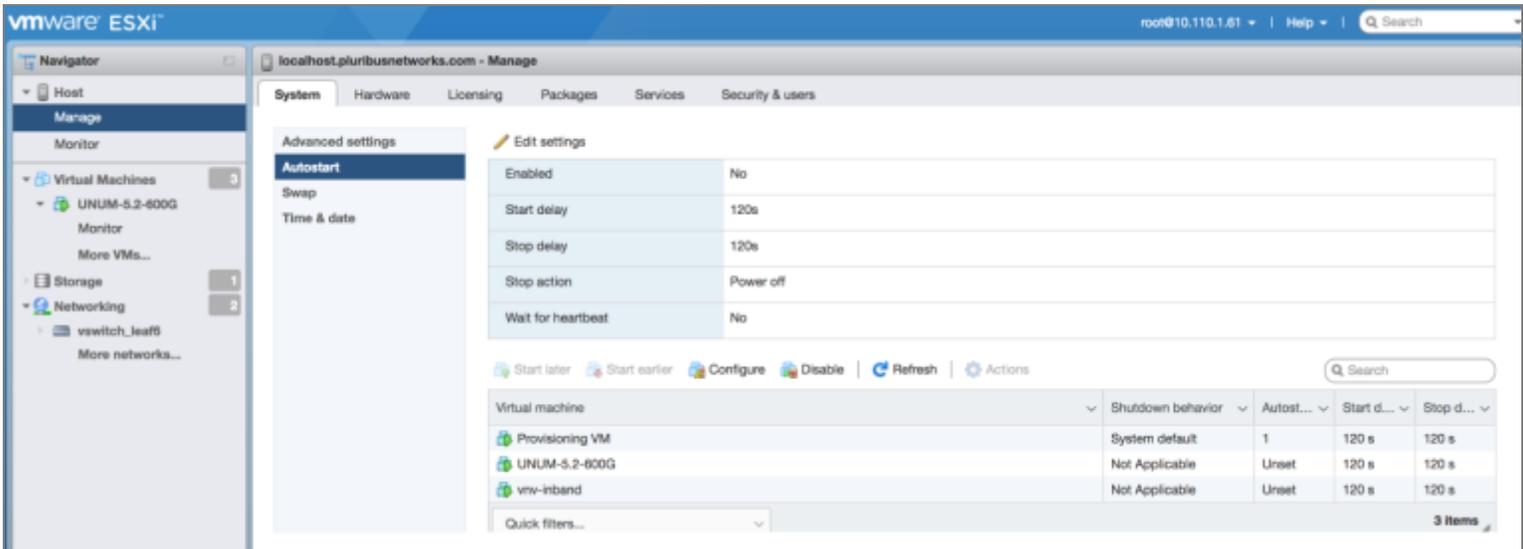
**Note:** Once provisioning is complete, we recommend powering down the Provisioning VM.

## Medium Capacity Appliance Configuration (cont'd)

### Autostart Settings for VMs

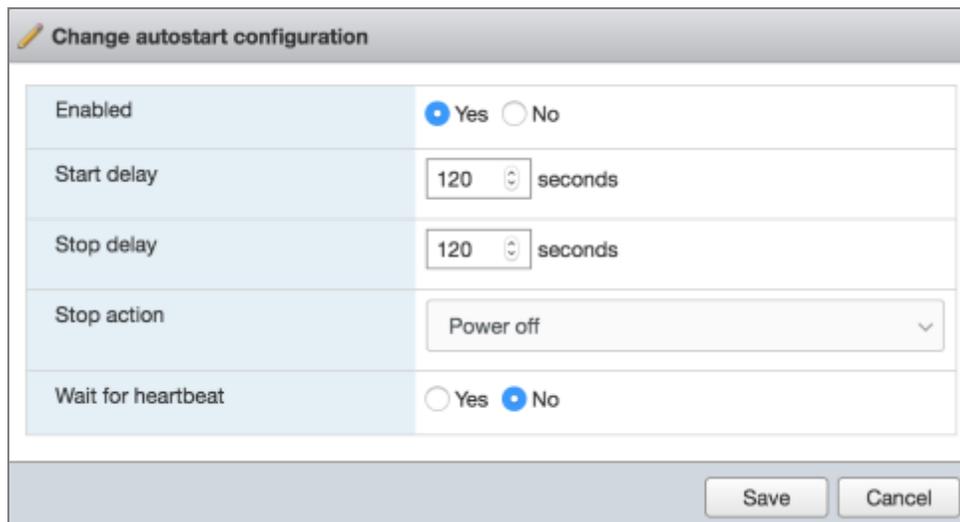
After deploying the VMs, enable autostart in the event the ESXi host reboots to ensure the UNUM VMs start as well.

From the ESXi Management Interface click **Manage** and choose **Autostart**.



Esxi Management Interface Configure Autostart

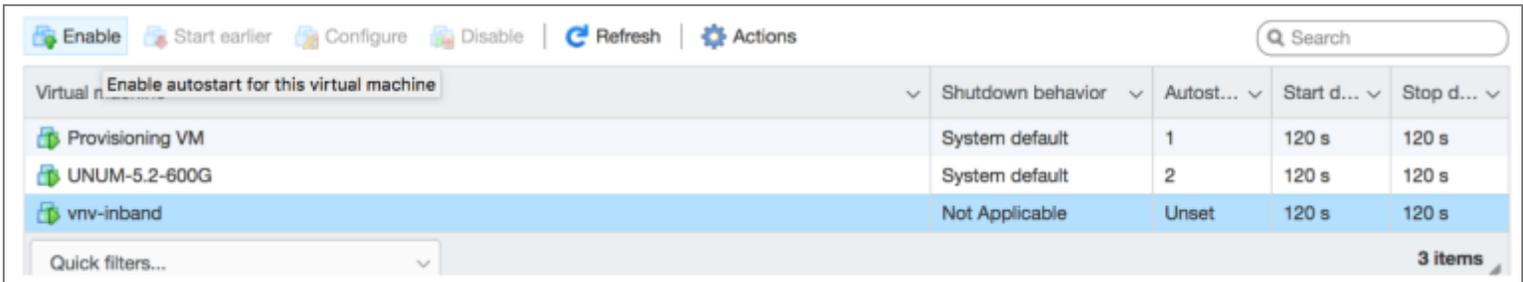
Click on **Edit Settings** and set **Enabled** to **Yes**.



Esxi Management Interface Enable Autostart

## Medium Capacity Appliance Configuration (cont'd)

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



Virtual Machine	Shutdown behavior	Autostart	Start delay	Stop delay
Provisioning VM	System default	1	120 s	120 s
UNUM-5.2-600G	System default	2	120 s	120 s
vnv-inband	Not Applicable	Unset	120 s	120 s

Quick filters... 3 items

*Esxi Management Interface Enable Autostart All VMs*

## 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.

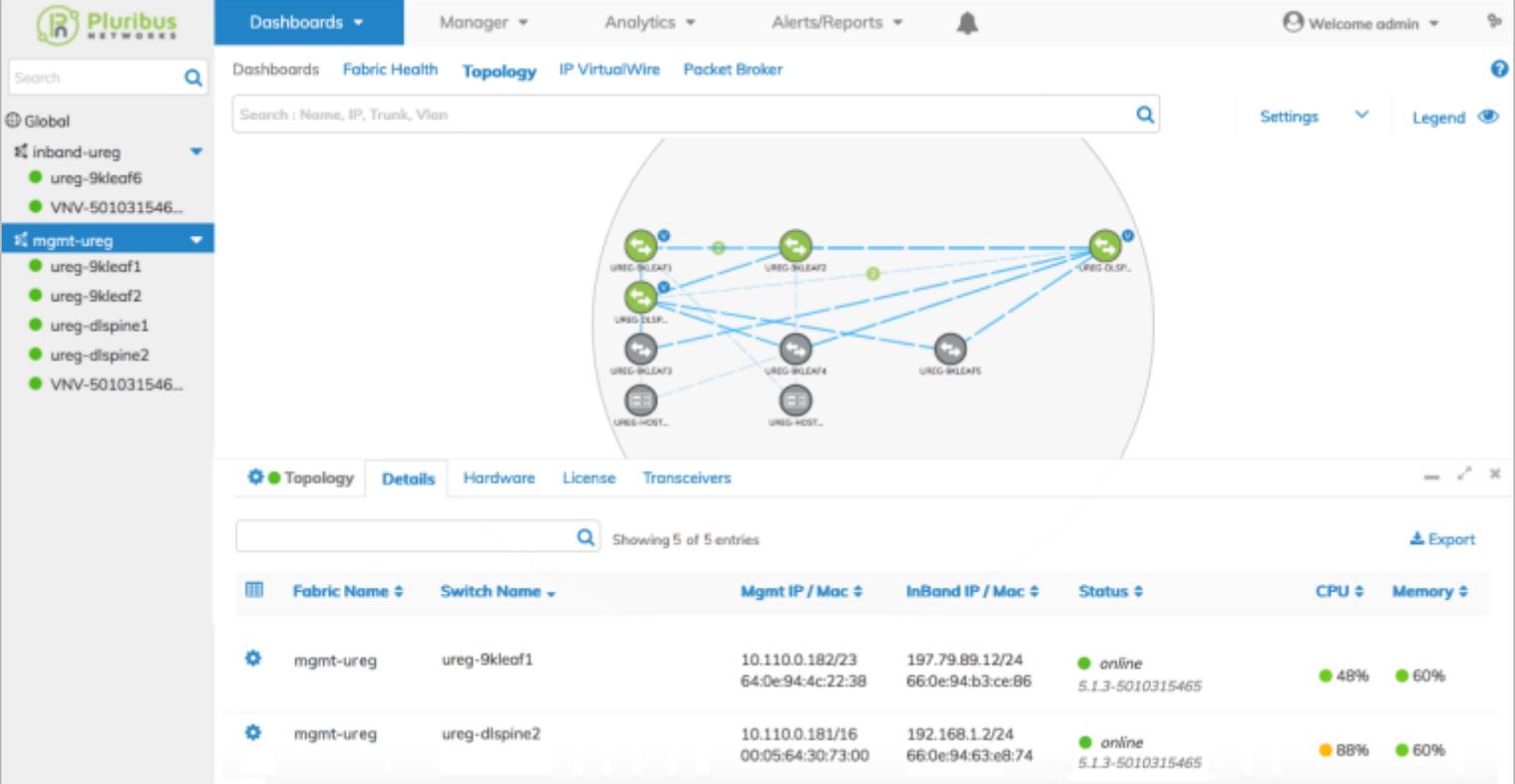
```
root@ureg-9kleaf6: ~ — Pluribus Networks UNUM
ps@Paseo ~ % ssh network-admin@10.110.0.216
The authenticity of host '10.110.0.216 (10.110.0.216)' can't be established.
ECDSA key fingerprint is SHA256:5+RNHHFaWYJda15+0qJGB4VGMLmsq0o04h0GHeVTLGo.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '10.110.0.216' (ECDSA) to the list of known hosts.
* Welcome to Pluribus Networks Inc. Netvisor(R). This is a monitored system. *
* ACCESS RESTRICTED TO AUTHORIZED USERS ONLY *
* By using the Netvisor(R) CLI, you agree to the terms of the Pluribus Networks *
* End User License Agreement (EULA). The EULA can be accessed via *
* http://www.pluribusnetworks.com/eula or by using the command "eula-show" *
network-admin@10.110.0.216's password:
Last login: Thu Feb 6 11:32:34 2020 from 10.110.3.21
Netvisor OS Command Line Interface 5.1
Connected to Switch VNV-5010315465; nvOS Identifier:0xc3bcac4; Ver: 5.1.3-5010315465
CLI (network-admin@VNV-5010315465) > switch-setup-show
switch-name: VNV-5010315465
mgmt-ip: 10.110.0.216/16
mgmt-ip-assignment: dhcp
mgmt-ip6: fe80::640e:94ff:fec4:8a41/64
mgmt-ip6-assignment: autoconf
in-band-ip: 169.254.2.1/24
in-band-ip6: fe80::640e:94ff:fec4:6753/64
in-band-ip6-assign: autoconf
gateway-ip: 10.110.0.1
dns-ip: 10.135.2.13
dns-secondary-ip: 172.16.1.4
domain-name: pluribusnetworks.com
ntp-server: 0.us.pool.ntp.org
ntp-secondary-server: 0.ubuntu.pool.ntp.org
timezone: America/Los_Angeles
date: 2020-02-06,11:44:39
hostid: 205245124
location-id: 5
enable-host-ports: yes
banner: * Welcome to Pluribus Networks Inc. Netvisor(R). This is a monitored system. *
banner: * ACCESS RESTRICTED TO AUTHORIZED USERS ONLY *
banner: * By using the Netvisor(R) CLI, you agree to the terms of the Pluribus Networks *
banner: * End User License Agreement (EULA). The EULA can be accessed via *
banner: * http://www.pluribusnetworks.com/eula or by using the command "eula-show" *
CLI (network-admin@VNV-5010315465) >
```

*SSH Terminal - UNUM Provisioning Show Switch Setup vNV Seed Switch*

**Login** to the **UNUM** instance. Refer to the [UNUM 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.



The screenshot shows the UNUM Topology Dashboard. The top navigation bar includes 'Dashboards', 'Manager', 'Analytics', and 'Alerts/Reports'. The left sidebar shows a tree view of configurations under 'mgmt-ureg'. The main area displays a network topology diagram with nodes labeled 'UREG-9KLEAF1' through 'UREG-9KLEAF5' and 'UREG-DISPINE1' through 'UREG-DISPINE2'. Below the diagram is a table with the following data:

Fabric Name	Switch Name	Mgmt IP / Mac	InBand IP / Mac	Status	CPU	Memory
mgmt-ureg	ureg-9kleaf1	10.110.0.182/23 64:0e:94:4c:22:38	197.79.89.12/24 66:0e:94:b3:ce:86	online 5.1.3-5010315465	48%	60%
mgmt-ureg	ureg-dispine2	10.110.0.181/16 00:05:64:30:73:00	192.168.1.2/24 66:0e:94:63:e8:74	online 5.1.3-5010315465	88%	60%

UNUM Topology Dashboard - Post Provisioning

**Note:** Refer to the [UNUM Installation & User Guide](#) for more information on using UNUM.

## High Availability

---

### 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.

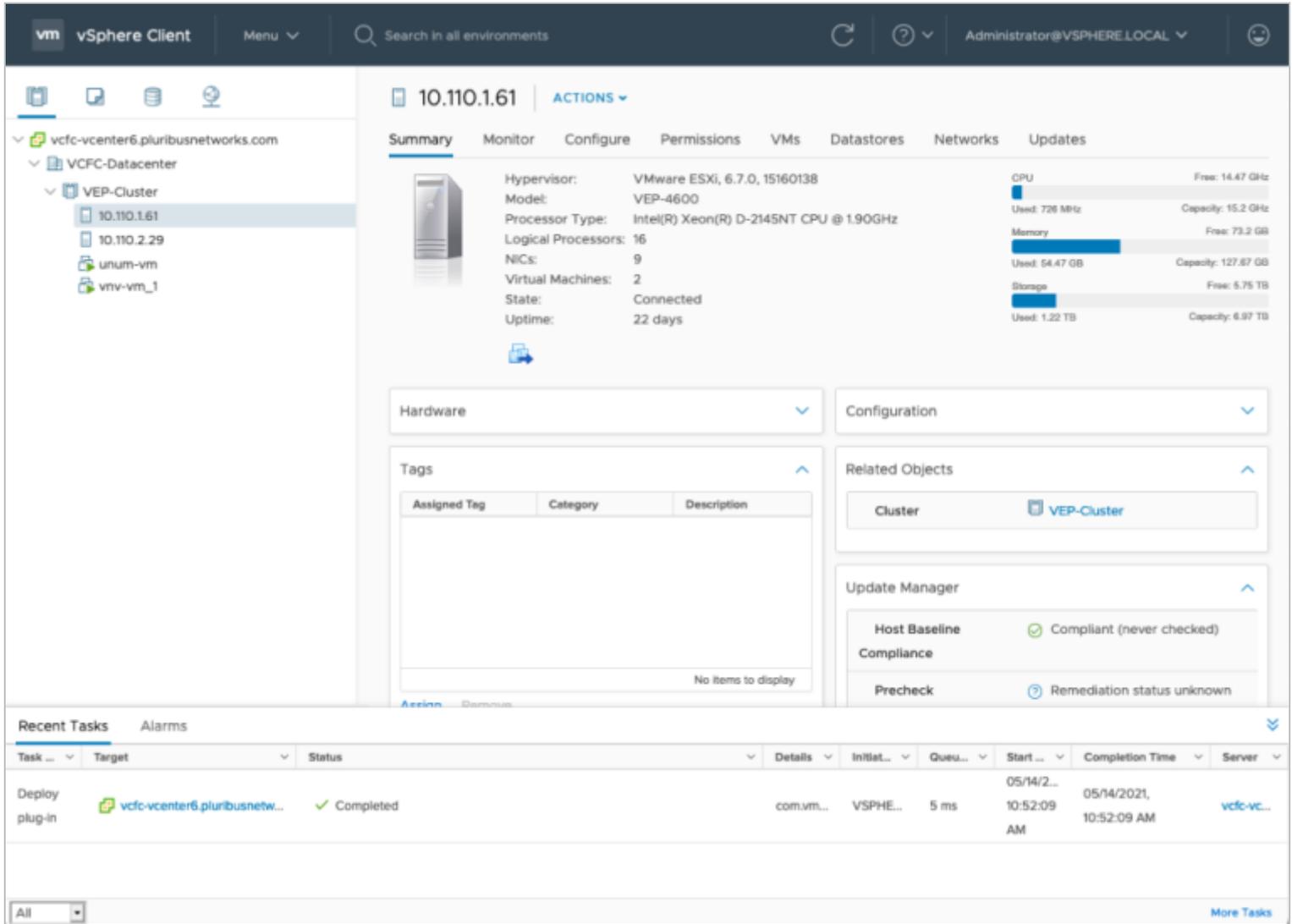
The following series of illustrations are examples of a fully configured UNUM HA instance and using UNUM to monitor cluster health.

## 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.



The screenshot shows the vSphere Client interface for a host named 10.110.1.61. The left sidebar shows a tree view with the following structure:

- vcfc-vcenter6.pluribusnetworks.com
  - VCFC-Datacenter
    - VEP-Cluster
      - 10.110.1.61 (selected)
      - 10.110.2.29
      - unum-vm
      - vnv-vm\_1

The main content area shows the host configuration summary:

- Summary:** Hypervisor: VMware ESXi, 6.7.0, 15160138; Model: VEP-4600; Processor Type: Intel(R) Xeon(R) D-2145NT CPU @ 1.90GHz; Logical Processors: 16; NICs: 9; Virtual Machines: 2; State: Connected; Uptime: 22 days.
- CPU:** Free: 14.47 GHz; Used: 726 MHz; Capacity: 15.2 GHz.
- Memory:** Free: 73.2 GB; Used: 54.47 GB; Capacity: 127.67 GB.
- Storage:** Free: 5.75 TB; Used: 1.22 TB; Capacity: 6.97 TB.

Below the summary are sections for Hardware, Configuration, Tags, Related Objects (Cluster: VEP-Cluster), and Update Manager (Host Baseline: Compliant (never checked), Precheck: Remediation status unknown).

The Recent Tasks table shows the following entry:

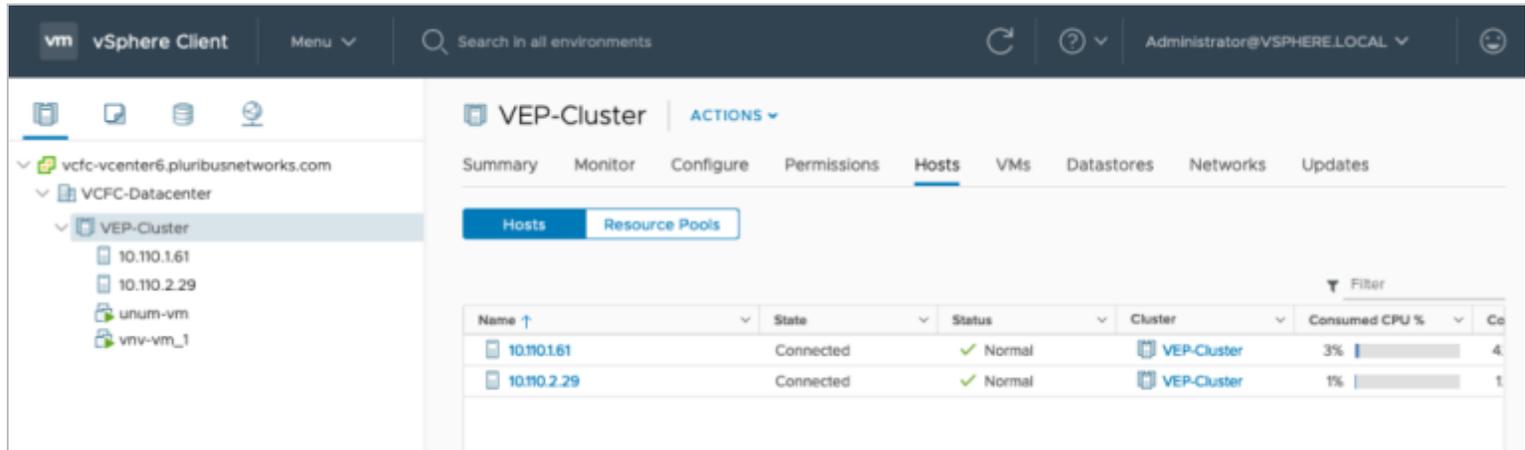
Task	Target	Status	Details	Initiat...	Queu...	Start ...	Completion Time	Server
Deploy plug-in	vcfc-vcenter6.pluribusnetw...	Completed	com.vm...	VSPHE...	5 ms	05/14/2... 10:52:09 AM	05/14/2021, 10:52:09 AM	vcfc-vc...

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



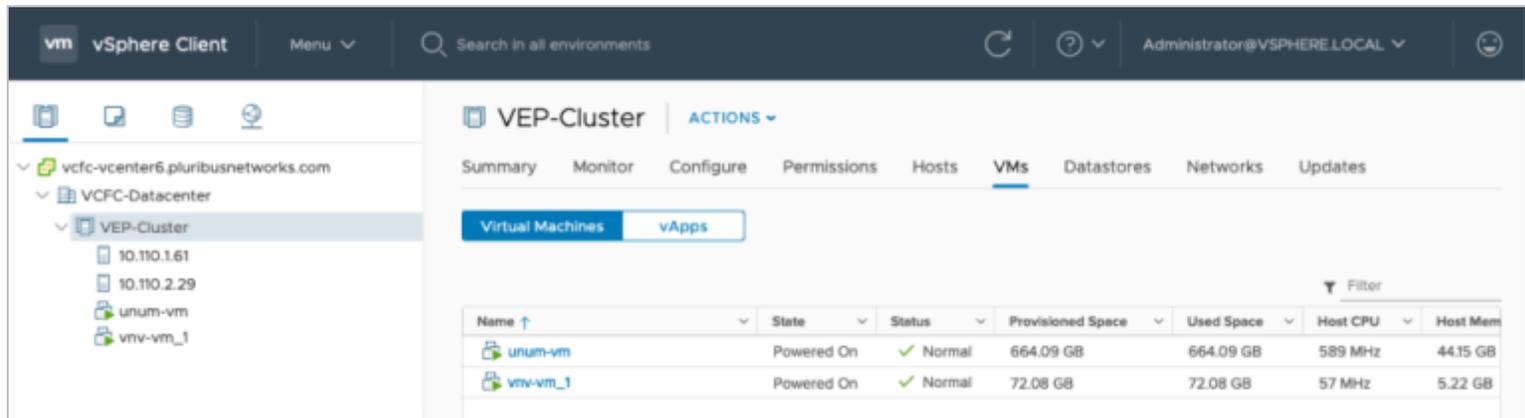
The screenshot shows the vSphere Client interface for a VEP-Cluster. The left sidebar shows the navigation tree with 'VEP-Cluster' selected. The main pane shows the 'Hosts' tab with a table of hosts.

Name	State	Status	Cluster	Consumed CPU %
10.110.1.61	Connected	Normal	VEP-Cluster	3%
10.110.2.29	Connected	Normal	VEP-Cluster	1%

Fully Configured High Availability UNUM Instance - Hosts

### 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.



The screenshot shows the vSphere Client interface for a VEP-Cluster, specifically the 'VMs' tab. The left sidebar shows the navigation tree with 'VEP-Cluster' selected. The main pane shows the 'Virtual Machines' tab with a table of VMs.

Name	State	Status	Provisioned Space	Used Space	Host CPU	Host Mem
unum-vm	Powered On	Normal	664.09 GB	664.09 GB	589 MHz	44.15 GB
vnv-vm_1	Powered On	Normal	72.08 GB	72.08 GB	57 MHz	5.22 GB

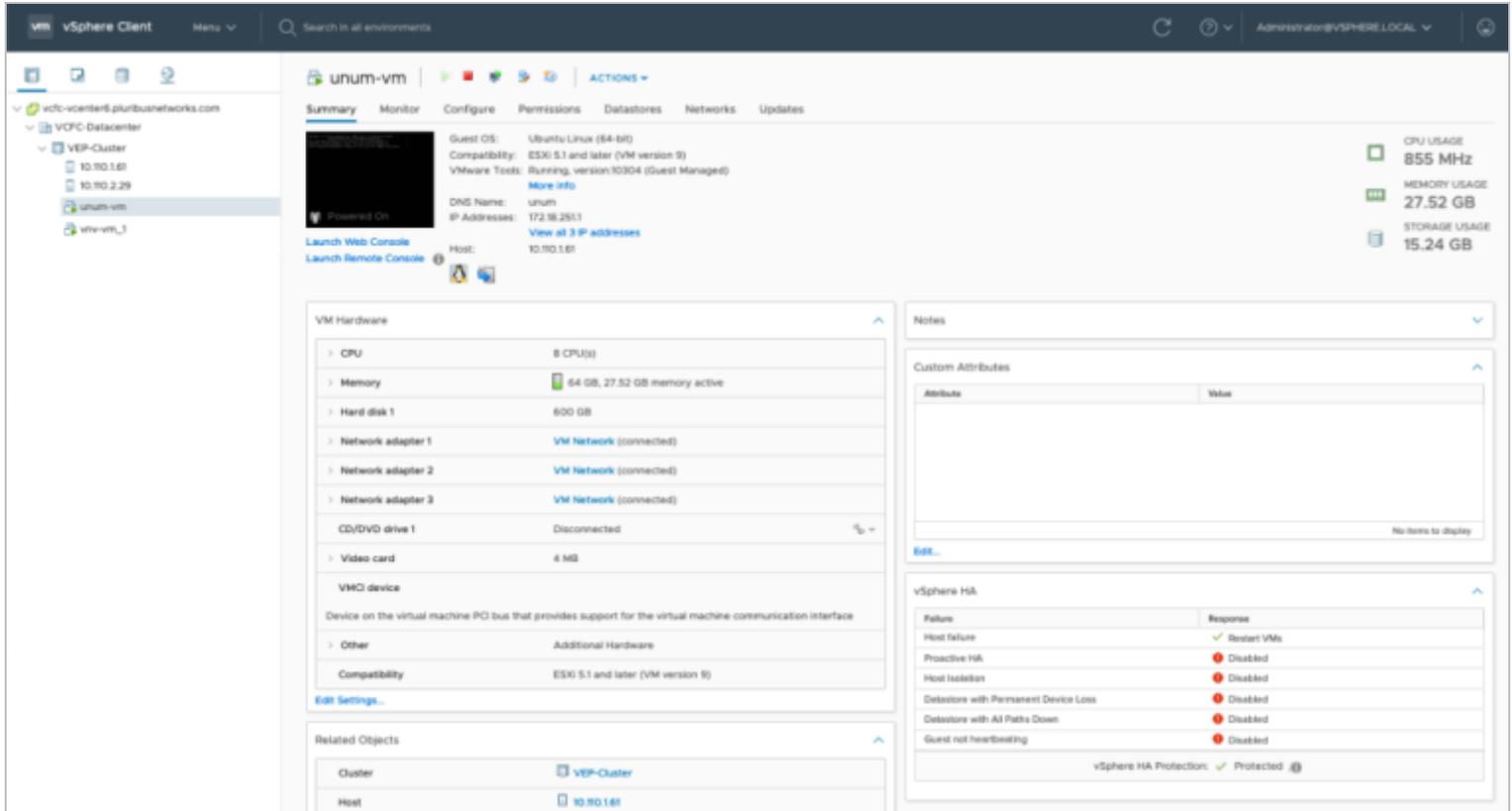
Fully Configured High Availability UNUM Instance - Virtual Machines

## 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.



The screenshot displays the vSphere Client interface for the **unum-vm** instance. The interface is divided into several sections:

- Summary:** Shows the VM is powered on. Key details include:
  - Guest OS: Ubuntu Linux (64-bit)
  - Compatibility: ESX/5.1 and later (VM version 9)
  - VMware Tools: Running, version 10304 (Guest Managed)
  - DNS Name: unum
  - IP Addresses: 172.16.251.1
  - Host: 10.110.1.61
- Performance Metrics:**
  - CPU Usage: 855 MHz
  - Memory Usage: 27.52 GB
  - Storage Usage: 15.24 GB
- VM Hardware:**
  - CPU: 8 CPU(s)
  - Memory: 64 GB, 27.52 GB memory active
  - Hard disk 1: 600 GB
  - Network adapter 1, 2, and 3: VM Network (connected)
  - CD/DVD drive 1: Disconnected
  - Video card: 4 MB
  - VMIO device: Device on the virtual machine PCI bus that provides support for the virtual machine communication interface
  - Other: Additional Hardware
  - Compatibility: ESX/5.1 and later (VM version 9)
- Related Objects:**
  - Cluster: vEP-Cluster
  - Host: 10.110.1.61
- vSphere HA:**

Failure	Response
Host failure	✓ Restart VMs
Proactive HA	✗ Disabled
Host Isolation	✗ Disabled
Datastores with Permanent Device Loss	✗ Disabled
Datastores with All Paths Down	✗ Disabled
Guest not heartbeating	✗ Disabled

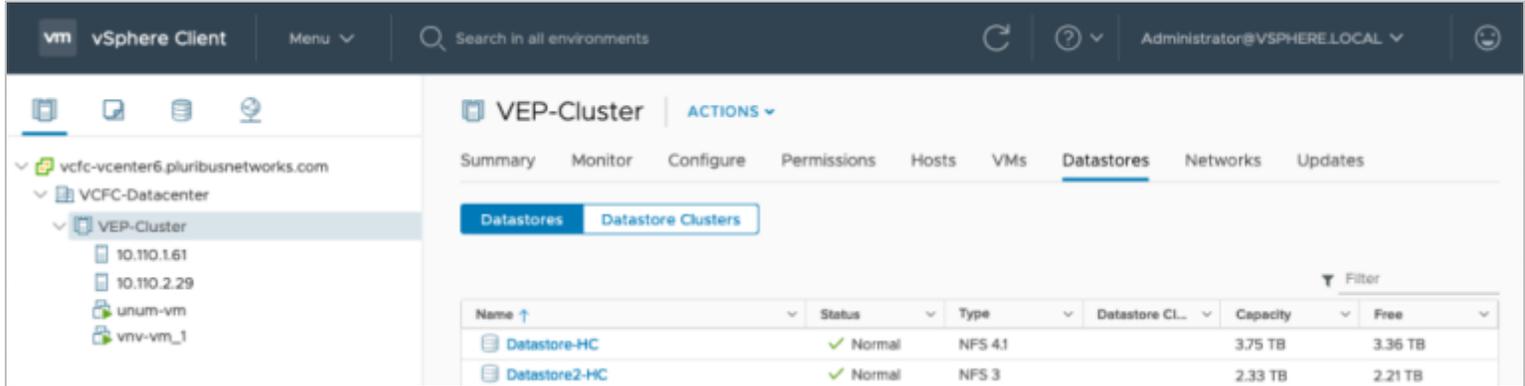
vSphere HA Protection: ✓ Protected

Fully Configured High Availability UNUM Instance - vSphere HA Protection Mode

## High Availability (cont'd)

### Datstores

- **Datstore-HC** - shared instance used by UNUM HA and VMware Heartbeat.
- **Datstore2-HC** - shared instance used for VMware Heartbeat.



Summary Monitor Configure Permissions Hosts VMs **Datstores** Networks Updates

Datstores Datastore Clusters

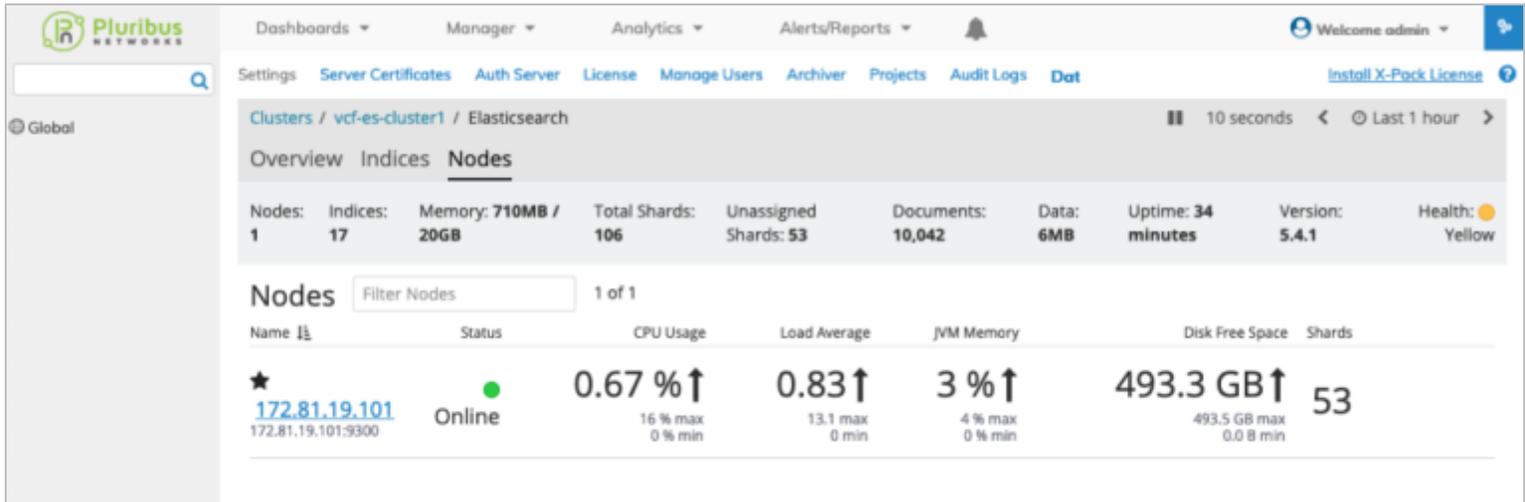
Name ↑	Status	Type	Datastore CL...	Capacity	Free
Datstore-HC	✓ Normal	NFS 4.1		3.75 TB	3.36 TB
Datstore2-HC	✓ Normal	NFS 3		2.33 TB	2.21 TB

Fully Configured High Availability UNUM Instance - Redundant Datstores

### UNUM Database Health

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

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



Clusters / vcf-es-cluster1 / Elasticsearch

Overview Indices **Nodes**

Nodes: 1 | Indices: 17 | Memory: 710MB / 20GB | Total Shards: 106 | Unassigned Shards: 53 | Documents: 10,042 | Data: 6MB | Uptime: 34 minutes | Version: 5.4.1 | Health: ● Yellow

Nodes  1 of 1

Name	Status	CPU Usage	Load Average	JVM Memory	Disk Free Space	Shards
★ 172.81.19.101 172.81.19.101:9300	Online	0.67 % ↑ 16 % max 0 % min	0.83 ↑ 13.1 max 0 min	3 % ↑ 4 % max 0 % min	493.3 GB ↑ 493.5 GB max 0.0 B min	53

Fully Configured High Availability UNUM Instance - Database Health

## High Availability (cont'd)

### Configure High Availability (HA)

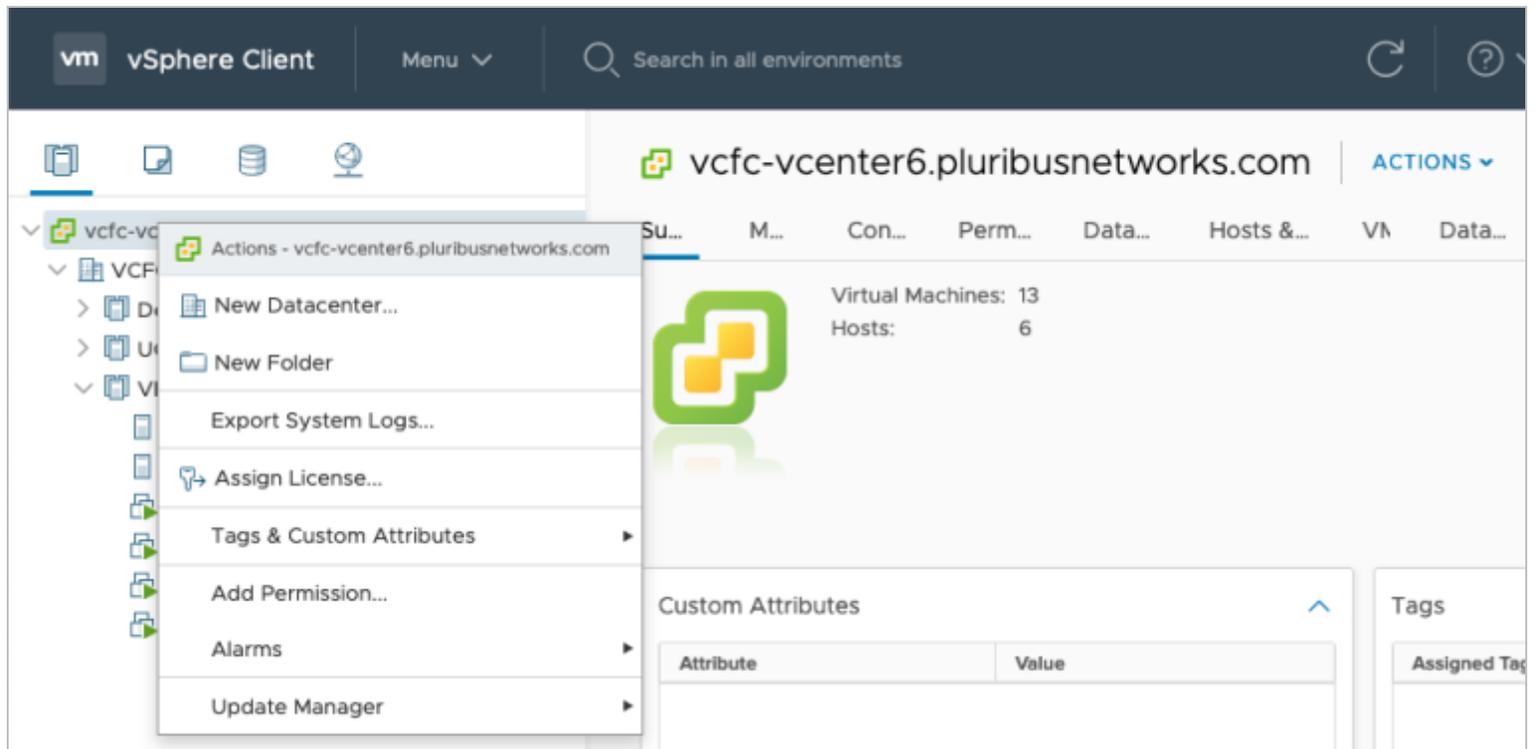
To configure HA refer to the following steps. The general process involves:

1. Creating a DataCenter on the VMware vCenter, if a datacenter does not currently exist.
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 exist you must create a new datacenter.

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



UNUM HA - Add New Datacenter

## High Availability (cont'd)

Enter the name for the new datacenter.

### New Datacenter ✕

Name VCFC-Datacenter

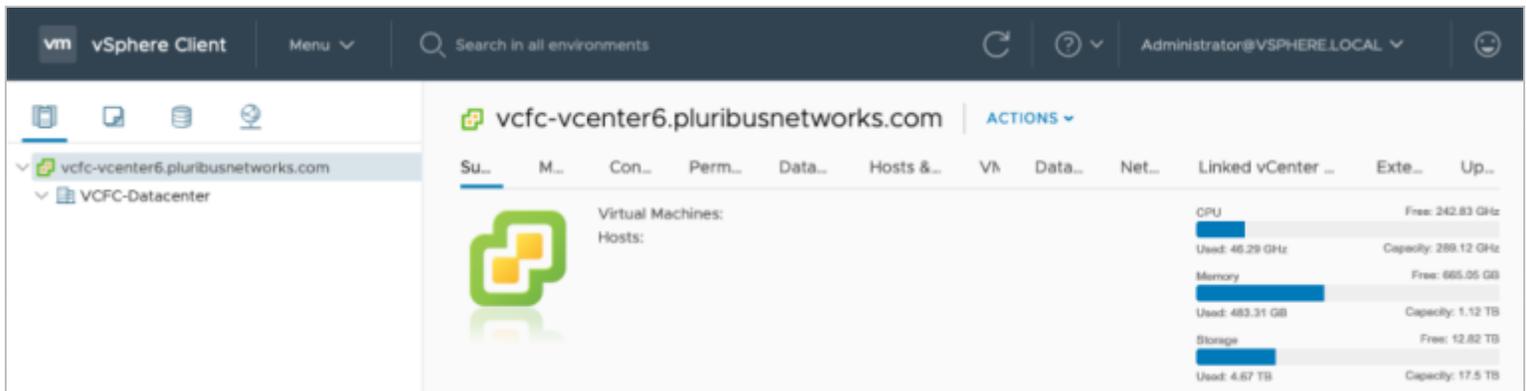
Location:  vcfc-vcenter6.pluribusnetworks.com

CANCEL
OK

UNUM HA - Add New Name

Click **OK** to continue.

The new datacenter appears in the dashboard.



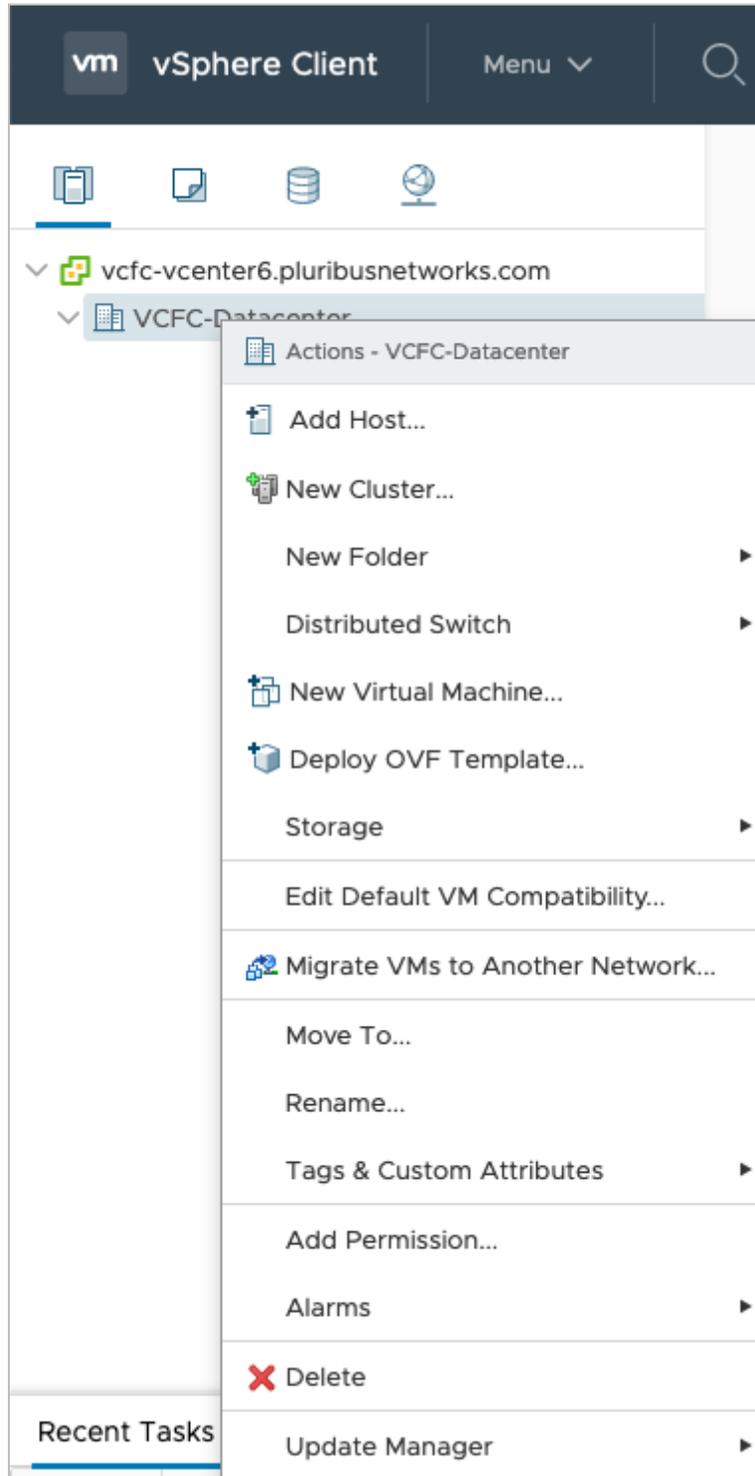
vcfc-vcenter6.pluribusnetworks.com		ACTIONS									
Su...	M...	Con...	Perm...	Data...	Hosts &...	VM	Data...	Net...	Linked vCenter ...	Exte...	Up...
		Virtual Machines:		CPU		Free: 342.83 GHz					
		Hosts:		Used: 46.29 GHz		Capacity: 289.12 GHz					
		Memory		Free: 665.05 GB							
		Used: 483.31 GB		Capacity: 1.12 TB							
		Storage		Free: 12.82 TB							
		Used: 4.67 TB		Capacity: 17.5 TB							

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**.



UNUM HA - Create Cluster

## High Availability (cont'd)

Enter a **name** for the new cluster.

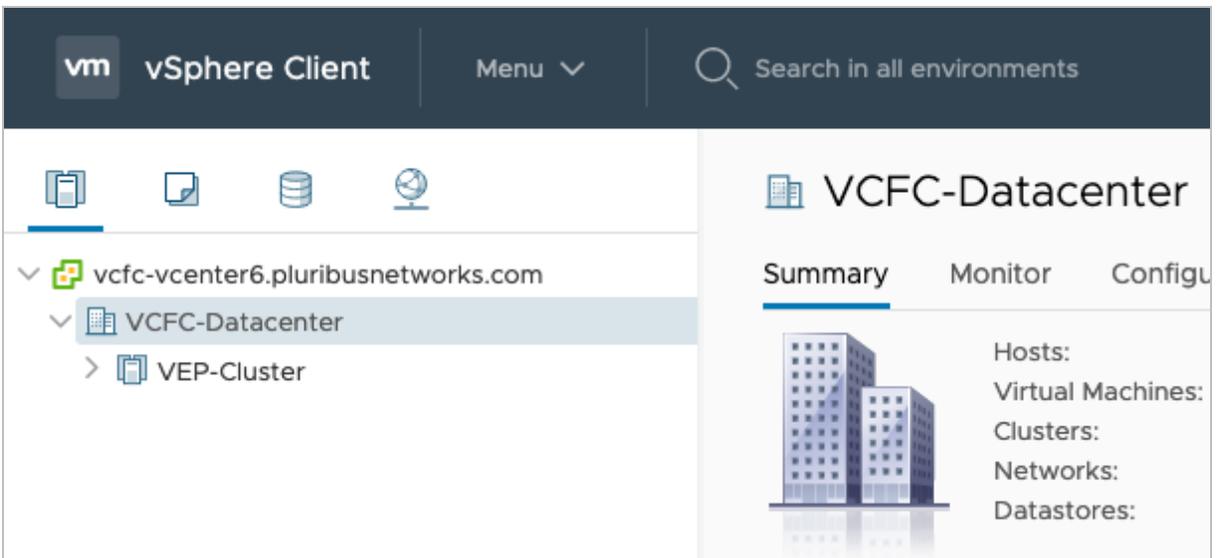
### New Cluster | VCFC-Datacenter

Name	<input type="text" value="VEP-Cluster"/>
Location	VCFC-Datacenter
vSphere DRS	<input type="checkbox"/>
vSphere HA	<input type="checkbox"/>
vSAN	<input type="checkbox"/>

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

UNUM HA - New Cluster Name

Click **OK** to continue. The new cluster appears in the dashboard.



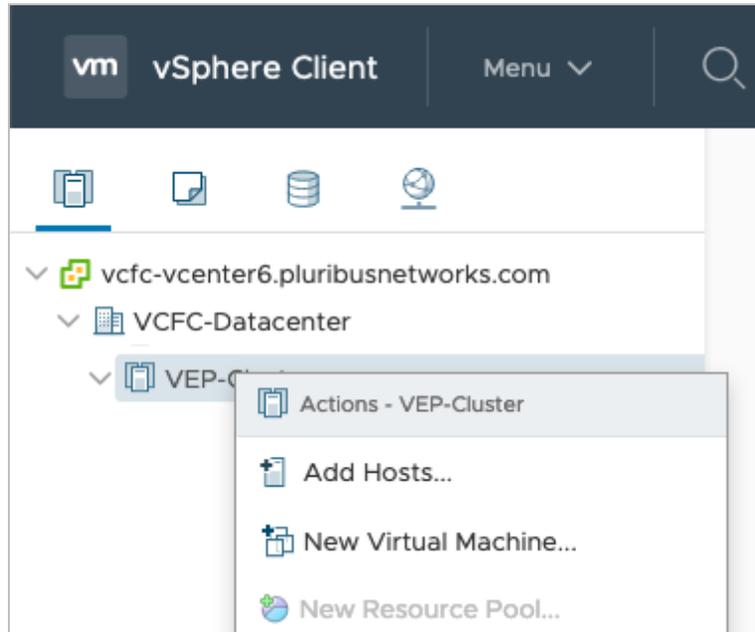
UNUM HA - New Cluster in Dashboard

## 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**.



UNUM HA - Add Hosts

## High Availability (cont'd)

Add Primary Hosts Servers One & Two.

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

### Add hosts

- 1 Add hosts
- 2 Host summary
- 3 Ready to complete

### Add new and existing hosts to your cluster

New hosts (2)
Existing hosts (0 from 0)

Use the same credentials for all hosts

10.110.1.61	admin_account	*****	✕
10.110.2.29	admin_account	*****	✕
IP address or FQDN	Username	Password	

CANCEL
NEXT

UNUM HA - Add Hosts Details

Click **Next** to continue.

Review the **Host Summary**.

### Add hosts

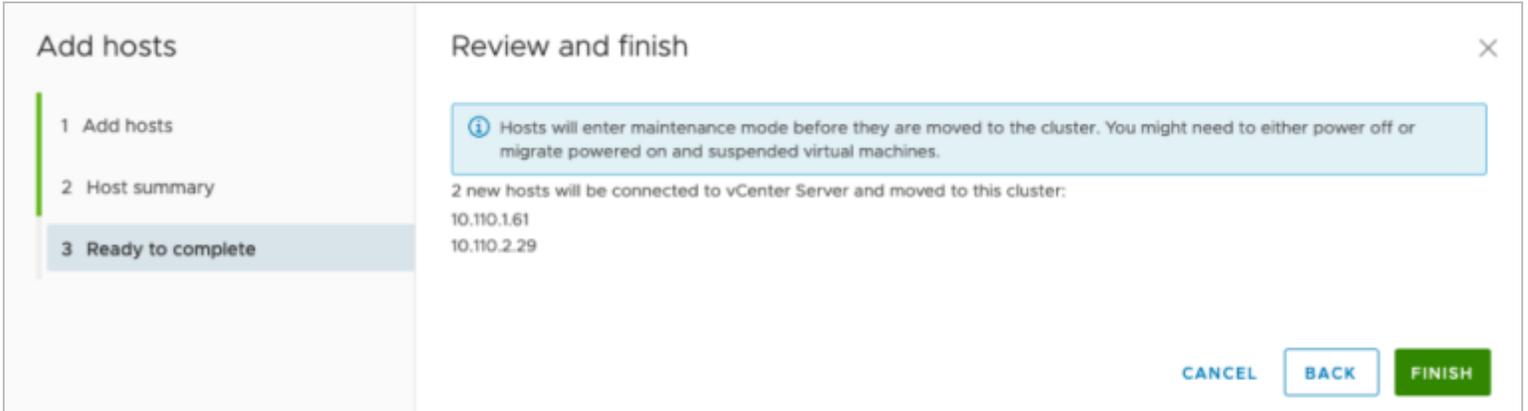
- 1 Add hosts
- 2 Host summary
- 3 Ready to complete

### Host summary

Hostname / IP Address	ESX Version	Model
> 10.110.1.61	6.7.0	DELL VEP-4600
> 10.110.2.29	6.7.0	DELL VEP-4600

Click **Next** to continue and review the entries.

## High Availability (cont'd)



**Add hosts**

- 1 Add hosts
- 2 Host summary
- 3 Ready to complete

**Review and finish** ✕

*i* Hosts will enter maintenance mode before they are moved to the cluster. You might need to either power off or migrate powered on and suspended virtual machines.

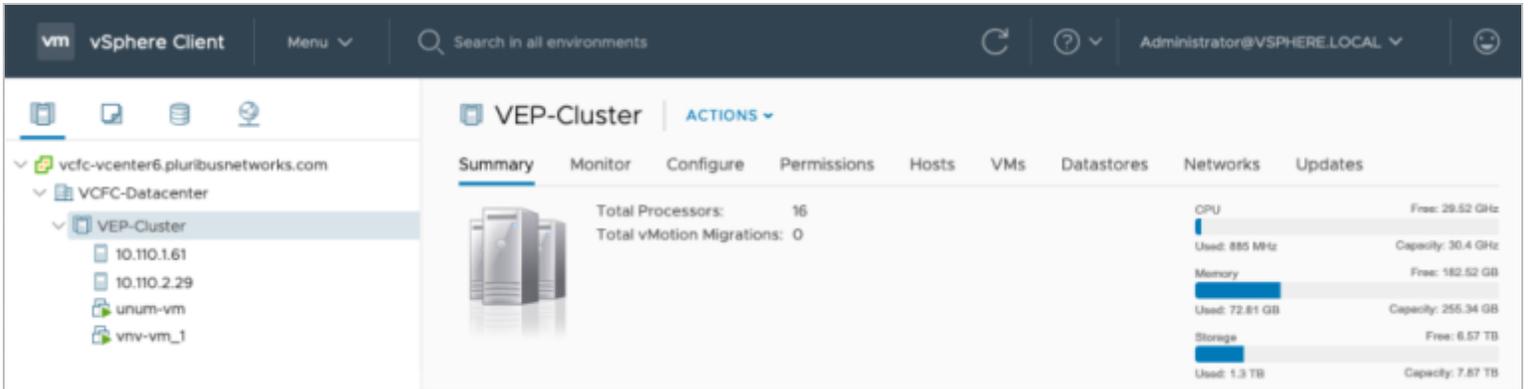
2 new hosts will be connected to vCenter Server and moved to this cluster:  
 10.110.1.61  
 10.110.2.29

**CANCEL** **BACK** **FINISH**

UNUM HA - Add Hosts Finish

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

The hosts appear in the dashboard.



vm vSphere Client | Menu | Search in all environments | Administrator@VSPHERE.LOCAL

vcfc-vcenter6.pluribusnetworks.com

VCFC-Datcenter

VEP-Cluster

- 10.110.1.61
- 10.110.2.29
- unum-vm
- vmv-vm\_1

**VEP-Cluster** | ACTIONS

Summary | Monitor | Configure | Permissions | Hosts | VMs | Datastores | Networks | Updates

Total Processors: 16  
 Total vMotion Migrations: 0

CPU: Free: 29.52 GHz  
 Used: 885 MHz | Capacity: 30.4 GHz

Memory: Free: 162.52 GB  
 Used: 72.81 GB | Capacity: 255.34 GB

Storage: Free: 6.57 TB  
 Used: 1.3 TB | Capacity: 7.87 TB

UNUM HA - Hosts 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**.

### New Datastore

- 1 Type**
- 2 Select NFS version
- 3 Name and configuration
- 4 Host accessibility
- 5 Ready to complete

**Type**  
Specify datastore type.

VMFS  
Create a VMFS datastore on a disk/LUN.

NFS  
Create an NFS datastore on an NFS share over the network.

VVol  
Create a Virtual Volumes datastore on a storage container connected to a storage provider.

[CANCEL](#) [BACK](#) [NEXT](#)

UNUM HA - Create Datastore

Click on **Next**.

## High Availability (cont'd)

Enter **NFS** type and details.

### New Datastore

---

- ✓ 1 Type
- 2 Select NFS version**
- 3 Name and configuration
- 4 Host accessibility
- 5 Ready to complete

**Select NFS version**

NFS Version

NFS 3  
NFS 3 allows the datastore to be accessed by ESX/ESXi hosts of version earlier than 6.0

NFS 4.1  
NFS 4.1 provides multipathing for servers and supports the Kerberos authentication protocol

[CANCEL](#) [BACK](#) [NEXT](#)

*UNUM HA - Create Datastore NFS Type*

Click on **Next**.

## High Availability (cont'd)

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

### New Datastore

- ✓ 1 Type
- ✓ 2 Select NFS version
- 3 Name and configuration**
- 4 Host accessibility
- 5 Ready to complete

**Name and configuration**  
Specify name and configuration.

**i** If you plan to configure an existing datastore on new hosts in the datacenter, it is recommended to use the "Mount to additional hosts" action from the datastore instead. ✕

**NFS Share Details**

Datastore name:

Folder:   
E.g: /vols/vol0/datastore-001

Server:   
E.g: nas, nas.it.com or 192.168.0.1

**Access Mode**

Mount NFS as read-only

**CANCEL** **BACK** **NEXT**

UNUM HA - Enter Datastore Details

Click on **Next**.

## High Availability (cont'd)

Select **all** hosts in the cluster.

### New Datastore

- ✓ 1 Type
- ✓ 2 Select NFS version
- ✓ 3 Name and configuration
- 4 Host accessibility**
- 5 Ready to complete

**Host accessibility**  
Select the hosts that require access to the datastore.

<input checked="" type="checkbox"/>	Host	Cluster
<input checked="" type="checkbox"/>	10.110.1.61	VEP-Cluster
<input checked="" type="checkbox"/>	10.110.2.29	VEP-Cluster

2 Items

**CANCEL** **BACK** **NEXT**

UNUM HA - Select Host Accessibility

Click **Next** to continue.

## High Availability (cont'd)

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

### New Datastore

- ✓ 1 Type
- ✓ 2 Select NFS version
- ✓ 3 Name and configuration
- ✓ 4 Host accessibility
- 5 Ready to complete**

**Ready to complete**  
Review your settings selections before finishing the wizard.

---

**General**

Name:	Datastore-HC
Type:	NFS 3

**NFS settings**

Server:	10.110.1.61
Folder:	/mnt/nfs_3.58/
Access Mode:	Read-write

**Hosts that will have access to this datastore**

Hosts:	<input type="checkbox"/> 10.110.1.61
	<input type="checkbox"/> 10.110.2.29

**CANCEL** **BACK** **FINISH**

UNUM HA - Complete New Datastore

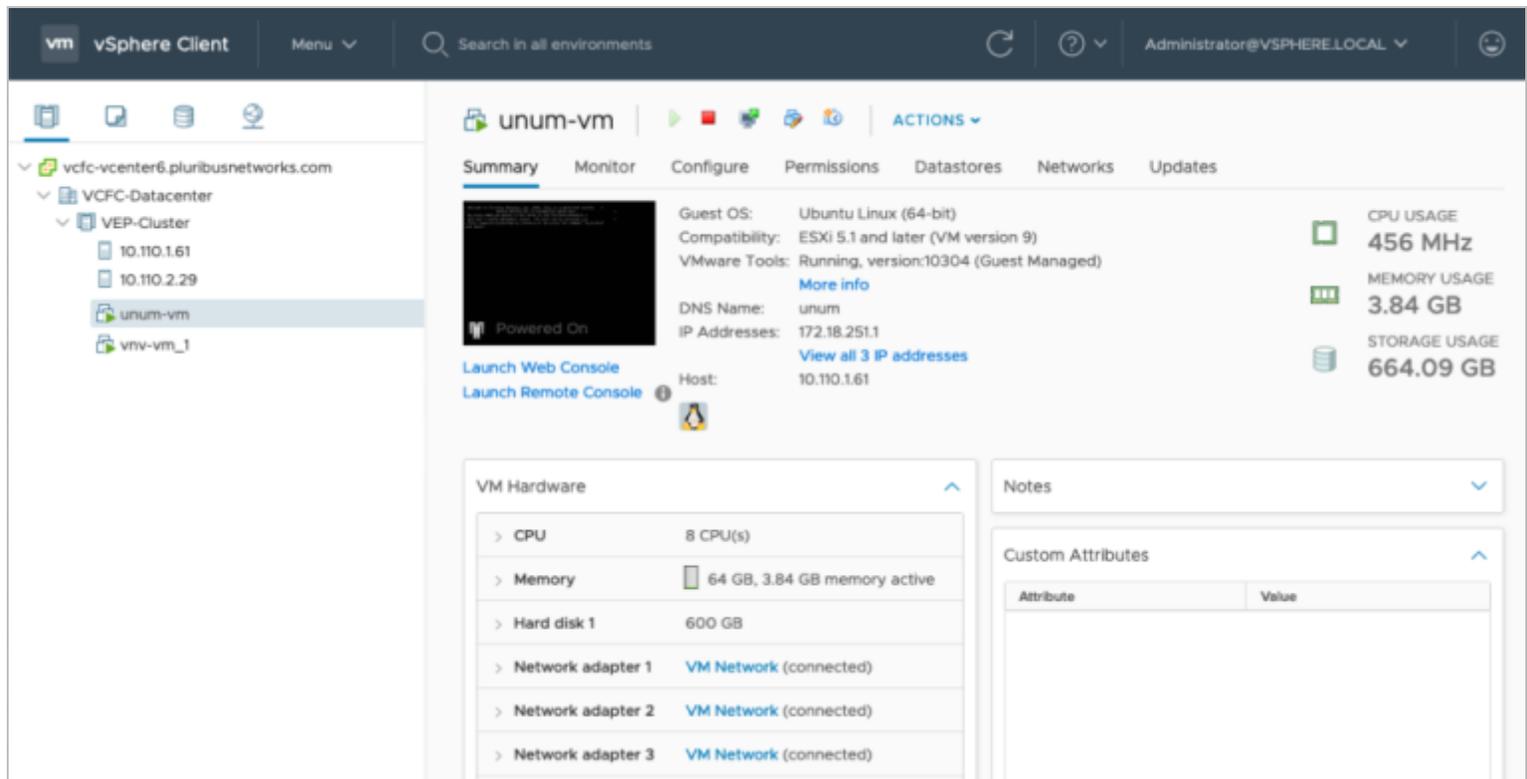
**Note:** Repeat the New Datastore process and create a second datastore for redundancy. For example, **Datastore2-HC**.

## 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.



The screenshot shows the vSphere Client interface for a virtual machine named 'unum-vm'. The interface includes a left-hand navigation pane, a top navigation bar, and a main content area with several tabs: Summary, Monitor, Configure, Permissions, Datastores, Networks, and Updates. The 'Summary' tab is active, displaying the following information:

- Guest OS:** Ubuntu Linux (64-bit)
- Compatibility:** ESXi 5.1 and later (VM version 9)
- VMware Tools:** Running, version:10304 (Guest Managed)
- DNS Name:** unum
- IP Addresses:** 172.18.251.1
- Host:** 10.110.1.61

On the right side of the Summary tab, there are three performance metrics:

- CPU USAGE:** 456 MHz
- MEMORY USAGE:** 3.84 GB
- STORAGE USAGE:** 664.09 GB

Below the Summary tab, the 'VM Hardware' section is expanded, showing the following configuration:

- CPU:** 8 CPU(s)
- Memory:** 64 GB, 3.84 GB memory active
- Hard disk 1:** 600 GB
- Network adapter 1:** VM Network (connected)
- Network adapter 2:** VM Network (connected)
- Network adapter 3:** VM Network (connected)

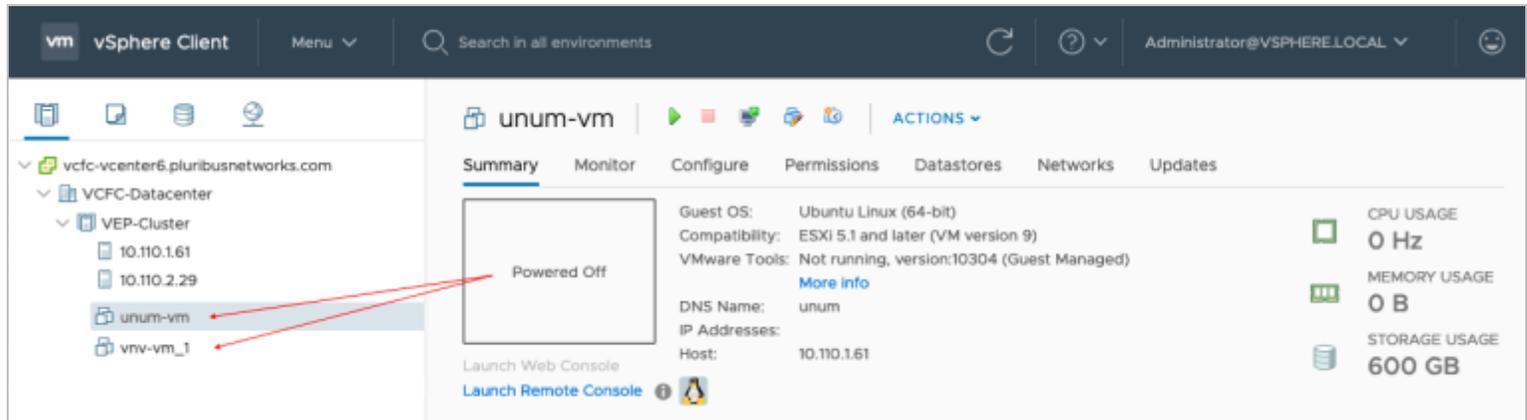
At the bottom of the Summary tab, there is a 'Notes' section and a 'Custom Attributes' section with a table structure:

Attribute	Value

UNUM HA - Dashboard - Ready for Migration

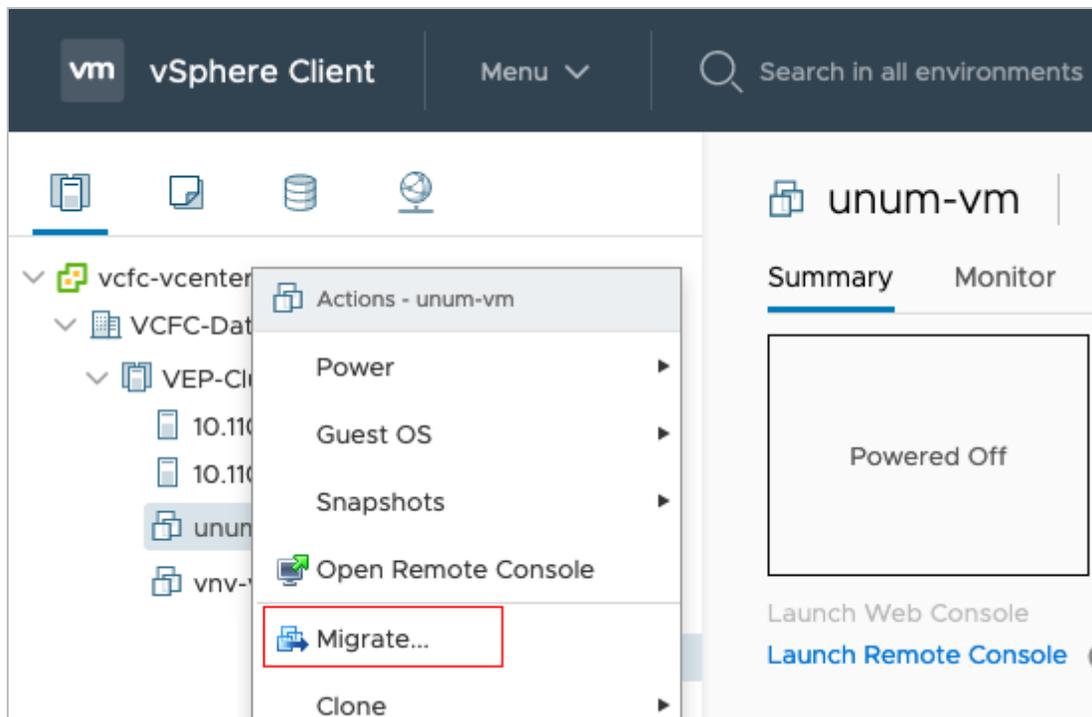
## High Availability (cont'd)

**Power Off** the **unum-vm** and **vnv-vm\_1** instances before proceeding.



UNUM HA - Dashboard - Power Off PN-Unum-main

**Right-click** on the **unum-vm** instance and select **Migrate**.



UNUM HA - Dashboard - Migrate

## High Availability (cont'd)

### Select Migration Type

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

#### unum-vm - Migrate

**1 Select a migration type**

2 Select a compute resource

3 Select networks

4 Ready to complete

**Select a migration type** VM origin ⓘ

Change the virtual machines' compute resource, storage, or both.

---

**Change compute resource only**  
Migrate the virtual machines to another host or cluster.

**Change storage only**  
Migrate the virtual machines' storage to a compatible datastore or datastore cluster.

**Change both compute resource and storage**  
Migrate the virtual machines to a specific host or cluster and their storage to a specific datastore or datastore cluster.

CANCEL BACK NEXT

UNUM HA - Migrate - Change Storage Only

Select the **Datastore** for the migration.

#### unum-vm - Migrate

✓ **1 Select a migration type**

**2 Select storage**

3 Ready to complete

**Select storage** VM origin ⓘ

Select the destination storage for the virtual machine migration.

---

Configure per disk

Select virtual disk format: Thin Provision ▾

VM Storage Policy: Keep existing VM storage policies ▾

Name	Capacity	Provisioned	Free	Type	Cluster
Datastore-HC	3.75 TB	434.26 GB	3.36 TB	NFS v4.1	
Datastore2-HC	2.33 TB	840.09 GB	2.21 TB	NFS v3	

Compatibility

✓ Compatibility checks succeeded.

CANCEL BACK NEXT

UNUM HA - Migrate - Select Storage for 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

**Ready to complete** VM origin ⓘ

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

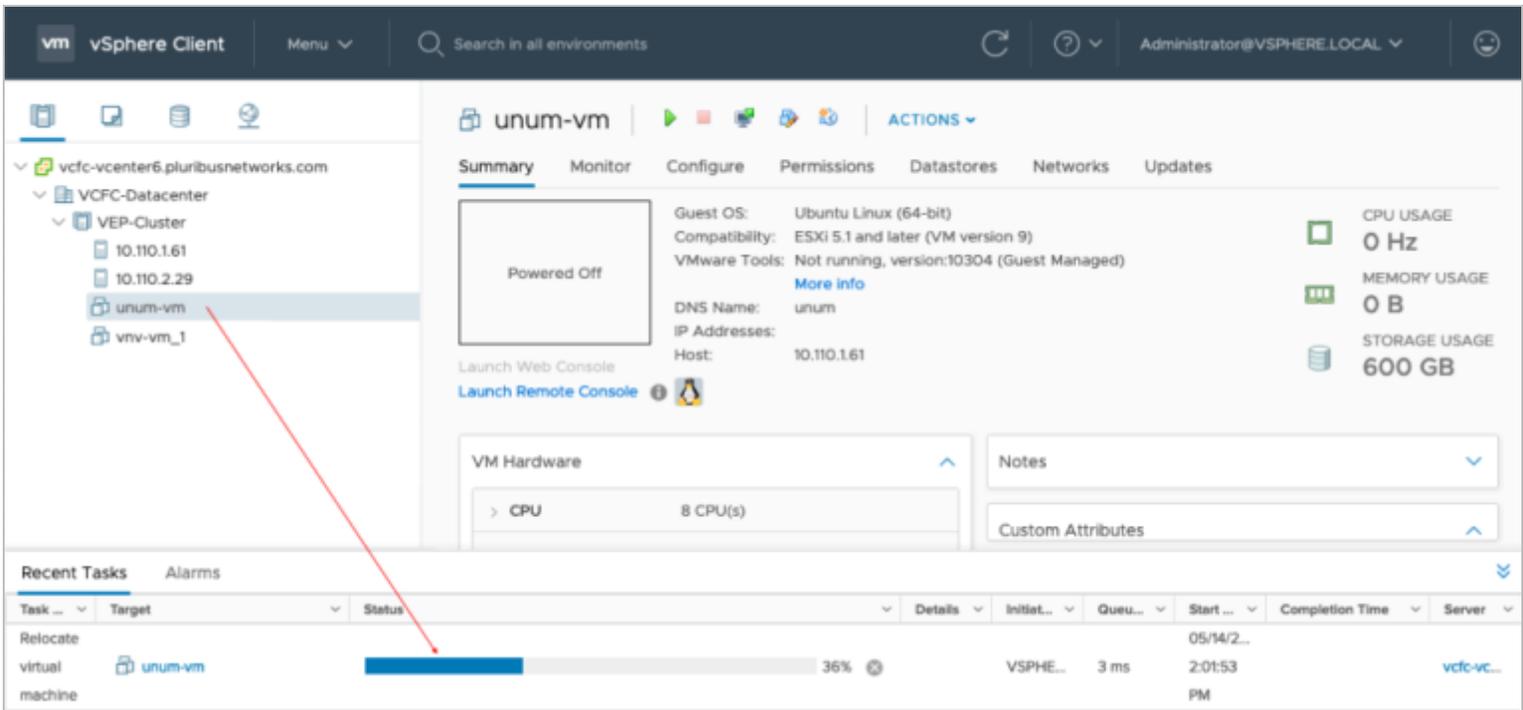
Migration Type	Change storage. Leave VM on the original compute resource
Virtual Machine	unum-vm
Storage	Datastore-HC
Disk Format	Thin Provision

CANCEL
BACK
FINISH

UNUM HA - Migrate - Ready To Complete Migration

Click **Finish** to begin the migration.

Progress is monitored in the dashboard.



The screenshot shows the vSphere Client interface. On the left, the 'unum-vm' is selected in the inventory tree. The main pane shows the VM's summary, including its powered-off status, guest OS (Ubuntu Linux), and hardware details (8 CPU(s)). On the right, resource usage is shown as 0 Hz CPU, 0 B memory, and 600 GB storage. At the bottom, the 'Recent Tasks' table displays the migration progress:

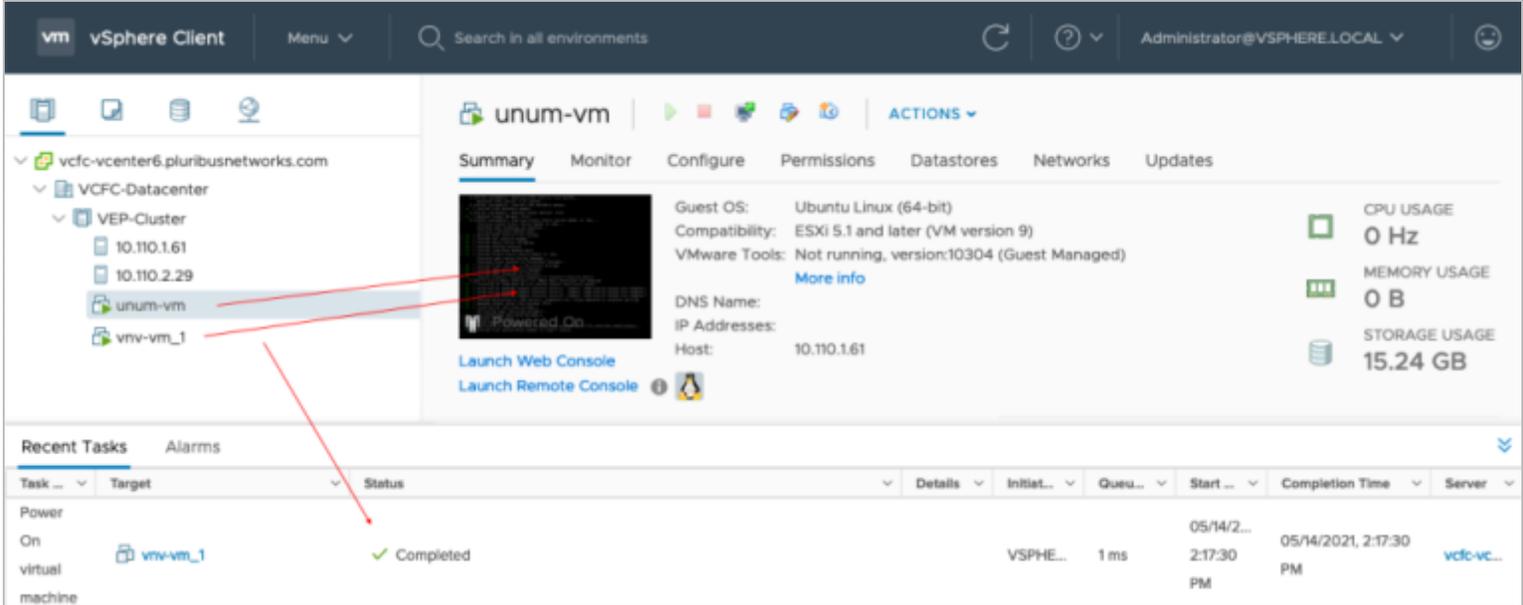
Task	Target	Status	Details	Initiated	Queued	Start	Completion Time	Server
Relocate	unum-vm	36%		VSPHE...	3 ms	05/14/2...		vdc-vc...

UNUM HA - Migrate - Migration in Progress

## 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.



The screenshot shows the vSphere Client interface. The left pane displays a folder hierarchy: vcfv-center6.pluribusnetworks.com > VCFC-Datacenter > VEP-Cluster > 10.110.1.61 > 10.110.2.29 > unum-vm > vnv-vm\_1. The main pane shows the details for the 'unum-vm' instance, which is powered on. The summary tab displays the following information:

- Guest OS: Ubuntu Linux (64-bit)
- Compatibility: ESXi 5.1 and later (VM version 9)
- VMware Tools: Not running, version:10304 (Guest Managed)
- DNS Name:
- IP Addresses: Host: 10.110.1.61
- CPU USAGE: 0 Hz
- MEMORY USAGE: 0 B
- STORAGE USAGE: 15.24 GB

Below the main pane, the 'Recent Tasks' section shows a task for 'Power On' of the 'vnv-vm\_1' virtual machine. The task is completed.

Task	Target	Status	Details	Initiat.	Queu.	Start	Completion Time	Server
Power On	vnv-vm_1	Completed		VSPHE...	1 ms	05/14/2... 2:17:30 PM	05/14/2021, 2:17:30 PM	vcfc-vc...

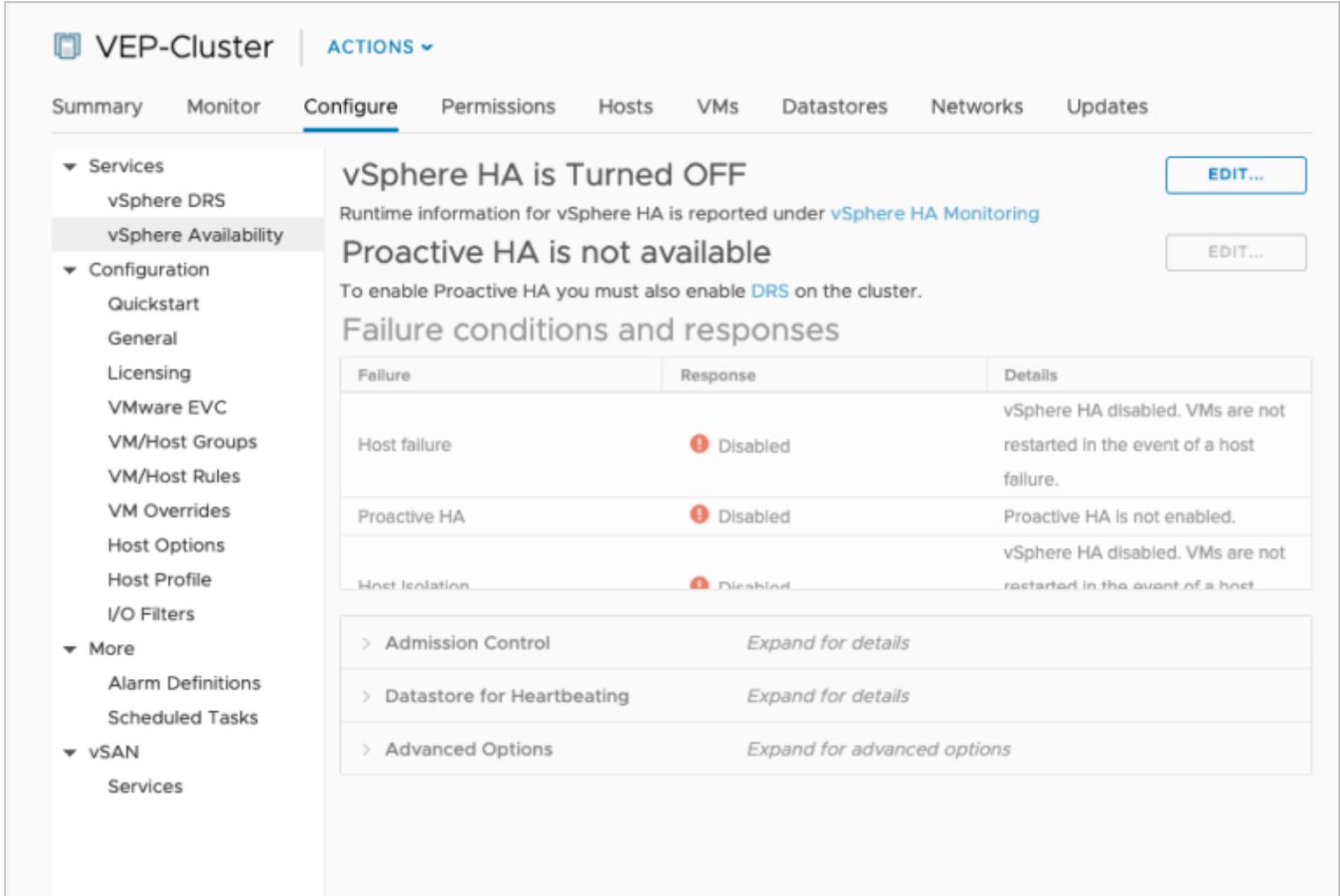
UNUM HA - Migrate - PN-Unum-main Powered On

## High Availability (cont'd)

### Configure HA on VMWare Cluster

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

Click on **Configure** → **vSphere Availability** → **Edit**.



The screenshot shows the vSphere configuration interface for a cluster named 'VEP-Cluster'. The 'Configure' tab is active, and the 'vSphere Availability' option is selected in the left-hand navigation menu. The main content area displays a warning that vSphere HA is turned off and proactive HA is not available. A table below lists failure conditions and their responses, all of which are currently disabled.

Failure	Response	Details
Host failure	Disabled	vSphere HA disabled. VMs are not restarted in the event of a host failure.
Proactive HA	Disabled	Proactive HA is not enabled.
Host Isolation	Disabled	vSphere HA disabled. VMs are not restarted in the event of a host

Below the table, there are expandable sections for 'Admission Control', 'Datastore for Heartbeating', and 'Advanced Options', each with an 'Expand for details' or 'Expand for advanced options' link.

UNUM HA - Configure vSphere HA

## High Availability (cont'd)

Select **vSphere HA** to **On**.

### Edit Cluster Settings | VEP-Cluster ✕

vSphere HA  

**Failures and responses** | Admission Control | Heartbeat Datastores | Advanced Options

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 <input type="text"/>
> Response for Host Isolation	Disabled <input type="text"/>
> Datastore with PDL	Disabled <input type="text"/>
> Datastore with APD	Disabled <input type="text"/>
> VM Monitoring	Disabled <input type="text"/>

**CANCEL** **OK**

UNUM HA - Configure vSphere HA On

## High Availability (cont'd)

**Disable** the **Admission Control** setting.

### Edit Cluster Settings | VEP-Cluster ✕

vSphere HA

Failures and responses | **Admission Control** | Heartbeat Datastores | Advanced Options

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*

## High Availability (cont'd)

Select **Heartbeat Datastores**.

Edit Cluster Settings
VEP-Cluster
✕

vSphere HA

Failures and responses
Admission Control
Heartbeat Datastores
Advanced Options

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

Available heartbeat datastores

	Name	Datastore Cluster	Hosts Mounting Datastore ↓
<input checked="" type="checkbox"/>	Datastore2-HC	N/A	2
<input checked="" type="checkbox"/>	Datastore-HC	N/A	2

CANCEL
OK

UNUM HA - Configure vSphere Heartbeat Datastores

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.

Recent Tasks		Alarms								
Task ...	Target	Status	Details	Initiat...	Queu...	Start ...	Completion Time	Server		
Config...	vSphere 10.110.2.29	50%		System	2 ms	05/14/2...		vcfc-vc...		
	HA					2:24:09 PM				
Config...	vSphere 10.110.1.61	50%		System	2 ms	05/14/2...		vcfc-vc...		
						2:24:09 PM				

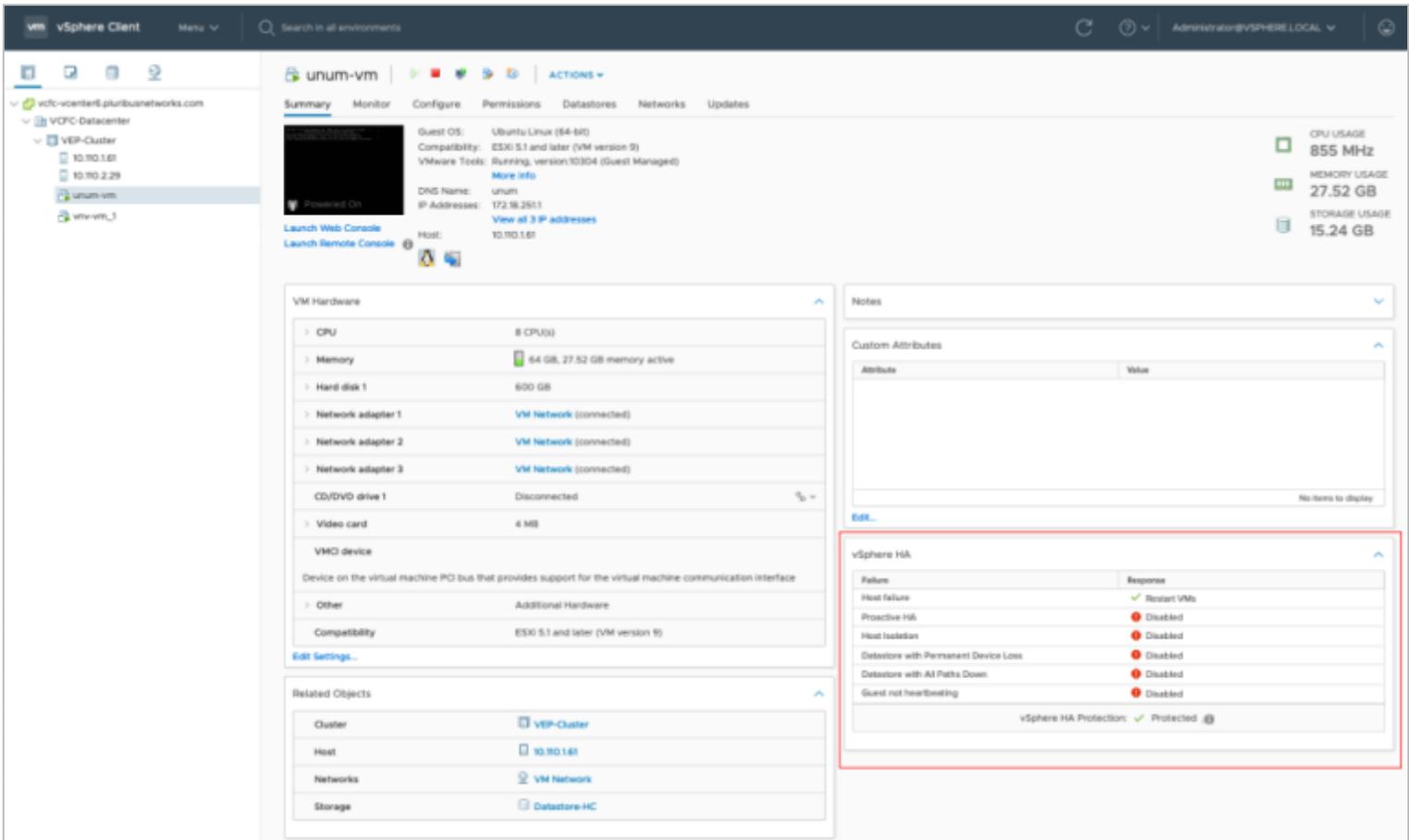
UNUM HA - Configuration Validation

Recent Tasks		Alarms								
Task ...	Target	Status	Details	Initiat...	Queu...	Start ...	Completion Time	Server		
Config...	vSphere 10.110.2.29	✓ Completed		System	2 ms	05/14/2...	05/14/2021, 2:24:30 PM	vcfc-vc...		
	HA					2:24:09 PM				
Config...	vSphere 10.110.1.61	✓ Completed		System	2 ms	05/14/2...	05/14/2021, 2:24:30 PM	vcfc-vc...		
						2:24:09 PM				

UNUM HA - Configuration Validation - Complete

## High Availability (cont'd)

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



The screenshot displays the vSphere Client interface for a virtual machine named 'unum-vm'. The 'vSphere HA' section is highlighted with a red box, showing the following configuration:

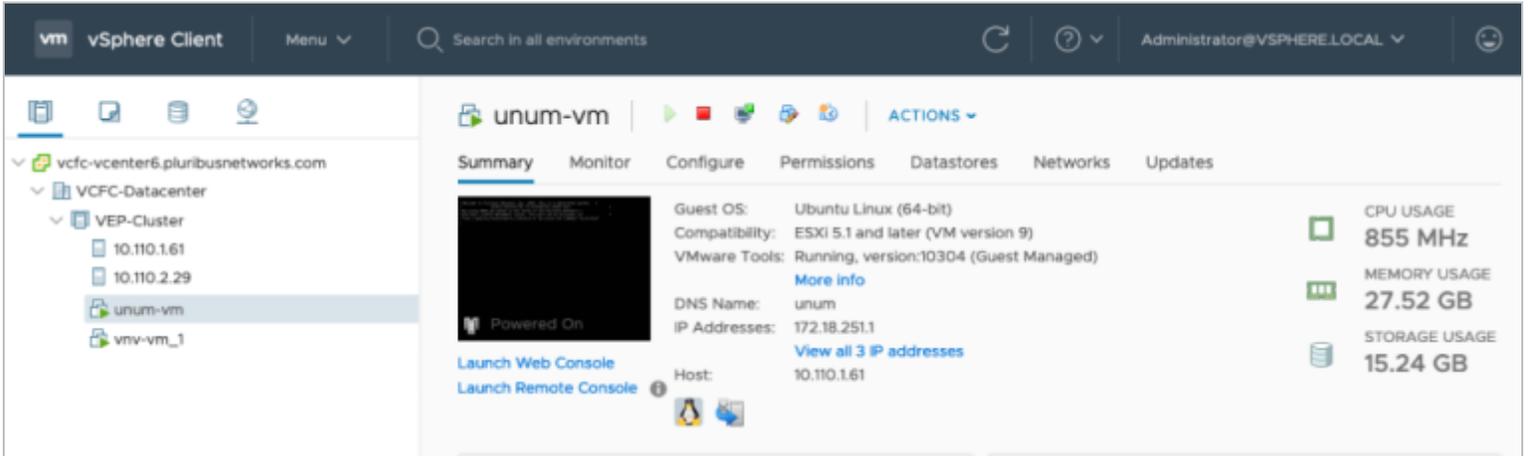
Feature	Response
Host failure	✓ Restart VMs
Proactive HA	⊘ Disabled
Host Isolation	⊘ Disabled
Datastore with Permanent Device Loss	⊘ Disabled
Datastore with All Paths Down	⊘ Disabled
Guest not heartbeating	⊘ Disabled
vSphere HA Protection: ✓ Protected ⓘ	

UNUM HA - Configuration Validation - vSphere HA Protection Enabled

## High Availability (cont'd)

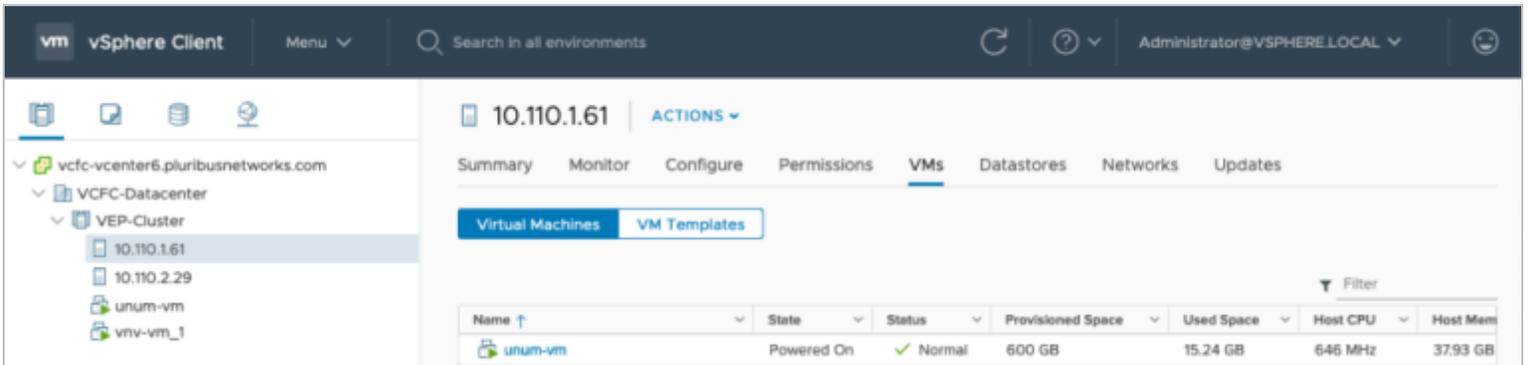
### High Availability Validation after Fail-over

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.



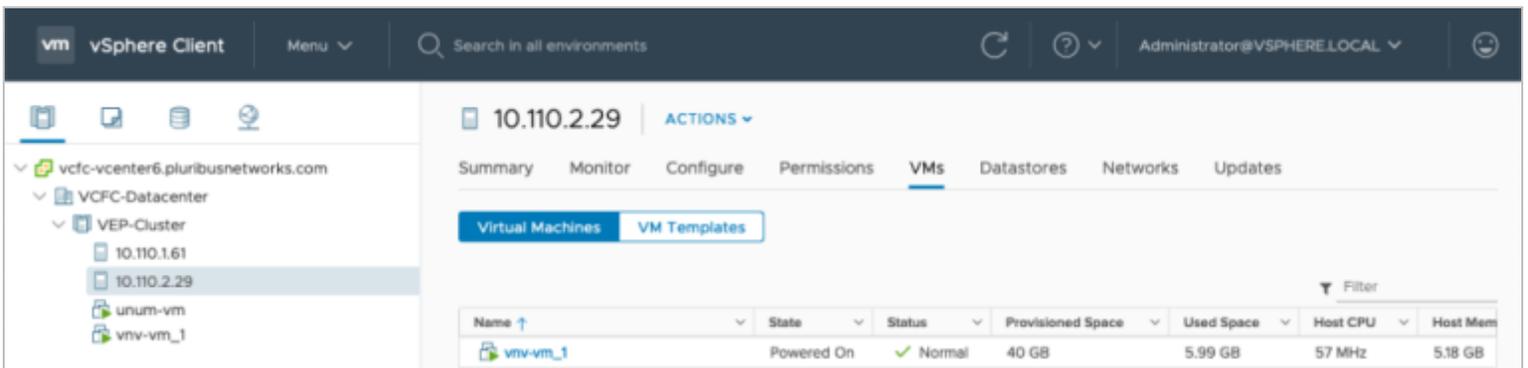
UNUM HA - Configuration Validation - Example - Healthy Cluster

Server One running UNUM instance.



UNUM HA - Configuration Validation - Example - Healthy Cluster - Server One - UNUM Instance

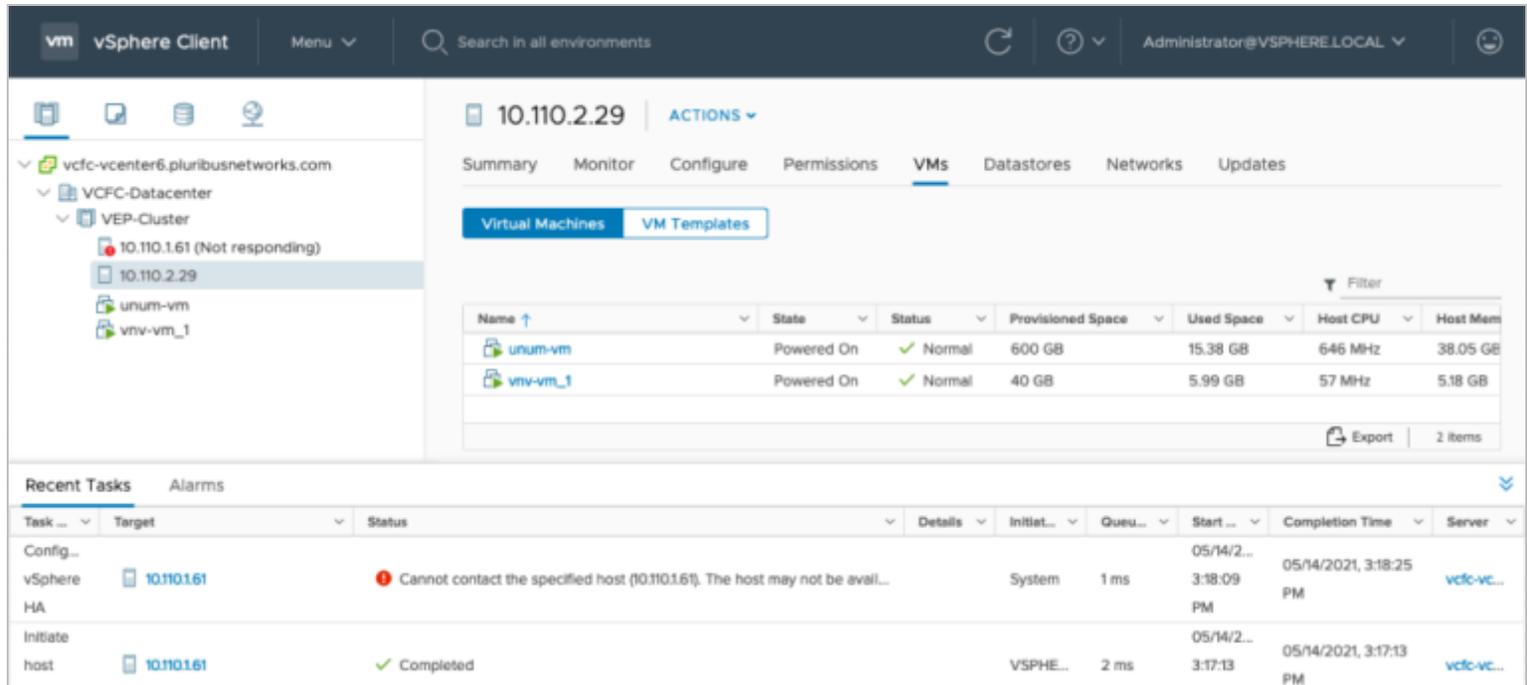
Server Two running vNV instance.



UNUM HA - Configuration Validation - Example - Server Two - 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.



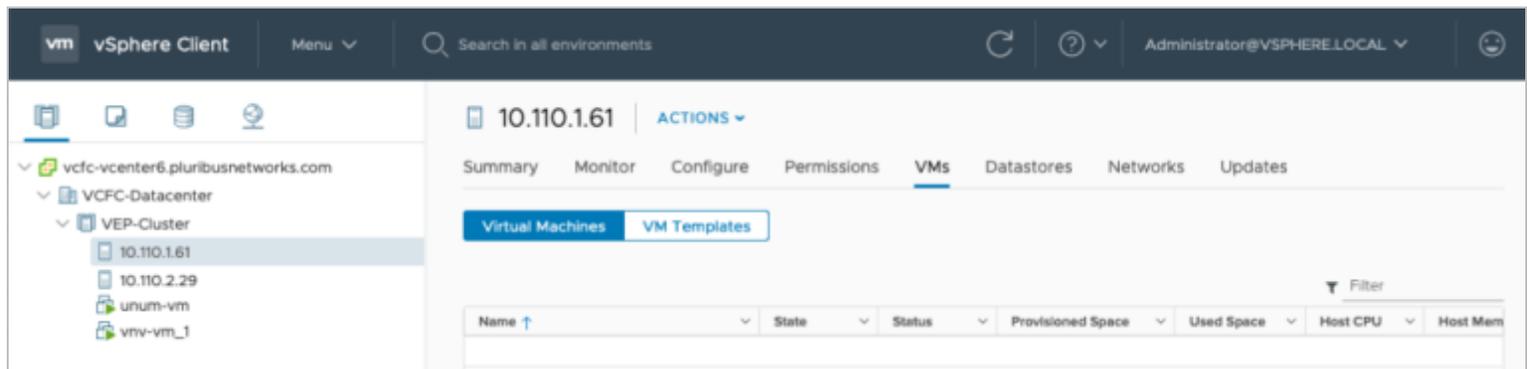
Name	State	Status	Provisioned Space	Used Space	Host CPU	Host Mem
unum-vm	Powered On	✓ Normal	600 GB	15.38 GB	646 MHz	38.05 GB
vnv-vm_1	Powered On	✓ Normal	40 GB	5.99 GB	57 MHz	5.18 GB

Task	Target	Status	Details	Initiat...	Queue...	Start ...	Completion Time	Server
Config...	vSphere 10.110.1.61	✗	Cannot contact the specified host (10.110.1.61). The host may not be avail...	System	1 ms	05/14/2... 3:18:09 PM	05/14/2021, 3:18:25 PM	vcfc-vc...
Initiate	host 10.110.1.61	✓	Completed	VSPHE...	2 ms	05/14/2... 3:17:13 PM	05/14/2021, 3:17:13 PM	vcfc-vc...

UNUM HA - Configuration Validation - Example - Cluster Instance Failed or Rebooted

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.



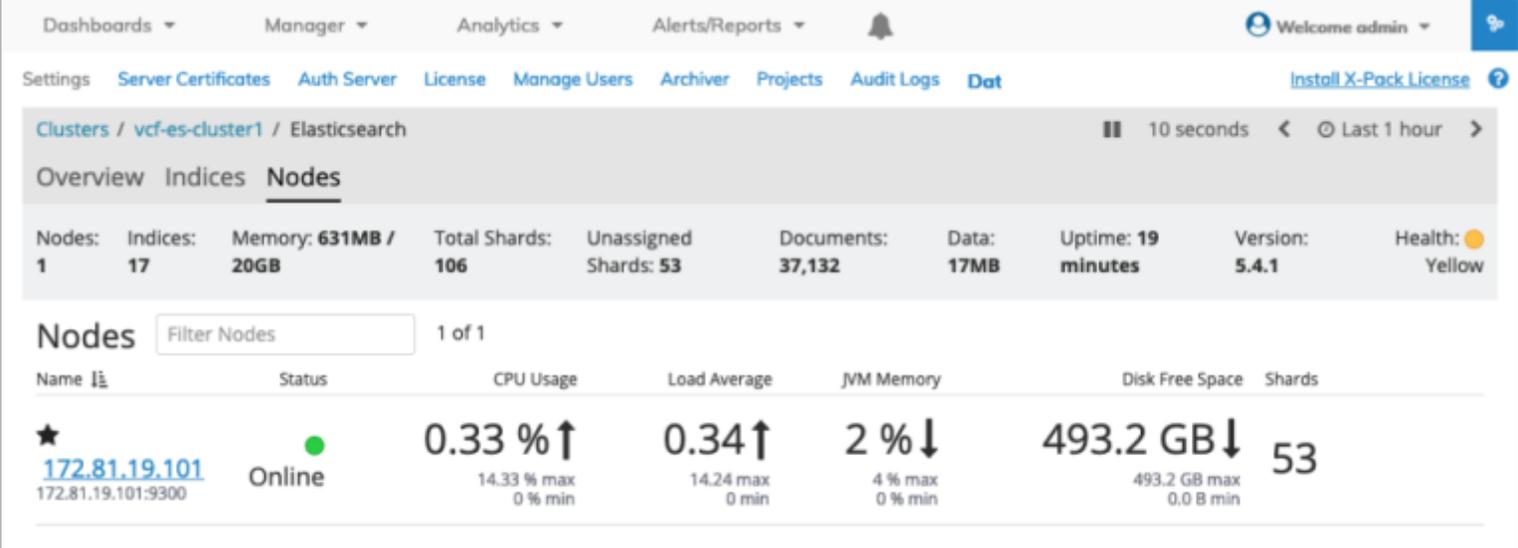
Name	State	Status	Provisioned Space	Used Space	Host CPU	Host Mem
vnv-vm_1	Powered On	✓ Normal	40 GB	5.99 GB	57 MHz	5.18 GB

UNUM HA - Configuration Validation - Example - Cluster Instance Failed Over

## High Availability (cont'd)

### UNUM Database Health - High Availability Validation after Fail-over

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



The screenshot displays the UNUM interface for monitoring an Elasticsearch cluster. The top navigation bar includes 'Dashboards', 'Manager', 'Analytics', and 'Alerts/Reports'. The main menu shows 'Settings', 'Server Certificates', 'Auth Server', 'License', 'Manage Users', 'Archiver', 'Projects', 'Audit Logs', and 'Dat'. The current view is 'Clusters / vcf-es-cluster1 / Elasticsearch', with a refresh rate of 10 seconds and a time range of 'Last 1 hour'.

The 'Overview' tab is selected, showing the following cluster metrics:

Nodes: 1	Indices: 17	Memory: 631MB / 20GB	Total Shards: 106	Unassigned Shards: 53	Documents: 37,132	Data: 17MB	Uptime: 19 minutes	Version: 5.4.1	Health: Yellow
----------	-------------	----------------------	-------------------	-----------------------	-------------------	------------	--------------------	----------------	----------------

The 'Nodes' tab is active, showing a table with 1 of 1 nodes. The table columns are Name, Status, CPU Usage, Load Average, JVM Memory, Disk Free Space, and Shards.

Name	Status	CPU Usage	Load Average	JVM Memory	Disk Free Space	Shards
★ <a href="#">172.81.19.101</a> 172.81.19.101:9300	Online	0.33 % ↑ 14.33 % max 0 % min	0.34 ↑ 14.24 max 0 min	2 % ↓ 4 % max 0 % min	493.2 GB ↓ 493.2 GB max 0.0 B min	53

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

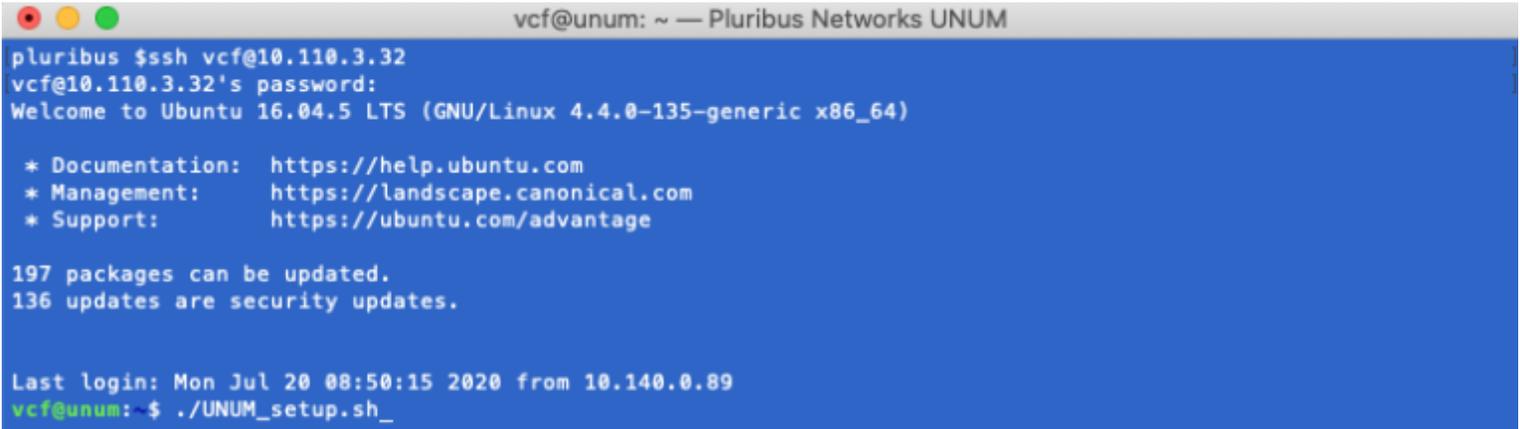
If you purchased a Pluribus FreedomCare maintenance agreement, you can contact Pluribus Networks directly for support requirements.

## 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.



```
vcf@unum: ~ — Pluribus Networks UNUM
pluribus $ssh vcf@10.110.3.32
vcf@10.110.3.32's password:
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-135-generic x86_64)

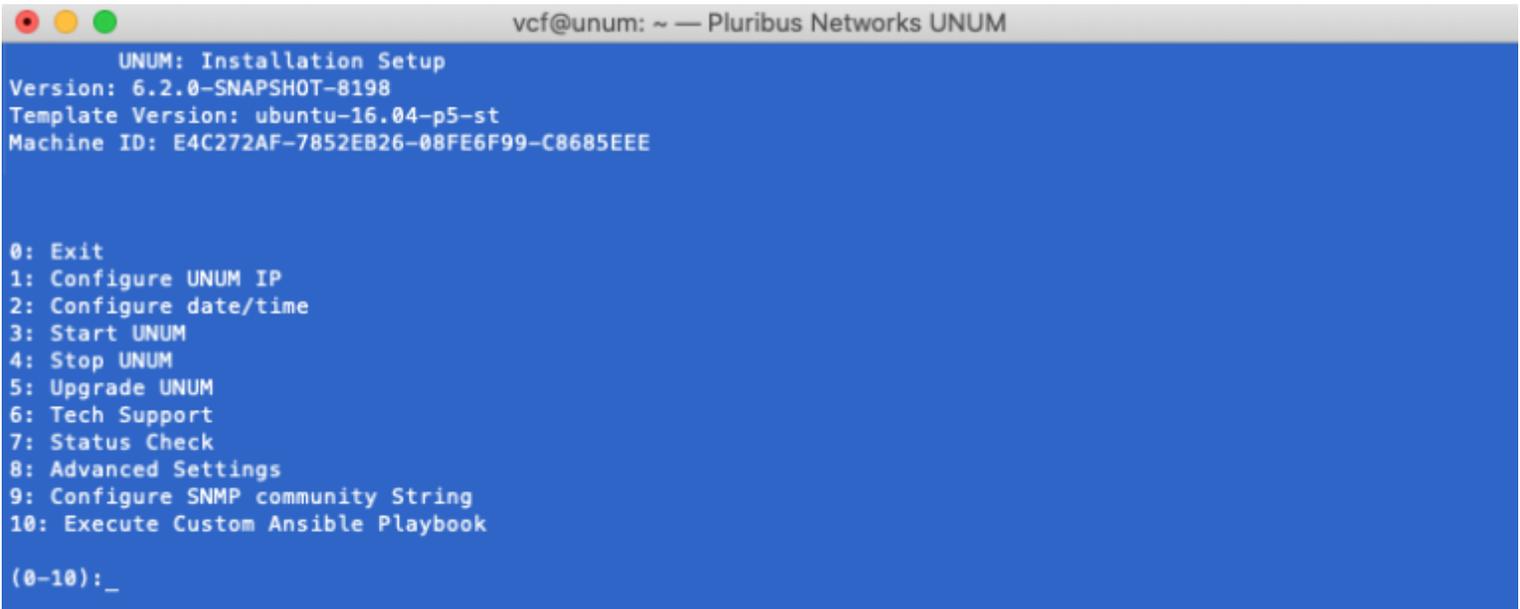
 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

197 packages can be updated.
136 updates are security updates.

Last login: Mon Jul 20 08:50:15 2020 from 10.140.0.89
vcf@unum:~$ ./UNUM_setup.sh_
```

*UNUM Console Login Screen*

2. **Run** ./UNUM\_setup.sh:



```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Installation Setup
Version: 6.2.0-SNAPSHOT-8198
Template Version: ubuntu-16.04-p5-st
Machine ID: E4C272AF-7852EB26-08FE6F99-C8685EEE

0: Exit
1: Configure UNUM IP
2: Configure date/time
3: Start UNUM
4: Stop UNUM
5: Upgrade UNUM
6: Tech Support
7: Status Check
8: Advanced Settings
9: Configure SNMP community String
10: Execute Custom Ansible Playbook

(0-10):_
```

*Run UNUM\_setup.sh Script*

## 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**.

```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Installation Setup
Version: 6.2.0-SNAPSHOT-8198
Template Version: ubuntu-16.04-p5-st
Machine ID: E4C272AF-7852EB26-08FE6F99-C8685EEE

0: Exit
1: Configure UNUM IP
2: Configure date/time
3: Start UNUM
4: Stop UNUM
5: Upgrade UNUM
6: Tech Support
7: Status Check
8: Advanced Settings
9: Configure SNMP community String
10: Execute Custom Ansible Playbook

(0-10):4_
```

UNUM Options Menu - Stop UNUM

```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Installation Setup
Version: 6.2.0-SNAPSHOT-8198
Template Version: ubuntu-16.04-p5-st
Machine ID: E4C272AF-7852EB26-08FE6F99-C8685EEE

0: Exit
1: Configure UNUM IP
2: Configure date/time
3: Start UNUM
4: Stop UNUM
5: Upgrade UNUM
6: Tech Support
7: Status Check
8: Advanced Settings
9: Configure SNMP community String
10: Execute Custom Ansible Playbook

(0-10):1_
```

UNUM Options Menu - Configure IP

## Appendix A (cont'd)

---

### Configure UNUM IP (cont'd)

```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network
(0-3):_
```

*UNUM Configure UNUM IP Menu*

## Appendix A (cont'd)

### Configure UNUM IP (cont'd)

```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network

(0-3):1

Configure Host IP Address:
This step is needed the first time that the UNUM OVA has been installed.

WARNING: If UNUM is currently running in a clustered environment, the IP
change can disrupt service and any remote node including Elasticsearch and PCAP
agent may need to be re-provisioned. UNUM must be restarted after changing
the IP address.
(Note: Unless you are on the server console, your current connection will be lost.
You will need to re-connect using the new IP address.)

Continue? ([Y]es or [N]o) [Yes]: Y
Enter interface [eth0]:
Enter ip address [10.110.3.32]: 10.110.3.32
Enter network mask [255.255.252.0]: 255.255.252.0
Enter gateway []: 10.110.0.1
Enter domain search list []: pluribusnetworks.com
Enter DNS name servers separated by space []: 10.20.4.1_
```

UNUM - Configure Host IP

**Note:** Please review the following usage information regarding the Ethernet adapters used by UNUM:

**Eth0:** used for management, GUI (user interaction) and data collection via Netvisor REST. This interface uses DHCP by default.

**Eth1:** used for internal system communication is set to IP address 172 . 16 . 251 . 1 by default.

**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.

**Eth2:** <Optional>used to connect a Seed Switch or Fabric via an inband connection.

UNUM Ethernet Adapters Usage Table

## Appendix A (cont'd)

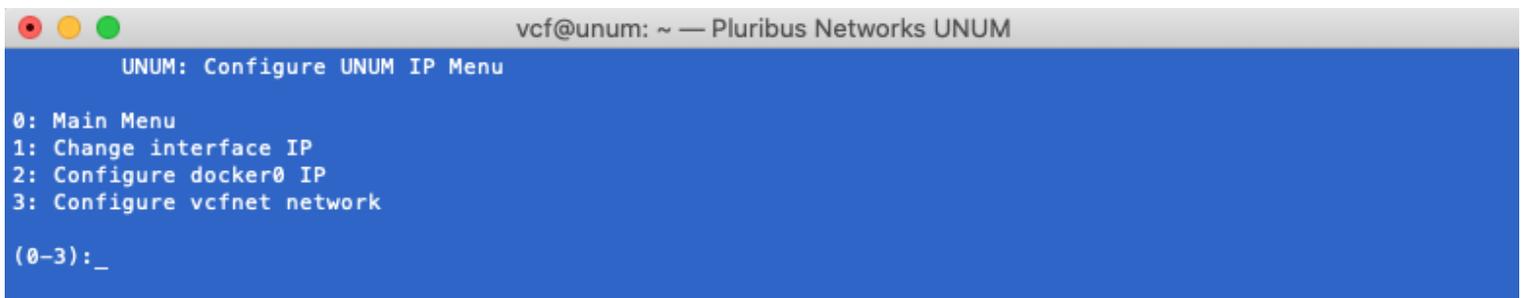
---

### 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**.



```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network
(0-3):_
```

*UNUM - Configure Docker0 & VCFnet Bridge 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.

```
vcf@unum: ~ — Pluribus Networks UNUM
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 13:53:54 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
docker0  Link encap:Ethernet  HWaddr 02:42:c3:14:63:6e
         inet addr:192.17.251.1  Bcast:0.0.0.0  Mask:255.255.255.0
         UP BROADCAST MULTICAST  MTU:1500  Metric:1
         RX packets:0 errors:0 dropped:0 overruns:0 frame:0
         TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:0
         RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

UNUM - New Docker0 IP Address

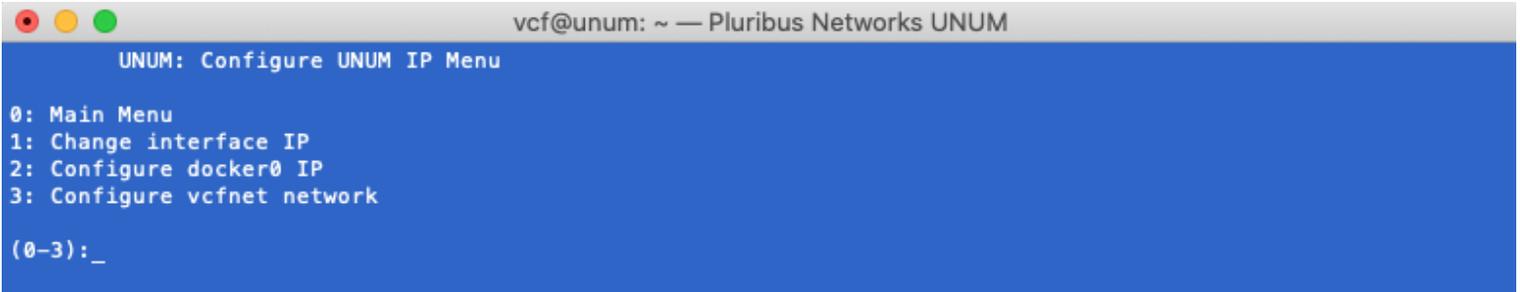
**Note:** The **docker0 IP** address has to be a specific host IP address and mask.

## 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**.



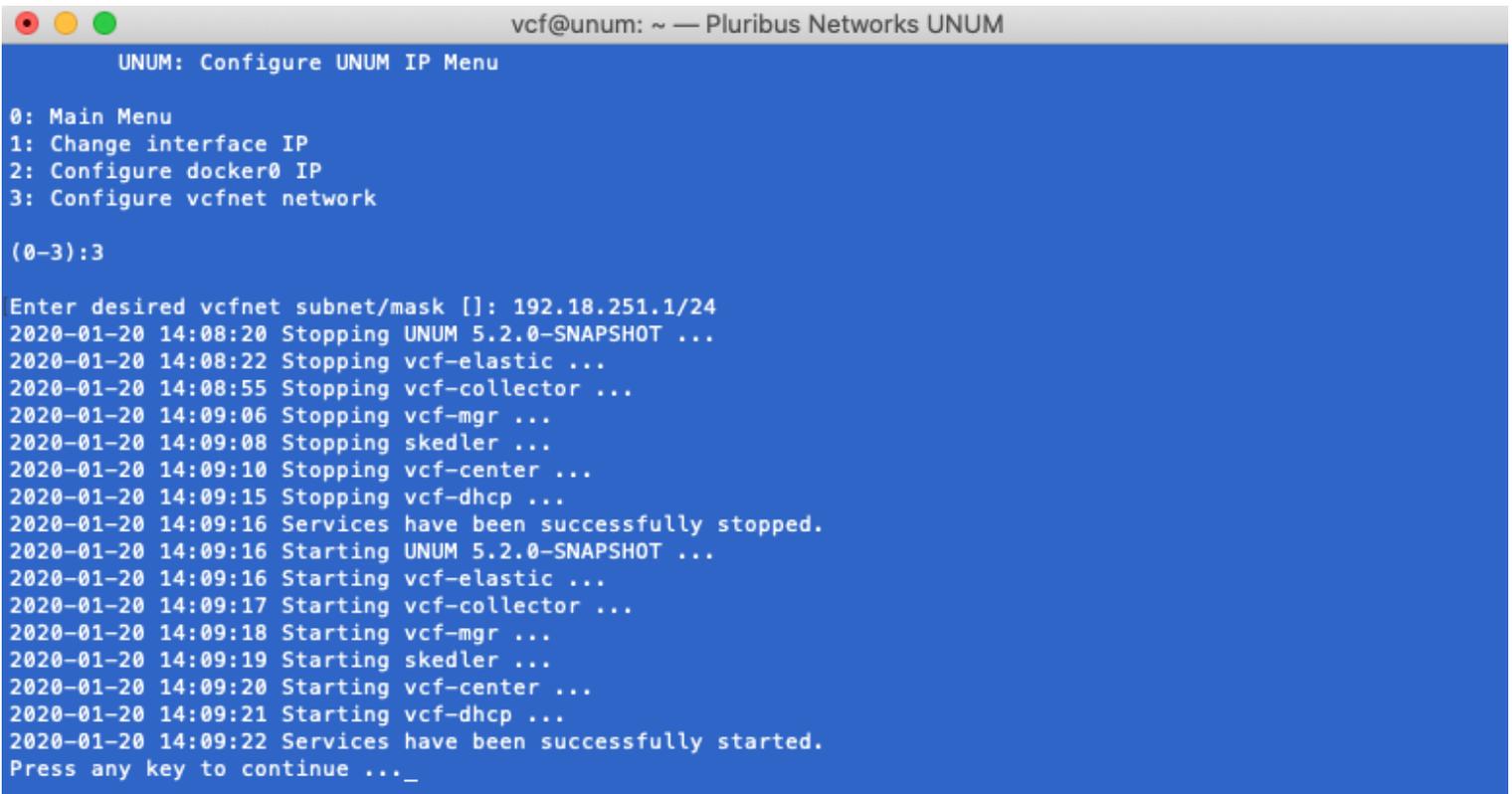
```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network
(0-3):_
```

*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.



```
vcf@unum: ~ — Pluribus Networks UNUM
UNUM: Configure UNUM IP Menu
0: Main Menu
1: Change interface IP
2: Configure docker0 IP
3: Configure vcfnet network
(0-3):3
Enter desired vcfnet subnet/mask []: 192.18.251.1/24
2020-01-20 14:08:20 Stopping UNUM 5.2.0-SNAPSHOT ...
2020-01-20 14:08:22 Stopping vcf-elastic ...
2020-01-20 14:08:55 Stopping vcf-collector ...
2020-01-20 14:09:06 Stopping vcf-mgr ...
2020-01-20 14:09:08 Stopping skedler ...
2020-01-20 14:09:10 Stopping vcf-center ...
2020-01-20 14:09:15 Stopping vcf-dhcp ...
2020-01-20 14:09:16 Services have been successfully stopped.
2020-01-20 14:09:16 Starting UNUM 5.2.0-SNAPSHOT ...
2020-01-20 14:09:16 Starting vcf-elastic ...
2020-01-20 14:09:17 Starting vcf-collector ...
2020-01-20 14:09:18 Starting vcf-mgr ...
2020-01-20 14:09:19 Starting skedler ...
2020-01-20 14:09:20 Starting vcf-center ...
2020-01-20 14:09:21 Starting vcf-dhcp ...
2020-01-20 14:09:22 Services have been successfully started.
Press any key to continue ..._
```

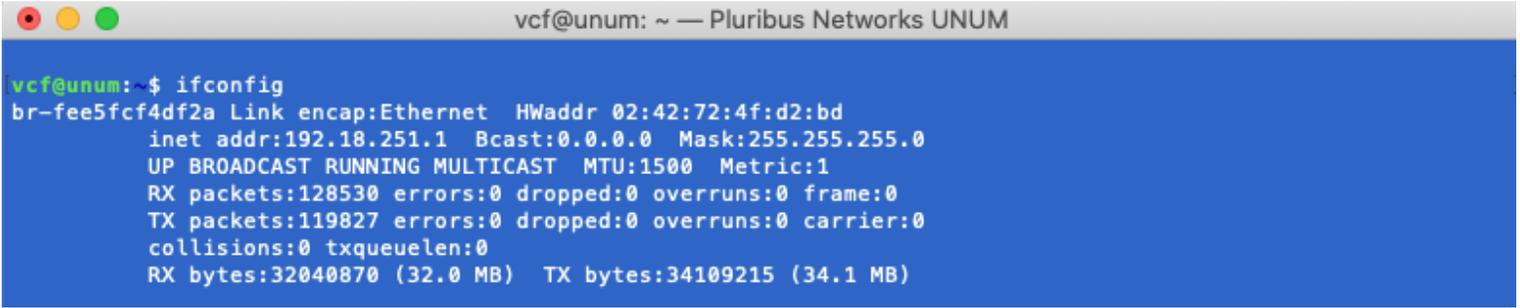
*UNUM - Configure VCFnet Network IP*

Press any key to continue.

## Appendix A (cont'd)

---

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



```
vcf@unum: ~ — Pluribus Networks UNUM
vcf@unum:~$ ifconfig
br-fee5fcf4df2a Link encap:Ethernet  HWaddr 02:42:72:4f:d2: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:119827 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:0
  RX bytes:32040870 (32.0 MB)  TX bytes:34109215 (34.1 MB)
```

*UNUM - New vcfnet IP Address*

**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

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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](mailto:info@pluribusnetworks.com) or visit [www.pluribusnetworks.com](http://www.pluribusnetworks.com)

Follow us on Twitter [@pluribusnet](https://twitter.com/pluribusnet) or on LinkedIn at <https://www.linkedin.com/company/pluribus-networks/>

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