



Hewlett Packard
Enterprise

HPE Alletra dHCI Deployment Guide for New Installations on Array OS 6.1.x and Later

Legal Notices

Copyright © 2019 - 2024 by Hewlett Packard Enterprise Development LP

Notices

The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Confidential computer software. Valid license from Hewlett Packard Enterprise required for possession, use, or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Links to third-party websites take you outside the Hewlett Packard Enterprise website. Hewlett Packard Enterprise has no control over and is not responsible for information outside the Hewlett Packard Enterprise website.

Hewlett Packard Enterprise believes in being unconditionally inclusive. If terms in this document are recognized as offensive or non-inclusive, they are used only for consistency within the product. When the product is updated to remove the terms, this document will be updated.

Acknowledgments

Intel®, Itanium®, Pentium®, Intel Inside®, and the Intel Inside logo are trademarks of Intel Corporation in the United States and other countries.

Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Adobe® and Acrobat® are trademarks of Adobe Systems Incorporated.

Java® and Oracle® are registered trademarks of Oracle and/or its affiliates.

UNIX® is a registered trademark of The Open Group.

All third-party marks are the property of their respective owners.

Publication Date

March 2024

Support

All documentation and knowledge base articles are available on HPE InfoSight at <https://infosight.hpe.com>. To register for HPE InfoSight, click the *Create Account* link on the main page.

Email: support@nimblestorage.com

For all other general support contact information, go to <https://www.hpe.com/us/en/services/nimble-storage.html>.

Contents

HPE Alletra dHCI Overview	7
Using This Document	8
Finding More Information	8
Setup Checklist	9
Setting up the System	11
Verifying Your Configuration	11
Deploying the HPE ProLiant Servers	11
Deploying Switches	12
Deploying the HPE Storage Arrays	12
HPE ProLiant Network Card Configuration	12
Cabling for Array OS Versions 6.0.0.0 and Later	13
HPE Alletra Storage Network Card Configuration	15
Server, Array, and Switch Cabling Example	16
Network Requirements for Configuring the Ethernet Switch	16
MTU	16
Flow Control	17
Jumbo Frame	17
VLAN	17
LLDP	18
Network Configuration Example for Using Peer Persistence	18
Installing and configuring dHCI	19
FQDN versus IP Addresses	19
DNS	19
NTP	19
iLO	19
DHCP Server	20
IP Address Range	20
Hardware iSCSI	21
VMware vCenter Server License	21
Firewall	21
ESXi Servers Discovery	21
Enable SSH	22
HPE Storage Connection Manager for VMware	22
Deploying dHCI	23

Discover the Array	23
Set Up dHCI for a New Environment	23
Initial Setup Using the HPE Alletra dHCI Setup Service	26
Download the HPE Storage Toolkit for Windows	26
Install the HPE Storage Toolkit for Windows on a Client	27
Discover the Array	28
Connect the Array to HPE GreenLake	29
Initialize the Array Using HPE Alletra Setup Service	30
Managing the HPE Alletra dHCI Solution	36
Add a New Server	36
Create a New VMFS Datastore	38
Grow a VMFS Datastore	39
Clone a VMFS datastore	39
Create a snapshot of a VMFS datastore	40
Create a vVol datastore	40
Using HPE GreenLake for Private Cloud Business Edition	42
Using HPE InfoSight with dHCI	42
The dHCI Dashboards on HPE InfoSight	42
Create an HPE Storage Account	43
Register Your HPE Storage Assets	43
Enable Streaming for HPE InfoSight and Cross-Stack Analytics	43
Appendix A: Configuration Worksheets	44
Appendix B: Resources for Automation	48
Appendix C: Configure Static IP Addresses on the ESXi Hypervisor	49
Appendix D: Configure Peer Persistence with dHCI	50
Limitations When Using Peer Persistence with dHCI	50
Network Configuration Example for Using Peer Persistence	50
Appendix E: Configure vSphere Enhanced Linked Mode with dHCI	51

HPE Alletra dHCI Overview

The HPE Alletra dHCI solution provided by Hewlett Packard Enterprise is a disaggregated hyperconverged infrastructure (HCI) platform that delivers the flexibility of converged infrastructure and the simplicity of HCI. It is a high availability, scalable solution that incorporates a range of products into a portfolio of repeatable and composable technologies.

This guide describes how dHCI combines HPE ProLiant servers with HPE arrays and HPE and Cisco switches to deploy and run a VMware vSphere environment. You can leverage this solution to support a variety of enterprise workloads:

- Datacenter server consolidation and cloud solutions
- Business-critical applications, such as Oracle, Microsoft, and SAP databases and applications
- Workforce-enablement applications, such as virtual desktop infrastructure (VDI), Microsoft Exchange Server, SharePoint Server, and Lync Server

The configuration covered in this deployment guide includes the following components:

- Storage: New HPE Storage all-flash or adaptive flash storage (for iSCSI only)
- Computing resources: New HPE ProLiant servers of the following supported models:
 - HPE ProLiant DL360 Gen10
 - HPE ProLiant DL360 Gen10 Plus
 - HPE ProLiant DL360 Gen11 *
 - HPE ProLiant DL380 Gen10
 - HPE ProLiant DL380 Gen10 Plus
 - HPE ProLiant DL380 Gen11 *
 - HPE ProLiant DL560 Gen10
 - HPE ProLiant DL580 Gen 10
 - HPE ProLiant DL325 Gen10
 - HPE ProLiant DL325 Gen10 Plus / Gen10 Plus v2
 - HPE ProLiant DL325 Gen11 *
 - HPE ProLiant DL365 Gen10 Plus v2
 - HPE ProLiant DL365 Gen11 *
 - HPE ProLiant DL385 Gen10
 - HPE ProLiant DL385 Gen10 Plus / Gen10 Plus v2
 - HPE ProLiant DL385 Gen11 *

* These servers require Array OS 6.1.2.0 or later.

- Hypervisor: VMware vSphere Hypervisor (VMware ESXi) 7.0 and 8.0 software

Note: For the most current list of supported products, refer to the *QuickSpecs for HPE Alletra dHCI* or the [Validated Configuration Matrix](#), which is available on HPE InfoSight.

This guide helps you understand:

- What you need to do to set up dHCI
- Basic instructions for setting up dHCI
- General information for using dHCI



Using This Document

This document provides examples of how you can set up your dHCI configuration. It includes information about setting up switches as well as installing and using dHCI.

Keep in mind that these are basic examples and overviews. Different configurations can require different set-up steps. You should always consult the documentation specific to your switches and other components.

You must tailor these instructions to your system. The examples provided can help guide you as you do that.

Finding More Information

The [Welcome Center](#) is the go-to portal for planning and executing deployment for HPE storage products, including HPE Alletra dHCI. This portal will guide you through the end-to-end process, from configuring your GreenLake account to rack, cabling, and deploying your storage solution.

The [HPE Alletra 6000, 5000, Nimble Storage Documentation Portal](#) on HPE InfoSight and the [HPE Support Center](#) contain numerous documents to help you set up dHCI to work with HPE Storage arrays.

Note: You can also find more information by logging on to HPE InfoSight and selecting **HPE Alletra 6000, Alletra 5000 Storage > Resources > Documentation**.

This guide focuses on deploying dHCI with new servers.

Note: These are general examples and overviews. They are not definitive examples because different configurations can require different setup steps. You should always consult the documentation specific to your switches and other components.

In addition to this document, you might want to review the following documents:

- [HPE Welcome Center](#)
- [HPE Alletra dHCI Solution Network Considerations Guide](#)
- [HPE Alletra dHCI Solution Security Guide](#)
- [HPE Integrated Lights Out \(iLO\) – Configuring the NIC Settings](#)
- [Getting Started with dHCI Guide](#)

For system requirements, refer to the [QuickSpecs for HPE Alletra dHCI](#) and the [Validated Configuration Matrix](#).

The [HPE Support Center](#) contains instructions and reference for iLO, HPE Aruba switches, HPE FlexFabric switches, and Cisco Nexus switches.

For details about dHCI components, such as switches or servers, refer to the documentation provided for those components.

Information about other resources is provided in [Appendix F: Resources](#) on page 52.



Setup Checklist

The following information serves as a checklist that you can use to confirm that everything is in place before you start the deployment.

Table 1: Setup checklist

Task	Section in this Guide	Comments
Configuration worksheet	Appendix A: Configuration Worksheets	Be sure to fill out your worksheets before starting deployment.
Solution cabling	15HPE Alletra Storage Network Card Configuration	Cabling is the source of the most common problems. Before deploying the solution, make sure that you have reviewed your cabling and that your solution is cabled appropriately. For more information, visit the HPE InfoSight Welcome Center.
LLDP	Network Requirements for Configuring the Ethernet Switch	Make sure that LLDP is enabled on your switch.
Switch Configuration	Network Requirements for Configuring the Ethernet Switch	The HPE Storage dHCI solution does not support LAN tagging for iSCSI and management traffic: • iSCSI traffic must be untagged for array and ESXi iSCSI interfaces. • Management traffic must be untagged for array, ESXi management interfaces, and iLO. • If you plan to use jumbo frames, you must configure them on your switch.
DNS/NTP	NTP	DNS and NTP are required for deploying the HPE Storage dHCI solution.
iLO	iLO	HPE dHCI only supports management of Proliant server configured with iLOs configured with Production security state. Proliant host Bios Setting needs to be configured with Workload Profile: Virtualization-Max Performance.
DHCP server	DHCP Server	A DHCP server is not required, but Hewlett Packard Enterprise strongly recommends that you use one. Each ESXi host and the iLO server must have temporary IP in the management VLAN in order to be discovered. If you do not have a DHCP server in the Management VLAN, you can manually configure a temporary IP address on each ESXi host. For more information, see Appendix C: Configure Static IP Addresses on the ESXi Hypervisor If there is no DHCP server, the array may be discovered by its serial number or automatically assigned 169.254.x.x IP address.



ESXi servers discovery	<u>ESXi Servers Discovery</u>	The array uses SLP to discover the ESXi servers. If no servers are discovered during deployment, make sure that: • IGMP snooping is turned off on the dHCI-management VLAN of the switches. • Each ESXi host has an IP address on the management VLAN. • You have not cabled any 1 Gb ports on ESXi hosts for the deployment. • The VMNIC for the management interface is the first port connected at 10 Gb. Afterward, restart the SLP server on each ESXi host.
Firewall	<u>Firewall</u>	If you are using an existing vCenter, ensure that the firewall rules allow the following types of communication: • HPE Storage array communication to vCenter through port 443 • vCenter communication to the HPE Storage array through port 443 vCenter communication with ESXi Management traffic (for more information, see VMware KB).



Setting up the System

To prepare for deployment and then deploy the solution, you must complete the following tasks:

- Understand the physical infrastructure layout.
- Verify that your system meets the dHCI requirements.
- Fill out the configuration worksheets.
- Configure the network.
- Deploy the dHCI solution:
 - Initialize and configure the HPE arrays.
 - Deploy a new VMware vCenter Server instance or use an existing VMware vCenter Server when you are creating a new dHCI configuration.
 - Add HPE ProLiant servers into the dHCI environment.
 - Create a VMware vSphere Virtual Machine File System (VMFS) or VMware vSphere Virtual Volumes (vVols).

Keep in mind:

- HPE supports the use of iLO dedicated and shared ports.

Verifying Your Configuration

Before you set up dHCI, it is a best practice to verify your configuration.

You can use the *QuickSpecs for HPE Alletra* dHCI to verify your configuration.

In addition, the HPE Storage [Validated Configuration Matrix](#) on HPE InfoSight also contains information about supported configurations and infrastructure components used in the solution and described in this document, including specific software and firmware versions.

After you install dHCI, you can use the One-Click Update feature included with it to automatically update the Array OS, ESXi, HPE Storage Connection Manager for VMware, and Service Pack for ProLiant (SPP) when new versions of those components are available. The dHCI catalogs provide information about the supported software versions. Instructions for using One-Click Update are in *Getting Started with dHCI*.

Deploying the HPE ProLiant Servers

The [HPE Support Center](#) provides information about site requirements, installation instructions, and other general reference materials for HPE ProLiant Servers.

Note: Although this guide does not cover iLO shared connections, HPE supports the use of an iLO shared connection instead of an iLO dedicated port. For more information, see *HPE Integrated Lights Out (iLO) – Configuring the NIC Settings*, which is available from the [HPE Support Center](#) website.



Deploying Switches

The [HPE Support Center](#) contains site requirements, installation instructions, and reference materials for the following switches:

- HPE M-Series
- HPE Aruba 83xx and 6300
- HPE FlexFabric 57x0 and 594x Series

When deploying network switches, follow switch manufacturer documentation. For information on network requirements, best practices, and supported topologies, please refer to the *HPE Alletra dHCI Networking Considerations Guide*. For HPE Alletra dHCI deployment guidance on M-Series and Aruba switches, please refer to those *HPE Alletra dHCI Switch Configuration Guides*.

Network switches must be configured prior to deploying HPE Alletra dHCI.

If you are using third party switches refer to the switch manufacturer website for site requirements, installation instructions, and reference materials. For information on HPE Alletra dHCI networking requirements and best practices, please refer to the *HPE Alletra dHCI Solution Network Considerations Guide*.

Additional information and examples for configuring HPE M-Series switches can be found in the [HPE Alletra dHCI Switch Configuration Guide - M-Series Switches](#).

Additional information and examples for configuring HPE Aruba 832X and 6300 switches can be found in [HPE Alletra dHCI Switch Configuration Guide - Aruba 832x and 6300](#).

Deploying the HPE Storage Arrays

The [Welcome Center](#), the [HPE Alletra 6000](#), [Alletra 5000](#), [Nimble Storage Documentation Portal](#), and [HPE Support Center](#) contain information to help you deploy and work with HPE Storage arrays. You can find site requirements, installation instructions, and other general reference materials on the portal.

If you are using an HPE Alletra array and Data Services Cloud Console, you must set up a cloud account. Information about setting up a cloud account for Data Services Cloud Console can be found in the [GreenLake Edge-to-Cloud Platform User Guide](#) on HPE Support Center.

HPE ProLiant Network Card Configuration

You must follow the dHCI cabling methodology when you set up the HPE ProLiant network card configuration.

Note: The *QuickSpecs for HPE Alletra dHCI* contains the most current information about supported HPE ProLiant DL server models.

When you deploy HPE Alletra dHCI, the stack setup wizard configures the compute nodes so that the first 4 network ports that are 10Gbps or faster and are connected will be configured for management and iSCSI traffic. HPE recommends that all the ports be configured to the same speed. If more than 4 NIC ports are present, only those ports to be used for management and iSCSI should be connected during deployment. Additional NIC ports can be connected and configured post stack setup.

The ProLiant DL servers discover the network cards based on the server model. Models that use a FlexLOM card discover that FlexLOM card before discovering any of the installed PCI network cards. Models that use OCP cards discover those cards after discovering all other installed PCI cards. This means that all PCI slots will be enumerated in order, followed by the OCP slots in order. HPE ProLiant Gen10+ servers have varying PCI slot counts depending on specific server model and options, and one OCP slot. HPE ProLiant Gen11 servers also have varying PCI slot counts depending on specific server model and options, and have up to two available OCP slots.

As an example, if a ProLiant DL380 Gen11 has NICs in PCI slots 1 and 4 as well as in OCP slots 1 and 2 the enumeration order will be:

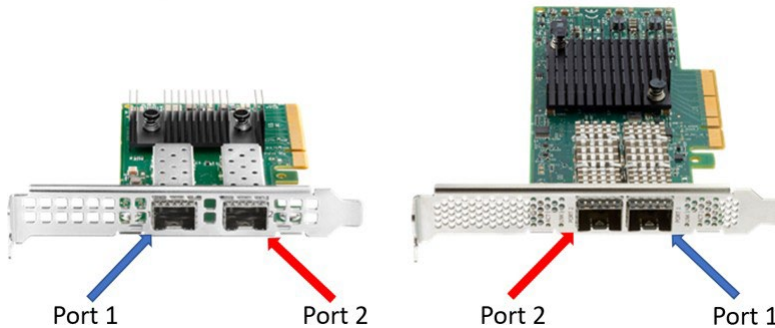
1. PCI slot 1 NIC
2. PCI slot 4 NIC
3. OCP slot 1 NIC

4. OCP slot 2 NIC

The network card ports are discovered and enumerated based on the models of network cards that are installed. The physical order of ports varies by network interface card. The ports should be discovered in the order in which they are labeled.

Because the order of the ports on a NIC can vary from model to model, you should record the specific port labeling to ensure that you cable it correctly. For example, compare the port order on the following two 10/25 GbE NICs:

Figure 1: Example of port differences on 10/25 GbE NICs



Cabling for Array OS Versions 6.0.0.0 and Later

When dHCI is deployed on an array running release 6.0.0.0 or later, the stack setup assigns ports 1 and 3 for **Management** and ports 2 and 4 for **iSCSI 1** and **iSCSI 2**.

The following tables provide information about the default port assignments and the switch they must connect to. This information depends on the server generation.

Table 2: HPE ProLiant DL Server Port Assignment for Array OS Versions 6.0.x and Later

Port Order	Role	Switch
Port 1	Management	Switch A
Port 2	iSCSI 1	Switch A
Port 3	Management	Switch B
Port 4	iSCSI 2	Switch B

Table 3: HPE ProLiant DL Server Port Assignment Example

Network Card and Port	Port Order	Role	Switch
PCI NIC Port 1	Port 1	Management	Switch A
PCI NIC Port 2	Port 2	iSCSI 1	Switch A
OCP Port 1	Port 3	Management	Switch B
OCP Port 2	Port 4	iSCSI 2	Switch B

Figure 3: Example of Port Assignments for HPE ProLiant DL Gen10 Plus Servers

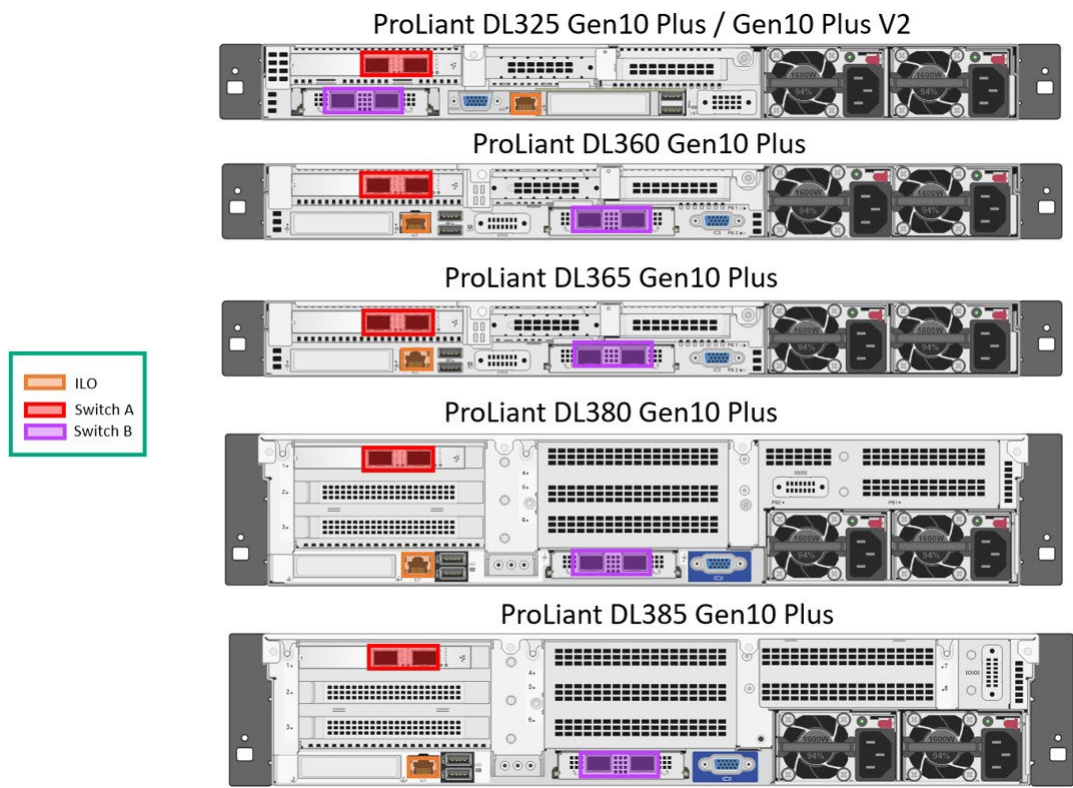
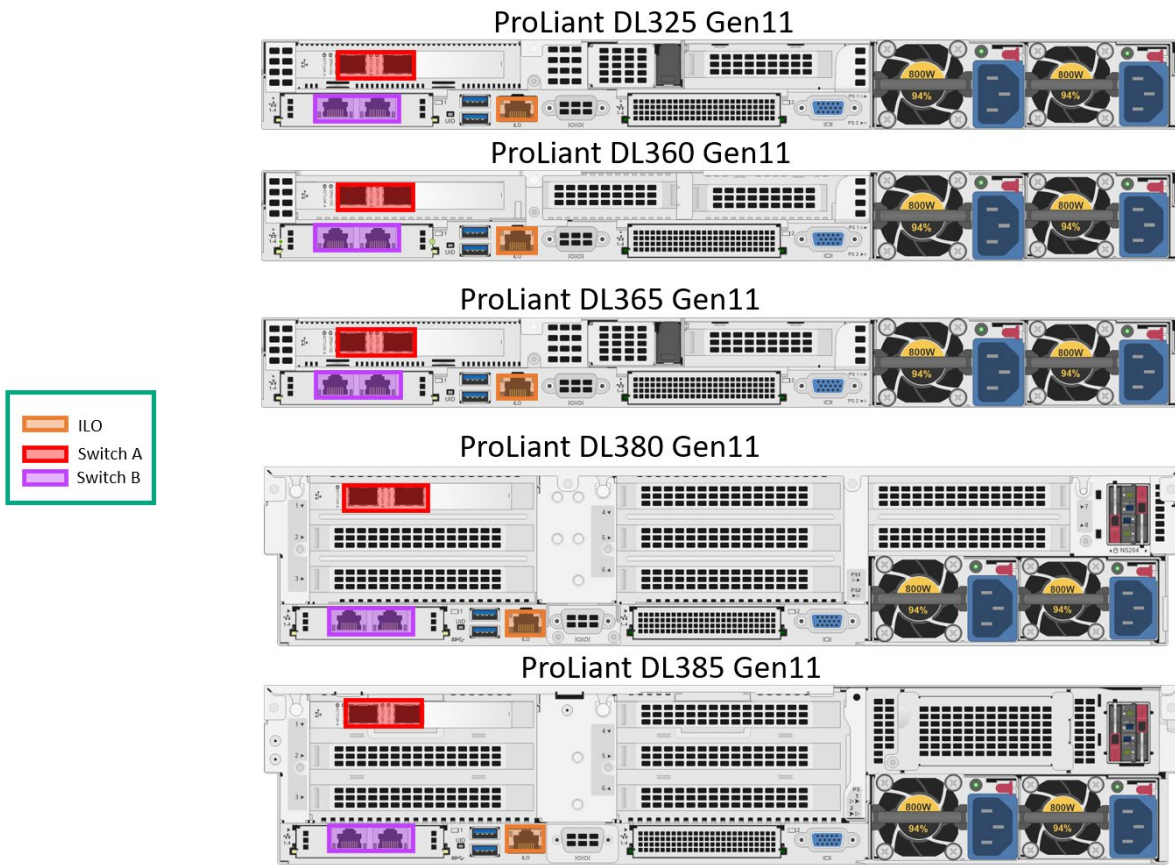


Figure 4: Example of Port Assignments for HPE ProLiant DL Gen11 Servers with NICs in PCI slot 1 and OCP slot 1



In the ProLiant DL Gen 11 figures, the network cards are in PCI slot 1 and OCP slot 1. However, there is not a requirement for the network cards to be in these specific slots. It is important that you carefully plan which ports on which NICs will be connected to ensure maximum resiliency. There must be at least two network cards installed per server.

If the discovered 10Gbps+ cards have more than two ports, **only two ports on each of the two cards should be connected at the time of deployment**. The best practice is to connect only the two ports on each of the two cards that are intended to be used for management and iSCSI traffic by the dHCI system. Any additional 10Gb ports beyond the first four are not configured during deployment, but you can configure them after you deploy dHCI.

dHCI does not support deployment on 1 Gbps ports on the server NICs. These ports will be ignored if they are active. These ports can be configured post deployment for VM networks if desired.

Note: When adding servers to an existing dHCI deployment, the original cabling schema is used. This means that, if the OS version on the array when dHCI was deployed was prior to 6.0.0.000 and you update the OS version to 6.1.x or later, dHCI will use the pre-6.0.0.0 cabling methodology.

HPE Alletra Storage Network Card Configuration

You must make sure your HPE Storage network card is correctly configured for the Management (**MGMT**) and **iSCSI 1** and **iSCSI 2** ports.

The **MGMT** and **iSCSI** ports are shown in the following figures. Your array might differ from the ones shown. The installation guide for your array provides instructions for cabling.

Note: The [HPE Alletra 6000](#), [Alletra 5000](#), [Nimble Storage Documentation Portal](#) on HPE InfoSight and the [HPE Support Center](#) contain the installation guides and numerous other documents to help you as you set up dHCI to work with HPE Storage

Figure 4: An example of an HPE Alletra 6000 array with two 10 Gbps iSCSI ports on each controller

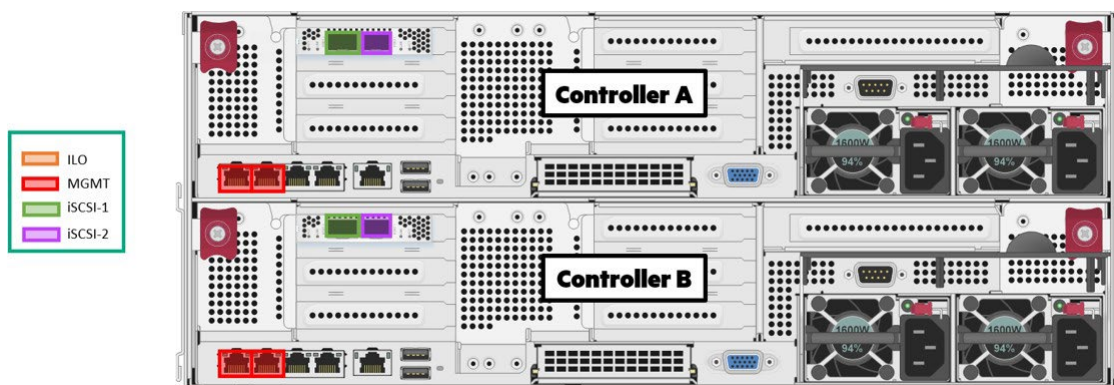
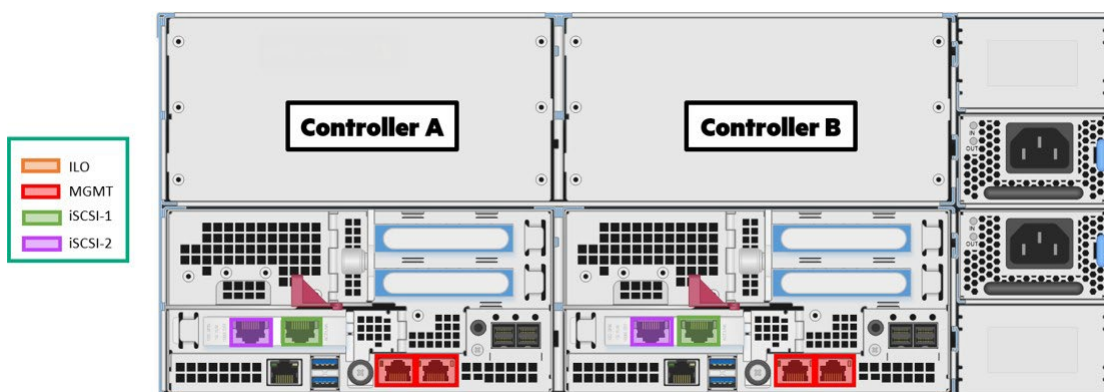


Figure 5: An example of an HPE Alletra 5000 array with two 10 Gbps iSCSI ports on each controller

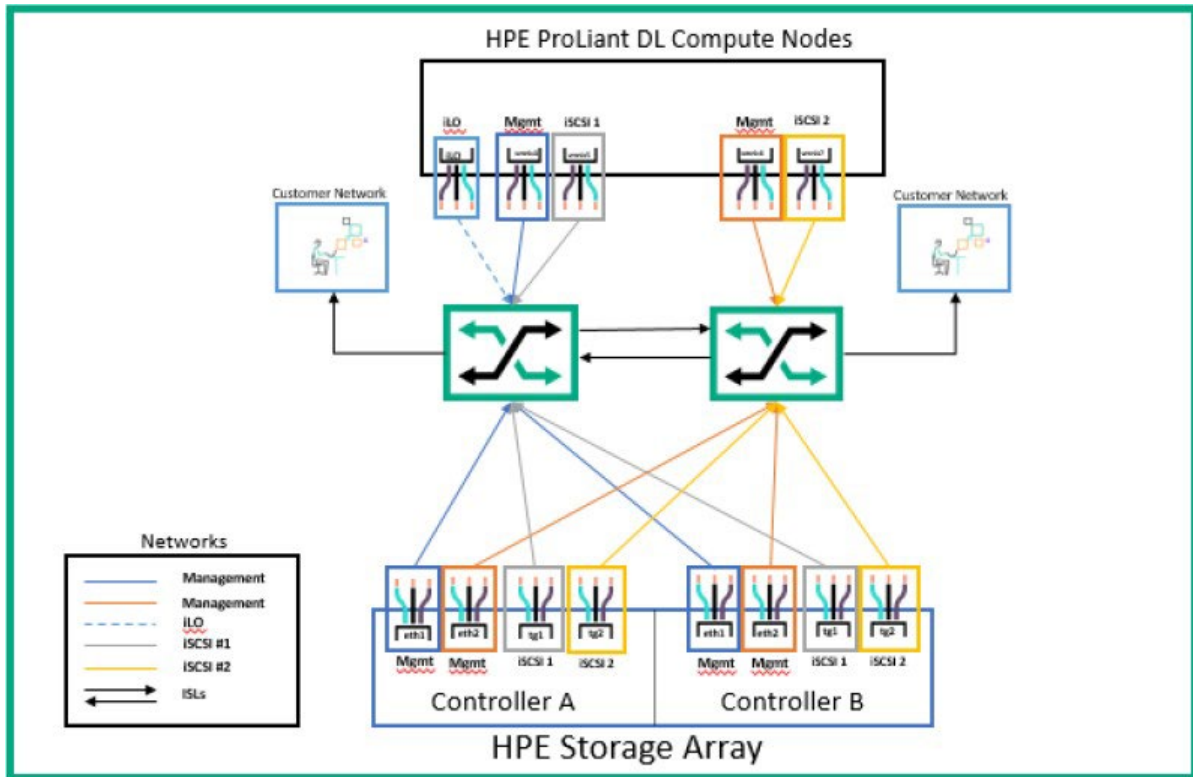


Server, Array, and Switch Cabling Example

Use the methodology shown in the following figure to cable your HPE ProLiant server, HPE Storage array, and network switch.

Additional configuration examples are in the *HPE Alletra dHCI Solution Network Considerations Guide*, which is available on the Documentation Portal on HPE InfoSight.

Figure 7: Logical cabling example: HPE ProLiant server with four 10 Gbps ports



Network Requirements for Configuring the Ethernet Switch

While different Ethernet switches can have different requirements, in general you must set up the following features:

- Maximum transmission unit (MTU)
- Flow control
- Jumbo frames
- VLAN
- Link Layer Discovery Protocol (LLDP)

MTU

Many switches define MTU differently from the way the initiator or target defines it. Switches often define MTU as the frame size. End hosts almost universally define MTU as the packet size. The configured frame size on the switch might need to be larger than the packet size or the MTU value defined on the host and the array. For example, a value of 9000 on the host might require a value of 9014 or higher on the switch. This difference might vary by manufacturer.

Setting the switch MTU value to a number that is higher than the MTU value on the host or initiator does not cause problems. The switch MTU setting causes problems only when the MTU value on the intermediate device (the switch) is set to a number that is lower than the MTU value on one or both end devices.

Flow Control

Flow control provides a mechanism for temporarily pausing the transmission of data on Ethernet networks if a sending node transmits data faster than the receiving node can accept it. Whenever possible, you should enable flow control on all host, switch, and array ports to ensure graceful communication between network nodes. HPE Storage array network interface cards (NICs) support flow control by default.

Jumbo Frame

Ethernet frames that transport data are typically 1500 bytes in size. Anything over 1514 bytes (or 1518 with VLAN tagging) in the Ethernet frame is typically referred to as a jumbo frame. Jumbo frames are generally better suited to handle the flow of iSCSI SAN traffic. They typically consist of 9000-byte frames. Enabling jumbo frames can help to improve storage throughput and reduce latency.

HPE recommends using jumbo frames with new server deployments of dHCI.

VLAN

dHCI requires at least three VLANs:

- A management VLAN

The management VLAN must be the native VLAN in the trunk port (untagged). This VLAN will carry management traffic and optionally, iLO traffic.

- Two iSCSI VLANs

You should have one per switch. The best practice is to use two different VLANs for iSCSI traffic:

- One VLAN should map to one 10 Gbps port of your server.
- The other should map to the second 10 Gbps port.

- Optional: iLO VLAN

If desired, a separate VLAN can be configured for iLO traffic, otherwise, iLO and management traffic will be on the same VLAN. If iLO is on a separate VLAN, it must be accessible by the array management ports via port 443.

If your server has four 10 Gbps ports, dedicate two ports to the use of iSCSI traffic only. These two ports should be configured in access mode (no VLAN tag). Each port should map to one VLAN only. Configure the iSCSI VLANs in access mode only (no VLAN tag).

Table 2: VLAN Requirements

VLAN Description	VLAN ID	VLAN /Mode	Note
Management/vMotion	mgmt_vlan	mgmt_vlan = native	Management/vMotion VLAN must be the native VLAN.
iSCSI 1 IP address range	iscsi1_vlan	iscsi1_vlan = access	Native VLAN only
iSCSI 2 IP address range	iscsi2_vlan	iscsi2_vlan = access	Native VLAN only
VM network	vm_network	vm_network = trunk	VM Network can be trunked on the Management interface.
iLO Network	ilo_vlan	ilo_vlan = access	Optional VLAN. Only required if Split Management is selected during deployment; that is a separate management network for iLO.

LLDP

Link Layer Discovery Protocol (LLDP) must be enabled on each switch. dHCI uses LLDP during deployment to verify your environment.

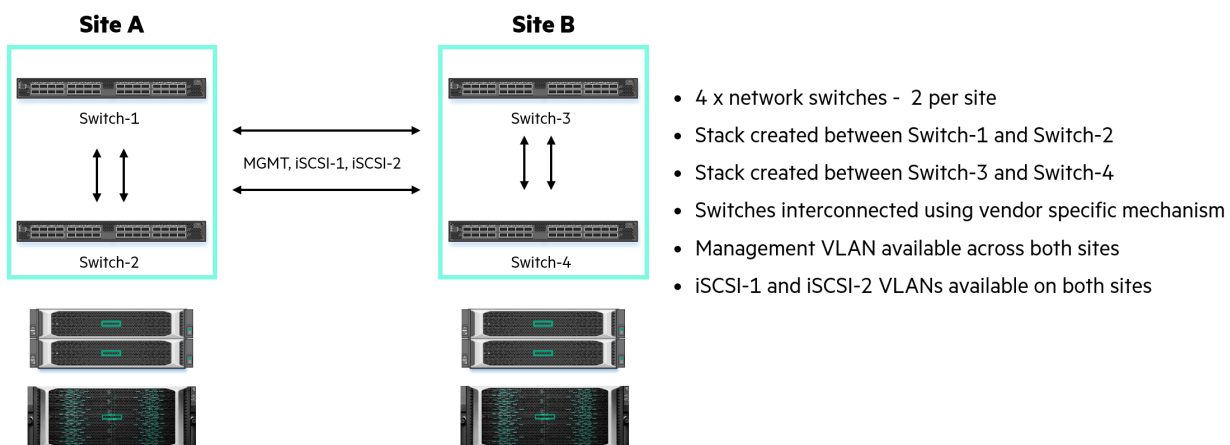
Network Configuration Example for Using Peer Persistence

Before you deploy dHCI, you must complete the network configuration between your sites. Peer Persistence with dHCI requires that you configure the Management VLAN and both iSCSI VLANs so that they are available between the two solutions.

Your networking configuration should be like the one shown in the following figure. Both arrays must be dHCI enabled arrays for a Peer Persistence relationship in dHCI.

For more detailed information on deploying and configuring Peer Persistence, please refer to the *HPE Alletra 5000 and 6000 Peer Persistence guide*.

Figure 8: Network Configuration Example



Installing and configuring dHCI

Installing and configuring dHCI involves multiple steps. The sections that follow provide information about different steps.

It is good practice to complete the configuration worksheet before deploying dHCI to a new or existing installation. The configuration worksheet contains lists of values that are required to complete the tasks described in this deployment guide. You can expand the worksheets in [Appendix A: Configuration Worksheets](#) on page 44 as needed for your configuration. The [Welcome Center](#) will also guide you through the deployment process with examples and links to relevant documentation.

Note: Before starting the deployment, review the requirements. The Setup Checklist on page 9 provides information about the requirements.

During deployment, dHCI verifies the ESXi server configuration to confirm that your environment is configured properly.

FQDN versus IP Addresses

It is important that all components deployed in dHCI have proper forward and reverse DNS entries entered in the network's DNS server.

The examples in this guide assume that your dHCI site has a DNS server and that you will modify the server to accommodate dHCI.

You can also deploy and configure a DNS server just for dHCI; however, those steps are not documented in this guide.

You can enter either a component's IP address, a DNS name, or a fully qualified domain name (FQDN).

HPE recommends that you use the FQDN of the components whenever possible.

Note: This information applies to setting up your vCenter. If you want to use an FQDN with your server, you must enter the FQDN instead of an IP address when you set up the server. You cannot go back later and change the server designation from an IP address to an FQDN.

DNS

Use the same DNS server across the servers and the HPE Storage array configuration to ensure that all relevant host names resolve to the same IP addresses.

NTP

Use the same NTP server across the servers and the HPE Storage array to ensure that the time is set the same for all components.

iLO

HPE dHCI only support management of Proliant server configured with iLOs configured with Production security state.

Proliant server needs to be configured with Bios Setting - Workload Profile: Virtualization-Max Performance.

From Array OS 6.1.100 and above, iLO dHCI user account, prostack_admin, is required for dHCI administration of iLO. This user account is pre-configured on new dHCI server. prostack_admin user requires all privileges and configured with default password of Prostack123!

DHCP Server

The best practice when deploying dHCI is to include a DHCP server in the management VLAN. You only need this for the initialization of the dHCI solution. After you deploy dHCI, you can remove the DHCP server from the management VLAN.

You should already have a DHCP server that you can use for dHCI at the dHCI deployment site.

Note: If you do not want to use a DHCP server, you can just configure the temporary, static IP addresses for the ESXi hosts before you deploy dHCI. The Windows Storage Toolkit can be utilized to discover the array via its serial number or automatically assigned 169.254.x.x IP address. For more information about configuring static IP addresses, see [Appendix C: Configure Static IP Addresses on the ESXi Hypervisor](#) on page 97 *Appendix C: Configure static IP addresses on the ESXi Hypervisor*. Both static IP addresses and IP addresses from DHCP servers are temporary. New IP addresses are assigned during deployment.

IP Address Range

During deployment, you must provide at least three different ranges of IP addresses. The number of servers in your environment determines the number of contiguous IP addresses that are needed in each range.

Use the following table to determine how many contiguous IP addresses are needed.

Table 2: IP Address Ranges

IP Address Range	Description	Variable	VLAN	Number of Contiguous IP Addresses
Management IP address range		<mgmt_ip_range>	mgmt_vlan	Depending on the deployment mode, each HPE ProLiant server requires two IP addresses: - One for iLO (if iLO is on the same subnet) - One for the ESXi management interface
iSCSI 1 IP address range		<iscsi1_ip_range>	iscsi1_vlan	Each HPE ProLiant server requires one IP address.
iSCSI 2 IP address range		<iscsi2_ip_range>	iscsi2_vlan	Each HPE ProLiant server requires one IP address.
iLO IP address range (optional)		<iilo_ip_range>	iilo_vlan	Depending on the deployment mode, each HPE ProLiant server requires an IP address for iLO.

The following example shows how to determine the number of IP addresses needed for a dHCI solution with six HPE ProLiant servers with management and iLO on the same network:

- **Management and iLO IP address range:** 6 HPE ProLiant servers × 2 IP addresses = 12 contiguous IP addresses in the management range
- **iSCSI 1 IP address range:** 6 HPE ProLiant servers × 1 IP address = 6 contiguous IP addresses in the iSCSI 1 range
- **iSCSI 2 IP address range:** 6 HPE ProLiant servers × 1 IP address = 6 contiguous IP addresses in the iSCSI 2 range

The following example shows how to determine the number of IP addresses needed for a dHCI solution with six HPE ProLiant servers with management and iLO on different networks:

- **Management address range:** 6 HPE ProLiant servers × 1 IP address = 6 contiguous IP addresses in the management range
- **iLO address range:** 6 HPE ProLiant servers × 1 IP addresses = 6 contiguous IP addresses in the iLO range
- **iSCSI 1 IP address range:** 6 HPE ProLiant servers × 1 IP address = 6 contiguous IP addresses in the iSCSI 1 range
- **iSCSI 2 IP address range:** 6 HPE ProLiant servers × 1 IP address = 6 contiguous IP addresses in the iSCSI 2 range

Hardware iSCSI

HPE does not currently support using the iSCSI offload functionality on HPE FlexFabric adapters with HPE arrays. To establish iSCSI communication, the dHCI solution creates the VMware iSCSI initiator on each host as part of the deployment.

VMware vCenter Server License

HPE Alletra dHC requires a minimum of a VMware vCenter Server Standard license and a VMware vSphere Standard license. The dHCI One-Click update feature uses VMware DRS to migrate virtual machines. DRS is included as part of the VMware vSphere Enterprise Plus license. If VMware DRS is available and enabled, the dHCI One-Click Update process will leverage DRS to migrate virtual machines during the host update process. If DRS is not present or enabled, you will be prompted to manually migrate virtual machines during the host update process.

Note: Support for manually migrating VMs during One-Click Updates was introduced in Array OS 6.1.2.000. This enables updates to function with a minimum of vSphere Standard licensing. During the update process, you will be prompted at the start of each server being updated, to migrate the virtual machines off that server. This process will be repeated for each server until the entire cluster is updated. This does require you to periodically check the status during the hypervisor update process.

Firewall

If you plan to use an existing vCenter, make sure that all firewall ports are open for communication between your existing vCenter to your new vSphere ESXi servers.

Note: For more information, see the VMware KB article *Required ports for configuring an external firewall to allow ESX/ESXi and vCenter Server traffic (1005189)*.

Make sure that your firewall allows communication in both directions:

- HPE array communication to the vCenter instance through port 443 and port 8443
- VMware vCenter communication to the HPE Storage array through port 443 and port 8443
- HPE array communication to ESXi over SSH port 22
- iLO communication to the array through port 443

ESXi Servers Discovery

The array uses Service Location Protocol (SLP) to discover the ESXi servers. By default, SLP should be running on all ESXi hosts without any user interaction. However, you might need to enable multicast on switches.

To enable multicast, use the following commands to disable IGMP snooping on the dHCI-management VLAN of the switch.

- Cisco switches. By default, IGMP snooping is turned on.

```
configure terminal
vlan 100
no ip igmp snooping
do write memory
```

- FlexFabric switches. By default, IGMP snooping is turned off.

```
system-view
# display igmp-snooping
# vlan 100
# undo igmp-snooping enable
# quit
# save
```

If no servers are discovered during deployment, take the following steps:

- 1 Make sure that IGMP snooping is turned off on the dHCI-management VLAN of the switches.
- 2 Make sure that each ESXi host has an IP address on the management VLAN.
- 3 Make sure you have not cabled any 1 Gb ports on ESXi hosts for the deployment. (They can be used after deployment.)
- 4 Make sure that the VMNIC selected for the management interface is the first port connected at 10 Gb:
 - a. From the server console, press F2 and log in as root using the default password.
 - b. Select the Configure Management network.
 - c. Select Network adapters.
 - d. Change the adapter to the first 10 Gb port (by pressing the space bar to add or remove adapters).
 - e. Press Enter, press ESC, and apply the setting.
- 5 Restart the SLP server on each ESXi host:
 - a. Log in as root and enter root as the default password.
 - b. Run **/etc/init.d/slpd restart**.

Note: If it is not possible to enable SLP or disable IGMP snooping due to security requirements, the servers can be manually specified during deployment using their temporary IP addresses.

Enable SSH

You **must have SSH enabled on each ESXi host**. SSH is used for deployment and post deployment management by the dHCI stack.

Procedure

1. On the ESXi host, select **Manage**.
Leave the default selections for all the other settings.
2. Select **Security Profile**.
3. In the **Services** section, select **Edit**.
4. Select **SSH**.
5. Select **Start**.
6. Select **OK**.

HPE Storage Connection Manager for VMware

HPE ProLiant DL servers ordered as part of an HPE Alletra dHCI will be configured with HPE Storage Connection Manager in the factory. If repurposing servers, you must deploy the HPE Storage Connection Manager for VMware on each host where you plan to deploy dHCI. Do this before you deploy dHCI.

For information about installing the Connection Manager, refer to the *VMware Integration Guide*, which is on the [HPE Alletra 6000, Alletra 5000, Nimble Storage Documentation Portal](#) on HPE InfoSight.



Deploying dHCI

The configuration worksheet contains lists of values that are required to complete the deployment tasks described in this guide. It is best practice to complete worksheets with the validated values before you deploy dHCI. You can expand the sample worksheets in [Appendix A: Configuration Worksheets](#) on page 44 as needed.

For information about setting up your array, see the array installation guide. The hardware guides are available from the [HPE Alletra 6000,5000, Nimble Storage Documentation Portal](#) on HPE InfoSight.

Discover the Array

After you complete the physical setup of the array, you must discover it.

After you discover the array, you can access the array GUI and use the setup wizard to complete your array and dHCI configuration.

Use one of the following methods to discover your array:

- Install the HPE Storage Windows Toolkit and run it. The toolkit is available from the Software Download page on HPE InfoSight. Detailed instructions for installing it are in the *Windows Integration Guide*, which is included in the [HPE Alletra 6000,5000, Nimble Storage Documentation Portal](#) on HPE InfoSight.
- Enter **https://<array_serial_number>.local** in the browser.
- Enter **https://<IP_address>** in the browser. This would be the DHCP assigned IP address.

Set Up dHCI for a New Environment

This procedure provides steps for setting up your array and creating a new dHCI configuration. This includes creating a new vCenter Server and storage and configuring new ProLiant servers. In many cases the actions you need to take are self-explanatory. The procedure steps provide additional information as needed. For switch configuration information, please refer to the switch manufacturer documentation. For HPE M-Series switches, please refer to [HPE Alletra dHCI Switch Configuration Guide - M-Series Switches](#). For HPE Aruba 832x and 63xx switches, please refer to [HPE Alletra dHCI Switch Configuration Guide - Aruba 832x and 6300](#).

Note: The dHCI wizard allows you create new components and use existing components during a single installation. This procedure explains how to configure the array and dHCI in a new (Greenfield) environment. The section [Set Up dHCI for an Existing Installation](#) provides steps for setting up dHCI in an existing environment.

Before you begin

Start by consulting the [Welcome Center](#). This will guide users through the deployment process from racking and cabling, to deploying the solution.

Make sure you have done the following:

- Verified that the components of your system are supported by checking the [Validated Configuration Matrix](#).
- Completed the physical setup of the array, including the cabling and the switches.
- Discovered the array.



- Set up your HPE Greenlake Cloud account and Data Services Cloud Console account. After deployment, management of the HPE Alletra dHCI can be through HPE GreenLake for Private Cloud Business Edition or the on premises HPE Multi-Array Storage plugin for vCenter.

The *Welcome Center* will guide you through these processes. Information about setting up a cloud account for Data Services Cloud Console's Data Operations Manager service can be found in the *Data Ops Manager Getting Started Guide*, which is available on the [HPE Support Center](#).

You need to have the following information available for your dHCI configuration. The wizard will prompt you for it.

Note: The wizard takes you through the process of setting up both the array and your dHCI configuration. This document focuses on what you need for your dHCI configuration.

- vCenter Server connection information.
- If you want to use a vSphere Distributed Switch (VDS), you must have the following:
 - Array OS 6.0.0.300 or later
 - A vSphere Enterprise Plus license for ESXi hosts
 - A new cluster
- If you want to use vSphere Distributed Switch (VDS) for management traffic only and standard vSwitch for iSCSI, you must deploy with the following:
 - Array OS 6.1.2.200 or later
 - PCBE
 - A vSphere Enterprise Plus license for ESXi hosts
 - A new cluster

Note: Converting from VSS to VDS or VDS to VSS post deployment is not a supported workflow.

- Data and management IP address ranges.
 - A management IP range for ESXi and iLO. You have two options:
 - ESXi and iLO in the same management subnet
You must provide two contiguous IP addresses for each server (one for ESXi and one for iLO).
 - iLO on a dedicated subnet (not an option if you select the dHCI network automation feature)
When iLO is in a different subnet than the ESXi management interface, you must provide one contiguous IP address per server per subnet (one in the ESXi subnet and one in the iLO subnet).
 - Two data subnets and each one must have an iSCSI IP address range where the IP addresses are available and in the same network.
 - These must be non-overlapping IPv4 addresses. Each subnet is defined by a network portion and a netmask.
 - You only need to provide the starting IP address. dHCI then handles the IP assignments as each server is configured.
- Network automation switch password.
 - Network Automation is currently only supported through the on-array deployment interface. It is not currently an option through Data Services Cloud Console's Setup Service interface.
 - You must provide credentials for a dHCI switch administrator. The wizard sets up a dHCI switch administrator using the format **dhci_admin_<array_serial_number>**. For example, the switch administrator might have the name **dhci_admin_af12345**.
 - HPE Aruba 8325 and 8360 switches are the only switches supported with the dHCI network automation feature.
 - You must perform the initial setup of these switches manually. The *dHCI Deployment Guide* contains instructions for doing this.

- Passwords. dHCI-enabled arrays come with default passwords for the ESXi root account and the iLO administrator account. You must change the default passwords to ones that are unique for your configuration.



Initial Setup Using the HPE Alletra dHCI Setup Service

After your array has been installed in the rack and connected to your network, you must complete the initial setup of the array by configuring some basic settings to get the array running on the network and connected to HPE GreenLake.

This chapter describes how to complete the process from a Windows host. If you do not have a Windows host or do not want to use the HPE Storage Toolkit to complete the initial setup, you can launch the initial configuration from the array-based HTTP UI.

- Enter **https://<array_serial_number>.local** in the browser.
- Enter **https://<IP_address>** in the browser. This would be the DHCP assigned IP address.

Download the HPE Storage Toolkit for Windows

About this task

Download the latest version of the HPE Storage Toolkit for Windows to install on your Windows host or Windows VM.

! **IMPORTANT:** Make sure that the version of the toolkit is compatible with the version of the operating system on your array. For compatibility information, see the Validated Configuration Matrix tool, which is available on HPE InfoSight (<https://infosight.hpe.com/resources/nimble/validated-configuration-matrix>).

Prerequisites

What you need on a Windows server:

- Internet connection to HPE InfoSight
- .NET Framework 4.5.2

What you need on a Windows client:

- Internet connection to HPE InfoSight
- Windows OS 7 or later
- .NET Framework 4.5.2

Procedure

1. In your Internet browser, go to <https://infosight.hpe.com/welcomecenter/>
2. On the Welcome Center home screen, click the array family.
3. Select the array model and click **Continue**.
4. In the navigation panel, click **Software Configuration** > **Prepare Client**.
5. Follow the instructions to download the toolkit.
6. Save the installation package to your Windows host.
The installation package has a name similar to **Setup-HPStorage-x64.x.x.x.x.exe**, where **x64** is the supported microprocessor and **x.x.x.x** is the version number.
7. Download the latest *Toolkit Release Notes*.
Review the list of Windows Server hotfixes.



NOTE: If you are installing the setup manager alone, then no hotfixes are needed. However, .NET framework requirements still apply. Hotfix requirements are mandatory for any Windows host on which the HPE Storage Connection Manager for Windows is used to connect to array volumes.

Install the HPE Storage Toolkit for Windows on a Client

About this task

You have the option of installing the HPE Storage Toolkit for Windows on a Windows client.

Prerequisites

Download the HPE Storage Toolkit for Windows from HPE InfoSight (<https://infosight.hpe.com>).

See **Download the HPE Storage Toolkit for Windows**.

The client must be running Windows OS 7 or later to install the toolkit.

❗ **IMPORTANT:** If you plan to install the toolkit in a Remote Desktop session or on a virtual machine, open the Command Prompt and enter:

```
mstsc /console
```

Procedure

1. Open the **Setup-HPStorage-x64.x.x.x.x.zip** file and extract the **Setup-HPStorage-x64.x.x.x.x.exe** installer file.
2. On the Windows client, right-click the installer file and choose **Run as administrator**.
3. In the Welcome to the InstallShield Wizard for the toolkit dialog, click **Next**.
4. In the License Agreement dialog, choose **I accept the terms of the license agreement** and click **Next**.

❗ **IMPORTANT:** You must accept the End User License Agreement (EULA) to install the toolkit.

5. In the Logs Directory dialog, do one of the following:
 - Click **Next** to accept the default log location.
 - Click **Change**, browse to the desired directory, click **OK**, and click **Next**.

In the Custom Setup dialog, **Setup Manager** is selected by default. The setup manager enables first-time setup of the storage array.

6. Specify the Group Management IP address and the username/password credentials for the storage array. The array user should have Power User or above credentials.

If you do not do this when you set up the toolkit, you can use the PowerShell cmdlet `Set-NWTConfiguration` to specify the array credentials.

You must register at least one group. The host must be registered with the array group to enable application-synchronized snapshot creation.

7. Click **Install.**

You can modify this option after clicking **OK** by clicking **Back** to return to the Custom Setup dialog.

If you deselected the Setup Manager, a message is displayed informing you that you need to explicitly select it if iSCSI management is required.

8. Click **OK to acknowledge the message.**

9. In the InstallShield completed dialog, click **Finish.**

The toolkit software installs onto the Windows host. This process might take a few minutes. The installer log is saved to the `C:\NWT_Install.log` file.

Discover the Array

About this task

The HPE Storage Setup Manager for Windows enables you to create a new group from an uninitialized array. The array is the only member of the group.

NOTE: A newly plugged-in array might not appear immediately on the array details page of the GUI. It might take up to five (5) minutes to update the page. Refresh the browser to see the array on the page immediately after you plug it in.

Prerequisites

The Windows host that you use to initially configure the array must be connected to the same physical subnet as the array management port and have direct (non-routed) access to the array management port.

The Windows host must have the following software installed:

- .NET Framework 4.5.2 or above
- HPE Storage Toolkit for Windows

Before you start, complete the Installation Checklist on the [HPE Welcome Center](#). You need the information from the checklist to perform the initial setup.



CAUTION: If you have multiple unconfigured arrays and you plan to add them to the same group, configure only one array now. Later, add the remaining arrays to the group. For information about how to add an array to a group, refer to the *GUI Administration Guide* or the *CLI Administration Guide*.

NOTE: Subnet and VLAN configuration are separate actions. VLANs are not supported during setup.

Procedure

1. In the Windows Start menu, choose **HPE Storage > Setup Manager**.
2. Select one of the uninitialized arrays from the setup manager list and click **Next**.

NOTE: If the array is not visible in Setup Manager, verify that the array is on the same subnet as the Windows host.

3. In the Information dialog, click **OK**.

The HPE Cloud Connectivity Wizard opens to guide you through the process of connecting the storage array to HPE GreenLake.



NOTE: When the array initialization wizard starts for HPE Alletra dHCI, you will be prompted as to whether they are going to be adding the dHCI system to an existing cluster. If you plan on adding the dHCI array to an existing ESXi compute cluster or on leveraging the Network Automation feature, you should select “Yes”, which will take you to the traditional on array dHCI deployment UI. Most users should select “No” which will connect the array and take them to Setup Service.

Connect the Array to HPE GreenLake

About this task

The HPE Cloud Connectivity Wizard guides you through the process of connecting the storage array to HPE GreenLake. This is the recommended process when deploying a dHCI system as a new server type deployment. If leveraging the Network Automation feature or deploying into an existing ESXi cluster, you will utilize the on-array deployment wizard. For more detailed information on deploying into an existing ESXi cluster please refer to HPE Alletra dHCI Deployment Considerations Guide – Existing Installations.

Procedure

1. Click **Get Started**.
2. Read and accept the end user license agree, then click **Continue**.
3. Specify the following network settings, then click **Continue**.
 - IP address
 - Netmask
 - Gateway
 - Domain Name
 - DNS Server IP
4. If using a proxy server to connect to the internet, select **Use proxy** and specify the following, then click **Continue**:
 - HTTP Proxy Server
 - HTTP Proxy Server Port
 - Proxy Server Username
 - Proxy Server Password
5. Specify the following time information, then click **Continue**.
 - Time (NTP) Server
 - Region
 - Country/State/City

! **IMPORTANT:** Maintaining the system time within 2 minutes of the correct time is required to initialize and manage an HPE Alletra storage array with Data Services Cloud Console. To maintain the array time within the tolerance, synchronize the array time with an accurate, highly available NTP service that is synchronized with global time services.

If the array time on an uninitialized array is not within the tolerance, the lack of a connection to Data Services Cloud Console will prevent the array from being initialized. Setting the array time within the tolerance will enable the connection to be established and allow you to begin the initialization.

If the array time on an initialized array is not within the tolerance, the array will not connect to Data Services Cloud Console. Or, if the array is already connected, the connection will be lost. A lost connection can happen if the array time is set incorrectly, or if the array time drifts beyond the tolerance. Resetting the array time within the tolerance will enable the connection to be reestablished.

6. Review the settings, then click **Submit**. The wizard makes the initial connection to HPE GreenLake and returns the subscription key.
7. When the wizard indicates that you have successfully connected the storage array to HPE GreenLake, click **Launch** to open HPE GreenLake.

What to do next

Initialize the storage array.

Initialize the Array Using HPE Alletra Setup Service

About this task

After you have connected the array to Data Services Cloud Console, initialize the array software using the HPE Alletra Setup Service.

Prerequisites

If you completed the installation checklist, refer to it while completing this procedure.

Procedure

1. If not already, log in to **HPE GreenLake**.
2. In the menu at the top of the screen, click **Applications**.
3. On the **My Applications** page, click **Data Services Cloud Console**.
4. On the **Deployment Regions** page, click **Launch** next to the Data Service Cloud Console instance.
5. On the **Welcome** page, click **Launch** in the **Setup Service** tile.
6. Set up the array using Setup Service. For information on using Setup Service, search for the service in the Data Services Cloud Console articles widget.

Setup Service Procedure

1. If there has already been a blueprint created for deployment, select the dHCI storage array, which should show a status of **"Connected"** and **"Not Initialized"**. The blueprint will apply all settings automatically. If not using blueprints, select the array and click **Set Up System**.
2. Walk through the Setup Service wizard and enter the necessary information. Some settings are pulled over from the initial array activation. If desired, these can be modified at this time.
 - Domain
 - DNS Servers
 - Domain Name
 - Time
 - NTP Servers
 - System region and timezone
 - Attributes
 - Proxy settings
 - Support Contact information
 - System
 - System Name and country location
 - Network settings for array management interface
 - Array admin credentials
 - Storage Networking
 - Management Networking
 - Verify management interface and set/modify diagnostic IP addresses
 - Data Networking
 - Enter exactly two data subnets for iSCSI data traffic
 - Select interface, enter IPv4 addresses and network settings for data and discover



- Private Cloud System
 - vCenter
 - Select to deploy a new or connect to an existing vCenter server
 - vCenter credentials
 - Cluster
 - Datacenter name (new or existing)
 - New cluster name
 - Select whether to deploy cluster onto VSS or VDS. If VDS is selected, you will have the option to split management and iSCSI networks between VSS and VDS. In that scenario, management interfaces would be on VDS and iSCSI interfaces would be on VSS
 - Servers
 - Add servers to be part of the initial cluster by their serial number or temporary IP address
 - Networking
 - Enter starting IP addresses for the server management, iLO (if on a different subnet than management), and iSCSI data networks.
 - Passwords
 - Add ESXi root credentials
 - Add iLO system credentials

3. Review the configuration and click **Continue**.

On Array Setup Procedure

This is the setup procedure to be used in an air gapped environment, when needing to leverage Network Automation, or when connecting to an existing ESXi cluster as part of deployment.

For more detailed information on deploying HPE Alletra dHCI into an existing ESXi cluster, please refer to the *HPE Alletra dHCI Deployment Considerations Guide – Existing Installations*.

1. Power on your array. You must accept the End User License agreement. Follow the prompts in the setup wizard to initialize the array.
2. Provide the information for the **Array Setup**.
 - For an existing group, follow the URL and add the array to that group.
 - For a new group, the wizard prompts you to provide information about the array. The required fields have a red asterisk next to them.

After you provide the required information, select **Submit**. The wizard initializes the array.

3. When the confirmation message Successfully initialized array appears, click **Continue**.
4. Log in to the array again.
5. Select **Attributes**

You must provide the following information:

- The DNS server. You can add up to three DNS servers.
 - The NTP server. You can use the default information provided for the region, country, and state or enter new information
 - Time info. You must enter the Time (NTP) Server information. You can also change the default values for Region, Country, and State.
 - Email addresses for receiving alerts.
 - SMTP server information.
 - Analytics. You can select both diagnostic and user analytics.
 - Proxy Server information.
6. Select **Network Switches** and verify that your system is set up correctly for switches.
Check each box in the **Prerequisites** section after you confirm that your system meets those requirements.
 7. In the **Switches** section, decide whether to use the dHCI network automation feature. By default, the **Skip Network Automation** box is checked. You must uncheck the box to use network automation.



Note: You will not be able to uncheck the box if the cabling is incorrect. The dHCI network automation feature requires that you:

- Have a pair of either HPE Aruba 8325 or 8360 switches.
- Have performed the preliminary switch setup on the array.
- Create a new cluster.

The wizard gathers information that you have already provided to the array, such as the switch IP addresses and the switch credentials.

To use network automation, perform the following steps in the wizard:

- a. Uncheck **Skip Network Automation**.
- b. Review and, if necessary, update the information in the **Add a Switch Pair** section.

You can add up to four racks. Each rack must contain two switches.

- c. Select **Validate Switches**. The wizard confirms that it can log in to the switches.

It displays a validation error if it encounters a problem. You must resolve the errors and select **Validate Switches** again. When the validation completes successfully, you can continue with the switch setup.

After the switches have been successfully validated, the wizard displays the VLAN management ID. You cannot change this.

8. In **Switches**, enter the password for the dHCI switch administrator.
9. In **Configure VLAN IDs** enter the necessary Management and iLO information. The wizard has filled in some of this information based on data it gathered from the array.
10. Select **Virtualization** to set up your vCenter, hosts, and datacenters.

Make sure you have met the prerequisites. These include:

- Setting up a DHCP server.
- Discovering the ESXi servers.
- Providing the firewall information.

11. Select **Create a new vCenter**.

The vCenter virtual machine (VM) is created on a Reserved Service Datastore on an array group.

- 1 Provide the following information:

- vCenter Hostname (optional)
You can leave this field blank. If you provide a hostname, it must resolve to the vCenter IP address you specify.
- vCenter IP Address
The IP address must be in the same management network as the array so that the array and the vCenter can communicate. You must provide a new IP address, not an address that is currently associated with anything.
- vCenter Root Password
- SSO Administrator Password

- 2 Select **Continue**.

Creating a new vCenter Server using the wizard automatically registers dHCI with that server. You do not need to perform an additional vCenter registration step.

Note: A dHCI environment can be registered with only one vCenter Server, even though an array group can be registered with multiple vCenter Servers.



12. Select **Create a new cluster from the discovered ProLiant servers.**

Considerations for creating a new cluster:

- You must provide a unique name for the new cluster. You get an error message if you provide the name of an existing cluster.
- Do not include an underscore (_) in the cluster name.
- dHCI only supports the datacenter cluster that you create during setup. You can manage this cluster from the dashboard using the dHCI manager. If you add another cluster after setting up dHCI, you will not be able to use Stack manager with it.

To create a new cluster:

- 1** From the drop-down list, select either an existing datacenter or the option to create a new datacenter. If you select **Create New Datacenter**, the wizard prompts you to enter the name for the datacenter.
- 2** Enter the name for the new cluster.
- 3** Select **Continue**.

13. Select your virtual switch. When you create a new cluster, you have the option of selecting either **vSphere Standard Switch (VSS)** or **vSphere Distributed Switch (VDS)**. By default, VSS is checked. Note that splitting management and iSCSI traffic between VDS and VSS switches is only supported through DSCC Setup Service.

14. In **Hosts,** select the servers you want to use in your configuration. A dHCI cluster must have either all Intel-based servers or all AMD-based servers. You cannot have servers with different processors in the same cluster.

dHCI automatically discovers servers. The tab **Supported Servers** displays the servers that match the criteria for your configuration. Check the boxes for the servers you want to include in your configuration.

The tab **Unsupported Servers** displays the servers that dHCI discovered, but that failed the dHCI validation test. Select the **i** icon to display details about why the server is not supported. You cannot use these servers unless you resolve the issues that were uncovered by the validation test.

Note: The wizard allows you to add up to 32 servers. You get an error message if you attempt to add more than 32 servers.

You can also manually add a server by selecting **Add Server**. To manually add a host, complete the following steps.

- a.** Select **Add Server**.
- b.** Provide the following information:

- ESXi IP Address
- ESXi Username. This value is filled in because it is always root.
- ESXi Password

Note: Wherever you are asked to enter a component's IP address, you can enter either a DNS name or a fully qualified domain name (FQDN) instead of the IP address. In general, HPE recommends that you use the FQDN of the components whenever possible.

- c.** Click **Add**.

The wizard runs the validation test on the server and returns you to the **Hosts** section. If the server you added passed the validation test, it appears in the Supported Servers list.

To re-run the Discovery operation, click **Refresh**.

After you select the servers, select **Continue**.

15. Configure the servers you added by providing both an ESXi root password and an iLO administrator password. Select **Continue.**



16. From **Provision Datastores, select **Add Datastore**.**

The wizard allows you to create a maximum of eight datastores during deployment. By default two reserve datastores are created. These are used for High Availability (HA) and cannot be deleted. In addition to these two, you can add up to six more datastores. Your datastores can be a mix of both VMFS and VMware Virtual Volumes (vVols).

Note: If you need more datastores, you can add them from the vCenter user interface after the wizard completes.

For a VMFS datastore, you must provide:

- A unique datastore name.
- The datastore size in either MiB, GiB, or TiB. It must be at least 10 GiB. The maximum size is 64 TiB.
- The protection template. Select the template from the drop-down list. By default, the array provides three protection templates.

For a vVol datastore, you must provide:

- A unique datastore name.
- The datastore size in either MiB, GiB, or TiB. It must be at least 10 GiB. The maximum size is 64 TiB.

17. The **Networking section prompts you for general array information and dHCI-specific information. You must provide information about IP ranges, gateways, subnets, and ports. dHCI requires you to specify ESXi and iLO information, including whether ESXi and iLO will share the same management subnet.**

Go through each page of this section and provide the required information.

Array Information

The management section pulls in information you provided earlier to the array and pre-populates those fields. You must fill in the other fields. Some points to keep in mind are:

- The initial array management configuration is done with interface eth1 connected. After the setup completes, you can configure additional IP addresses and their respective interfaces.
- You do not need to enter a secondary management IP address.
- If you attempt to select a subnet port that is down, the wizard displays a warning.

dHCI Information

If you selected network automation, you must set up two management subnets that use the default values of **Standard** for MTU Size and **1500** for MTU Bytes. The data subnets use the default values of **Jumbo** for MTU Size and **9000** for MTU Bytes.

Note: When you are using network automation, you must select either port A or port C for the first subnet. For the second one, select either port B or port D.

If you did not use network automation, you can specify whether to use the same network for ESXi and iLO management or to use separate networks.

The dHCI-specific information includes:

- The starting IP address for the ESXi management IP address range. The wizard performs a DNS check. If the DNS resolution fails, the wizard gives you the option of correcting the issue or continuing without fixing it.



Note: When you supply a starting IP address, that becomes the first address in the range. The wizard calculates the end address. All IP addresses in the range must be available for use. The range cannot include IP addresses that are already in use. The IP addresses must be sequential and on the same network so that the server can talk with other servers. The range must include an IP address for each selected server.

- The iLO management IP address range.

Note: Make sure the ESXi management range and the iLO management range do not overlap.

- Details on whether ESXi and iLO use the same management network. This option not available when you are using network automation.
- Select **Same network as ESXi management** to have both ESXi and iLO on the same management network.
- Select **Different network** to have ESXi and iLO use different management networks.
- If you select **Different network**, you must specify the iLO management IP address range.

Click **Continue** when you have set up your dHCI information.

Data Subnet Configuration

dHCI requires that you set up two data subnets.

Note: When you are using network automation, you must select either port A or port C for the first subnet. For the second one, select either port B or port D.

The wizard takes you through the process of setting up each subnet. You must supply a port and IP address range for each subnet. The IP address range must include the address for the port you specified, the discovery IP address, and the iSCSI IP address range for virtualization.

When you select **Continue**, dHCI validates the networking information and provides a summary of all the networking information you provided for you to review.

When you are satisfied with the configuration, select **Continue**.

- 18.** In the **Summary** section, review the complete array and dHCI configuration information. If it is correct, click **Submit**. The wizard displays status information as it sets up the array and the dHCI configuration. Doing this allows you to monitor the setup progress.
- 19.** When the setup completes successfully, select **Continue**. The **Post Setup** section provides a checklist of tasks you can perform to verify your setup. When you have completed your verifications, select **Finish** then the **Setup Complete** window displays links so you can go to either the array GUI or the vCenter GUI, which contains the dHCI dashboard.



Managing the HPE Alletra dHCI Solution

After deployment is successfully completed, you can perform a number of tasks from the HPE Alletra dHCI dashboard that is included with the HPE Multi-array Storage vCenter plugin:

- Add a new server.
- Create a new VMFS datastore.
- Grow a VMFS datastore.
- Clone a VMFS datastore.
- Create a snapshot of a VMFS datastore.
- Create a vVol datastore.

Add a New Server

You can add servers to your dHCI environment either manually or by having dHCI perform a discovery operation. This procedure provides instructions for manually adding a server.

The new server will be added to the group for the virtual switch you set up during deployment. This will be either a vSphere Distributed Switch (VDS) or a vSphere Standard Switch (VSS).

You will have the option to add physical switches as you add the server.

Before you begin

Perform the following tasks to prepare for adding a new server:

- Confirm that the cabling is set up correctly. See the section [HPE ProLiant Network Card Configuration](#) on page 12.
- Review the information about Ethernet switches. See the section [Network Requirements for Configuring the Ethernet Switch](#) on page 16.
- Configure the switches. You must assign the correct VLAN and assign an IP address to the ESXi management interface. See the sections:
 - [VLAN](#) on page 17
 - [IP Address Range](#) on page 20.
 - [DHCP Server](#) on page 20 or [Appendix C: Configure Static IP Addresses on the ESXi Hypervisor](#) on page 49
 - [ESXi Servers Discovery](#) on page 21
- Add the server in the vSphere cluster by using the HPE Multi-array Storage vCenter plugin.

Procedure

1. From the VMware vSphere Web Client, select HPE Storage link.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**

2. Click the link for HPE Storage groups and select your group.
3. Click Inventory
4. Select Servers.
5. Click the plus sign (+).
6. Configure the switches.



You can have up to four racks. Each rack must have two switches. Click **ADD A SWITCH PAIR** to another pair of switches. If you are using HPE Aruba 83xx switches, the **Add Server** wizard pulls in the current switch information.

Enter passwords for the switches and click **Next**.

Note: The dHCI Stack wizard sets up a dHCI switch administrator with a name that uses the format **dhci_admin_<array_serial_number>**; for example, the dHCI switch administrator might have the name **dhci_admin_af12345**. The dHCI switch administrator uses the password that you supply here.

7. The wizard displays switches that you can use with your dHCI configuration. Take one of the following actions:

- Select one of the servers displayed in the list.
- Click **Refresh** to tell dHCI to perform another discovery operation to look for new servers.
- Click **Add Server** to manually add a server. This button displays the **Add new server** pop-up box.

When you add servers, make sure you add either all Intel-based servers or all AMD-based servers to a dHCI cluster. You cannot have servers with different processors in the same cluster.

To add a server, enter the following information and then click **Add**:

- ESXi IP Address
- ESXi User Name. This must always be root.
- ESXi Password

8. Click **Next**.

9. After you add a server, you must provide configuration information.

When you supply a starting IP address, that becomes the first address in the range. The setup wizard calculates the end address. All IP addresses in the range must be available for use. The range cannot include IP addresses that are already in use. The IP addresses must be sequential and on the same network so that the server can talk with other servers. The IP addresses must use IPv4.

a. Provide information for ESXi Management:

- The starting IP address in the network

b. Provide the iLO information:

- To keep ESXi and iLO on the same management network, select **Same network as ESXi management** and enter the starting management IP address.

Note: If the array is running release 5.3.1.0 or later, you have the option of specifying separate management networks for ESXi and iLO. The default is to use the same management network. If the array is running an earlier version of the Array OS, you do not have this option.

- To use a separate management IP address, select **Different network**. You must enter:

- The IP range.
- The subnet mask.
- The gateway.

c. Enter the data IP addresses for iSCSI IP Range 1 and iSCSI range 2.

d. Create new ESXi and iLO passwords. You must specify a new passwords for the ESXi root user and the iLO dHCI prostack_admin user.

e. Click **Next**.

10. Review information and click **Add**. dHCI configures the server and adds it to vSphere cluster automatically.

This step can take several minutes if the vCenter Server has a heavy load. You can use the task panel in the vCenter to monitor this task. After the task completes, you must refresh the view to see the server that has been added.



Create a New VMFS Datastore

You can use the HPE Multi-array Storage vCenter plugin to create VMFS datastores that are mapped to volumes on an array. The vCenter plugin always uses the latest VMFS version available to provision a datastore.

It is best practice to use the plugin to grow the datastores. Using the plugin prevents you from selecting the wrong device during a grow operation.

Procedure

1. From the VMware vSphere Web Client, select **HPE Storage**.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**.

2. Click **Groups** and select your group.
3. Click **Datastores** and select **VMFS**.
4. Click the plus sign (+) to add a new datastore.
5. In the Datastore dialog box, provide the following information:
 - 1 Specify a name for the datastore.
 - 2 Provide a short description of the datastore.
 - 3 Select the datacenter where you want the VMFS datastore to be created.
 - 4 Under **Protocol**, select **iSCSI**.
 - 5 Under **Host**, select your dHCI cluster.
 - 6 After you enter the information, click **Next**.
6. Specify a size for the VMFS datastore (leaving the other default parameters unchanged) and click **Next**.
7. Select from the following protection and synchronization options to use with this datastore and click **Next**.
 - 1 **No volume collection.** No protection schedule is set up for the datastore.
 - 2 **Join volume collection.** Use the search option or the drop-down list to select an existing volume collection. When you select a volume collection, the wizard displays its protection schedule.
 - 3 **Create new volume collection.** The dialog box expands to enable you to create a volume collection and a schedule for it. You must provide a name for the volume collection. You can then use that volume collection with another datastore if you choose to. Next, complete the information in the **Create Volume Collection** section of the dialog box. You might need to use the scroll bar to see all the options:
 - **Start from protection template.** Decide whether to use one of the default protection templates as the basis for the volume collection you are creating. Otherwise, select **No protection template**.
 - **Replication type.** If you have a replication partner set up, you can select **Periodic snapshot**. The vCenter plugin takes snapshots of the datastore that can be used for a backup based on the schedule you specify.
 - **Replication partner.** If you select **Periodic snapshot** as the replication type, you must supply a value in this field.
 - **Synchronization service.** From the drop-down list, select the application that provides the synchronization. If you select **VMware vCenter**, you must provide a host IP address or a host name, the port number to be used for communication (default: 443), and a username and password for the host.
 - **Schedule name.** Provide a name that you can use to identify the schedule. It is a good practice to include a summary of the schedule in the name; for example, Retain-30Daily indicates that backups are made daily and are retained for 30 days. In this section of the dialog box, you can specify when backups will be taken, how often they will be taken, and how long they will be retained. You can also specify how frequently to update the replication partner by using one of the backup snapshots.

4. **Protect as standalone volume.** The dialog box expands to enable you to create a volume collection and a schedule that is specific to that datastore. You do not need to provide a name for this schedule; however, you must supply the other information that you would supply if you had selected Create a new volume collection.
8. Set limits for IOPS and MBps and click **Next**.
You can select either No Limit or Set Limit, which allows you to enter a value for that option.
9. Verify the settings summary and click **Finish**.

Grow a VMFS Datastore

You can use the HPE Multi-array Storage vCenter Plugin to grow or resize a traditional datastore. You must have the correct permission to perform this task.

It is best practice to use the plugin to grow the datastores. Using the plugin prevents you from selecting the wrong device during a grow operation.

Procedure

1. From the VMware vSphere Web Client, select **HPE Storage**.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**.

2. Click **Menu** and select **HPE Storage**.
3. Click **Groups** and select your group.
4. Click **Datastores** and select **VMFS**.
5. Select the datastore that you want to grow.
6. Click the **Grow** sign.
7. Type in the new size and select the unit type.
8. Click **Grow**.

Clone a VMFS datastore

You can use the HPE Multi-array Storage vCenter Plugin to clone VMFS datastores that reside on an array. You create clones from snapshots.

Procedure

1. From the VMware vSphere Web Client, select **HPE Storage**.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**.

2. Click **Menu** and select **HPE Storage**.
3. Click **Groups** and select your group.
4. Click **Datastores** and select **VMFS**.
5. Select the datastore you want to clone.
6. Click the **Clone** sign.
7. Specify a name for the clone.
8. Select the number of clones that you want to create.



9. Choose whether you want to use an existing snapshot or create a new one:
 - If you choose to use an existing snapshot, the wizard displays a list of existing snapshots.
 - If you choose to create a new one, enter the name for the new snapshot.
10. Click **Clone**.

Create a snapshot of a VMFS datastore

You can use the HPE Multi-array Storage vCenter Plugin to create snapshots of VMFS datastores that are mapped to volumes on an array.

Procedure

1. From the VMware vSphere Web Client, select **HPE Storage**.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**.

2. Click **Menu** and select **HPE Storage**.
3. Click **Groups** and select your group.
4. Click **Datastores** and select **VMFS**.
5. Select the datastore for which you want to create a snapshot.
6. Click the **Snapshot** sign.
7. Provide a name for the snapshot.
8. Enter a description.
9. Click **Create**.

Create a vVol datastore

The Create Datastore wizard enables you to create a vVol datastore and map it to a folder on an array.

For other tasks related to vVols, see the appropriate *VMware Integration Guide* for your version of the Array OS. This documentation is available on HPE Infosight.

Procedure

1. From the VMware vSphere Web Client, select **HPE Storage**.

Note: This link can vary depending on the version of the software you are running. For example, in some versions, this link is **HPE Alletra 6000 and HPE Nimble Actions**.

2. Click **Menu** and select **HPE Storage**.
3. Click **Groups** and select your group.
4. Click **Datastores** and select **vVol**.
5. Click the green plus sign (+) to add a datastore.
6. Provide the following information and then click **Next**:
 - Specify a name for the datastore.
 - Provide a description of the datastore.
 - Identify the datacenter where you want the vVol to be created.
 - Under **Protocol**, select **iSCSI**.
 - Under **Host**, select your dHCI cluster.



7. Set a space limit for your vVol folder and click **Next**.

8. Set limits for IOPS and MBps and click **Next**.

You can select either **No Limit** or **Set Limit**, which allows you to enter a value for that option.

9. Click **Create**.



Using HPE GreenLake for Private Cloud Business Edition

HPE Alletra dHCI systems connected to Data Services Cloud Console can be managed using the Private Cloud Business Edition management interface. This cloud-based management tool gives you the ability to globally manage your virtualization environments from a single interface. This includes deploying and managing virtual machines, provisioning datastores, monitoring the health of the virtualization stacks, and performing non-disruptive updates of the stacks.

Documentation on features and their use can be found within the Data Services Cloud Console contextual articles or in the [HPE Support Center documentation](#).

Using HPE InfoSight with dHCI

HPE InfoSight is an artificial intelligence (AI) platform that provides an approach to data collection and analysis, an approach that goes beyond depending on the logs and obvious metrics used in traditional infrastructure. HPE InfoSight collects and analyzes millions of sensors from its globally connected installed base. It collects thousands of embedded sensors that are built into every storage system and pulls in data from VMware for full-stack visibility.

This data is sent to the cloud, where HPE applies advanced machine learning to drive its predictive analytics and recommendation engines. The predictive analytic capabilities of HPE InfoSight extend across the lifecycle and range from planning to managing to expanding. Its recommendation engine tells IT administrators how to avoid issues, how to improve their environment, and how to get more out of their resources. The ability of HPE InfoSight to learn from every system enables it to identify ideal operating environments and to recognize abnormal patterns in infrastructure, configurations, and workloads.

This platform then drives predictive support automation, which transforms the support experience by both predicting problems and also preventing them from happening. This approach to managing infrastructure through the HPE InfoSight cloud portal tells IT administrators how to improve their environment. In addition, it offers a unique product experience in which the infrastructure that is supported by HPE InfoSight continues to get smarter and more reliable.

The dHCI Dashboards on HPE InfoSight

HPE InfoSight provides two dHCI dashboards that allow you to get insights into the health of your system:

- The **HPE Storage dHCI Overview Dashboard** offers views of dHCI solutions and shows CPU, memory, and capacity utilization for each HPE dHCI solution you have. You can get a quick health check across your dHCI environment.
- The **HPE Storage dHCI Cluster Dashboard** shows an overview of the environment. Each section of the dashboard offers a specialized view of the system:
 - The **Virtualization section** offers views of the host utilization from a CPU and memory perspective. It also shows which VMs are top performing in terms of latency and IOPS.
 - The **Compute section** shows the CPU and memory utilization of your HPE Storage dHCI cluster. It also predicts when you will run out of CPU or memory.
 - The **Storage section** displays the used capacity and overall space savings that can be achieved through various data-savings techniques.
 - The **Wellness section** summarizes problems related to the array, switches, and servers.



Create an HPE Storage Account

By default, the first enrolled user of an HPE account is given the superuser role. Subsequent enrolled users are given the standard user role. Only a superuser can associate a new email address with an account in HPE InfoSight. As a new user, you must create an

HPE account (if you do not already have one) to access the account on HPE InfoSight.

Procedure

1. Go to HPE InfoSight.
2. Click **Create Account** to register for an HPE account, which enables you to log into HPE InfoSight.
3. Complete the fields and click **Create account**.
4. Wait to receive an email with steps for you to verify your new account.

Note: If you are a new customer and your email address is not recognized by the system, email support@nimblestorage.com for assistance.

Register Your HPE Storage Assets

Before you can register your HPE Storage assets, you must have created an account. If you are not associated with an HPE Storage account, you must be invited by another member of your organization.

Procedure

1. Go to HPE InfoSight.
If your account is not associated with any assets, a banner appears saying that you must register your systems with HPE InfoSight to associate those systems with your account.
2. Take one of the following actions:
 - Click one of the links in the banner.
 - In the settings menu (the gear icon), under Nimble, click **Register**.
3. Follow the steps to complete the registration.

Enable Streaming for HPE InfoSight and Cross-Stack Analytics

For data to be streamed over to HPE InfoSight, you must log in to the HPE InfoSight portal and make some modifications.

Procedure

1. Log in to HPE InfoSight.
2. From the settings menu (the gear icon), select **Telemetry Settings**.
3. Locate the array you want to monitor and click the **Streaming** button to **On**. This button enables data streaming from the array.
4. In the same row, click the **VMware** button to **On**. This button allows data to be collected from VMware.
5. Wait for HPE InfoSight to process the vCenter registration and start streaming VMware and array data. This can take up to 48 hours.



Appendix A: Configuration Worksheets

The configuration worksheets list the values needed to complete the procedures in this guide. Enter the correct and validated values on these sheets before you deploy dHCI. You can expand the sample configuration worksheets as needed to suit your situation.

Certain products have naming or password character restrictions. Before you fill in this sheet, refer to the documentation for each component to understand whether there are restrictions associated with it.

Note: Only fill out the iLO network information if using different subnets for management and iLO.

Table 2: Global networking configuration worksheet

Global networking description	Variable	Value
Management network VLAN	<44gmt_net_vlan>	
Management network netmask	< 44gmt_net_netmask>	
Management network gateway	<44gmt_net_gw >	
Management network DNS server	<44gmt_net_dns1>	
Management network domain name	<44gmt_net_domain_name>	
Management network NTP server	<44gmt_net_ntp1>	
VM production network VLAN	<vm_production_net_1_vlan>	
Dead VLAN	<dead_net_vlan>	
iSCSI A VLAN	<iscsi_a_vlan>	
iSCSI B VLAN	<iscsi_b_vlan>	
iSCSI A network	<iscsi_a_network>	
iSCSI B network	<iscsi_b_network>	
iSCSI A netmask	<iscsi_a_netmask>	
iSCSI B netmask	<iscsi_b_netmask>	

Table 3: Table 5. HPE Storage configuration worksheet

HPE Storage description	Variable	Value
HPE Storage system name	<system_name>	
HPE Storage group name	< group_name>	
HPE Storage manage IP address	<44gmt_ip >	
HPE Storage controller A diagnostic IP address	<ctrl_a_diag_ip>	
HPE Storage controller B diagnostic IP address	<ctrl_b_diag_ip>	
HPE Storage management FQDN	<fqdn>	
HPE Storage admin password	<admin_pwd>	

HPE Storage description	Variable	Value
HPE Storage iSCSI A discovery IP address	<iscsi_a_discovery_ip>	
HPE Storage iSCSI B discovery IP address	<iscsi_b_discovery_ip>	
HPE Storage iSCSI A data IP address	<iscsi_a_data_ip>	
HPE Storage iSCSI B data IP address	<iscsi_b_data_ip>	

Table 4: HPE FF switches configuration worksheet

HPE FF switches description	Variable	Value
Network switch management IP address	<net_switch1_mgmt_ip>	
Network switch host name	<net_switch1_hostname>	
Network switch 1 MAD IP address	<net_switch1_mad_ip>	
Network switch 2 MAD IP address	<net_switch2_mad_ip>	
MAD network netmask	<mad_net_netmask>	
Network switch admin password	<net_switch_admin_password>	
Network switch IRF domain ID	<net_switch_domain_id>	

Table 5: HPE M-Series switches configuration worksheet

HPE M-Series switches description	Variable	Value
Network switch 1 management IP address	<net_switch1_mgmt_ip>	
Network switch 2 management IP address	<net_switch2_mgmt_ip>	
Network switch MLAG VIP	<mlag-vip>	
Network switch 1 MLAG IP address	<mlag_private_ip1>	
Network switch 2 MLAG IP address	<mlag_private_ip2>	
MLAG network netmask	<mlag_private_netmask>	
Network switch admin password	<net_switch_admin_password>	

Table 6: HPE Aruba 83xx switches configuration worksheet

HPE Aruba switches description	Variable	Value
Network switch 1 management IP address	<net_switch1_mgmt_ip>	
Network switch 2 management IP address	<net_switch2_mgmt_ip>	
Network switch 1 VSX IP address	<net_switch1_vsx_ip >	
Network switch 2 VSX IP address	<net_switch2_vsx_ip >	
VSX network netmask	<vsx_net_netmask >	
Network switch admin password	<net_switch_admin_password>	

Table 7: HPE Aruba 6300 switches configuration worksheet

HPE Aruba switches description	Variable	Value
Network switch 1 management IP address-	<net_switch1_mgmt_ip>	
Network switch 2 management IP address	<net_switch2_mgmt_ip>	
Network switch admin password	<net_switch_admin_password>	

Table 8: Cisco Nexus switches configuration worksheet

Cisco Nexus switches description	Variable	Value
Network switch 1 management IP address	<net_switch1_mgmt_ip>	
Network switch 2 management IP address	<net_switch2_mgmt_ip>	
Network switch 1 hostname	<net_switch1_hostname>	
Network switch 2 hostname	<net_switch2_hostname>	
vPC domain id	<net_switch_domain_id>	
Network switch admin password	<net_switch_admin_password>	

Table 9: IP address range configuration worksheet

HPE ProLiant IP address range description	Variable	Value
Management IP address range	<mgmt_ip_range>	
iLO IP address range (if on different subnet than mgmt)	<ilo_ip_range>	
iSCSI 1 IP address range	<iSCSI1_ip_range>	
iSCSI 2 IP address range	<iSCSI2_ip_range>	

Table 10: VMware vCenter configuration worksheet

VMware vCenter description	Variable	Value
vCenter VM name	<vcenter_vm_name>	
vCenter IP address	<vcenter_mgmt_ip>	
vCenter FQDN	<vcenter_fqdn>	
vCenter appliance root password	<vcenter_root_password>	
vCenter administrator password	<vcenter_admin_password>	
vCenter SSO password	<vcenter_sso_password>	
vCenter SSO site name	<vcenter_sso_site_name>	
vCenter datacenter name	<vcenter_dc_name>	

Table 11: HPE Storage dHCI configuration worksheet

HPE Storage dHCI description	Variable	Value
HPE Storage dHCI VMware datacenter name	<dhci_new_dc>	
HPE Storage dHCI VMware cluster name	<dhci_new_cluster>	
ESXi root password	<esxi_dHCI_admin_password>	
ILO dHCI admin password	<ilo_dHCI_admin_password>	



Appendix B: Resources for Automation

This guide provides the manual steps for building an HPE Alletra dHCI solution based on the verified configuration. No automation is provided except for automation that is built into products. Most components of a dHCI solution have some type of library (REST, Python, Java, PowerShell, and so on) that can be used for automation efforts. The following list identifies resources that can be used to streamline deployments:

VMware

- [VMware API and SDK documentation](#)

HPE Storage

- (Login required) HPE Storage API documentation, available on the [HPE Alletra 6000, 5000, Nimble Storage Documentation Portal](#) and the [HPE Support Center](#)

HPE iLO

- [HPE iLO RESTful API](#)
- [Managing Hewlett Packard Enterprise Servers Using the RESTful API](#)
- [HPE iLO SDK and libraries on GitHub](#)



Appendix C: Configure Static IP Addresses on the ESXi Hypervisor

If you do not have a DHCP server, use the following procedure to configure static IP addresses for all components before beginning the deployment of your HPE Storage dHCI solution. Instead, follow the instructions in this guide.

Note: If you have a DHCP server in the management VLAN, do not use this appendix.

You must perform the following steps on each HPE ProLiant DL rack server in your configuration.

Before you begin

Before you begin, verify that you have the correct versions of all firmware components as specified in the *dHCI QuickSpec Guide* and the HPE Storage Validated Configuration Matrix.

Procedure

1. Connect the keyboard and monitor to the HPE ProLiant DL rack server.
2. Power up the server.
3. After the server reboots, press **F2** to open the RBSU and customize the system.
4. Select **Configure Management Network** and press **Enter**.
5. Select **Network Adapters** and press **Enter**.
6. In the **Network Adapters** dialog box, select your correct vmnic interface (for example, vmnic4 or vmnic5).
7. Press **Enter** to confirm the network adapter selections.
8. Select **IPv4 Configuration**.
9. In the **IPv4 Configuration** dialog box, provide the following information about your network and then press **Enter**:
 - 1 Set the IPv4 address.
 - 2 Specify the subnet mask.
 - 3 Identify the default gateway.
10. Select **DNS Configuration**.
11. In the **DNS Configuration** dialog box, provide the following information and then press **Enter**:
 - 1 Specify the primary DNS server.
 - 2 Specify the host name.
12. Select **Custom DNS Suffixes**.
13. In the **Custom DNS Suffixes** dialog box, specify the suffixes and press **Enter**.
14. Press **Esc** to exit the **Configure Management Network** submenu.
15. Press **Y** to confirm the changes and return to the main menu.
16. Select **Troubleshooting Options** and press **Enter**.
17. In the **Troubleshooting Options** dialog box, select **Enable SSH** and press **Enter**.
18. Press **Esc** to exit the **Troubleshooting Mode Options** submenu.
19. Press **Esc** to return to the login screen.
20. Restart the SLP server on each ESXi host.
 - 1 Log in as **root** and use **Prostack123!** as the password.
 - 2 Run **/etc/init.d/slpd restart**.
21. Repeat this procedure for all other HPE ProLiant servers in the configuration.

Appendix D: Configure Peer Persistence with dHCI

dHCI supports Peer Persistence with some limitations.

Note: Some documentation uses the term "synchronous replication with Automatic Switchover (ASO)" to refer to Peer Persistence.

For information about setting up and using Peer Persistence, refer to the following documentation:

- The Peer Persistence deployment guide, which is available from the Documentation Portal on HPE InfoSight
- The GUI and CLI Administration Guides, which are available from the Documentation Portal on HPE InfoSight
- Synchronous Replication Witness, which is available on the HPE InfoSight Software Download page.

Limitations When Using Peer Persistence with dHCI

HPE Storage support for Peer Persistence has the following limitations:

- Two HPE Storage dHCI arrays are required.
- The arrays must be of the same model (for example, AF40 and AF40).
- The arrays must be running the same version of the Array OS.
- No more than 32 servers can be used for dHCI. (This maximum total does not mean 20 per site, but 20 for both sites together.)
- A VMware vSphere cluster can be spread across only two sites.
- One VMware vCenter server is required.

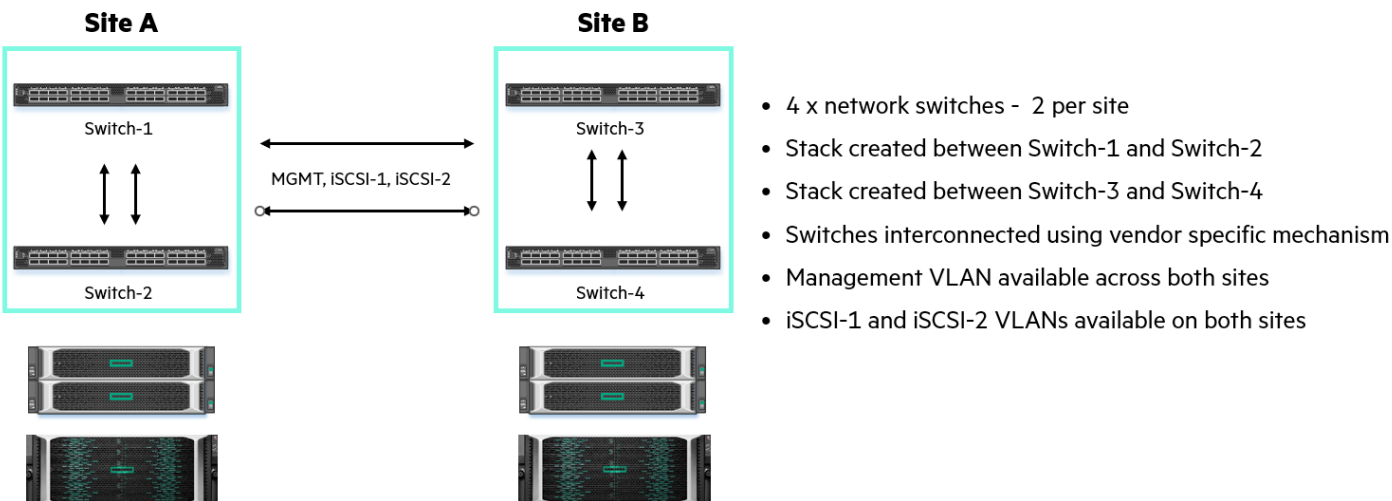
Other limitations might apply. Check HPE Infosight for the most recent HPE Storage array documentation.

Network Configuration Example for Using Peer Persistence

Before you deploy dHCI, you must complete the network configuration between your sites. Peer Persistence with dHCI requires that you configure the Management VLAN and both iSCSI VLANs so that they are available between the two solutions.

Your networking configuration should be like the one shown in the following figure.

Figure 9: Network Configuration Example



Appendix E: Configure vSphere Enhanced Linked Mode with dHCI

dHCI supports vSphere Enhanced Linked mode. This VMware feature allows you to join multiple vCenter Server instances for unified monitoring and management purposes. This capability enables centralized virtual machine (VM) administrators to perform management tasks transparently across sites, regardless of the vCenter Server and datacenter boundaries.

You should configure vSphere Enhanced Linked mode before starting the first dHCI deployment, unless you want to deploy new or multiple new vCenter Server instances during that deployment.

Before you begin

Setting up vSphere Enhanced Linked Mode requires that you:

- Are running Nimble OS 5.1.3.100 or later, or Array OS 6.0.x or later.
- Created a new vCenter Server instance when you set up and configured the first dHCI system. Review the sections [Installing and configuring dHCI](#) on page 19 and [Deploying dHCI](#) on page 23.

Procedure

1. Before you install your second dHCI system, make sure you deploy the new vCenter Server instance that you created when you set up the first dHCI system.
Refer to the VMware documentation for instructions on doing this.
2. Configure Enhanced Linked Mode for a vCenter Server with an external platform.
Refer to the VMware documentation for instructions on doing this.
3. On the second dHCI system, configure the solution using the existing vCenter Server instance and point it to the second vCenter Server instance that you deployed manually.
4. Check your configuration by logging in to your first vCenter Server instance.
5. Select **Menu**.
6. Select **HPE Storage**. You should now be able to browse among all the vCenter Server instances that were configured using vSphere Enhanced linked mode.



Appendix F: Resources

The section [Finding More Information](#) on page 8 contains pointers that can be helpful as you are configuring and using dHCI. Here are some additional resources:

- [HPE Welcome Center](#)
- [HPE Storage Validated Configuration Matrix](#)
- [HPE Alletra dHCI solution security guide](#)
- [HPE Alletra dHCI solution network considerations guide](#)
- [HPE Alletra dHCI Switch Configuration Guide - M-Series Switches](#)
- [HPE Alletra dHCI Switch Configuration Guide - Aruba 832x and 6300](#)
- [HPE Integrated Lights Out \(iLO\) – Configuring the NIC Settings](#)
- [HPE Alletra 6000, 5000, Alletra documentation page of the HPE InfoSight portal \(login required\)](#)
- [Array Installation – Alletra 5000](#)
- [Installation Guide – Alletra 5000](#)
- [Array Installation – Alletra 6000](#)
- [Installation Guide – Alletra 6000](#)
- [HPE Nimble Storage and Alletra 5000 / 6000 Peer Persistence Deployment Considerations](#)
- [VMware API and SDK documentation](#)
- [HPE iLO RESTful API](#)
- [Managing Hewlett Packard Enterprise Servers Using the RESTful API](#)

