

# Pluribus UNUM™ Management Platform

High Capacity Appliance

Getting Started Guide

Version 6.3.1

July 2022



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## Introduction

## Introduction

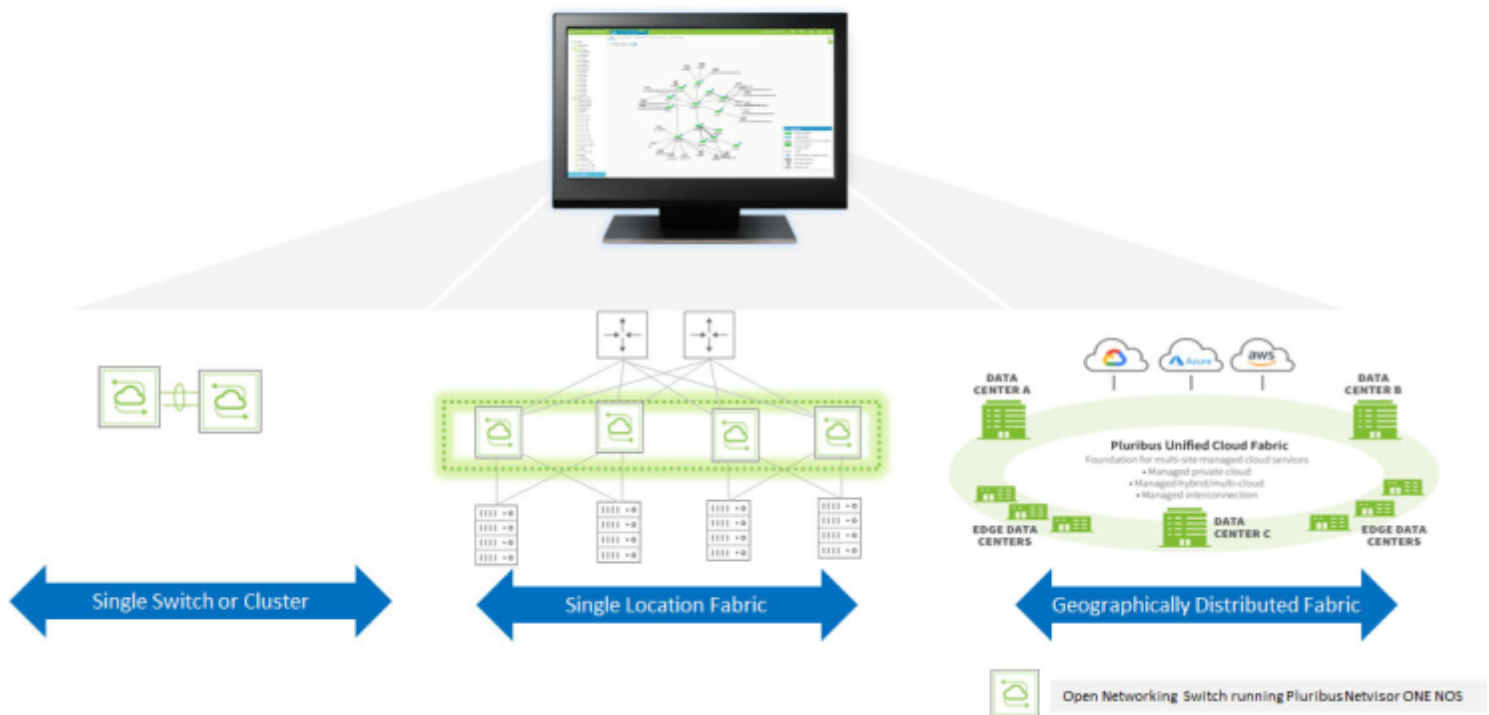
**Pluribus UNUM™ Unified Management, Automation, and Analytics Platform Software** is an application portal developed by Pluribus Networks.

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

### 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*

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



## 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



## 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

For more information about the Hardware and Specifications and Scalability please refer to the Pluribus UNUM Platform [Data Sheet](#).

## Physical Installation

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### Physical Installation

Please refer to “**Server Installation**” section in the Users Manual (MNL-1662). Follow the “Manuals” link at the following location:

<https://www.supermicro.com/products/system/2U/2028/SYS-2028TP-HTTR.cfm>

Please review and follow all Warnings! outlined in the above documentation.

## Hardware Overview

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### High Capacity Appliance Hardware Overview

The 2RU Pluribus UNUM High Capacity Appliance is a unique server system. With four system boards incorporated into a single chassis acting as four separate server nodes.

#### Server Nodes

Each of the four server boards act as a separate server node in the system.

As independent server nodes, each may be powered off and on without affecting the others.

In addition, each server node is a hot-swappable unit that may be removed from the rear of the chassis.

The server nodes are connected to the server back-plane by means of an adapter card.

**Note:** A guide pin is located between the upper and lower server nodes on the inner chassis wall. This guide pin also acts as a “stop” when a server node is fully installed. If too much force is used when inserting a server node this pin may break off. Take care to slowly slide a server node in until you hear the “click” of the locking tab seating itself.

Each Server node consists of:

#### Processors

Dual Intel® Xeon® E5-26x series processors.

#### Memory

Sixteen DIMM slots supporting 256 GB of ECC RDIMM (Registered DIMM) memory.

#### Serial ATA

A Serial ATA controller is integrated to provide dual 1.2 TB SSD Drives.

**Warning:** The SATA drives are physically hot-swappable units, however doing so during regular operation results in loss of data in the Pluribus UNUM High Capacity Appliance.

**Recommended Procedure:** Under normal operation, power down the server node and data redistribute across the nodes, and then the SATA drives can be safely removed without data loss.

## Hardware Overview (cont'd)

### Onboard Controllers/Ports

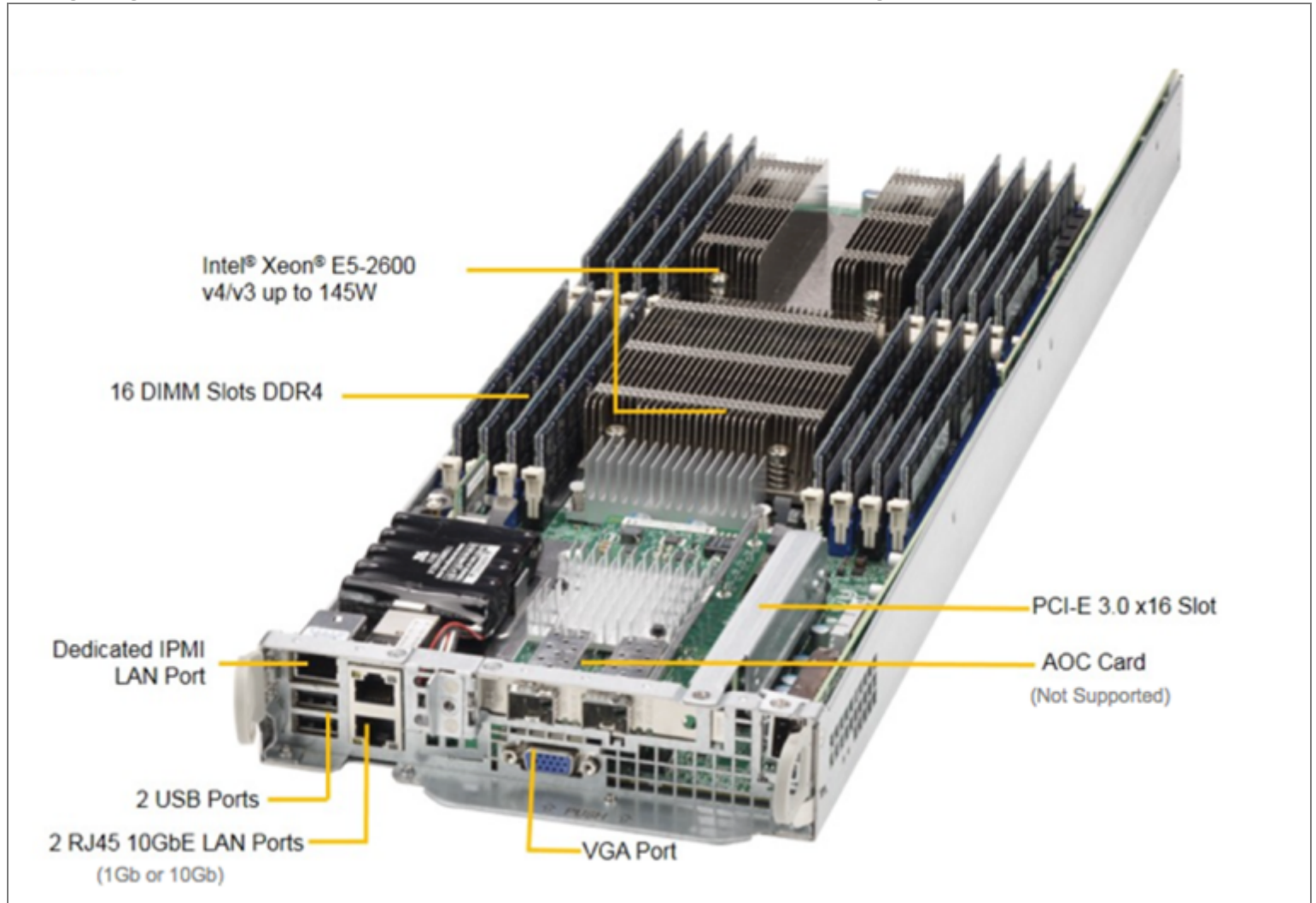
An Intel Gigabit (100/1000/10000 Mb/s) Ethernet dual-channel controller is included. Using an AOC Card not a supported configuration.

I/O ports include a VGA (monitor) port, two USB 3.0 ports, an IPMI dedicated LAN port and two Ethernet ports, Eth0 and Eth1. Eth0 is used for Management, Eth1 is used for internal server node to server node communications.

Eth1 must be isolated from the public network.

### Other Features

Other onboard features that promote system health include onboard voltage monitors, auto-switching voltage regulators, chassis and CPU overheat sensors, server node manager software and BIOS rescue.



Server Nodes

## Hardware Overview (cont'd)

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### Server Chassis Features

The following is a general outline of the main features of the appliance chassis.

#### System Power

Each chassis model includes redundant, hot-plug high-efficiency 80-plus Platinum certified power supplies, rated at 2000 Watts. In the unlikely event your power supply fails, replacement is simple and can be accomplished without tools. An amber light will be illuminated on the power supply when the power is off. An illuminated green light indicates that the power supply is operating.

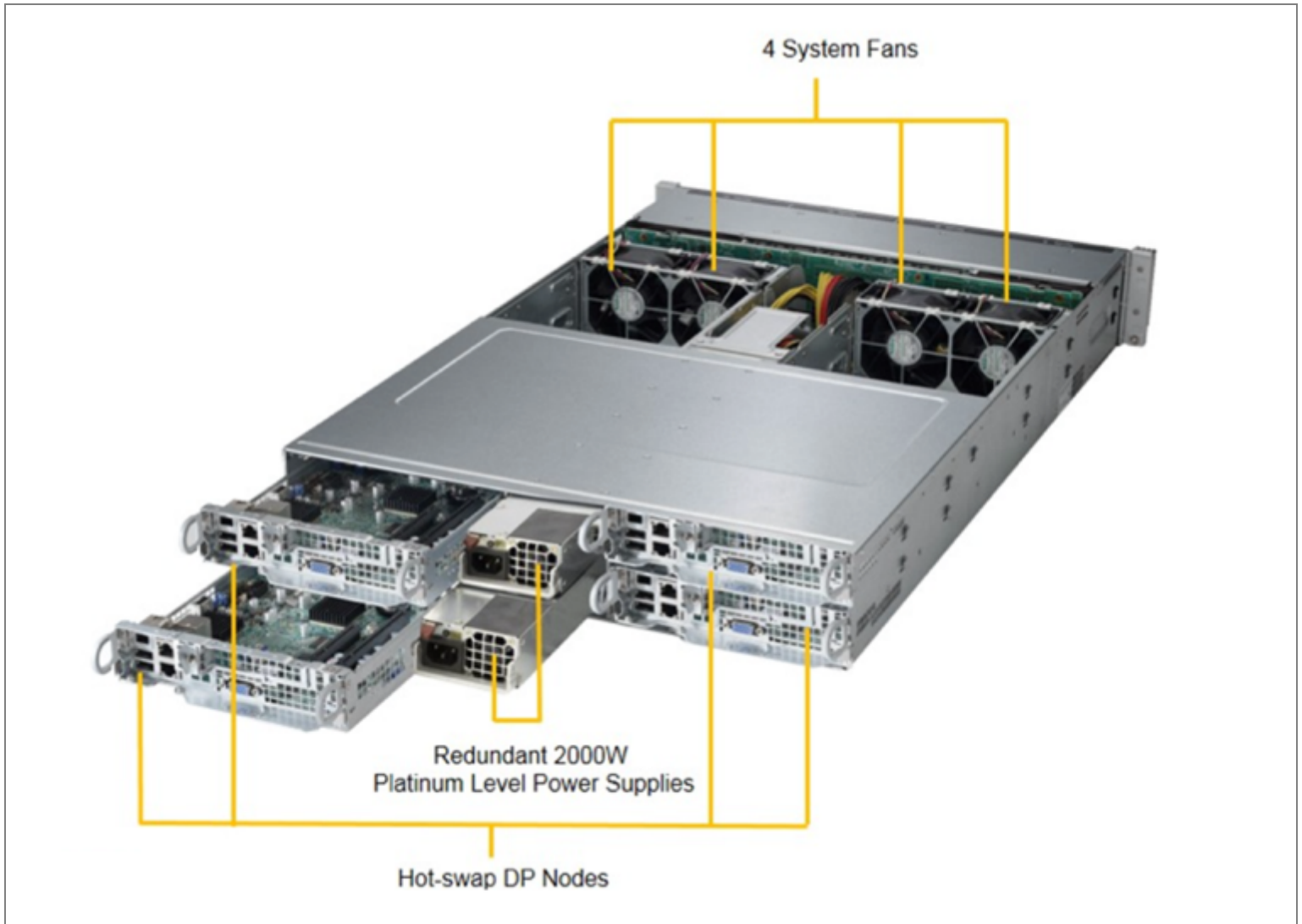
#### Cooling System

The chassis contains four system fans, which are powered from the back-plane.

## Hardware Overview (cont'd)

### Mounting Rails

The Pluribus UNUM High Capacity Appliance includes a set of quick-release rails, and can be placed in a rack for secure storage and use. To setup your rack, follow the step-by-step instructions included in the SMC1 manual.



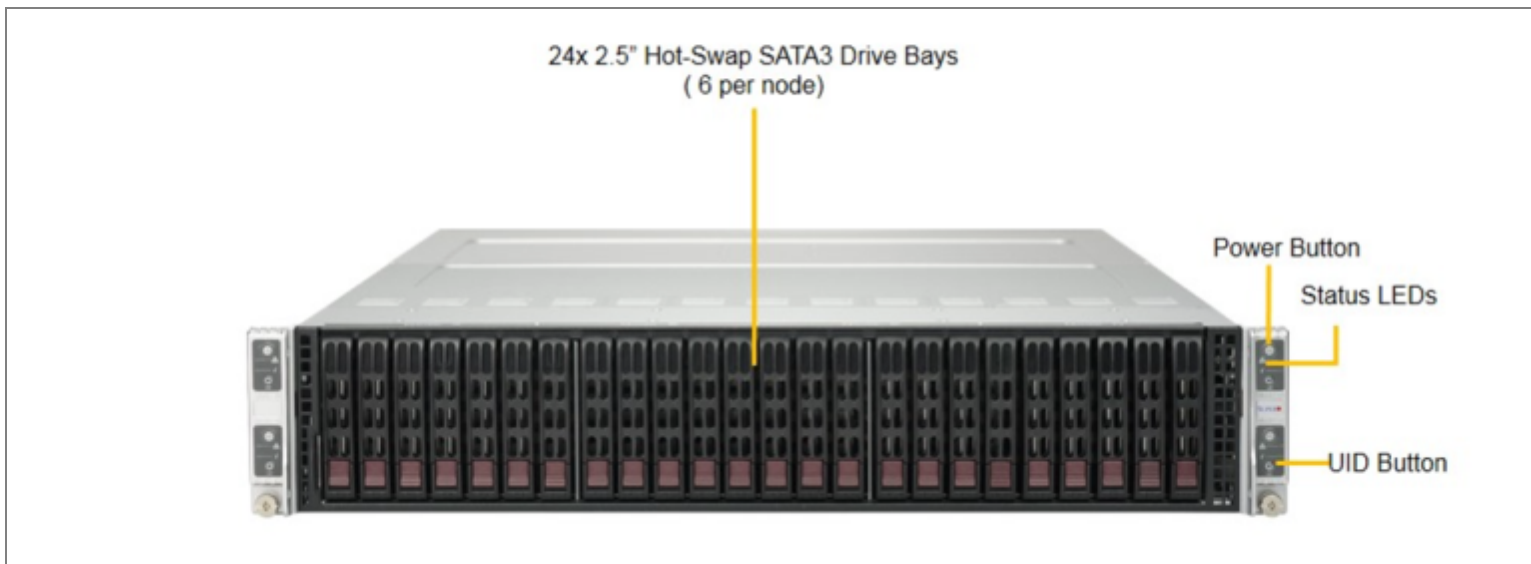
Server Chassis Features

## System Interface

### High Capacity Appliance Interface

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.

This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.



*LED Indicators*

### Control Panel Button

#### Power

The main power button on each of the four control panels is used to apply or remove power from the power supply to each of the four server nodes in the chassis.

The power button has a built-in LED which will turn green when the power is on.

Each of the four server nodes are powered on and off individually.

Powering off one server node does not affect the power of the other server nodes.

Turning power off with this button does not remove power from the chassis, hence caution must be used when servicing.

#### UID

The UID button is used to turn on or off the blue light function of the LED.

Once the blue light is activated, the unit can be easily located in very large racks and server banks.



## System Interface (cont'd)

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### Control Panel LEDs

The four control panels are located on the front handle of the chassis.

Each control panel has two additional LEDs.

These LEDs provide you with critical information related to different parts of the system.

This section explains what each LED indicates when illuminated and any corrective action you may need to take.

### Alert

This LED is illuminated when an alert condition occurs:

- A solid red light indicates an overheat condition in the system
- A flashing red light which flashes in one second intervals indicates a fan failure
- A flashing red light which flashes in four second intervals indicates a power failure

When notified of an alert, check the routing of the cables and make sure all fans are present and operating normally.

You should also check to make sure that the chassis covers, and air shrouds are installed.

This LED will remain flashing or on as long as the temperature is too high, or a fan does not function properly.

### NIC

Indicates network activity on either LAN1 or LAN2 when flashing.

### Drive Carrier LEDs

#### SATA Drives

Each drive carrier has two LEDs.

- Blue: When illuminated, this blue LED (on the front of the drive carrier) indicates drive activity. A connection to the back-plane enables this LED to blink on and off when that drive is being accessed
- Red: The red LED to indicate a hard drive failure.

## Network Connections

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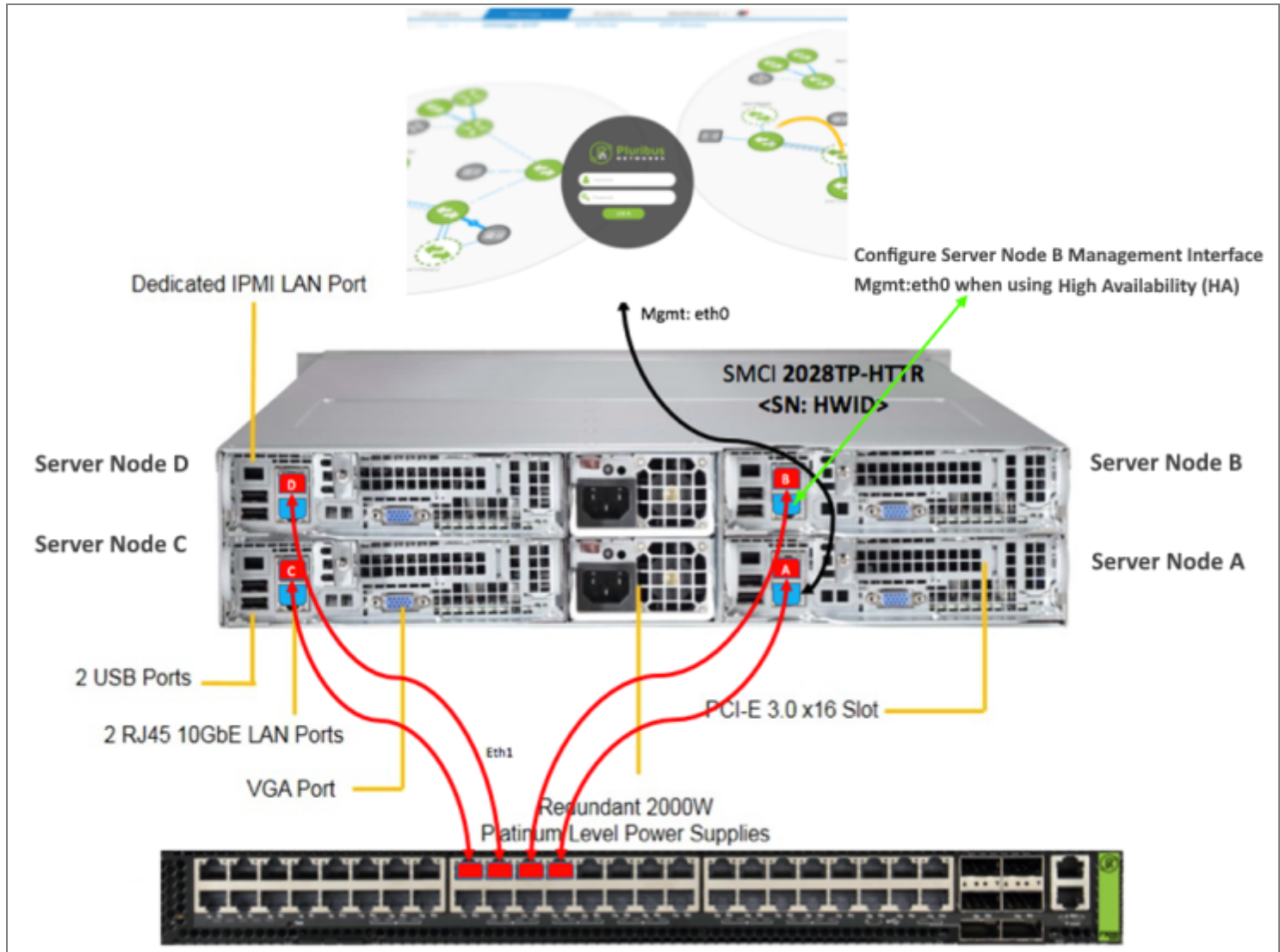
### High Capacity Appliance Network Interface

After installation of the Pluribus UNUM High Capacity Appliance, network activity must be setup as follows (please refer to the figure below for proper connections):

1. For proper operation the Pluribus UNUM High Capacity Appliance requires a separate 1G or 10G switch for connectivity between eth1 on all Server nodes.
2. Connect your Management Network to Eth0 (1G or 10G) on Server node A. By default, Server node A (Host) is configured for DHCP. To set a static IP, see [Appendix A](#).
3. It is required to connect Eth1 into an isolated 1G or 10G switch. Server nodes will communicate via Eth1, with the following IP Addresses:
  - a. 172.16.250.150 - 172.16.250.162
4. Plug in redundant power connections with the provided cables ONLY and power up.

## Network Connections (cont'd)

### High Capacity Appliance Network Interface (cont'd)



Network Connections

## Network Connections (cont'd)

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### High Capacity Appliance Network Interface (cont'd)

**NOTE:** Eth1 connections are not configured on a VLAN, please contact Pluribus Technical support if one of the following must occur:

- More than one Pluribus UNUM High Capacity Appliance plugged into the same switch (by default, all appliances come with the same pre-configured Eth1 IP addresses), and each Appliance isolated in a separate and dedicated VLAN.
- You want to change the default Eth1 IP Addresses of: 172.16.250.150 - 172.16.250.162.

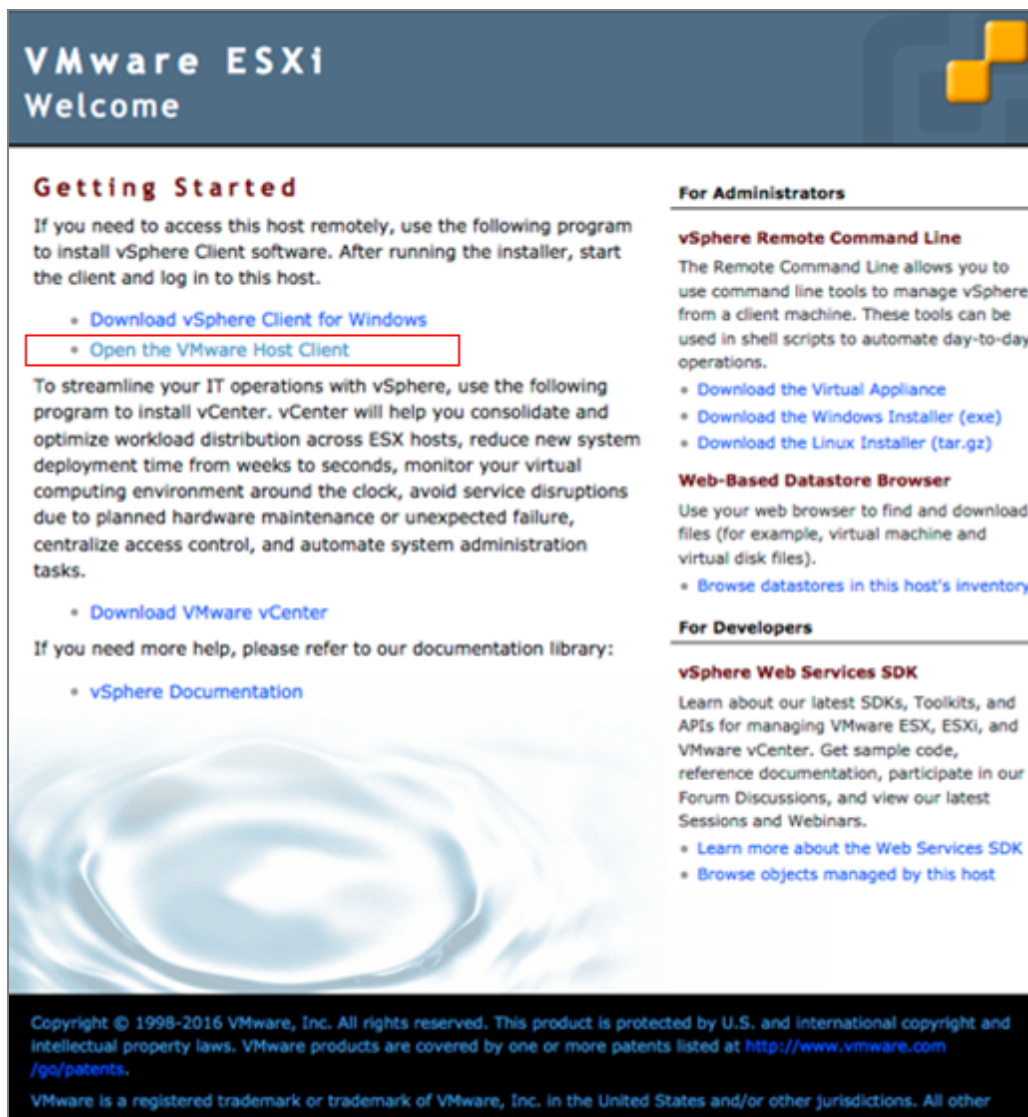
5. Connect VGA console and IPMI as desired. IPMI default configuration is DHCP.
6. USB connections are not advised.
7. The Pluribus UNUM High Capacity Appliance, comes with the Pluribus UNUM software pre-installed.
8. Upon boot up, by default Pluribus UNUM will use DHCP to obtain a Management / eth0 IP address. If a Static IP is desired, see [Appendix B](#).
9. It is highly recommended that the default root password of your Server nodes be changed from test123.

**NOTE:** It is required that all Server nodes have the same root password.

**To change the root password of your Server nodes, you can do the following:**

## Network Connections (cont'd)

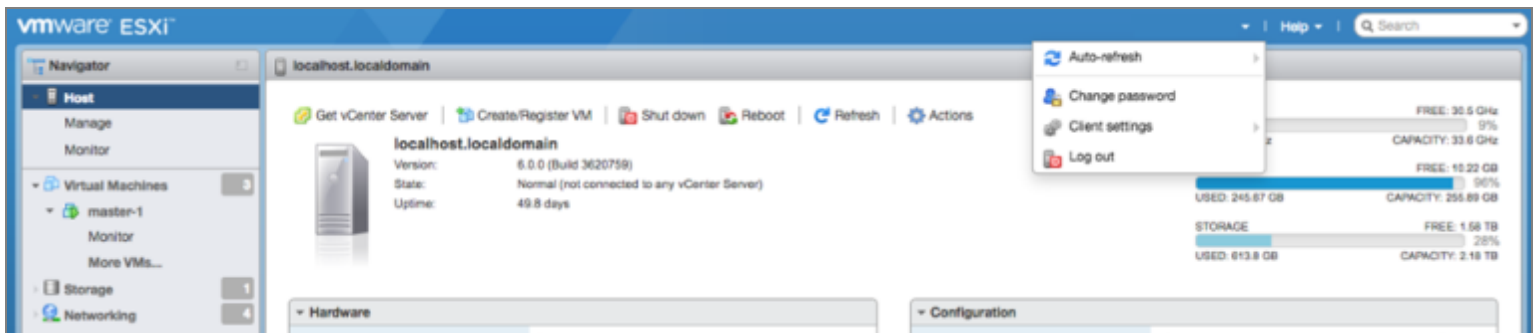
Log onto each Server node as root using the ESXi web client (or vSphere client if you have access):



VMware Welcome Screen

## Network Connections (cont'd)

Select “Change Password”



VMware Change Password Dashboard

Enter New Password:

A screenshot of the 'Change password' dialog box in VMware. The dialog has a title bar with a lock icon and the text 'Change password'. Inside, there is a large blue padlock icon on the left. To its right, there are two text input fields: 'New password' and 'New password again'. The 'New password' field contains several dots, indicating it is masked. At the bottom of the dialog, there are two buttons: 'Change password' and 'Cancel'.

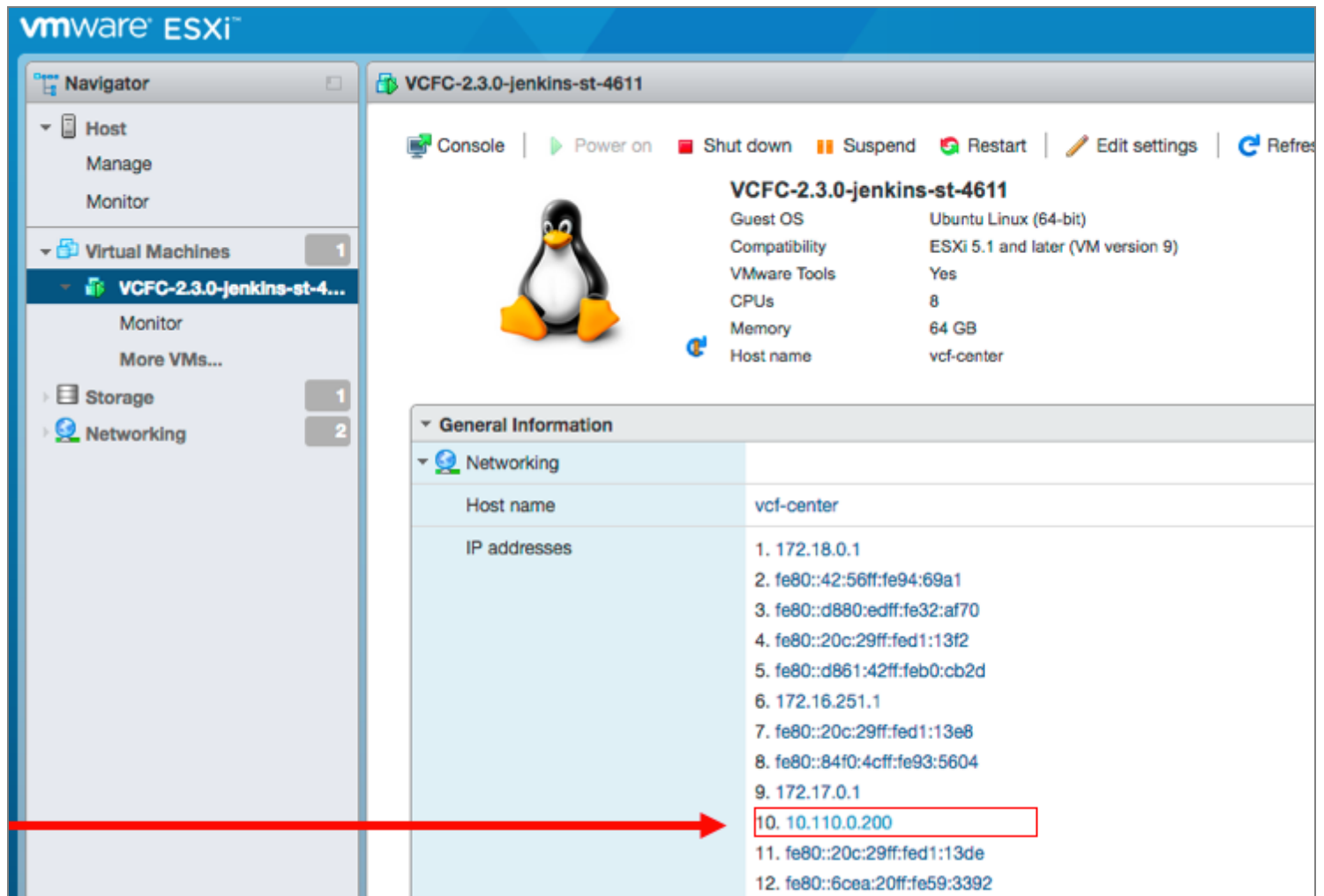
VMware Change Password

## Network Connections (cont'd)

**IMPORTANT: Repeat for each Server node, root passwords must be the same on each.**

10. The Primary Server Node A, runs the Pluribus UNUM Web Interface.

You can find the IP of your Pluribus UNUM Primary VM via the ESXi web client (or vSphere client if you have access), log in with the your newly set root password:



Pluribus UNUM Primary VM

In the above example, you will see the IP from your DHCP server, in this case it is “10.x.x.x”, but the actual IP will depend on your DHCP configurations.

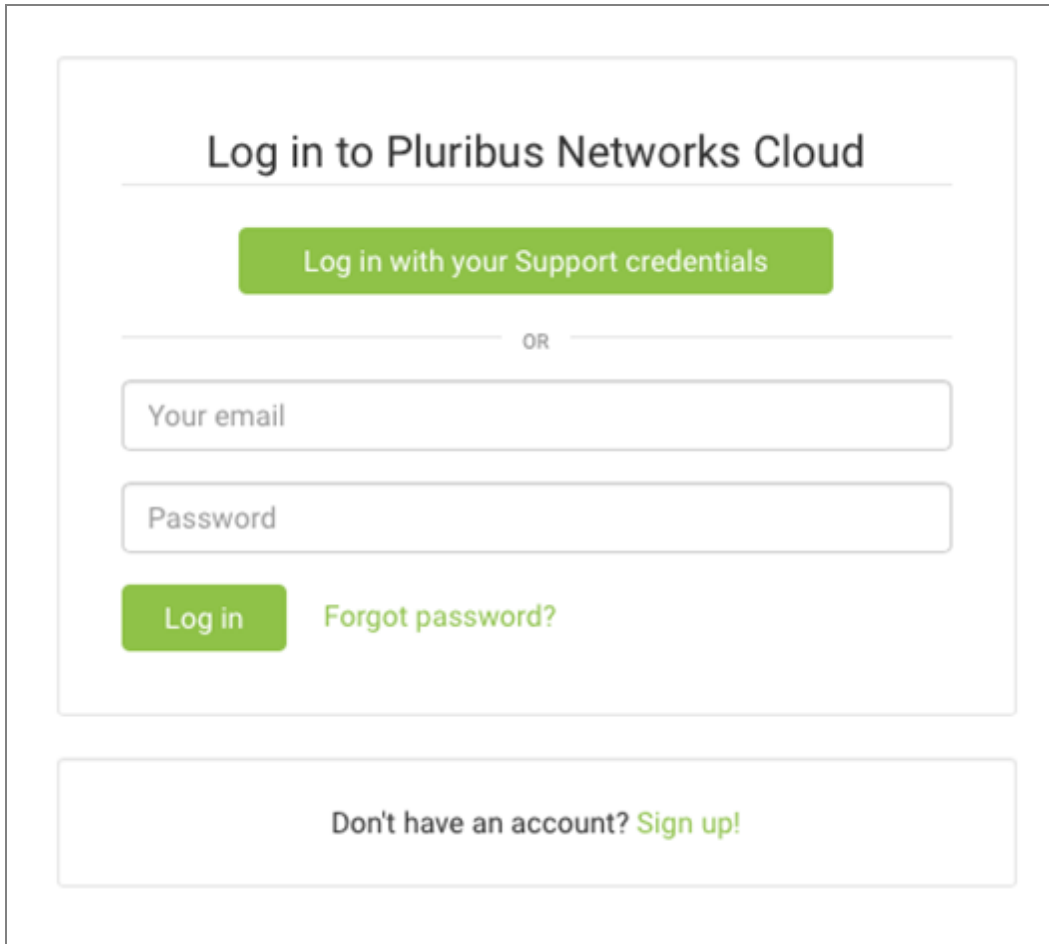
11. Once you obtain the IP of your Pluribus UNUM, use a Chrome browser to connect for the best experience.



## Network Connections (cont'd)

12. Please refer to the Pluribus UNUM Installation & User's Guide for SW configuration and current Release Notes for configuration and operating instructions:

- a. These documents can be found at: <https://www.pluribusnetworks.com/get-started/unum>

The image shows a login interface for Pluribus Networks Cloud. At the top, it says "Log in to Pluribus Networks Cloud". Below this is a green button labeled "Log in with your Support credentials". Underneath is a horizontal line with the word "OR" in the center. Below the line are two input fields: "Your email" and "Password". Below the "Password" field is a green "Log in" button and a green link "Forgot password?". At the bottom of the form is a box containing the text "Don't have an account? Sign up!".

*Pluribus Networks Cloud Login Screen*

**NOTE:** All content of the Installation & User's Guide is applicable to both the Pluribus UNUM Standalone VM as well as the Pluribus UNUM High Capacity Appliance unless otherwise noted. There is no need to download the OVA software as it comes pre-installed on the High-Capacity Appliance.

The software upgrade procedure is the same for both the Standalone VM/Appliance and the High Capacity Appliance.

If supported between two compatible versions, upgrade software can also be obtained from: <https://www.pluribusnetworks.com/get-started/unum>

## High Availability

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### 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 primary UNUM instance.
- Configure HA on the cluster.
- Validate the configuration in VMware and UNUM Database Health.

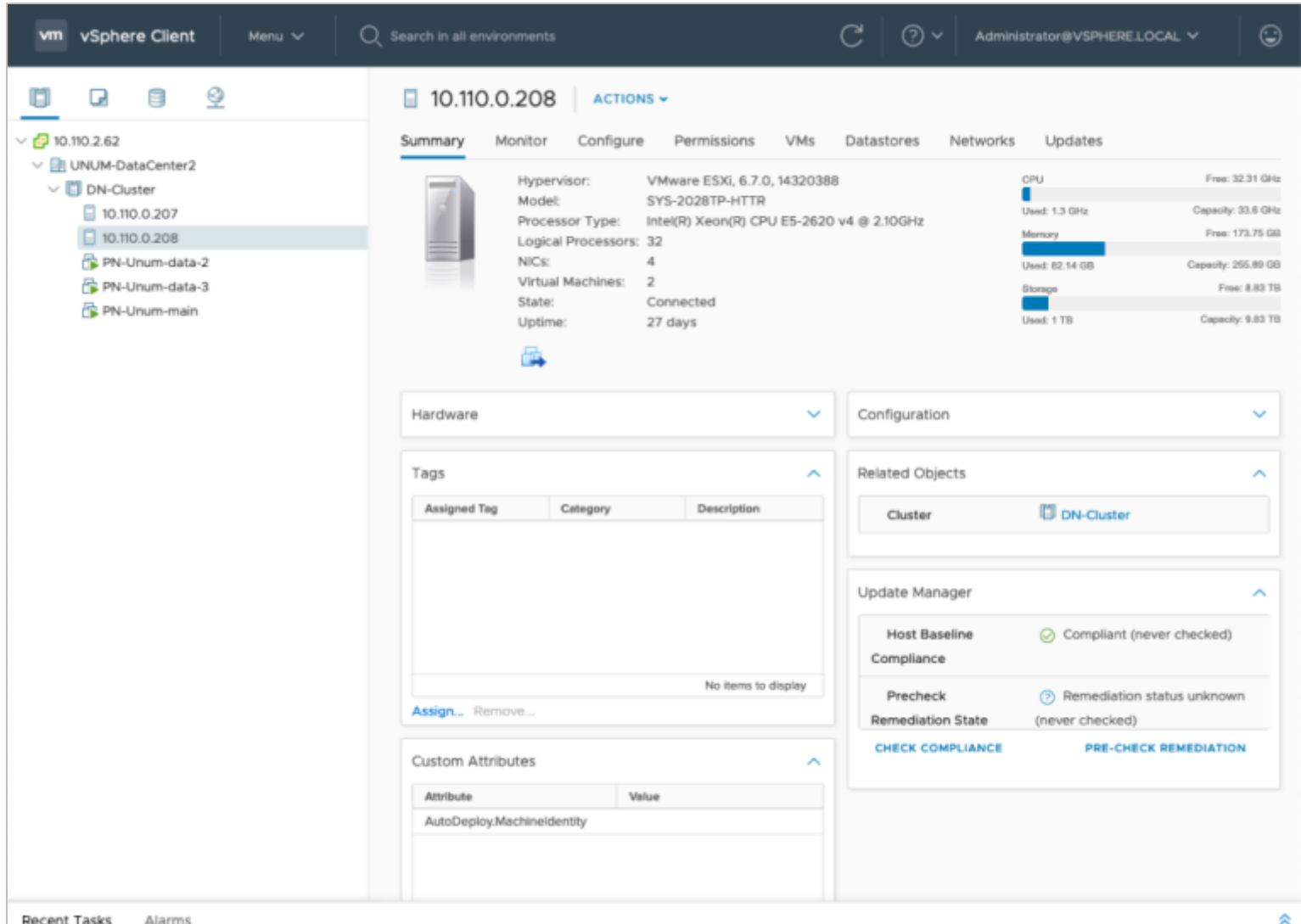
More detailed instructions are listed below in the [Configure High Availability](#) section.

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

- **ESXi Server Node A** - configured on IP address 10.110.0.207.
- **ESXi Server Node B** - configured on IP Address 10.110.0.208.
- **PN-Unum-main** - UNUM application instance running on Node A and fails over to Node B as necessary.
- **PN-Unum-data-2** - UNUM datanode residing on local datastore on Node A.
- **PN-Unum-data-3** - UNUM datastore residing on local datastore on Node B.



The screenshot shows the vSphere Client interface for ESXi Server Node B (10.110.0.208). The left sidebar shows the hierarchy: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster > 10.110.0.208. The main panel displays the Summary tab for the selected host.

**Host Details:**

- Hypervisor: VMware ESXi, 6.7.0, 14320388
- Model: SYS-2028TP-HTTR
- Processor Type: Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz
- Logical Processors: 32
- NICs: 4
- Virtual Machines: 2
- State: Connected
- Uptime: 27 days

**Resource Usage:**

- CPU:** Free: 32.31 GHz, Used: 1.3 GHz, Capacity: 33.6 GHz
- Memory:** Free: 173.75 GB, Used: 62.14 GB, Capacity: 255.89 GB
- Storage:** Free: 8.83 TB, Used: 1 TB, Capacity: 9.83 TB

**Update Manager:**

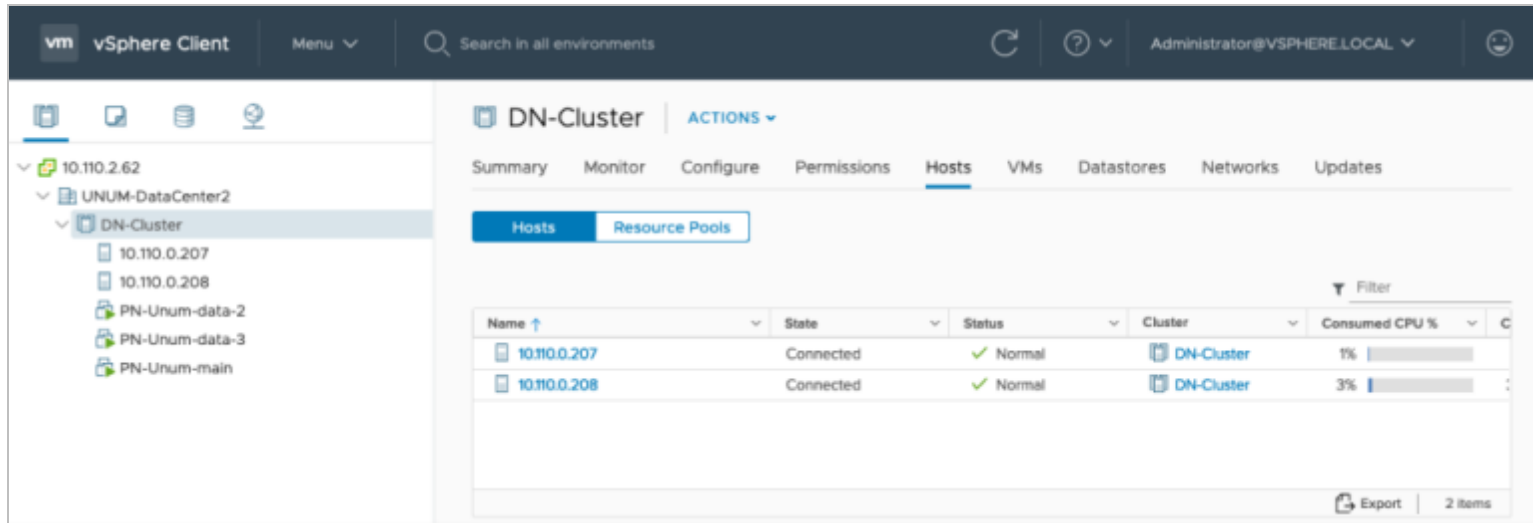
- Host Baseline Compliance: ✔ Compliant (never checked)
- Precheck Remediation State: ⚙ Remediation status unknown (never checked)
- Buttons: CHECK COMPLIANCE, PRE-CHECK REMEDIATION

Fully Configured High Availability UNUM Instance

## High Availability (cont'd)

### DN Cluster ESXi Hosts

- **ESXi Server Node A** - configured on IP address 10.110.0.207
- **ESXi Server Node B** - configured on IP Address 10.110.0.208



The screenshot shows the vSphere Client interface. On the left, the inventory tree shows the path: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster. The main pane displays the 'DN-Cluster' configuration page with the 'Hosts' tab selected. Below the tabs, there are two buttons: 'Hosts' and 'Resource Pools'. A table lists the hosts in the cluster:

Name	State	Status	Cluster	Consumed CPU %
10.110.0.207	Connected	✓ Normal	DN-Cluster	1%
10.110.0.208	Connected	✓ Normal	DN-Cluster	3%

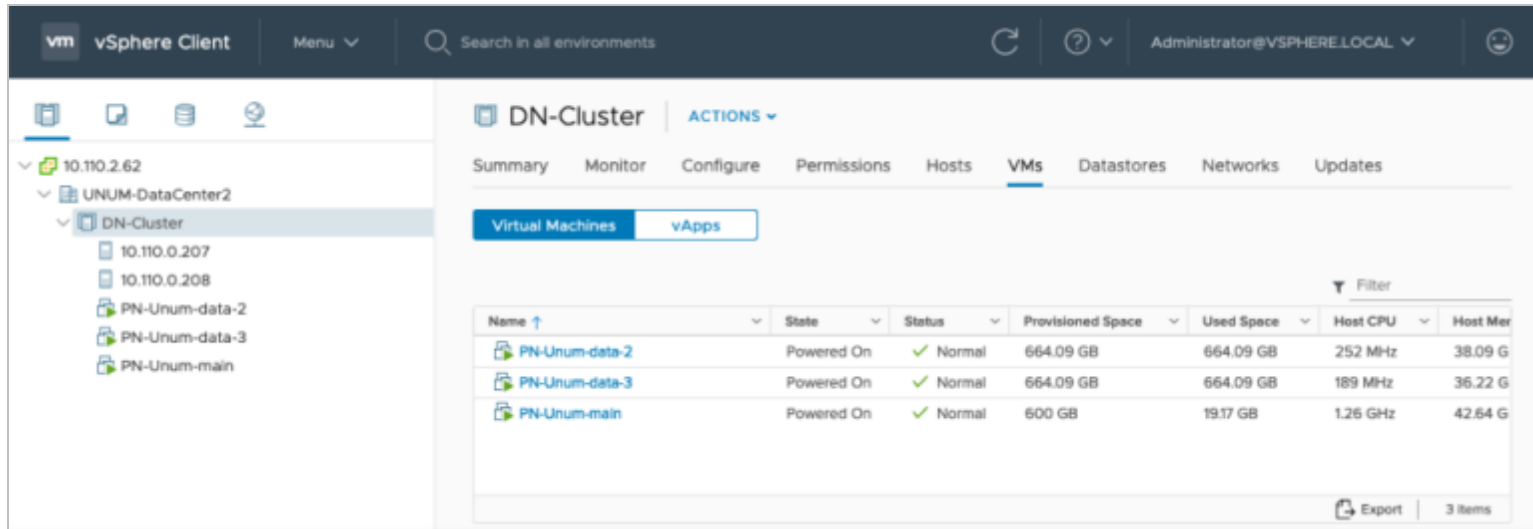
At the bottom right of the table, there is an 'Export' button and a count of '2 items'.

Fully Configured High Availability UNUM Instance - Hosts

## High Availability (cont'd)

### DN Cluster Virtual Machines

- **PN-Unum-main** - UNUM application instance running on Node A and fails over to Node B as necessary.
- **PN-Unum-data-2** - UNUM datanode residing on local datastore on Node A.
- **PN-Unum-data-3** - UNUM datastore residing on local datastore on Node B.



The screenshot shows the vSphere Client interface for a cluster named 'DN-Cluster'. The 'VMs' tab is selected, displaying a table of virtual machines. The table includes columns for Name, State, Status, Provisioned Space, Used Space, Host CPU, and Host Memory. Three VMs are listed: PN-Unum-data-2, PN-Unum-data-3, and PN-Unum-main. All three are in a 'Powered On' state with a 'Normal' status.

Name	State	Status	Provisioned Space	Used Space	Host CPU	Host Memory
PN-Unum-data-2	Powered On	✓ Normal	664.09 GB	664.09 GB	252 MHz	38.09 G
PN-Unum-data-3	Powered On	✓ Normal	664.09 GB	664.09 GB	189 MHz	36.22 G
PN-Unum-main	Powered On	✓ Normal	600 GB	19.17 GB	1.26 GHz	42.64 G

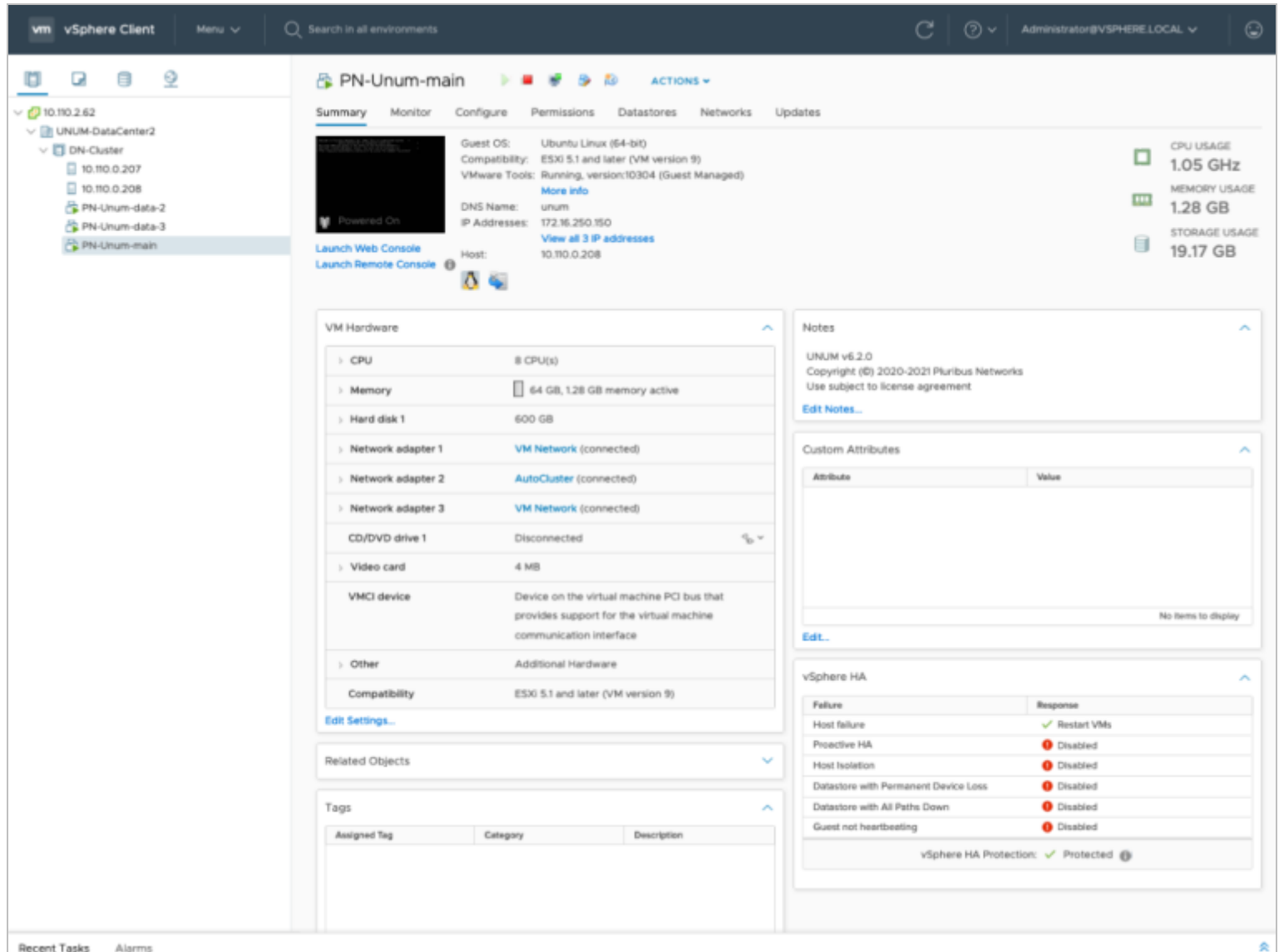
Fully Configured High Availability UNUM Instance - Virtual Machines

## High Availability (cont'd)

### UNUM Instance

The PN-Unum-main shown currently running on ESXi instance 10.110.0.208 and in vSphere HA protection mode (High Availability).

Should this instance go down or offline the UNUM application switches over to run on ESXi instance 10.110.0.207.



The screenshot displays the vSphere Client interface for a virtual machine named "PN-Unum-main". The left sidebar shows the environment structure: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster > 10.110.0.207 > PN-Unum-main. The main panel shows the VM's summary, including its state (Powered On), guest OS (Ubuntu Linux (64-bit)), and hardware specifications. The vSphere HA section at the bottom right shows the protection mode is "Protected".

Attribute	Value
CPU Usage	1.05 GHz
Memory Usage	1.28 GB
Storage Usage	19.17 GB

Failure	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

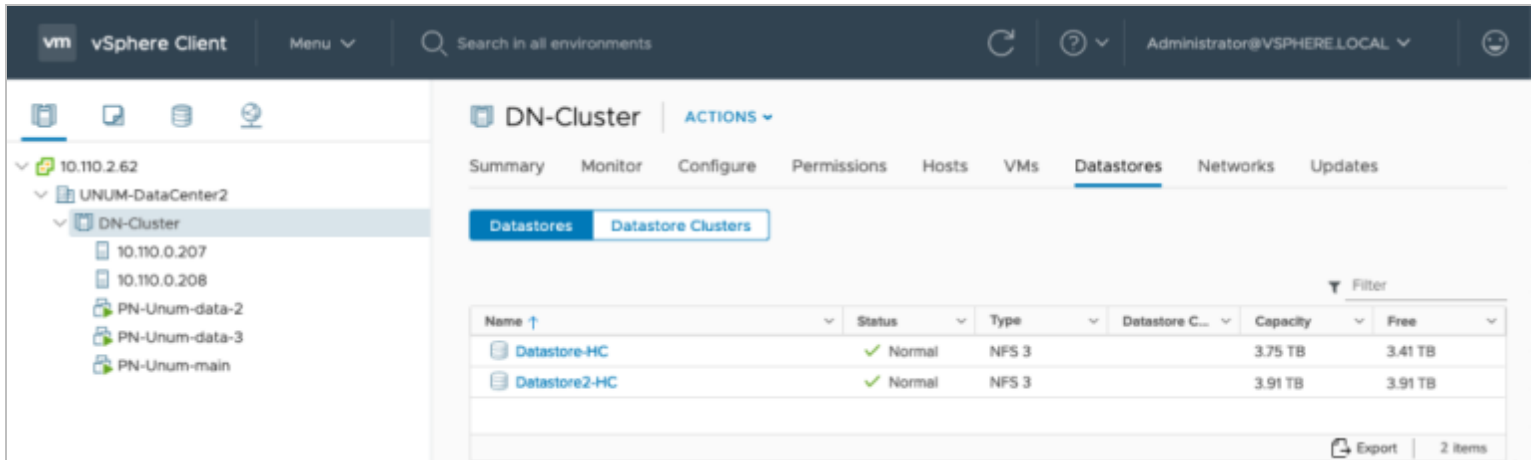
vSphere HA Protection: ✓ Protected

Fully Configured High Availability UNUM Instance - vSphere HA Protection Mode

## High Availability (cont'd)

### Datastores

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



The screenshot shows the vSphere Client interface. On the left, the inventory tree shows the path: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster. The main pane displays the 'Datastores' tab for the 'DN-Cluster'. A table lists the configured datastores:

Name	Status	Type	Datastore C...	Capacity	Free
Datastore-HC	✓ Normal	NFS 3		3.75 TB	3.41 TB
Datastore2-HC	✓ Normal	NFS 3		3.91 TB	3.91 TB

At the bottom right of the table, there is an 'Export' button and a count of '2 items'.

Fully Configured High Availability UNUM Instance - Redundant Datastores

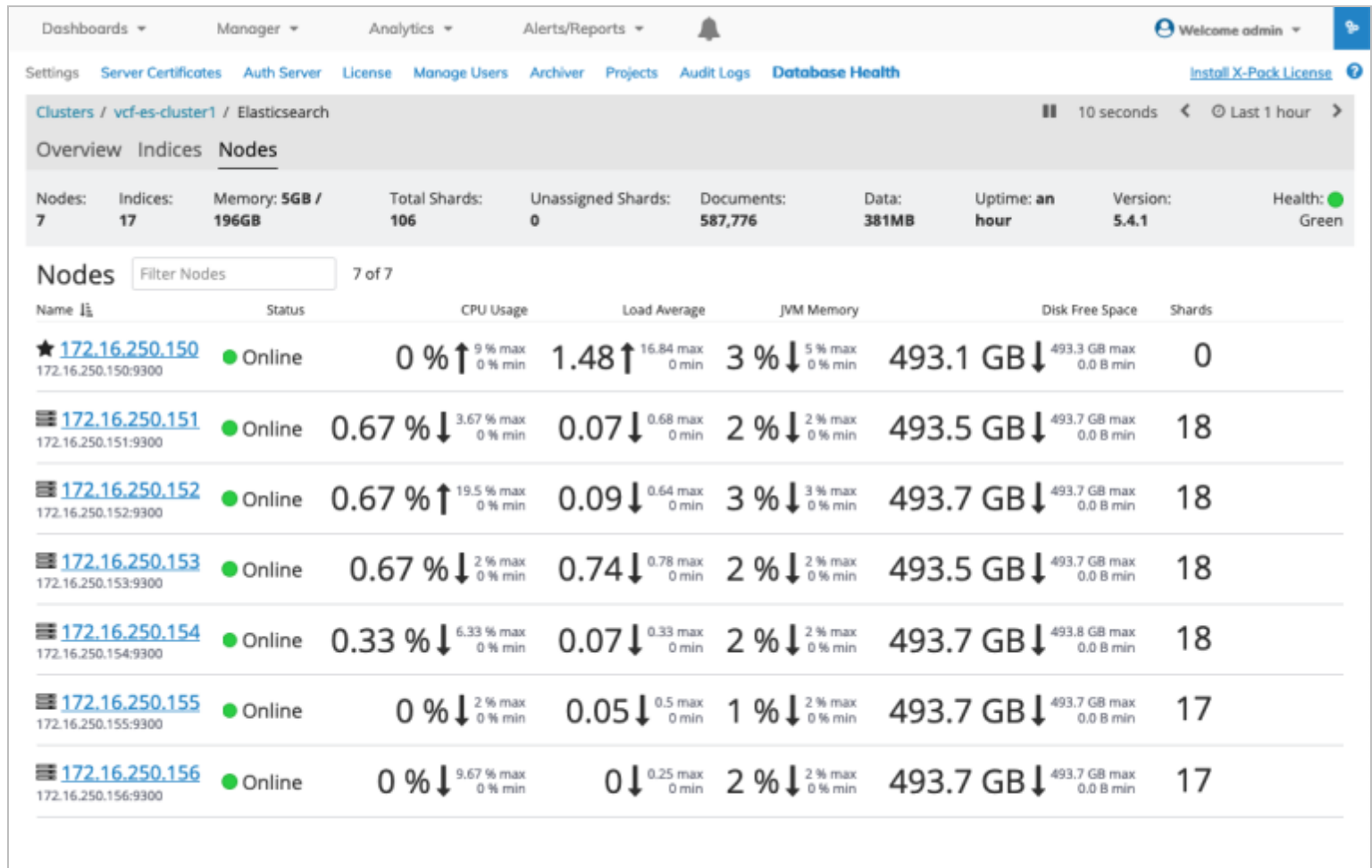


## High Availability (cont'd)

### UNUM Database Health

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

- **172.16.250.150** represents the health of the UNUM primary instance.
- **172.16.250.151 - .156** represent the health of the UNUM datanodes. The datanodes for **Nodes A & B** appear in the vCenter dashboard and all datanodes appear in the UNUM Database Health.



The screenshot shows the UNUM Database Health dashboard. At the top, there's a navigation bar with tabs like Settings, Server Certificates, Auth Server, License, Manage Users, Archiver, Projects, Audit Logs, and Database Health. Below this, a summary row shows: Nodes: 7, Indices: 17, Memory: 5GB / 196GB, Total Shards: 106, Unassigned Shards: 0, Documents: 587,776, Data: 381MB, Uptime: an hour, Version: 5.4.1, and Health: Green.

The main section is titled 'Nodes' and shows a list of 7 nodes. Each node row includes its name, status (Online), 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="#">172.16.250.150</a> 172.16.250.150:9300	Online	0 % ↑ 9 % max 0 % min	1.48 ↑ 16.84 max 0 min	3 % ↓ 5 % max 0 % min	493.1 GB ↓ 493.3 GB max 0.0 B min	0
<a href="#">172.16.250.151</a> 172.16.250.151:9300	Online	0.67 % ↓ 3.67 % max 0 % min	0.07 ↓ 0.68 max 0 min	2 % ↓ 2 % max 0 % min	493.5 GB ↓ 493.7 GB max 0.0 B min	18
<a href="#">172.16.250.152</a> 172.16.250.152:9300	Online	0.67 % ↑ 19.5 % max 0 % min	0.09 ↓ 0.64 max 0 min	3 % ↓ 3 % max 0 % min	493.7 GB ↓ 493.7 GB max 0.0 B min	18
<a href="#">172.16.250.153</a> 172.16.250.153:9300	Online	0.67 % ↓ 2 % max 0 % min	0.74 ↓ 0.78 max 0 min	2 % ↓ 2 % max 0 % min	493.5 GB ↓ 493.7 GB max 0.0 B min	18
<a href="#">172.16.250.154</a> 172.16.250.154:9300	Online	0.33 % ↓ 6.33 % max 0 % min	0.07 ↓ 0.33 max 0 min	2 % ↓ 2 % max 0 % min	493.7 GB ↓ 493.8 GB max 0.0 B min	18
<a href="#">172.16.250.155</a> 172.16.250.155:9300	Online	0 % ↓ 2 % max 0 % min	0.05 ↓ 0.5 max 0 min	1 % ↓ 2 % max 0 % min	493.7 GB ↓ 493.7 GB max 0.0 B min	17
<a href="#">172.16.250.156</a> 172.16.250.156:9300	Online	0 % ↓ 9.67 % max 0 % min	0 ↓ 0.25 max 0 min	2 % ↓ 2 % max 0 % min	493.7 GB ↓ 493.7 GB max 0.0 B min	17

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:

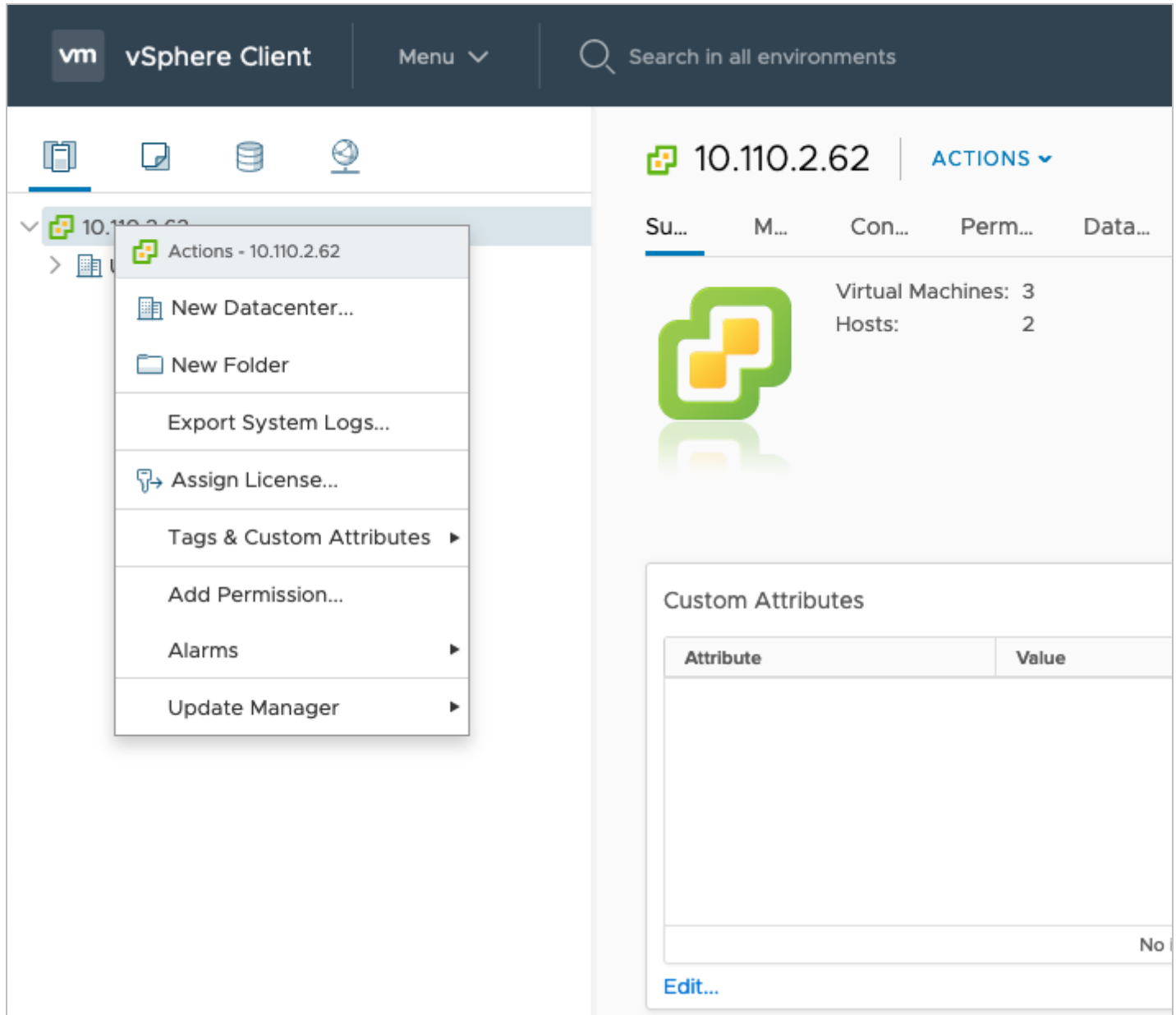
1. Creating a DataCenter on the VMware vCenter, if a datacenter does not currently exist.
2. Creating a VMWare Cluster.
3. Creating an NFS datastore.
4. Migrating the primary UNUM instance.
5. Configuring HA on the cluster.
6. Validating the configuration and Database Health.

## High Availability (cont'd)

### 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

UNUM-Datacenter2

Location:

 10.110.2.62

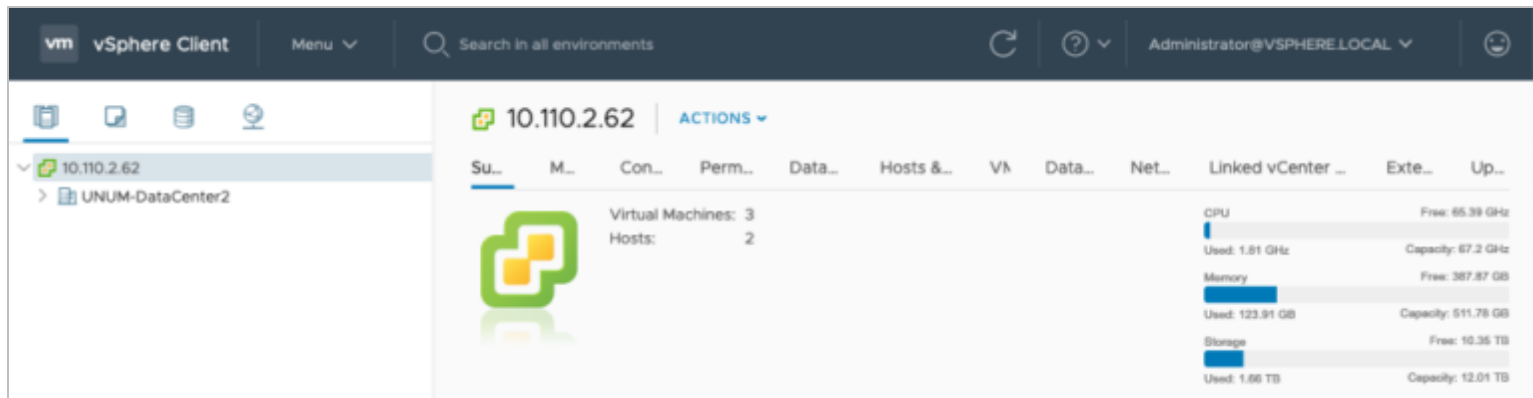
CANCEL

OK

UNUM HA - Add New Name

Click **OK** to continue.

The new datacenter appears in the dashboard.



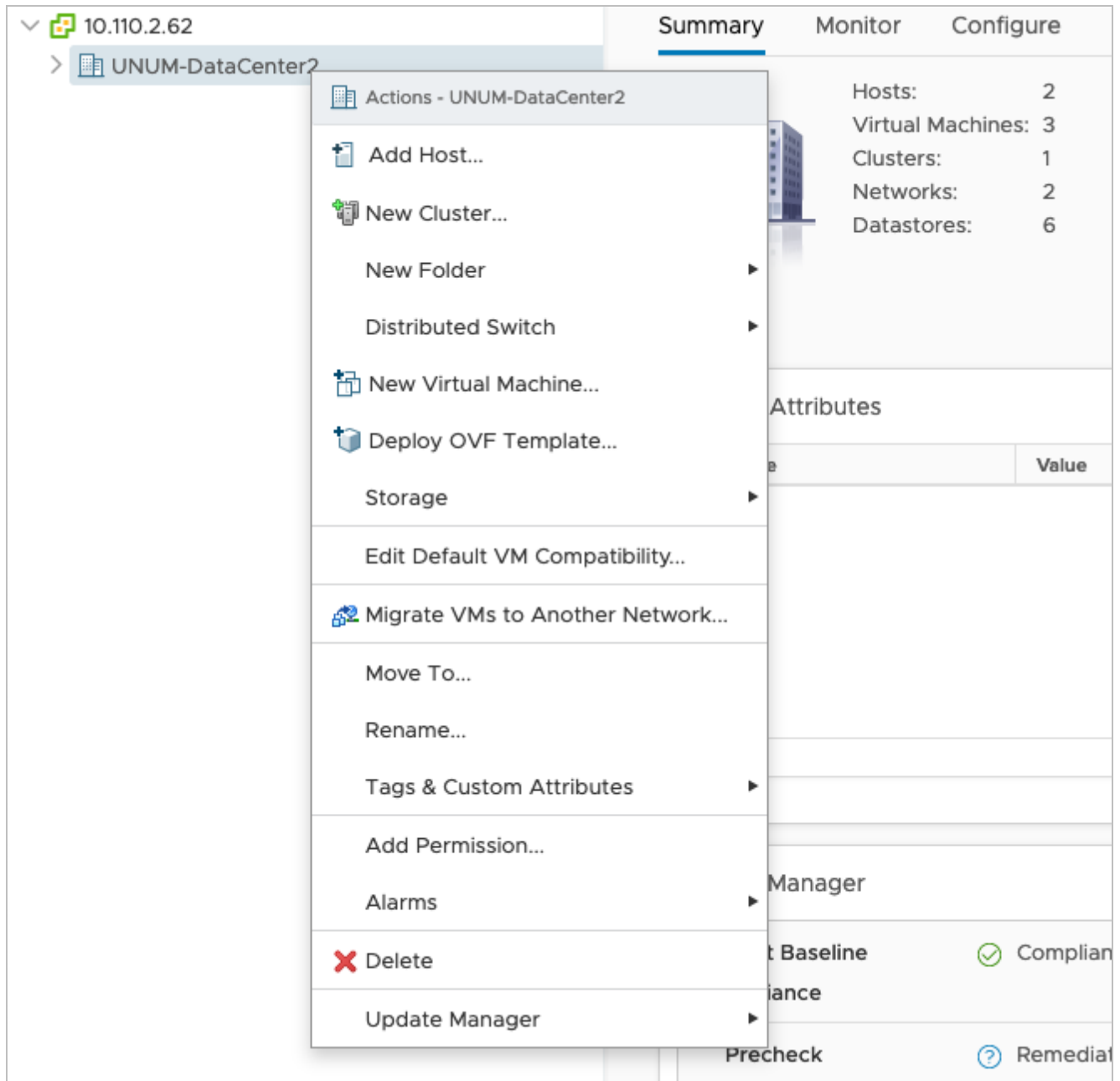
Resource	Used	Free	Capacity
CPU	1.81 GHz	65.39 GHz	67.2 GHz
Memory	123.91 GB	387.87 GB	511.78 GB
Storage	1.66 TB	10.35 TB	12.01 TB

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

UNUM-DataCenter2

×

Name	DN-Cluster
Location	 UNUM-DataCenter2
 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.

CANCEL

OK





UNUM HA - New Cluster Name

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

vm vSphere Client

Menu


Search in all environments

10.110.2.62

UNUM-DataCenter2

DN-Cluster

 UNUM-DataCenter2
 


ACTIONS

Summary

Monitor

Configure

Permissions



Hosts:

Virtual Machines:

Clusters: 1

Networks: 2

Datastores:

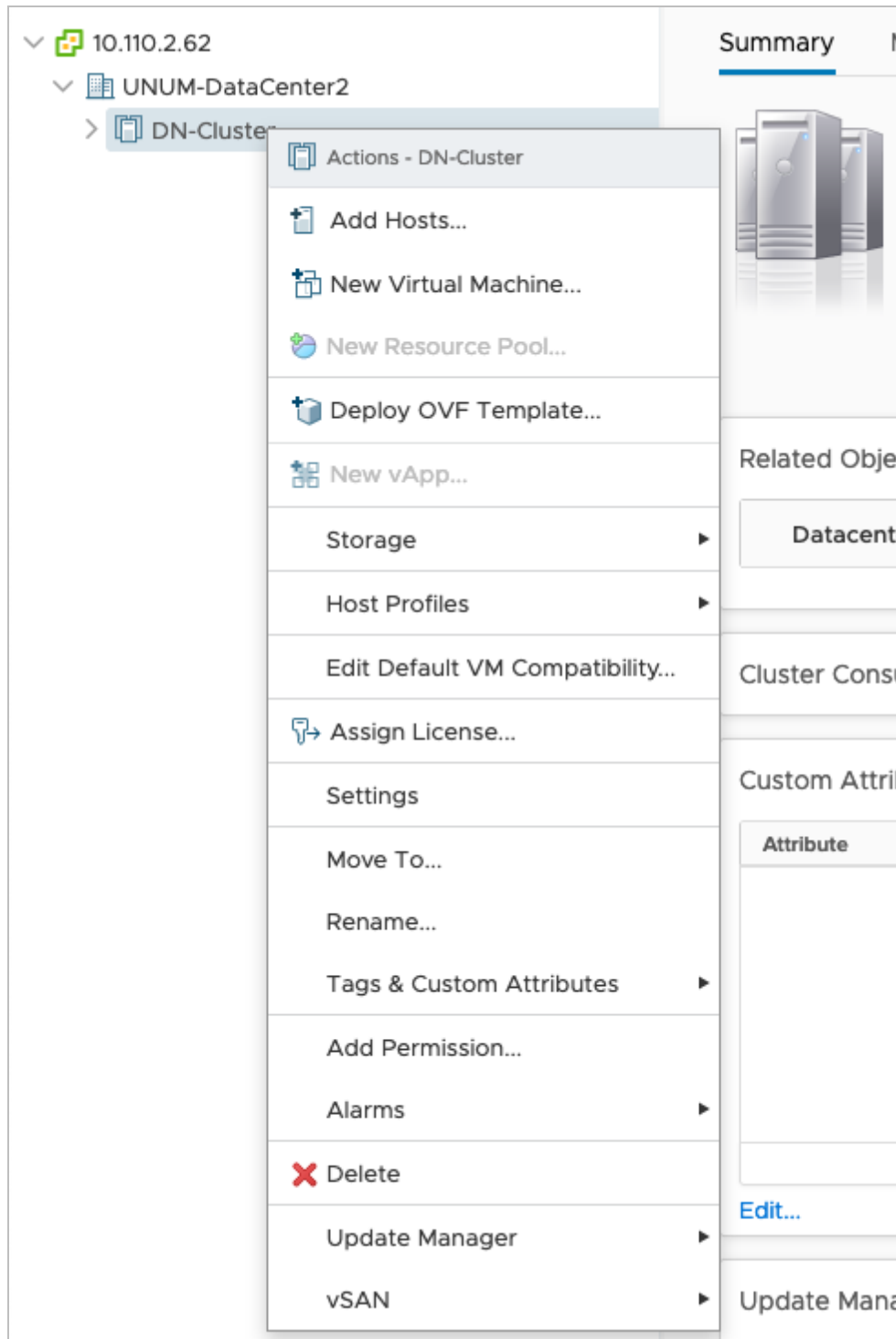
UNUM HA - New Cluster in Dashboard

## 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 (ESXi servers) only, ESXi servers A & B.

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

10.110.0.207	root	*****	×
10.110.0.208	root	*****	×
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
>	10.110.0.207	6.7.0	Supermicro SYS-2028TP-HTTR
>	10.110.0.208	6.7.0	Supermicro SYS-2028TP-HTTR

CANCEL BACK NEXT

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



## High Availability (cont'd)

### Add hosts

- Add hosts
- Host summary
- Ready to complete

### Review and finish

*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:

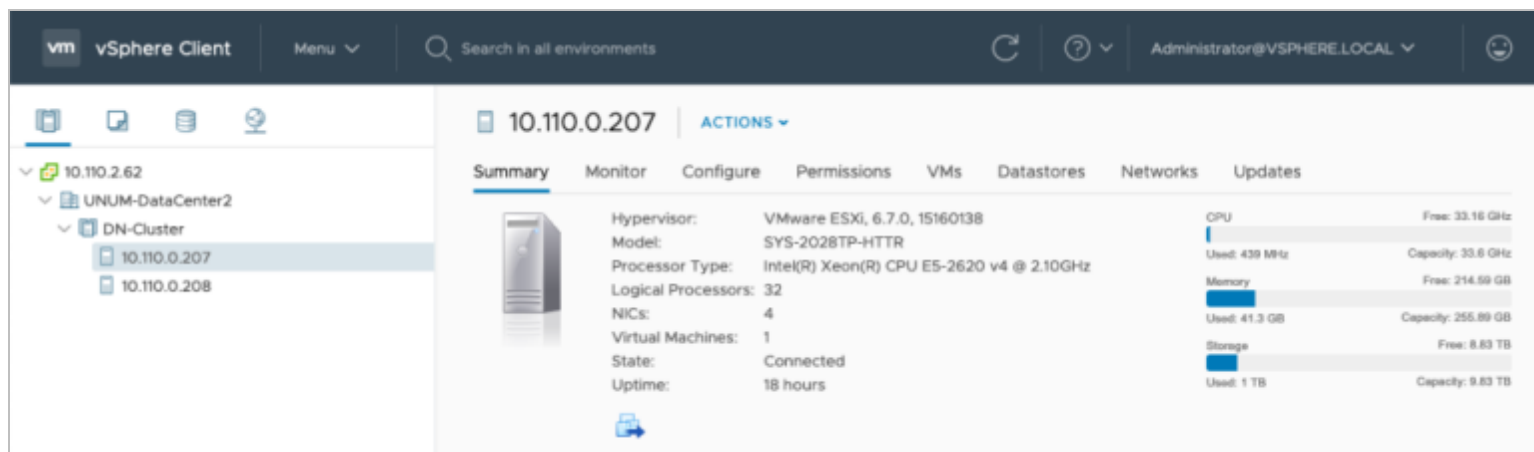
10.110.0.207  
10.110.0.208

CANCEL
BACK
FINISH

UNUM HA - Add Hosts Finish

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

The hosts appear in the dashboard.



The screenshot shows the vSphere Client interface. On the left, a tree view shows the hierarchy: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster > 10.110.0.207. The main panel displays the 'Summary' tab for host 10.110.0.207. The summary includes a server icon, a list of specifications (Hypervisor, Model, Processor Type, Logical Processors, NICs, Virtual Machines, State, Uptime), and resource usage bars for CPU, Memory, and Storage.

Resource	Used	Free	Capacity
CPU	439 MHz	33.16 GHz	33.6 GHz
Memory	41.3 GB	214.59 GB	255.89 GB
Storage	1 TB	8.83 TB	9.83 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.

X

#### NFS Share Details

Datastore name:

Datastore-HC

Folder:

/mnt/nfs\_3.58/

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

Server:

10.110.3.50

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**.

UNUM High Capacity Appliance - Getting Started Guide - Copyright © 2022 by Pluribus Networks. All Rights Reserved. Page 41 of 82

## 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"/>	10.110.0.207	DN-Cluster
<input checked="" type="checkbox"/>	10.110.0.208	DN-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: 10.110.3.50

Folder: /mnt/nfs\_3.58/

Access Mode: Read-write

Hosts that will have access to this datastore

Hosts:

10.110.0.207

10.110.0.208

CANCEL

BACK

FINISH

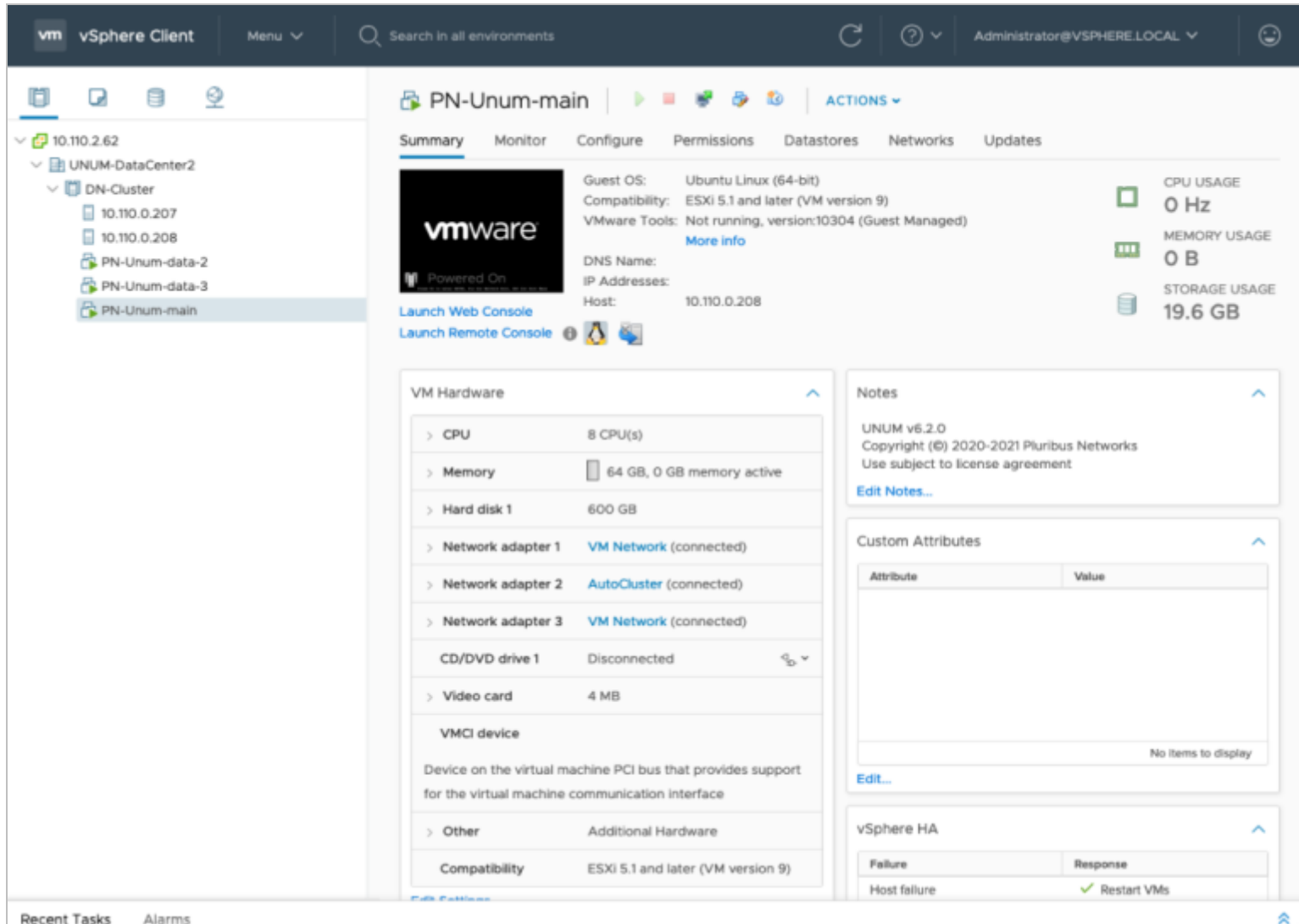
UNUM HA - Complete New Datastore

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

## High Availability (cont'd)

### Migrate Primary UNUM Instance

You must migrate PN-Unum-main instance to the clustered datastore.



**PN-Unum-main**

**Summary** | Monitor | Configure | Permissions | Datastores | Networks | Updates

Guest OS: Ubuntu Linux (64-bit)  
 Compatibility: ESXi 5.1 and later (VM version 9)  
 VMware Tools: Not running, version:10304 (Guest Managed)  
[More info](#)

DNS Name:  
 IP Addresses:  
 Host: 10.110.0.208

**Powered On**

[Launch Web Console](#)  
[Launch Remote Console](#)

**VM Hardware**

CPU	8 CPU(s)
Memory	64 GB, 0 GB memory active
Hard disk 1	600 GB
Network adapter 1	VM Network (connected)
Network adapter 2	AutoCluster (connected)
Network adapter 3	VM Network (connected)
CD/DVD drive 1	Disconnected
Video card	4 MB
<b>VMCI device</b>	
Device on the virtual machine PCI bus that provides support for the virtual machine communication interface	
Other	Additional Hardware
Compatibility	ESXi 5.1 and later (VM version 9)

**Notes**

UNUM v6.2.0  
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[Edit Notes...](#)

**Custom Attributes**

Attribute	Value
No items to display	

[Edit...](#)

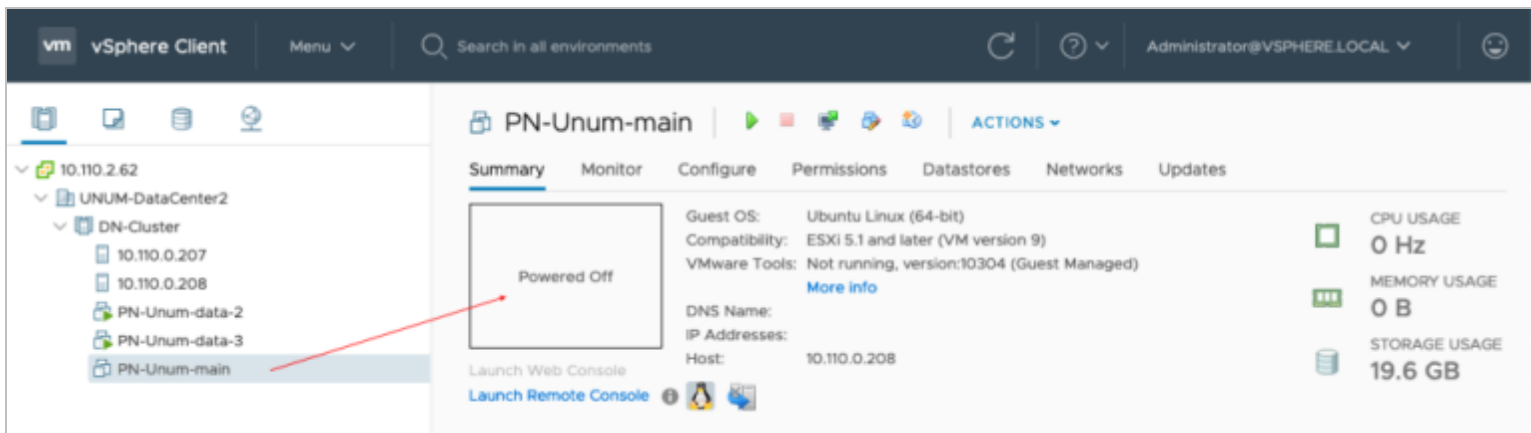
**vSphere HA**

Failure	Response
Host failure	✓ Restart VMs

UNUM HA - Dashboard - Ready for Migration

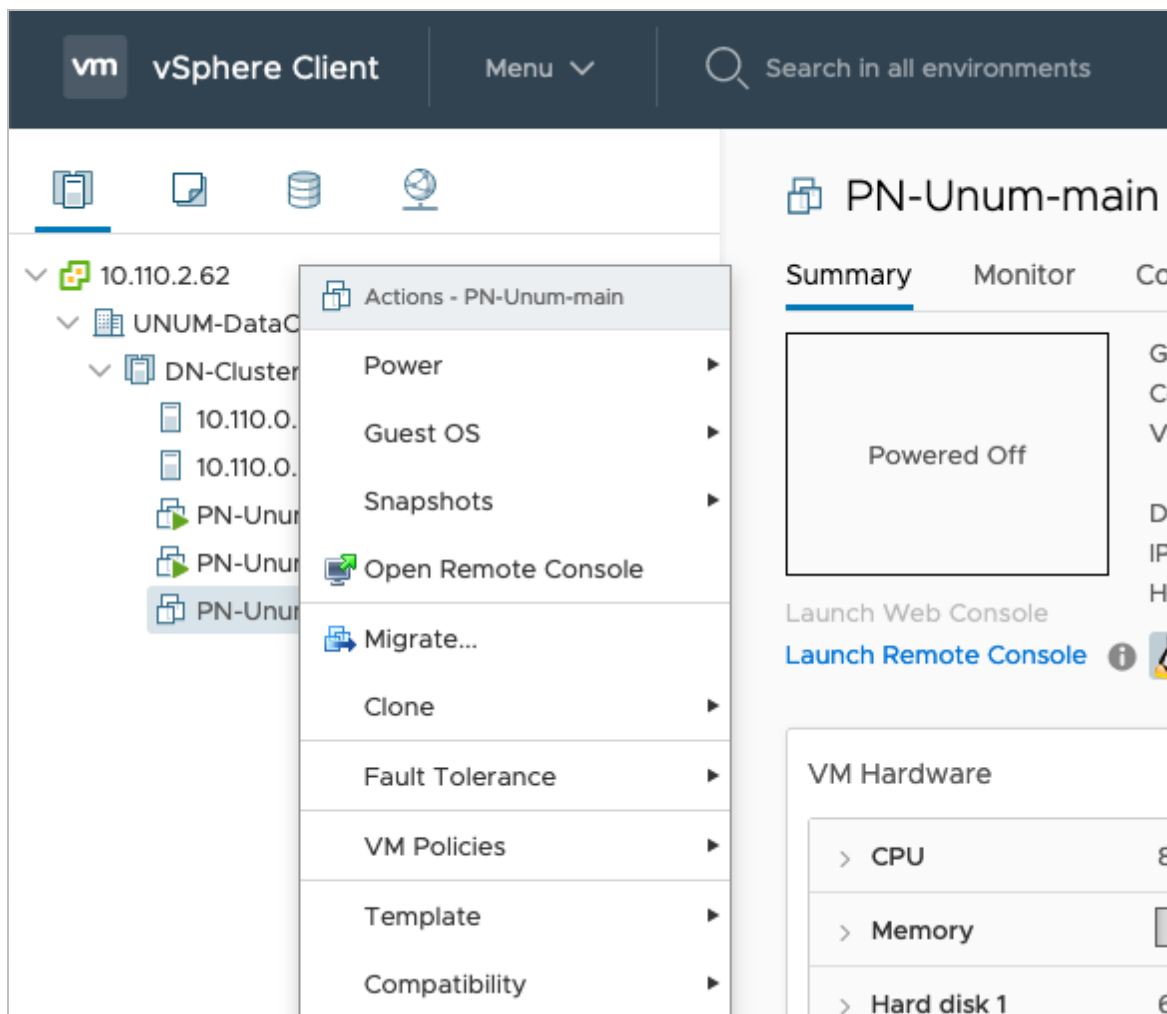
## High Availability (cont'd)

**Power Off** the **PN-Unum-main VM instance** before proceeding.



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

**Right-click** on the **PN-Unum-main** instance and select **Migrate**.



UNUM HA - Dashboard - Migrate



## High Availability (cont'd)

### Select Migration Type

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

#### PN-Unum-main - Migrate

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

##### Select a migration type

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.

[VM origin ⓘ](#)

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

UNUM HA - Migrate - Change Storage Only

## High Availability (cont'd)

Select the **Datastore** for the migration.

### PN-Unum-main - Migrate

1 Select a migration type

2 Select storage

3 Ready to complete

Select storage

Select the destination storage for the virtual machine migration.

VM origin ⓘ





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	999.01 GB	3.41 TB	NFS v3	
 Datastore2-HC	3.91 TB	44.88 MB	3.91 TB	NFS v3	
 datastore11	1.08 TB	667.45 GB	442.8 GB	VMFS 6	
 datastore222	1.09 TB	4.45 GB	1.09 TB	VMFS 5	

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

#### PN-Unum-main - Migrate

✓ 1 Select a migration type

✓ 2 Select storage

**3 Ready to complete**

**Ready to complete**  
Verify that the information is correct and click Finish to start the migration.  
[VM origin ⓘ](#)

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

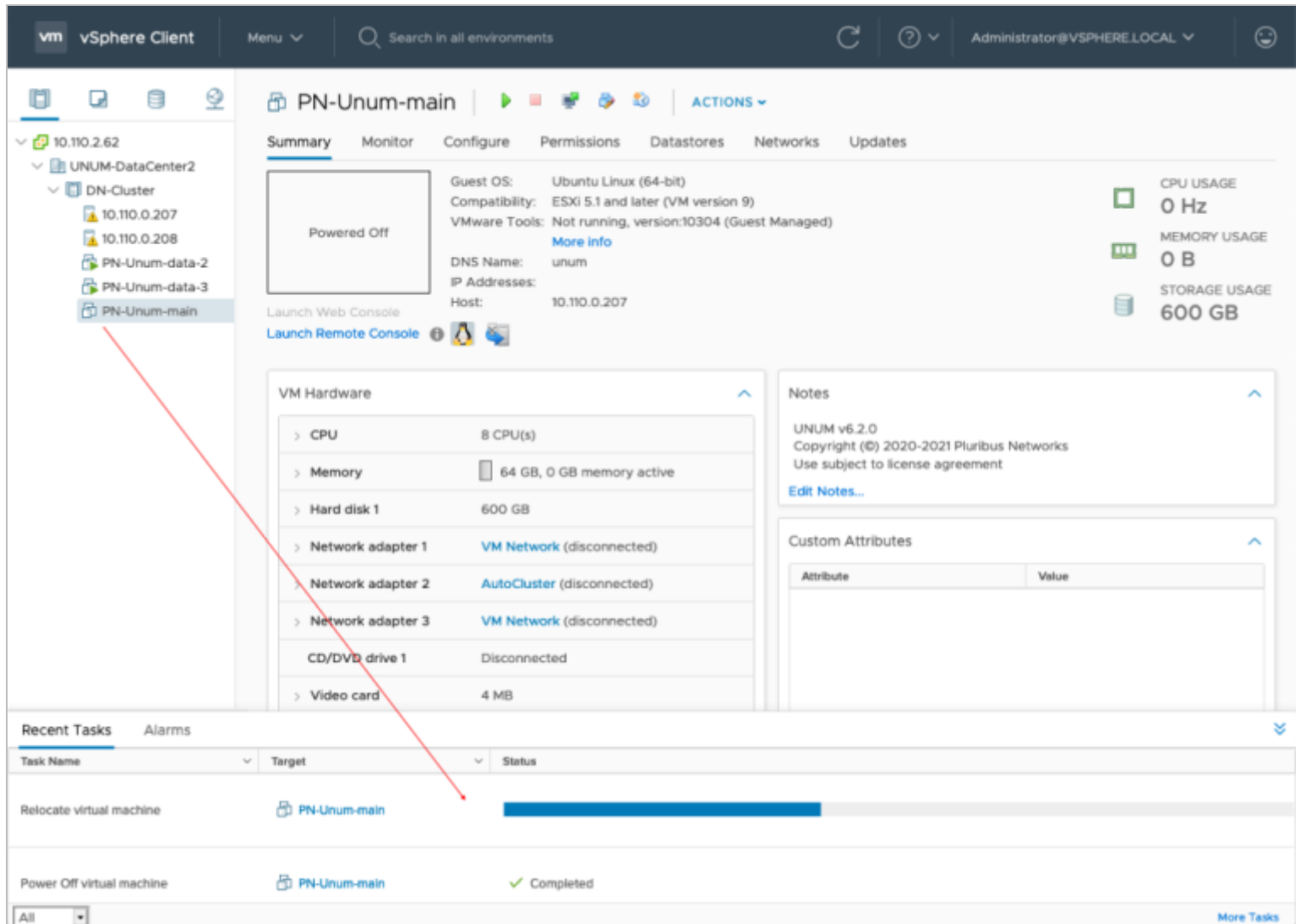
[CANCEL](#)[BACK](#)[FINISH](#)

UNUM HA - Migrate - Ready To Complete Migration

Click **Finish** to begin the migration.

## High Availability (cont'd)

Progress is monitored in the dashboard.



The screenshot shows the vSphere Client interface. In the left sidebar, the VM 'PN-Unum-main' is selected. The main panel displays the VM's summary, including its status (Powered Off), guest OS (Ubuntu Linux), and hardware configuration. The 'Recent Tasks' list at the bottom shows a 'Relocate virtual machine' task for 'PN-Unum-main' in progress, indicated by a blue progress bar. A red arrow points from this task to the VM in the sidebar.

**VM Summary:**

- 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: unum
- IP Addresses: 10.110.0.207
- Host: 10.110.0.207

**VM Hardware:**

- CPU: 8 CPU(s)
- Memory: 64 GB, 0 GB memory active
- Hard disk 1: 600 GB
- Network adapter 1: VM Network (disconnected)
- Network adapter 2: AutoCluster (disconnected)
- Network adapter 3: VM Network (disconnected)
- CD/DVD drive 1: Disconnected
- Video card: 4 MB

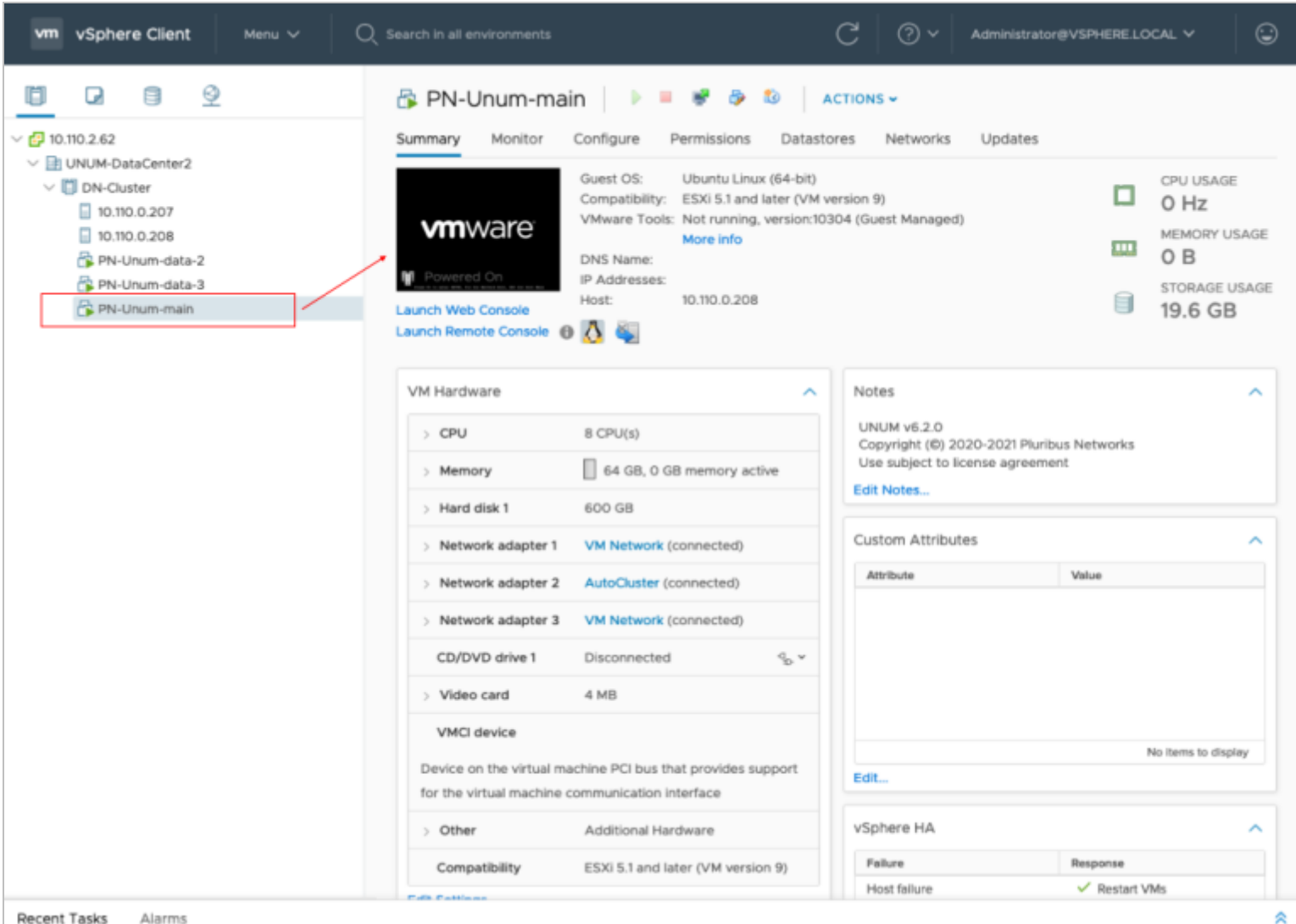
**Recent Tasks:**

Task Name	Target	Status
Relocate virtual machine	PN-Unum-main	In Progress
Power Off virtual machine	PN-Unum-main	Completed

UNUM HA - Migrate - Migration in Progress

## High Availability (cont'd)

After the migration completes, **Power On** the **PN-Unum-main** instance.



The screenshot shows the vSphere Client interface. On the left, the inventory tree shows the hierarchy: 10.110.2.62 > UNUM-DataCenter2 > DN-Cluster > 10.110.0.207 > 10.110.0.208 > PN-Unum-data-2 > PN-Unum-data-3 > **PN-Unum-main** (highlighted with a red box). A red arrow points from this box to the main VM summary page.

The main page for **PN-Unum-main** shows the following details:

- Summary:** 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: 10.110.0.208. The VM status is **Powered On**.
- Monitor:** CPU USAGE: 0 Hz, MEMORY USAGE: 0 B, STORAGE USAGE: 19.6 GB.
- VM Hardware:**
  - CPU: 8 CPU(s)
  - Memory: 64 GB, 0 GB memory active
  - Hard disk 1: 600 GB
  - Network adapter 1: VM Network (connected)
  - Network adapter 2: AutoCluster (connected)
  - Network adapter 3: VM Network (connected)
  - CD/DVD drive 1: Disconnected
  - Video card: 4 MB
  - VMCI device: Device on the virtual machine PCI bus that provides support for the virtual machine communication interface
  - Other: Additional Hardware
  - Compatibility: ESXi 5.1 and later (VM version 9)
- Notes:** UNUM v6.2.0, Copyright (©) 2020-2021 Pluribus Networks, Use subject to license agreement.
- Custom Attributes:** No items to display.
- vSphere HA:**

Failure	Response
Host failure	✓ Restart VMs

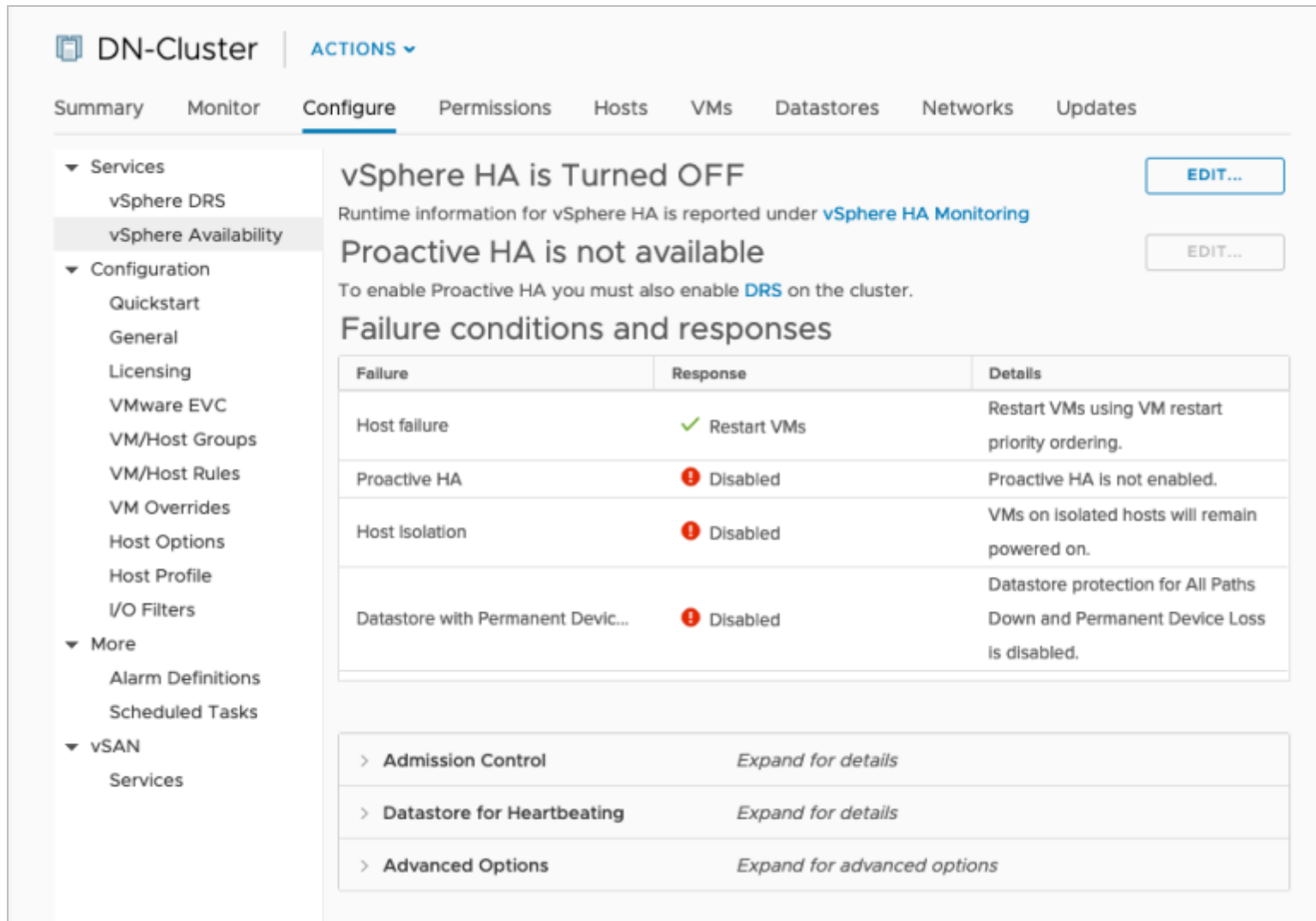
UNUM HA - Migrate - PN-Unum-main Powered On

## High Availability (cont'd)

### Configure HA on VMWare Cluster

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

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



**DN-Cluster** | ACTIONS ▾

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

▼ Services  
 vSphere DRS  
**vSphere Availability**

▼ Configuration  
 Quickstart  
 General  
 Licensing  
 VMware EVC  
 VM/Host Groups  
 VM/Host Rules  
 VM Overrides  
 Host Options  
 Host Profile  
 I/O Filters

▼ More  
 Alarm Definitions  
 Scheduled Tasks

▼ vSAN  
 Services

### vSphere HA is Turned OFF

Runtime information for vSphere HA is reported under [vSphere HA Monitoring](#)

**Proactive HA is not available**

To enable Proactive HA you must also enable [DRS](#) on the cluster.

#### Failure conditions and responses

Failure	Response	Details
Host failure	✓ Restart VMs	Restart VMs using VM restart priority ordering.
Proactive HA	❗ Disabled	Proactive HA is not enabled.
Host Isolation	❗ Disabled	VMs on isolated hosts will remain powered on.
Datastore with Permanent Devic...	❗ Disabled	Datastore protection for All Paths Down and Permanent Device Loss is disabled.

> Admission Control *Expand for details*

> Datastore for Heartbeating *Expand for details*

> Advanced Options *Expand for advanced options*

UNUM HA - Configure vSphere HA

## High Availability (cont'd)

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

### Edit Cluster Settings

DN-Cluster×

vSphere HA ☒

Failures and responsesAdmission ControlHeartbeat DatastoresAdvanced 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 *i* ☒

> Host Failure Response	Restart VMs ▾
> Response for Host Isolation	Disabled ▾
> Datastore with PDL	Disabled ▾
> Datastore with APD	Disabled ▾
> VM Monitoring	Disabled ▾

CANCELOK

UNUM HA - Configure vSphere HA On

## High Availability (cont'd)

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

### Edit Cluster Settings

DN-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

Disabled

CANCEL

OK

UNUM HA - Configure vSphere Admission Control - Disabled



## High Availability (cont'd)

Select **Heartbeat Datastores**.

Edit Cluster Settings

DN-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"/>	 Datastore-HC	N/A	2
<input checked="" type="checkbox"/>	 Datastore2-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.

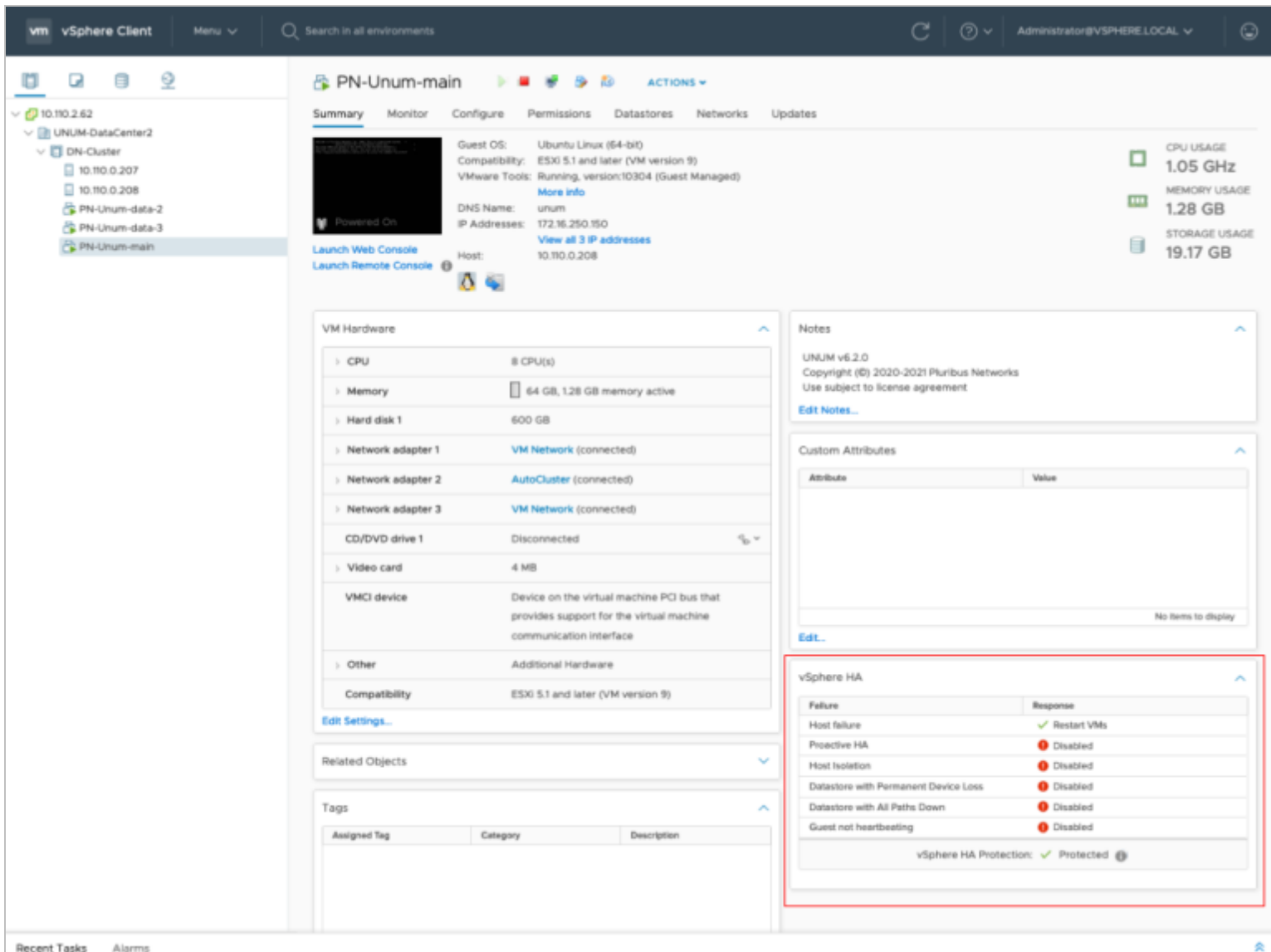
Recent Tasks		Alarms							
Task Name	Target	Status	Details	Initiator	Queued For	Start Time	Completion Time	Server	
specification						PM	PM		
Configuring vSphere HA	10.110.0.207	53%		System	4 ms	09/24/2020, 4:48:05 PM		10.110.2.62	
Configuring vSphere HA	10.110.0.208	52%		System	3 ms	09/24/2020, 4:48:05 PM		10.110.2.62	

#### UNUM HA - Configuration Validation

Configuring vSphere HA	10.110.0.207	✓ Completed	System	4 ms	09/24/2020, 4:48:05 PM	09/24/2020, 4:48:55 PM	10.110.2.62
Configuring vSphere HA	10.110.0.208	✓ Completed	System	3 ms	09/24/2020, 4:48:05 PM	09/24/2020, 4:48:55 PM	10.110.2.62

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

## High Availability (cont'd)



**PN-Unum-main**

**Summary** Monitor Configure Permissions Datastores Networks Updates

Guest OS: Ubuntu Linux (64-bit)  
 Compatibility: ESX 5.1 and later (VM version 9)  
 VMware Tools: Running, version:10304 (Guest Managed)  
[More info](#)  
 DNS Name: unum  
 IP Addresses: 172.16.250.150 [View all 3 IP addresses](#)  
 Host: 10.110.0.208

Powered On  
[Launch Web Console](#)  
[Launch Remote Console](#)

CPU USAGE: 1.05 GHz  
 MEMORY USAGE: 1.28 GB  
 STORAGE USAGE: 19.17 GB

**VM Hardware**

CPU	8 CPU(s)
Memory	64 GB, 1.28 GB memory active
Hard disk 1	600 GB
Network adapter 1	VM Network (connected)
Network adapter 2	AutoCluster (connected)
Network adapter 3	VM Network (connected)
CD/DVD drive 1	Disconnected
Video card	4 MB
VMCI 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)

[Edit Settings...](#)

**Related Objects**

**Tags**

Assigned Tag	Category	Description
--------------	----------	-------------

**Notes**

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[Edit Notes...](#)

**Custom Attributes**

Attribute	Value
-----------	-------

[Edit...](#)

**vSphere HA**

Failure	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

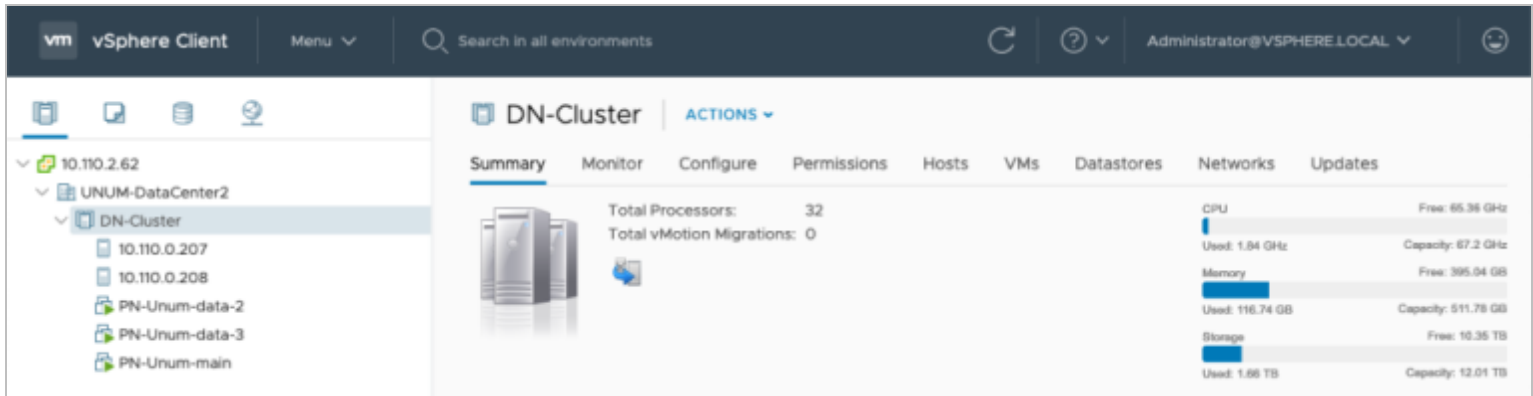
vSphere HA Protection: ✓ Protected ⓘ

UNUM HA - Configuration Validation - vSphere HA Protection Enabled

## High Availability (cont'd)

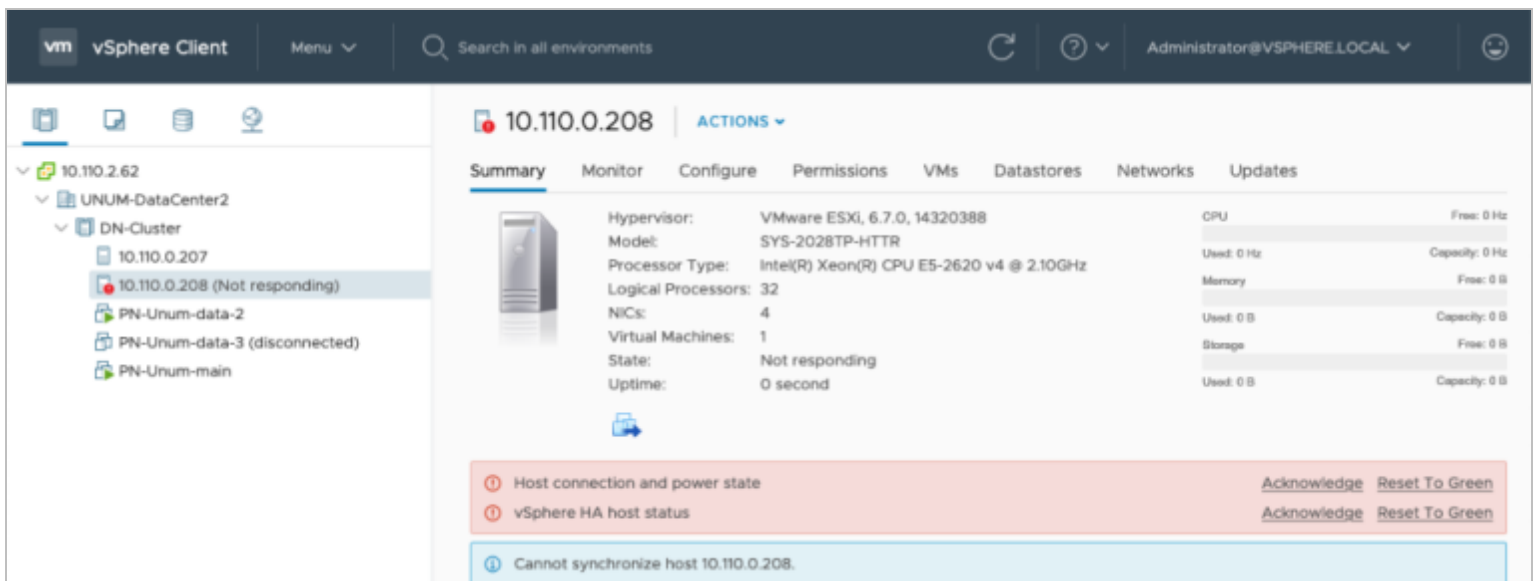
### High Availability Validation after Fail-over

In the following example, the UNUM instance runs on one of the instances in the cluster. This instance is HA protected.



UNUM HA - Configuration Validation - Example - Cluster Good

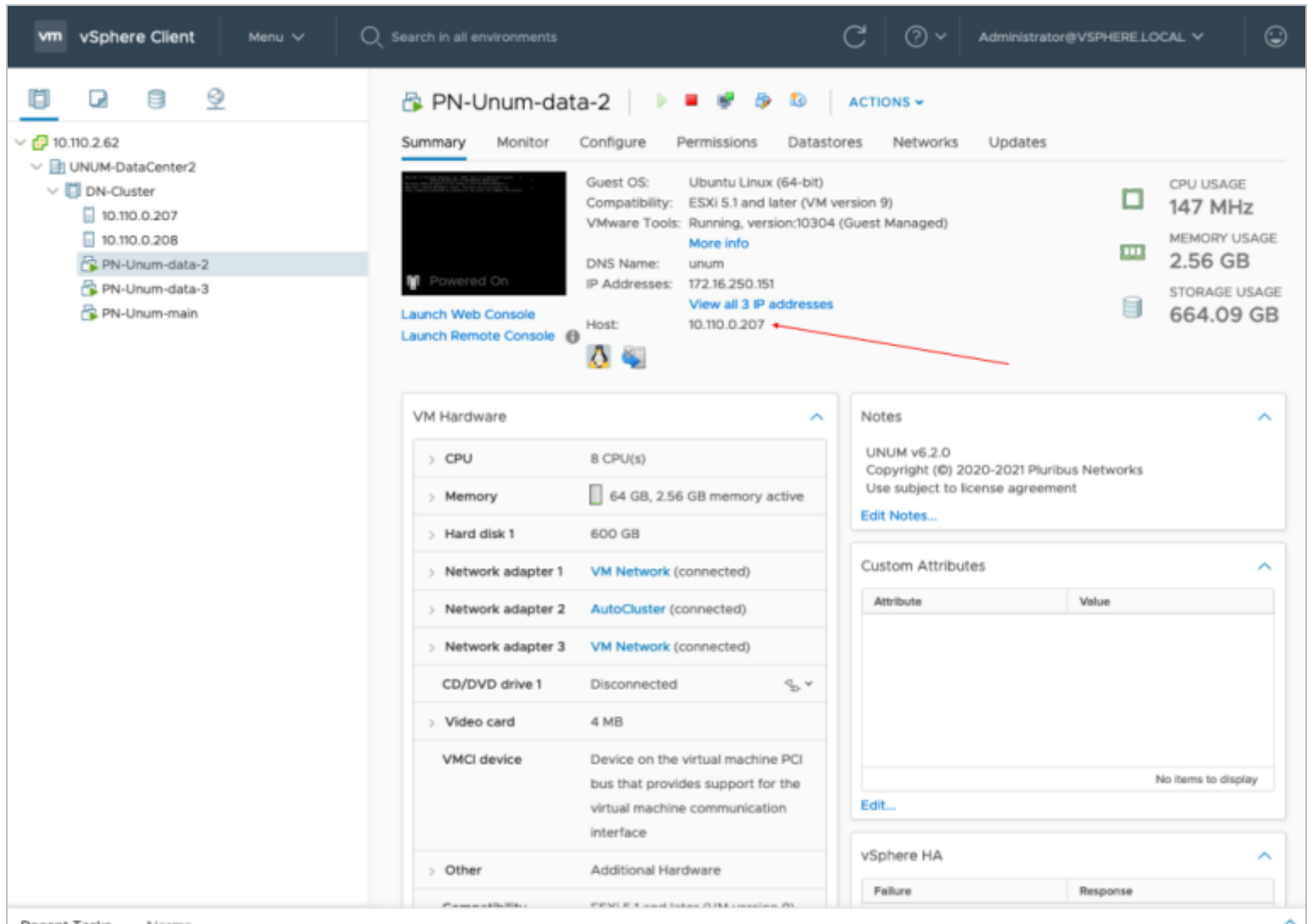
Respective instance (10.110.0.208) then becomes unresponsive or is rebooted.



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

## High Availability (cont'd)

You can confirm the UNUM instance restarts on the second host (10.110.0.207), Host B, in the same VMWare Cluster.



The screenshot shows the vSphere Client interface for a VM named **PN-Unum-data-2**. The left sidebar shows the environment structure: **10.110.2.62** > **UNUM-DataCenter2** > **DN-Cluster** > **10.110.0.207** > **PN-Unum-data-2**. The main pane displays the **Summary** tab for the VM. Key details include:

- 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:** 172.16.250.151
- Host:** 10.110.0.207 (indicated by a red arrow)
- CPU Usage:** 147 MHz
- Memory Usage:** 2.56 GB
- Storage Usage:** 664.09 GB

The **VM Hardware** section shows the following configuration:

- CPU:** 8 CPU(s)
- Memory:** 64 GB, 2.56 GB memory active
- Hard disk 1:** 600 GB
- Network adapter 1:** VM Network (connected)
- Network adapter 2:** AutoCluster (connected)
- Network adapter 3:** VM Network (connected)
- CD/DVD drive 1:** Disconnected
- Video card:** 4 MB
- VMCI device:** Device on the virtual machine PCI bus that provides support for the virtual machine communication interface
- Other:** Additional Hardware

The **Notes** section contains the following text:

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The **Custom Attributes** section is empty, showing "No items to display".

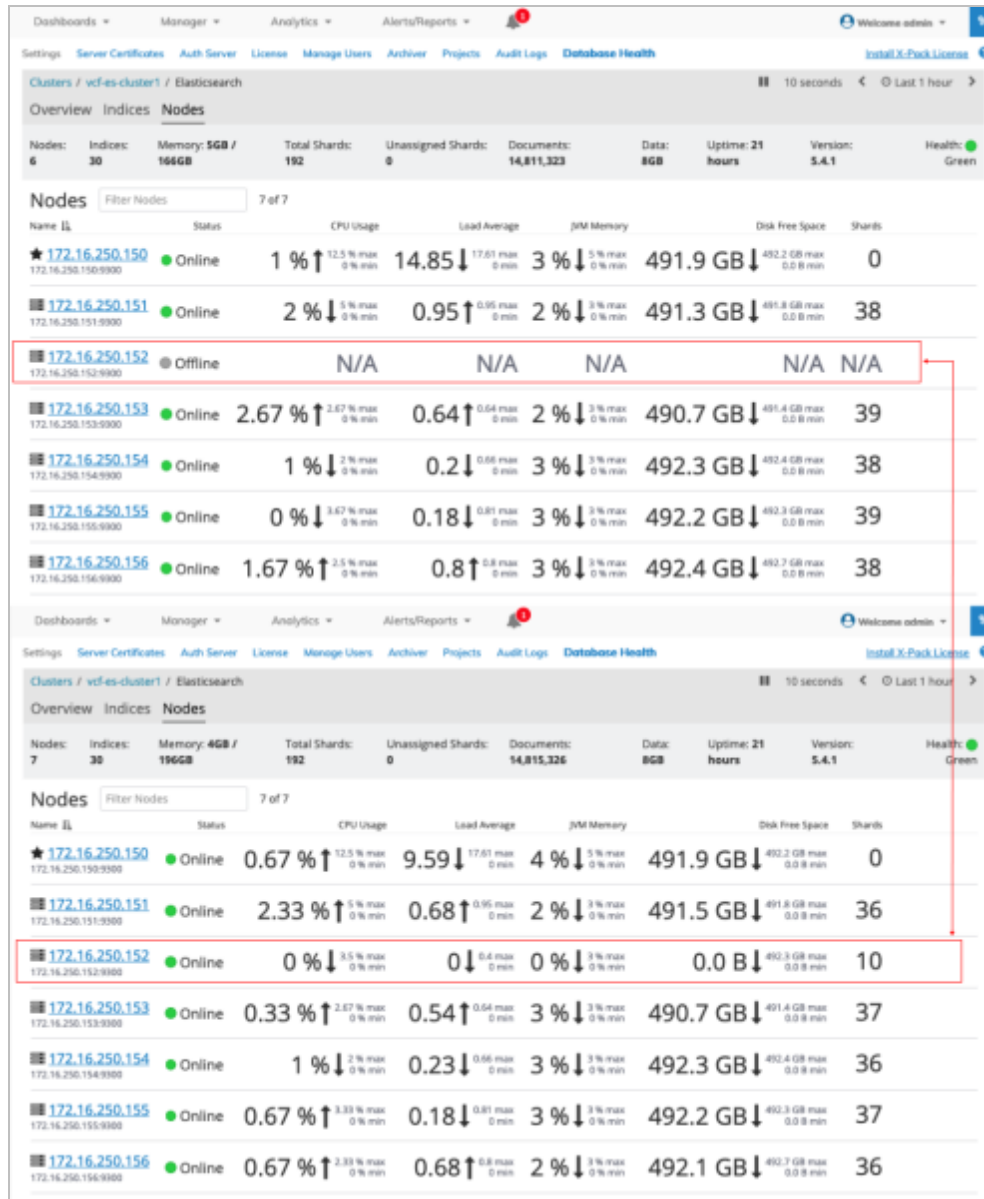
The **vSphere HA** section shows the **Failure** and **Response** settings.

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. In this example the offline datanode returns to service.



The screenshot shows the UNUM Database Health interface for an Elasticsearch cluster. The top section displays cluster overview metrics, and the bottom section shows a detailed list of nodes. A red box highlights the node 172.16.250.152, which has transitioned from an 'Offline' state to an 'Online' state.

Cluster Overview									
Nodes	Indices	Memory	Total Shards	Unassigned Shards	Documents	Data	Uptime	Version	Health
6	30	5GB / 166GB	192	0	14,811,323	8GB	21 hours	5.4.1	Green

Nodes (7 of 7)									
Name ID	Status	CPU Usage	Load Average	JVM Memory	Disk Free Space	Shards			
172.16.250.150	Online	1 % ↑ 12.5 % max	14.85 ↓ 17.61 max	3 % ↓ 5 % max	491.9 GB ↓ 492.2 GB max	0			
172.16.250.151	Online	2 % ↓ 5 % max	0.95 ↑ 0.95 max	2 % ↓ 3 % max	491.3 GB ↓ 491.8 GB max	38			
172.16.250.152	Offline	N/A	N/A	N/A	N/A	N/A			
172.16.250.153	Online	2.67 % ↑ 2.67 % max	0.64 ↑ 0.64 max	2 % ↓ 3 % max	490.7 GB ↓ 491.4 GB max	39			
172.16.250.154	Online	1 % ↓ 2 % max	0.2 ↓ 0.66 max	3 % ↓ 3 % max	492.3 GB ↓ 492.4 GB max	38			
172.16.250.155	Online	0 % ↓ 3.67 % max	0.18 ↓ 0.81 max	3 % ↓ 3 % max	492.2 GB ↓ 492.3 GB max	39			
172.16.250.156	Online	1.67 % ↑ 2.5 % max	0.8 ↑ 0.8 max	3 % ↓ 3 % max	492.4 GB ↓ 492.7 GB max	38			

Nodes (7 of 7)									
Name ID	Status	CPU Usage	Load Average	JVM Memory	Disk Free Space	Shards			
172.16.250.150	Online	0.67 % ↑ 12.5 % max	9.59 ↓ 17.61 max	4 % ↓ 5 % max	491.9 GB ↓ 492.2 GB max	0			
172.16.250.151	Online	2.33 % ↑ 5 % max	0.68 ↑ 0.95 max	2 % ↓ 3 % max	491.5 GB ↓ 491.8 GB max	36			
172.16.250.152	Online	0 % ↓ 3.5 % max	0 ↓ 0.4 max	0 % ↓ 3 % max	0.0 B ↓ 492.3 GB max	10			
172.16.250.153	Online	0.33 % ↑ 2.67 % max	0.54 ↑ 0.64 max	3 % ↓ 3 % max	490.7 GB ↓ 491.4 GB max	37			
172.16.250.154	Online	1 % ↓ 2 % max	0.23 ↓ 0.66 max	3 % ↓ 3 % max	492.3 GB ↓ 492.4 GB max	36			
172.16.250.155	Online	0.67 % ↑ 3.33 % max	0.18 ↓ 0.81 max	3 % ↓ 3 % max	492.2 GB ↓ 492.3 GB max	37			
172.16.250.156	Online	0.67 % ↑ 3.33 % max	0.68 ↑ 0.8 max	2 % ↓ 3 % max	492.1 GB ↓ 492.7 GB max	36			

UNUM HA - Configuration Validation - Example - UNUM Datanodes Status

## HA Considerations - Cluster

---

### Cluster / Data Node Health:

- Green Cluster is fully operational with replicated data.
- Yellow Cluster is fully operational data is being replicated.
- Red Cluster is operational data has been lost.

### Failure of any one Server Node B, C, or D:

Upon failure or removal of any one Server node B, C, or D, the Pluribus UNUM High Capacity Appliance will redistribute data such that no data will be lost.

The Cluster will temporarily go to Yellow, then will recover to Green after data is fully redistributed.

Redistribution of data times will vary depending on system / traffic load.

Normal operation can continue; however, the system is operating in a non-redundant configuration.

The failed or removed Server node, must be replaced as soon as possible.

### Failure of more than one Server Node B, C, or D:

Upon failure or removal of more than one Server node B, C, or D will likely result in permanent data loss.

Two of the three Server nodes B, C, and D must be operational for the system to collect, manage and store data properly.

Upon data loss the Cluster status will likely go Red and require replacement of failed or removed Server nodes until at a minimum, two of the three are replaced.

### Failure of Server Node A:

Upon failure or removal of the Primary Server node A, data will not be lost, however data collection and connectivity to Pluribus UNUM will stop.

The Primary Server node A must be replaced as soon as possible for normal operation to resume.

## Replace a Failed Cluster Server

### Data Server Node Replacement

One symptom of a failed **Data Server Node** is the appearance of offline nodes in the UNUM **System Health** dashboard as shown in the example below.

In the example, UNUM displays single ESXi instance with 4 data nodes, all offline.

Pluribus

NETWORKS

Overview

Manage

Analytics

Notifications

Welcome admin

Search

Global

Add

TME-BE

leaf111

leaf112

leaf113

leaf114

leaf115

leaf123

leaf131

leaf133

leaf134

spine101

spine102

Settings

Certificate Authority

Auth Server

License

Manage Users

Audit Logs

System Health

Install X-Pack License

172.16.248.31

172.16.248.31:9300

Online

0.33 %

17.33 % max

0 % min

0.8

1.73 max

0 min

6 %

7 % max

0 % min

189.1 GB

191.9 GB max

0.0 B min

18

172.16.248.32

172.16.248.32:9300

Online

0.67 %

13.33 % max

0 % min

0.01

1.44 max

0.01 min

34 %

34 % max

32 % min

190.7 GB

191.8 GB max

190.7 GB min

18

172.16.248.33

172.16.248.33:9300

Online

0 %

10.67 % max

0 % min

0.06

0.59 max

0 min

12 %

12 % max

10 % min

190.9 GB

193.5 GB max

190.9 GB min

17

172.16.248.34

172.16.248.34:9300

Online

0 %

15 % max

0 % min

0.16

1.51 max

0 min

13 %

15 % max

11 % min

189.5 GB

193.5 GB max

189.5 GB min

17

172.16.248.35

172.16.248.35:9300

Offline

N/A

N/A

N/A

N/A

N/A

N/A

172.16.248.36

172.16.248.36:9300

Offline

N/A

N/A

N/A

N/A

N/A

N/A

172.16.248.37

172.16.248.37:9300

Offline

N/A

N/A

N/A

N/A

N/A

N/A

172.16.248.38

172.16.248.38:9300

Offline

N/A

N/A

N/A

N/A

N/A

N/A

UNUM System Health Dashboard - Cluster

In the event of a **Cluster Server** failure and you have received a replacement **Server** from Pluribus Networks please use the following instructions to rebuild the **Cluster**.

**Note:** The replacement **Server** you receive has **VMware ESXi** installed. You need to add the Server to the Cluster using the `cluster_menu.sh` configuration script.

**Note:** The **replacement Server Node** must be connected via the **Eth0** Ethernet interface. Specify **Static IP** address when using static IPs otherwise **DHCP** settings are used.



## Replace a Failed Cluster Server (cont'd)

1. Login into the Remote Console of a **Primary VM** instance with your login credential. If you have not changed the default credentials the username and password is “vcf” and the password is “changeme”. The UNUM Cluster setup script is named “unum\_provision.sh” and is located in the default folder “/home/vcf/srv/vcf/bin/tools/cluster”.
2. Run the setup script: `./unum_provision.sh`



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

*UNUM Cluster Menu - Setup Script*

3. Select Option 2 - **Manage Cluster** from the deployment menu.

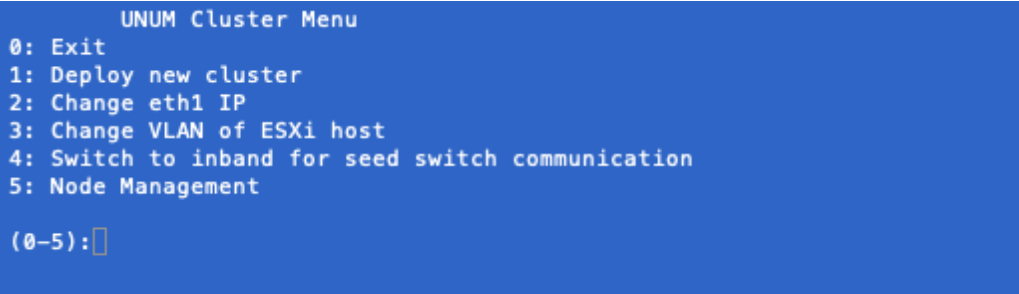


```
UNUM Deployment Menu
0: Exit
1: Deploy standalone VM
2: Manage cluster

(0-2):_
```

*UNUM Cluster Menu - Manage Cluster*

4. Select Option 5 - **Node Management** - from the setup menu.

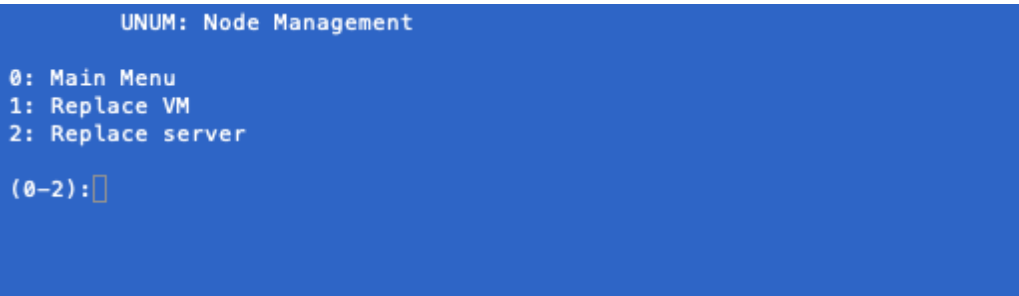


```
UNUM Cluster Menu
0: Exit
1: Deploy new cluster
2: Change eth1 IP
3: Change VLAN of ESXi host
4: Switch to inband for seed switch communication
5: Node Management

(0-5):
```

*UNUM Cluster Menu - Node Management*

5. Select Option 2 - **Replace Server** - from Node Management.



```
UNUM: Node Management
0: Main Menu
1: Replace VM
2: Replace server

(0-2):
```

*UNUM Cluster Menu - Node Management - Replace Server*

## Replace a Failed Cluster Server (cont'd)

6. Follow the on-screen instructions. Enter the **IP address** of the **VMWare ESXi Primary Node**. In the event of a **Primary Server Node** failure you use the IP address of a **Data Server Node**. However, the instructions for replacing a **Primary Server Node** server differ slightly. Refer to Primary Server Node replacement for more instructions.

```
UNUM: Node Management

0: Main Menu
1: Replace VM
2: Replace server

(0-2):2

Enter IP of ESXI server to be replaced: 10.110.0.203
```

UNUM Cluster Menu - Primary Server Node IP Address

7. Download the applicable **Cluster OVA Template** from the **Pluribus Cloud**. The downloaded OVA version must be the same version as previously installed. Enter the absolute path of the OVA template. Enter **Shift U** and then press the **Tab** key on your keyboard. The downloaded **OVA** template name will be displayed. Press **Enter** to continue. For the **VM Port Group Name** press **Enter** and use the default **AutoCluster**.

```
UNUM: Node Management

0: Main Menu
1: Replace VM
2: Replace server

(0-2):2

Enter IP of ESXI server to be replaced: 10.110.0.203
Enter absolute path of OVA: UNUM-3.1.0-6176.5-cl.ova
Enter VM port group name [AutoCluster]:
```

UNUM Cluster Menu - OVA Template Path - VM Port Group Name

8. Provisioning of the replacement **Server** begins.

## Replace a Failed Cluster Server (cont'd)

```

UNUM: Node Management

0: Main Menu
1: Replace VM
2: Replace server

(0-2):2

Enter IP of ESXI server to be replaced: 10.110.0.203
Enter absolute path of OVA: UNUM-3.1.0-6176.5-cl.ova
Enter VM port group name [AutoCluster]:
Wed Oct 3 13:15:01 PDT 2018: Invoking provisioning script. Please wait
JSON:{"nodes": [{"host": "172.16.248.31", "serverId": "10.110.0.202", "service": "data,kafka"}, {"host": "172.16.248.32", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.33", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.34", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.35", "serverId": "10.110.0.203", "service": "data,kafka"}, {"host": "172.16.248.36", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.37", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.38", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.39", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.40", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.41", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.42", "serverId": "10.110.0.204", "service": "data"}], "esShards": "6"}

Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-6 node_no: 5
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-7 node_no: 6
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-8 node_no: 7
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-9 node_no: 8
  
```

UNUM Cluster Menu - Replacement Server Provisioning

When you replace a **Data Node Server** auto-provisioning starts and details appear as the process continues.

The auto-provisioning process typically begins within 10 minutes and provisions the new **Data Node Server**.

```

UNUM: Node Management

0: Main Menu
1: Replace VM
2: Replace server

(0-2):2

Enter IP of ESXI server to be replaced: 10.110.0.203
Enter absolute path of OVA: UNUM-3.1.0-6176.5-cl.ova
Enter VM port group name [AutoCluster]:
Wed Oct 3 13:15:01 PDT 2018: Invoking provisioning script. Please wait
JSON:{"nodes": [{"host": "172.16.248.31", "serverId": "10.110.0.202", "service": "data,kafka"}, {"host": "172.16.248.32", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.33", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.34", "serverId": "10.110.0.202", "service": "data"}, {"host": "172.16.248.35", "serverId": "10.110.0.203", "service": "data,kafka"}, {"host": "172.16.248.36", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.37", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.38", "serverId": "10.110.0.203", "service": "data"}, {"host": "172.16.248.39", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.40", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.41", "serverId": "10.110.0.204", "service": "data"}, {"host": "172.16.248.42", "serverId": "10.110.0.204", "service": "data"}], "esShards": "6"}

Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-6 node_no: 5
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-7 node_no: 6
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-8 node_no: 7
Starting thread with arguments: blade_ip: 10.110.0.203 ds_name: datastore1 vm_name: dn-9 node_no: 8
eth0 IP for dn-6 on ESXi host 10.110.0.203 is 10.110.3.115
eth0 IP for dn-7 on ESXi host 10.110.0.203 is 10.110.3.48
eth0 IP for dn-8 on ESXi host 10.110.0.203 is 10.110.3.217
Ping to 10.110.3.115 detected 0% loss
Ping to IP 10.110.3.115 was successful
Logging into 10.110.3.115
eth0 IP for dn-9 on ESXi host 10.110.0.203 is 10.110.3.135
Ping to 10.110.3.48 detected 0% loss
Ping to IP 10.110.3.48 was successful
Logging into 10.110.3.48
Ping to 10.110.3.217 detected 0% loss
Ping to IP 10.110.3.217 was successful
Logging into 10.110.3.217
Ping to 10.110.3.135 detected 0% loss
Ping to IP 10.110.3.135 was successful
Logging into 10.110.3.135
  
```

UNUM Cluster Menu - Replacement Server Provisioning Details

**UNUM** will restart and **NTP** details for each new **Data Server Node** are displayed along with a summary message indicating Cluster Provisioning passed.

9. Press any key to continue and you return to the configuration menu. Press **0 (zero)** to exit.

## Replace a Failed Cluster Server (cont'd)

At any time during the provisioning process you can review the status of the **Data Server Nodes** in the **UNUM System Health** dashboard.


**Note:** For each **Data Server Node** there is an **Eth1 IP Address** entry and you may observe two entries per **IP Address**, one **Offline** and one **Online**. This is a normal and expected condition and is temporary until the next automatic data refresh is performed by **UNUM** as shown in the images below. This should normally occur with 20 - 25 minutes.

Pluribus Networks										
Overview		Manage	Analytics	Notifications	Welcome admin					
Settings		Certificate Authority	Auth Server	License	Manage Users	Audit Logs	System Health			
172.16.248.32		Online	2 % ↓	1.33 % max 0 % min	1.44 max 0 min	35 % max 32 % min	16			
172.16.248.32:9300							191.6 GB max 190.5 GB min			
172.16.248.33		Online	1 % ↑	10.67 % max 0 % min	0 ↓ 0.59 max 0 min	11 % ↑ 12 % max 10 % min	16			
172.16.248.33:9300							190.8 GB ↓ 193.3 GB max 190.8 GB min			
172.16.248.34		Online	3 % ↑	15 % max 0 % min	0.05 ↓ 1.51 max 0 min	15 % ↑ 15 % max 10 % min	16			
172.16.248.34:9300							189.3 GB ↓ 193.2 GB max 189.3 GB min			
172.16.248.35		Offline	N/A				N/A N/A			
172.16.248.35:9300										
172.16.248.35		Online	0.67 % ↑	20.67 % max 0 % min	1.74 ↑ 2.86 max 0 min	4 % ↑ 4 % max 0 % min	6			
172.16.248.35:9300							190.3 GB ↑ 193.6 GB max 0.0 B min			
172.16.248.36		Offline	N/A				N/A N/A			
172.16.248.36:9300										
172.16.248.36		Online	16.67 % ↑	21.67 % max 0 % min	1.16 ↑ 1.56 max 0 min	4 % ↑ 4 % max 0 % min	3			
172.16.248.36:9300							194.7 GB ↑ 196.0 GB max 0.0 B min			
172.16.248.37		Offline	N/A				N/A N/A			
172.16.248.37:9300										
172.16.248.37		Online	1.67 % ↑	2 % max 0 % min	0.43 ↑ 0.87 max 0 min	2 % ↑ 2 % max 0 % min	1			
172.16.248.37:9300							195.5 GB ↑ 196.0 GB max 0.0 B min			
172.16.248.38		Offline	N/A				N/A N/A			
172.16.248.38:9300										
172.16.248.38		Online	0 % ↑	2 % max 0 % min	0.54 ↑ 1.07 max 0 min	1 % ↑ 1 % max 0 % min	2			
172.16.248.38:9300							196.0 GB ↑ 196.0 GB max 0.0 B min			

UNUM Cluster Menu - Replacement Server Offline / Online

## Replace a Failed Cluster Server (cont'd)

### Data Server Nodes in the UNUM System Health dashboard. (cont'd)



Global

Add

TME-BE

leaf111

leaf112

leaf113

leaf114

leaf115

leaf123

leaf131

leaf133

leaf134

spine101

spine102

Overview

Manage

Analytics

Notifications

Welcome admin

Settings

Certificate Authority

Auth Server

License

Manage Users

Audit Logs

System Health

Install X-Pack License

Clusters / vcf-es-cluster1 / Elasticsearch

10 seconds

Last 1 hour

Overview

Indices

Nodes

Nodes: 13

Indices: 30

Memory: 49GB / 375GB

Total Shards: 142

Unassigned Shards: 0

Documents: 46,877,709

Data: 39GB

Uptime: 16 hours

Version: 5.4.1

Health: Green

Nodes

Filter Nodes

13 of 13

Name	Status	CPU Usage	Load Average	JVM Memory	Disk Free Space	Shards
★ <a href="#">172.16.248.30</a> 172.16.248.30:9300	Online	0 % ↓ 0 % max 0 % min	0.42 ↓ 1.6 max 0.1 min	4 % ↑ 5 % max 2 % min	189.6 GB ↑ 189.7 GB max 189.1 GB min	0
■ <a href="#">172.16.248.31</a> 172.16.248.31:9300	Online	0 % ↑ 7.67 % max 0 % min	0.17 ↓ 0.84 max 0 min	8 % ↑ 8 % max 6 % min	191.3 GB ↑ 191.6 GB max 188.9 GB min	12
■ <a href="#">172.16.248.32</a> 172.16.248.32:9300	Online	9.67 % ↑ 11.33 % max 0 % min	0.95 ↑ 0.95 max 0 min	37 % ↑ 37 % max 34 % min	190.2 GB ↑ 190.9 GB max 189.6 GB min	12
■ <a href="#">172.16.248.33</a> 172.16.248.33:9300	Online	0 % ↓ 4 % max 0 % min	0.05 ↑ 0.69 max 0 min	10 % ↑ 12 % max 10 % min	192.8 GB ↑ 193.1 GB max 190.7 GB min	12
■ <a href="#">172.16.248.34</a> 172.16.248.34:9300	Online	0 % ↓ 11.67 % max 0 % min	0.02 ↑ 0.92 max 0 min	14 % ↓ 15 % max 14 % min	193.1 GB ↑ 193.4 GB max 190.8 GB min	12
■ <a href="#">172.16.248.35</a> 172.16.248.35:9300	Online	0 % ↓ 13.33 % max 0 % min	0.11 ↑ 1.2 max 0.01 min	7 % ↑ 7 % max 3 % min	191.2 GB ↑ 191.3 GB max 189.5 GB min	12
■ <a href="#">172.16.248.36</a> 172.16.248.36:9300	Online	1 % ↓ 17 % max 0 % min	0.1 ↓ 0.84 max 0 min	11 % ↑ 11 % max 3 % min	190.2 GB ↓ 194.4 GB max 190.0 GB min	11
■ <a href="#">172.16.248.37</a> 172.16.248.37:9300	Online	0 % ↓ 23.33 % max 0 % min	0.01 ↓ 1.86 max 0 min	6 % ↑ 7 % max 2 % min	192.9 GB ↑ 193.7 GB max 192.1 GB min	11
■ <a href="#">172.16.248.38</a> 172.16.248.38:9300	Online	0 % ↓ 19 % max 0 % min	0.03 ↓ 1.98 max 0 min	6 % ↑ 7 % max 1 % min	192.9 GB ↑ 195.3 GB max 191.8 GB min	12
■ <a href="#">172.16.248.39</a> 172.16.248.39:9300	Online	0.33 % ↓ 3.67 % max 0 % min	0.45 ↑ 0.88 max 0 min	8 % ↓ 8 % max 6 % min	192.9 GB ↑ 193.2 GB max 192.2 GB min	12
■ <a href="#">172.16.248.40</a> 172.16.248.40:9300	Online	0.67 % ↓ 9.67 % max 0 % min	0.13 ↑ 0.86 max 0 min	7 % ↓ 8 % max 7 % min	192.9 GB ↑ 193.2 GB max 192.2 GB min	12
■ <a href="#">172.16.248.41</a> 172.16.248.41:9300	Online	0 % ↓ 9.33 % max 0 % min	0.03 ↓ 0.49 max 0 min	32 % ↓ 33 % max 31 % min	193.1 GB ↑ 193.4 GB max 190.6 GB min	12
■ <a href="#">172.16.248.42</a> 172.16.248.42:9300	Online	0.33 % ↑ 11 % max 0 % min	0.52 ↑ 0.73 max 0 min	12 % ↓ 13 % max 11 % min	192.8 GB ↑ 193.2 GB max 191.0 GB min	12

UNUM Cluster Menu - Replacement Server Online

## Replace a Failed Cluster Server (cont'd)

### Primary Server Node Replacement

Follow the instructions provided above for **Data Server Node** replacement, however you will login to an existing **Data Server Node**.

**Note:** When the new **Primary Server Node** is inserted into the **Cluster** with already provisioned **Data Server Nodes** and their respective IP addresses match, the **Cluster** will form.

You must run a “**Restore Configuration**” from the “UNUM\_setup.sh” script located on the new **Primary Server Node** in the “/home/vcf” directory to restore previously stored data and configuration. On an UNUM Primary Server Node data is automatically backed up on a daily basis.

Select **Option 8: Advanced Settings - Restore Configuration**

### Restore Configuration

Select **Option 2** to restore your configuration.

Select the desired backup file from the list of Available Backups and follow the on-screen instructions.

**Note:** UNUM will be restarted during the process.

```
UNUM: Advanced Settings

0: Main Menu
1: Backup Configuration
2: Restore Configuration
3: Delete Backup
4: Enable|Disable Debug Mode

(0-4):2

Available backups: BACKUP-3.1.0-SNAPSHOT-2018-08-23_16:25:22
Enter the backup to restore from []: BACKUP-3.1.0-SNAPSHOT-2018-08-23_16:25:22
To restore configurations, UNUM will be restarted during the process.
Continue? ([Y]es or [N]o) [Yes]:
```

*Option 2 - Advanced Settings Restore Configuration*



## Replace a Failed Cluster Server (cont'd)

### Primary Server Node Replacement (cont'd)

```
UNUM: Advanced Settings

0: Main Menu
1: Backup Configuration
2: Restore Configuration
3: Delete Backup
4: Enable|Disable Debug Mode

(0-4):2

Available backups: BACKUP-3.1.0-SNAPSHOT-2018-08-23_16:25:22
Enter the backup to restore from []: BACKUP-3.1.0-SNAPSHOT-2018-08-23_16:25:22
To restore configurations, UNUM will be restarted during the process.
Continue? ([Y]es or [N]o) [Yes]: Yes
2018-08-23 16:33:29 Preparing to restore, please wait ...
2018-08-23 16:33:40 Downloading files .....
2018-08-23 16:34:06 Restoring database from /tmp/unum_backup/postgres-dump.sql ...
2018-08-23 16:34:15 Restore completed successfully.
2018-08-23 16:34:15 Stopping UNUM 3.1.0-SNAPSHOT ...
2018-08-23 16:34:17 Stopping vcf-elastic ...
2018-08-23 16:34:31 Stopping vcf-collector ...
2018-08-23 16:34:33 Stopping vcf-mgr ...
2018-08-23 16:34:40 Stopping skedler ...
2018-08-23 16:34:41 Stopping vcf-center ...
2018-08-23 16:34:42 Stopping vcf-dhcp ...
2018-08-23 16:34:43 Services have been successfully stopped.
2018-08-23 16:34:43 Starting UNUM 3.1.0-SNAPSHOT ...
2018-08-23 16:34:44 Starting vcf-elastic ...
2018-08-23 16:34:44 Starting vcf-collector ...
2018-08-23 16:34:46 Starting vcf-mgr ...
2018-08-23 16:34:46 Starting skedler ...
2018-08-23 16:34:47 Starting vcf-center ...
2018-08-23 16:34:48 Starting vcf-dhcp ...
2018-08-23 16:34:49 Services have been successfully started.
Press any key to continue ...
```

#### Option 2 - Advanced Settings Restore Process

When the **Data Server Node** (with data node VMs) is inserted into the Cluster with **Primary Server Node** and **Data Server Node** and the IP address matches the previous IP Address the auto provisioning begins and the **Cluster** will eventually form.

## Submitting a Service Request

---

### Pluribus Software Support

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

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

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

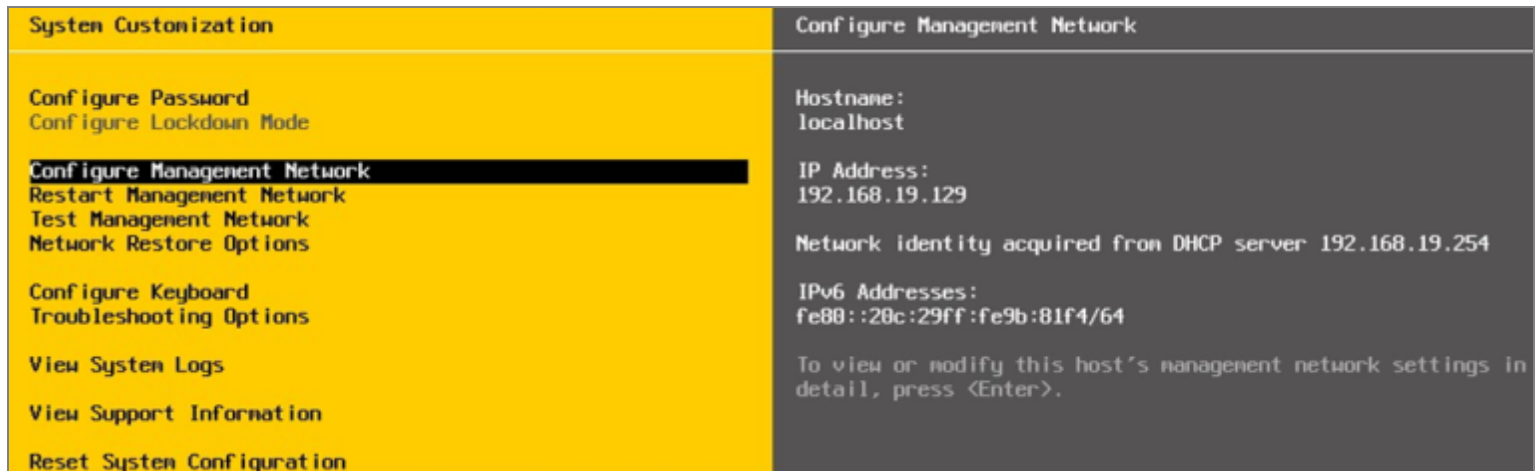
If you purchased a Pluribus FreedomCare maintenance agreement, you can contact [Pluribus Networks](#) directly for support requirements.



## Appendix A

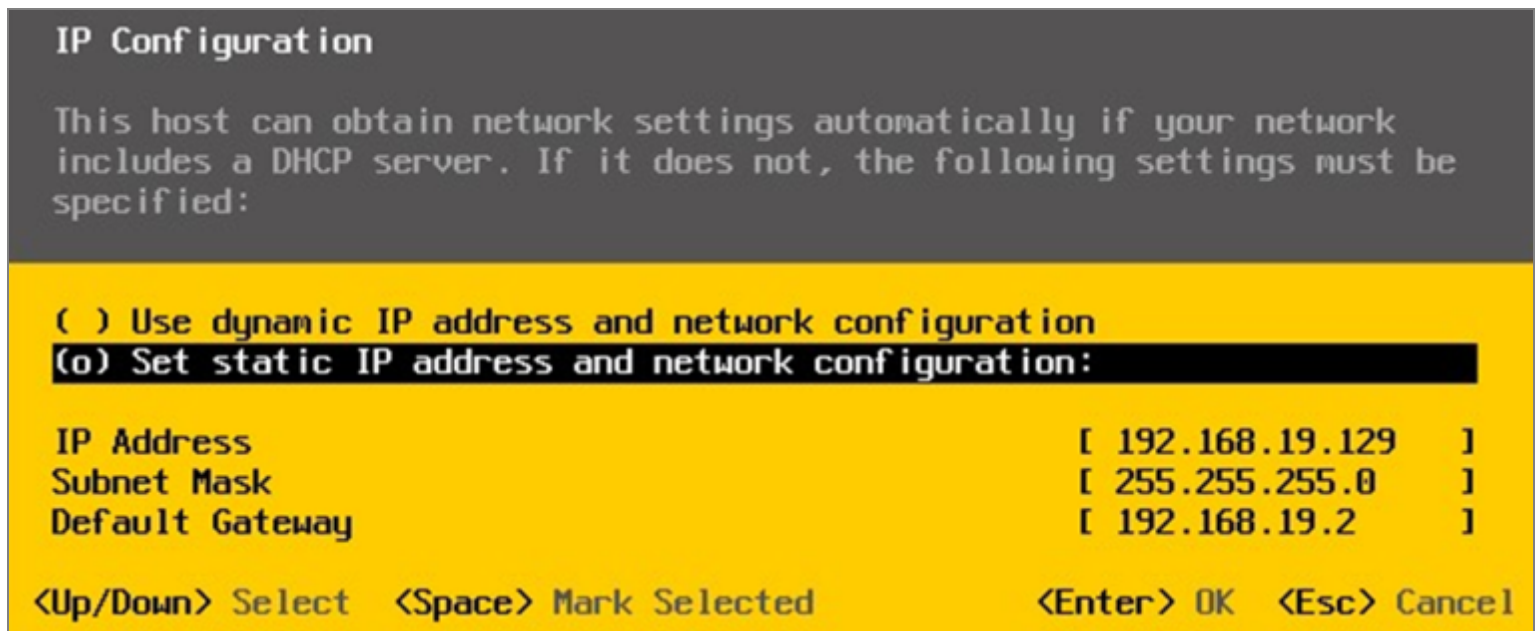
### Static IP Assignment for ESXi Management (eth0) Interface

1. Connect to the ESXi console and Press **F2** to log in to DCUI.
2. In the **System Customization** screen, move the cursor down and select **Configure Management Network**:



EXSI Management - Configure Management Network

3. Select **IP Configuration** and press **Enter** to assign an IP address:



EXSI IP Configuration

4. Select "Set static IP address and network configuration" and press **Enter**.

## Appendix A (cont'd)

- Now, you will be back on the **Configure Management** screen; scroll down to the DNS Configuration and press **Enter** to modify the DNS IP settings.
- You will be presented with the DNS configuration where you need to enter the DNS Server IP address and hostname. When you have finished entering the details, press **Enter**.

**DNS Configuration**

This host can only obtain DNS settings automatically if it also obtains its IP configuration automatically.

( ) Obtain DNS server addresses and a hostname automatically  
(o) Use the following DNS server addresses and hostname:

Primary DNS Server	[ 192.168.19.2 ]
Alternate DNS Server	[ ]
Hostname	[ ESXi1.test.local_ ]

<Up/Down> Select   <Space> Mark Selected   <Enter> OK   <Esc> Cancel

EXSI DNS Configuration

- Now, you will be back on the **Configure Management** screen. Scroll down to **Custom DNS Suffixes** and press **Enter** to change DNS suffixes.
- In **Custom DNS Suffixes**, modify the **suffixes** as required, press **Enter**:

**Custom DNS Suffixes**

DNS queries will attempt to locate hosts by appending the suffixes specified here to short, unqualified names.

Use spaces or commas to separate multiple entries.

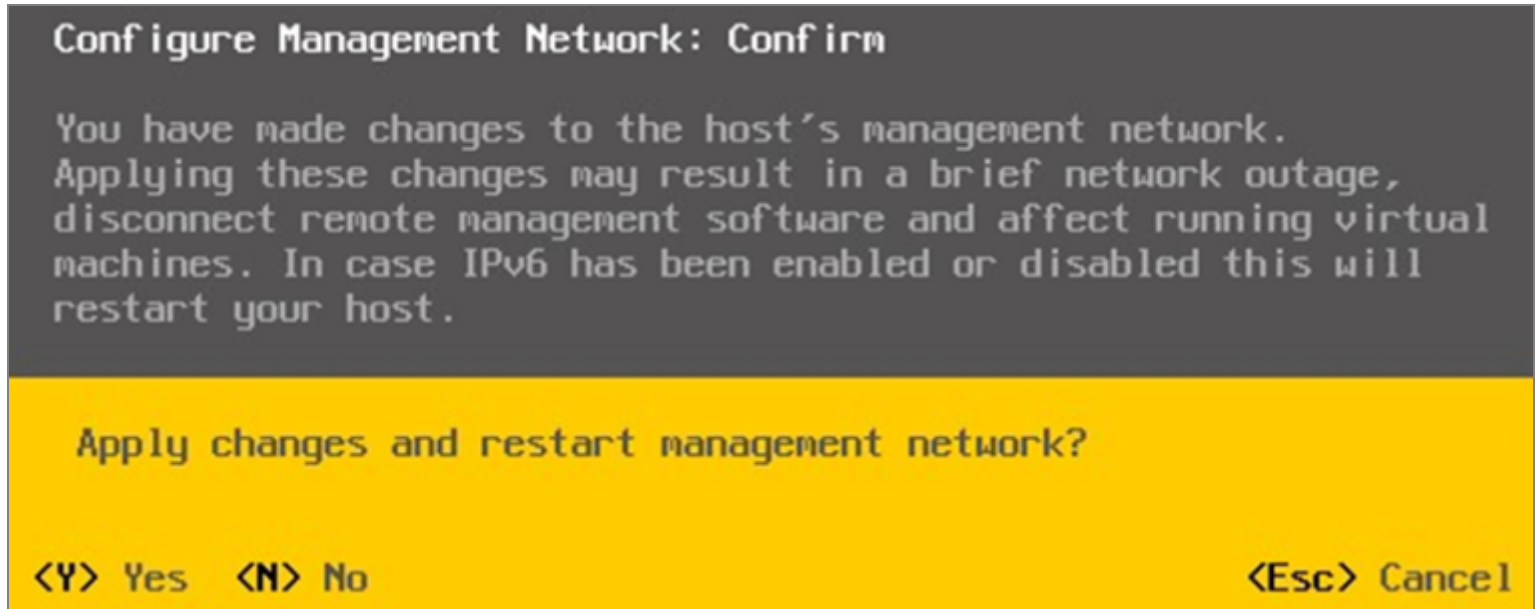
Suffixes: [ test.local\_ ]

<Enter> OK   <Esc> Cancel

EXSI Custom DNS Suffixes

## Appendix A (cont'd)

9. You need to save the configuration that has been changed, from the **Configure Management Network**, press **Esc** and you will be asked for confirmation on the **Configure Management Network** scene:



*ESXi Configure Management Network - Confirm*

10. Press **Y** to confirm the settings; this will save the settings and restart the management network.
11. If you want to make sure that the configuration is correct, from the **System Customization** screen you can perform the test management network operation. To proceed with the test, select **Test Management Network** and press **Enter**.
12. The ESXi host will try to ping the DNS servers and the default gateway and resolve the configured host name:

## Appendix A (cont'd)

### Test Management Network

By default, this test will attempt to ping your default gateway and DNS servers, and resolve your hostname.

```
Ping Address #0:      [ 192.168.19.2      ]
Ping Address #1:      [ 192.168.19.5_    ]
Ping Address #2:      [                  ]
Resolve Hostname      [ ESXi1.test.local ]

<Up/Down> Select          <Enter> OK  <Esc> Cancel
```

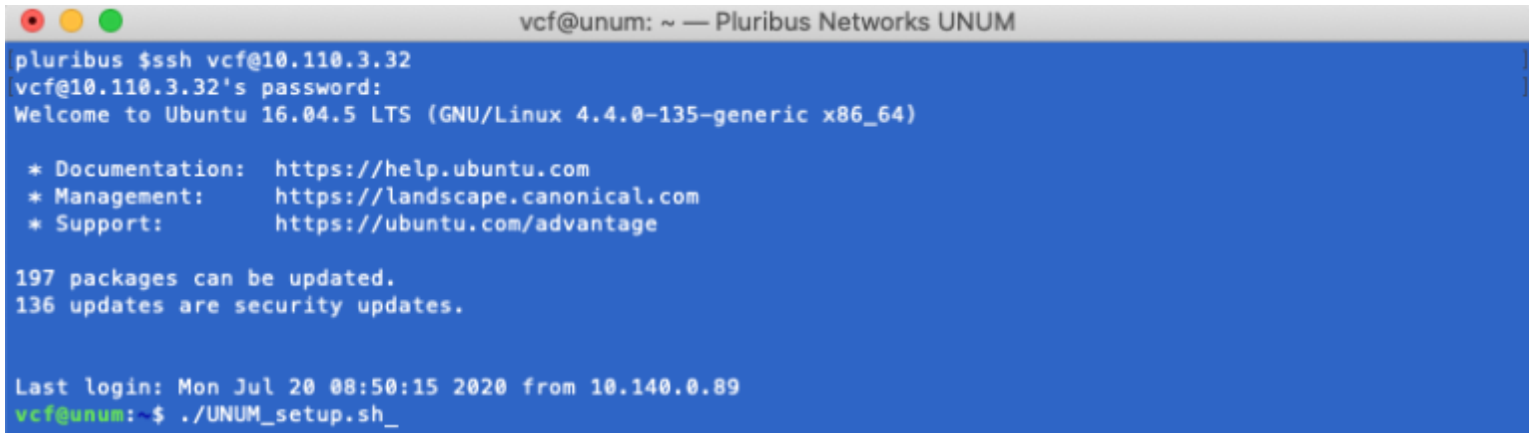
*ESXi Test Management Network*

13. Press **Enter** to proceed with the testing, and the test will show the status as **OK** or **Failed**. If you notice any failure, make sure that you have configured the correct settings.

## Appendix B

### Static IP Assignment Pluribus UNUM Management (eth0) Interface

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)

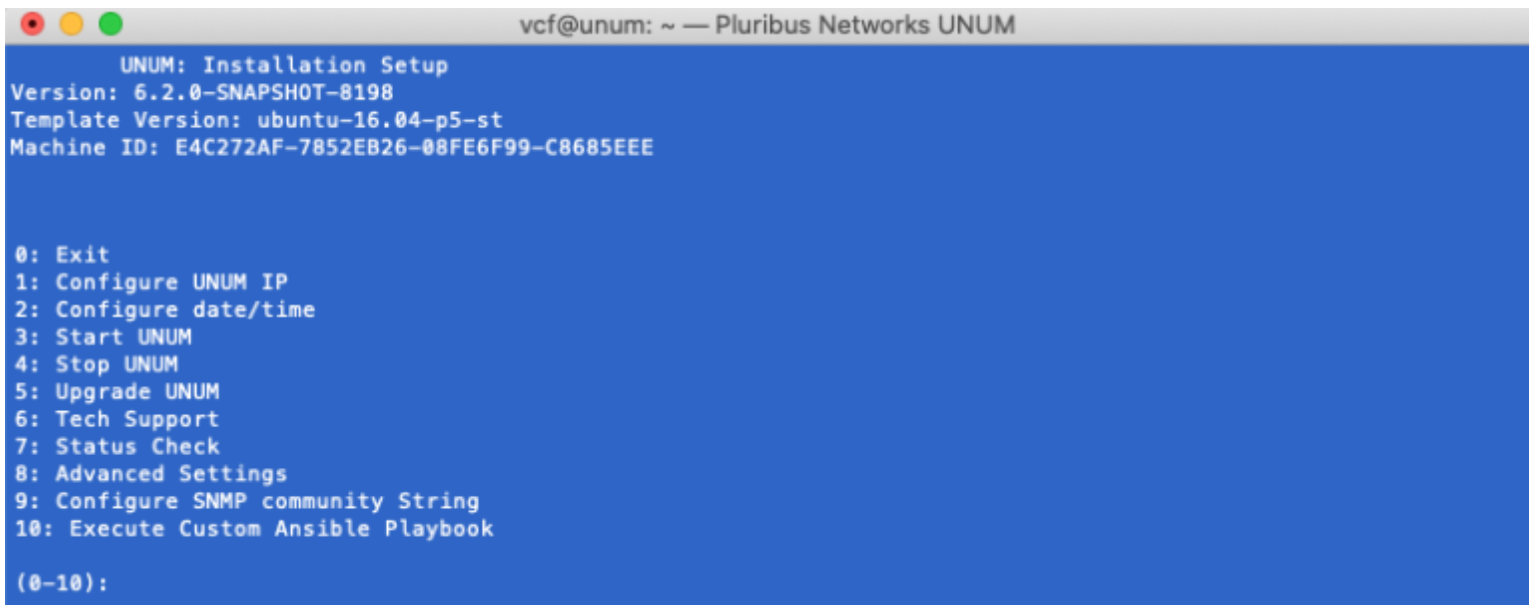
 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

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 B (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

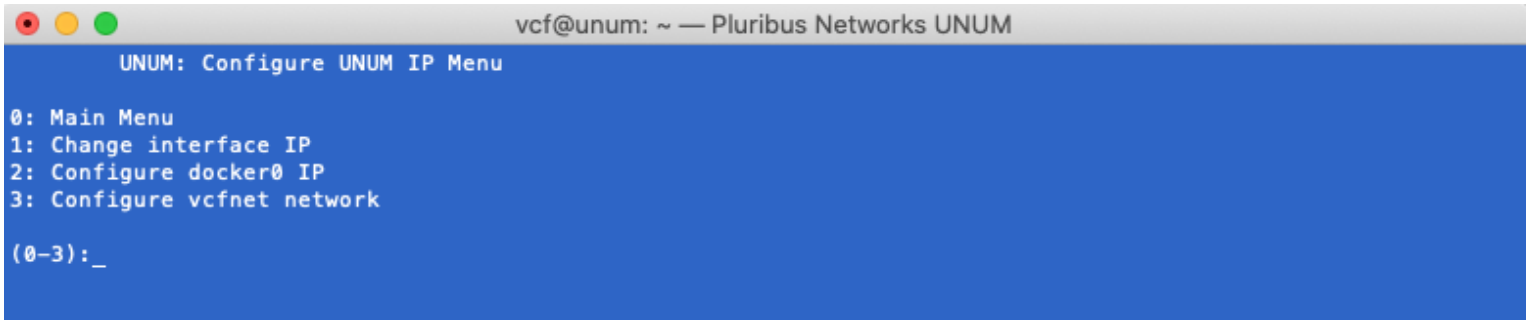
(0-10):1_
```

UNUM Options Menu - Configure IP

## Appendix B (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 B (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 as clustered UNUM VM instances **REQUIRE** a range of IP address settings for **Eth1** before normal operations begin.
- Eth1** is set to IP address 172.16.250.150/24 by default.
- WARNING!** If you change the IP addresses 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*



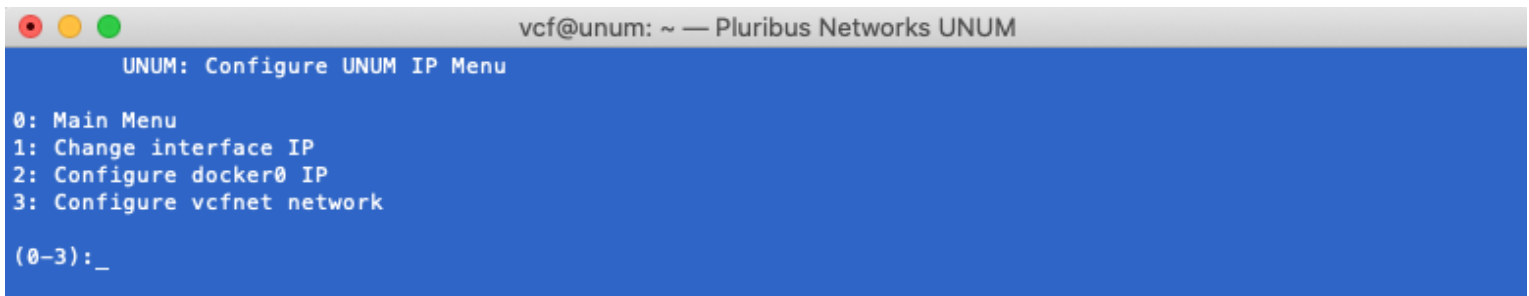
## Appendix B (cont'd)

### 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.

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

## Appendix B (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):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: ~$ 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 B (cont'd)

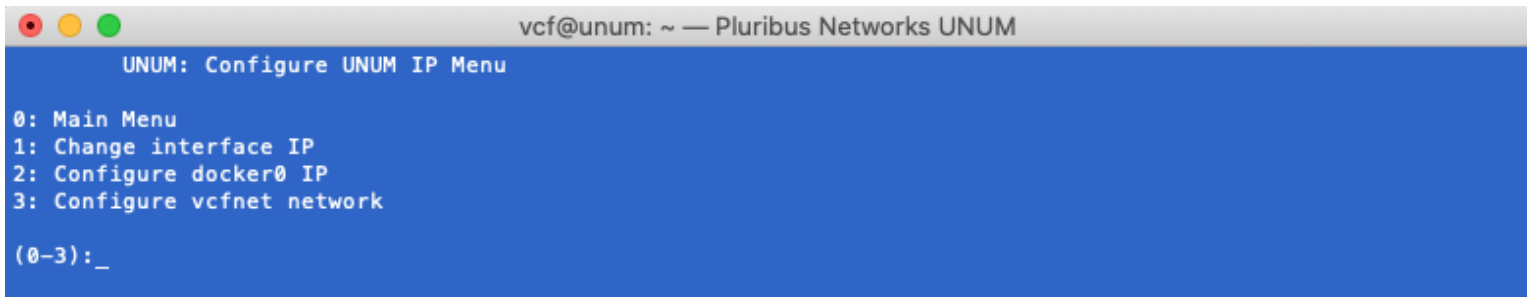
---

### 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.

## Appendix B (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):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.

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)

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### Corporate Headquarters

Pluribus Networks, Inc.  
5201 Great America Parkway, Suite 422  
Santa Clara, CA 95054

1-855-438-8638 / +1-650-289-4717

### India Office

Pluribus Networks India Private Limited  
Indique Brigade Square, 4th Floor  
21, Cambridge Road  
Bangalore 560008

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