Get started with NetApp HCI

HCI

NetApp
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Table of Contents

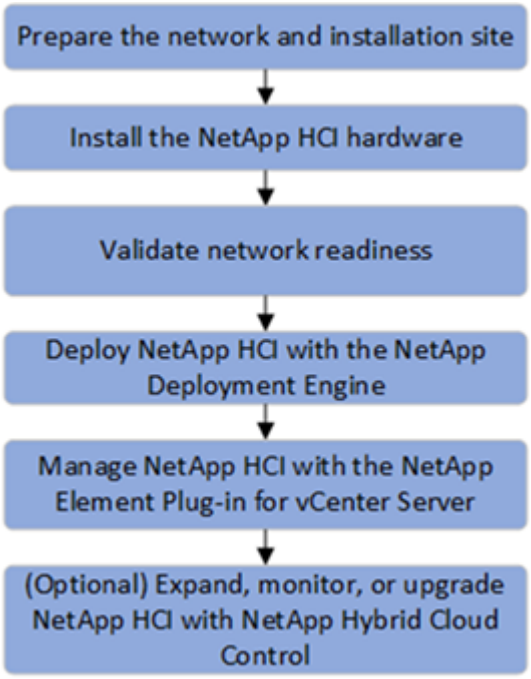
Get started with NetApp HCI 1
NetApp HCI installation and deployment overview 1
Install H-series hardware 7

Get started with NetApp HCI

NetApp HCI installation and deployment overview

Use these instructions to install and deploy NetApp HCI. These instructions include links to more details.

Here is an overview of the process.



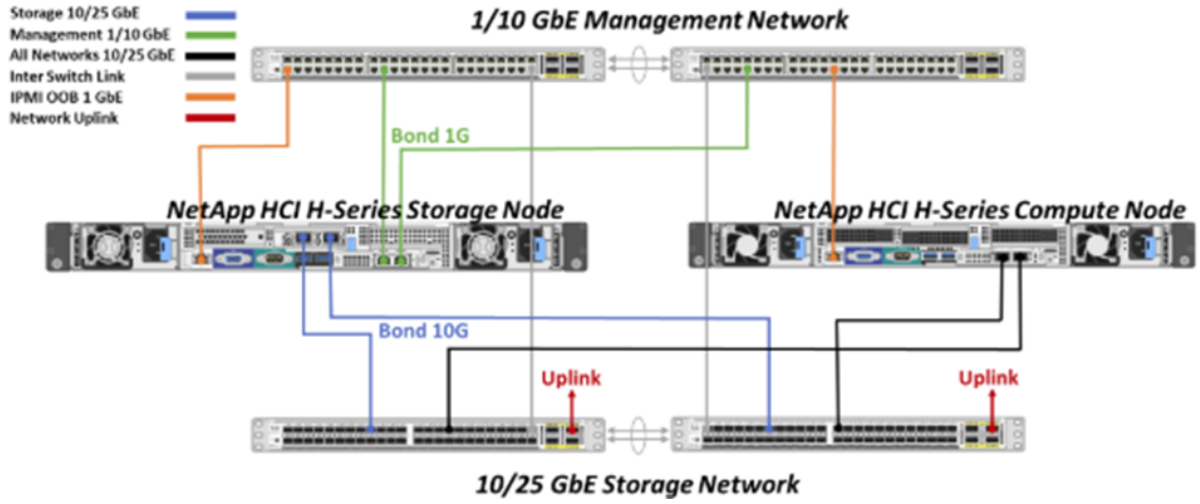
Prepare for installation

Before you begin the installation, complete the *NetApp HCI Installation Discovery Workbook* pre-flight checklist sent to you prior to receiving the hardware.

Prepare the network and installation sites

Here is a simplified NetApp HCI network topology installation:

NetApp HCI Simplified Network Topology Installation



This is the simplified network topology for a single storage node and single compute node. The minimum cluster for NetApp HCI is two storage and two compute nodes.

Your network topology might differ from what is shown here. This is an example only.

This setup uses two network cables on the compute nodes for connectivity to all NetApp HCI networks.

Read these resources:

- Use the *NetApp HCI Installation Discovery Workbook* to configure your network before the installation.
- For details and other supported configurations, see *TR-4820: NetApp HCI Networking Quick Planning Guide* and the *NetApp HCI Installation and Setup Instructions*.
- For information about NetApp HCI configurations smaller than four storage nodes, see *TR-4823: NetApp HCI 2-Node Storage Cluster*.

This setup consolidates all traffic onto two physical, redundant ports, reducing the cabling and streamlining network configuration. This configuration requires that the storage, vMotion and any virtual machine network segments use VLAN tagging. The management network segment can use native or tagged VLAN; however, native VLAN is the preferred mode so that NetApp Deployment Engine (NDE) can assign network resources in an automated manner (Zero Conf).

This mode requires vSphere Distributed Switches (vDS), which require VMware vSphere Enterprise Plus licensing.

Networking requirements before you begin

- Bond1G is a logical interface that combines 1GbE network ports on storage nodes and a management interface on compute nodes. This network is used for NDE API traffic. All nodes must be able to communicate over the management interface in the same L2 network.
- Bond10G is a logical interface that combines 10/25GbE ports and are used by NDE for beaconing

and inventory. All nodes must be able to communicate over the Bond10G interface with non-fragmented jumbo frames.

- NDE requires at a minimum one manually assigned IP address on the Bond1G interface on one storage node. NDE will be run from this node.
- All nodes will have temporary IP addresses assigned by NDE discovery, which is accomplished by Automatic Private IP Addressing (APIPA).

During the NDE process, all nodes will then be assigned permanent IP addresses and any APIPA assigned temporary IPs will be released.

- NDE requires separate networks for management, iSCSI and vMotion that are preconfigured on the switch network.

Install NetApp HCI hardware

NetApp HCI can be installed in different configurations:

- H410C compute nodes: Two-cable configuration or six-cable configuration
- H610C compute node: Two-cable configuration
- H615C compute node: Two-cable configuration
- H410S storage node
- H610S storage node

For precautions and details, see Install H-series hardware.

Steps

1. Install the rails and the chassis.
2. Install nodes in the chassis and install drives for storage nodes. (Applies only if you are installing H410C and H410S in a NetApp H-series chassis.)
3. Cable the compute node.
4. Cable the storage node.
5. Connect the power cords.
6. Power on the NetApp HCI nodes.

Validate network readiness

To ensure network readiness for NetApp HCI, install the NetApp Configuration Advisor 5.8.1 or later. This network validation tool is located with other NetApp Support Tools. Use this tool to validate connectivity, VLAN IDs, IP address requirements, switch connectivity and more.

Deploy NetApp HCI using the NetApp Deployment Engine (NDE)

The NDE UI is the software wizard interface used to install NetApp HCI.

Launch the NDE UI

NetApp HCI uses a storage node management network IPv4 address for initial access to the NDE. As a best practice, connect from the first storage node.

Prerequisites

- You already assigned the initial storage node management network IP address manually or by using DHCP.
- You must have physical access to the NetApp HCI installation.

Steps

1. If you do not know the initial storage node management network IP, use the Terminal User Interface (TUI), which is accessed via keyboard and monitor on the storage node or use a USB stick.

   For details, see *Accessing the NetApp Deployment Engine*.

2. If you do know the IP address, from a web browser, connect to the Bond1G address of the primary node via HTTP, not HTTPS.

   Example: `http://<IP_address>:442/nde/`

Deploy NetApp HCI with the NDE UI

1. In the NDE, accept the prerequisites, check to use Active IQ, and accept license agreements.
2. Optionally, enable Data Fabric File Services by ONTAP Select and accept the ONTAP Select license.
3. Configure a new vCenter deployment. Click **Configure Using a Fully Qualified Domain Name** and enter both the vCenter Server Domain Name and DNS Server IP address.

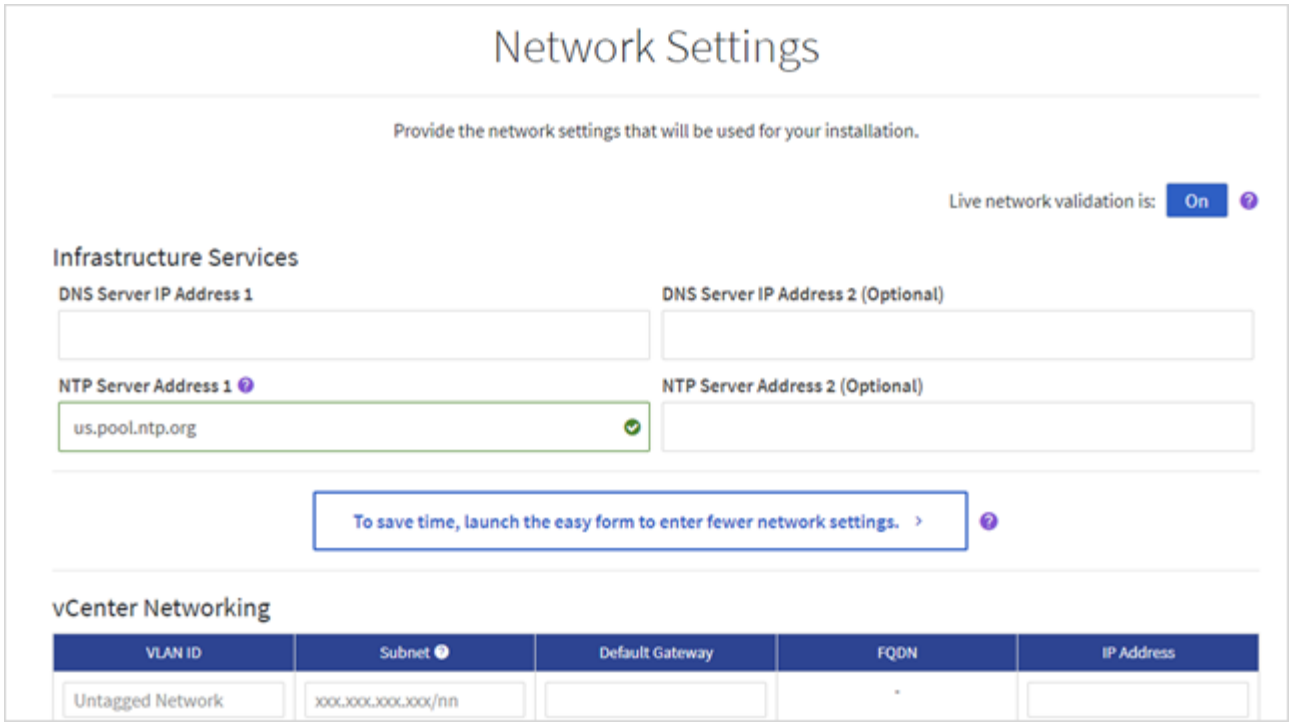
   

   It is strongly recommended to use the FQDN approach for vCenter installation.

4. Review that the inventory assessment of all nodes completed successfully.

   The storage node that is running the NDE is already checked.

5. Select all nodes and click **Continue**.
6. Configure network settings. Refer to the *NetApp HCI Installation Discovery Workbook* for the values to use.
7. Click the blue box to launch the easy form.



8. On the Network Settings Easy Form:
   a. Type the Naming Prefix. (Refer to the System Details of the *NetApp HCI Installation Discovery Workbook*.)
   b. Click **No** for Will you assign VLAN IDs? (You assign them later in the main Network Settings page.)
   c. Type the subnet CIDR, default gateway, and starting IP address for the management, vMotion, and iSCI networks according to your workbook. (Refer to the IP Assignment Method section of the *NetApp HCI Installation Discovery Workbook* for these values.)
   d. Click **Apply to Network Settings**.
9. Join an existing vCenter (optional). See the *NetApp HCI Deployment Guide* in the NetApp HCI Documentation Center.
10. Record node serial numbers in the *NetApp HCI Installation Discovery Workbook*.
11. Specify a VLAN ID for the vMotion Network and any network that requires VLAN tagging. See the *NetApp HCI Installation Discovery Workbook*.
12. Download your configuration as a .CSV file.
13. Click **Start Deployment**.
14. Copy and save the URL that appears.

It can take about 45 minutes to complete the deployment.

Verify the installation using the vSphere Web Client

1. Launch the vSphere Web Client and log in using the credentials specified during NDE use.

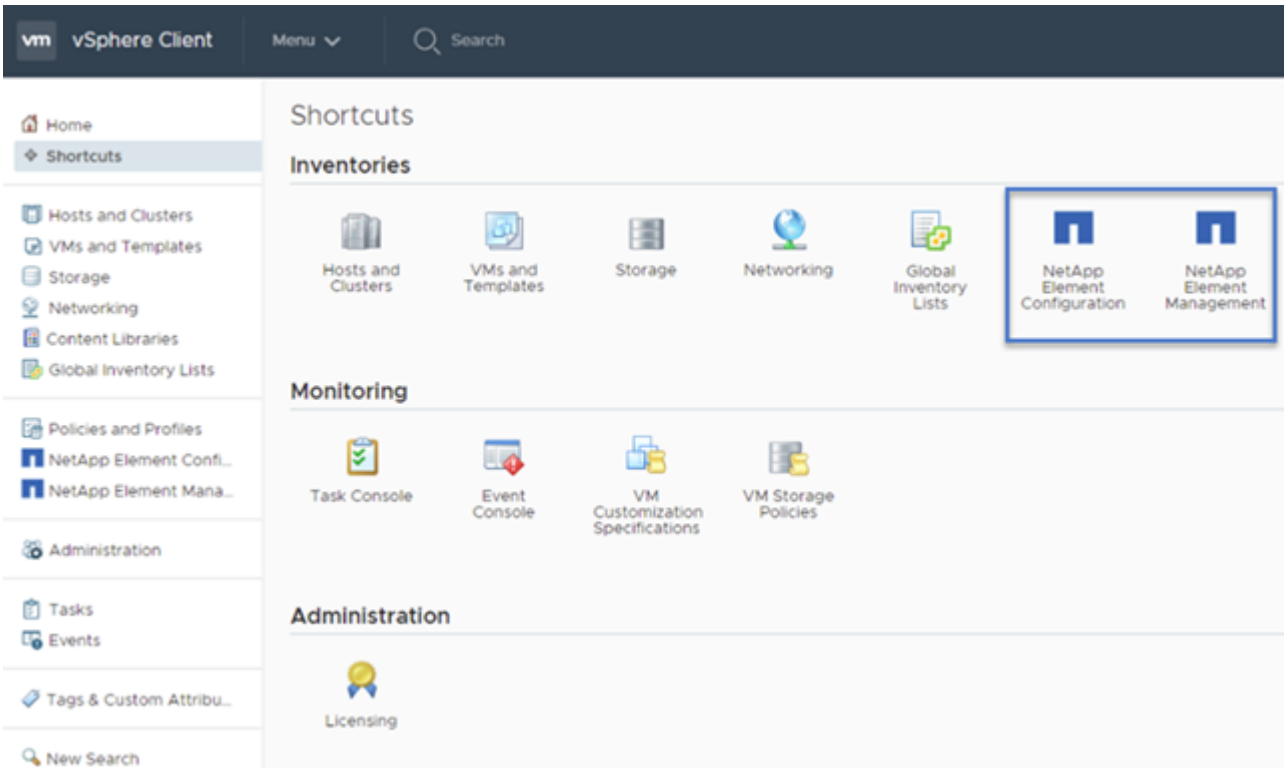
   You must append `@vsphere.local` to the user name.

2. Verify that no alarms are present.
3. Verify that the vCenter, mNode, and ONTAP Select (optional) appliances are running without warning icons.
4. Observe that the two default datastores (NetApp-HCI-Datastore_01 & 02) are created.
5. Select each datastore and ensure that all compute nodes are listed in the Hosts tab.
6. Validate vMotion and Datastore-02.
   a. Migrate the vCenter Server to NetApp-HCI-Datastore-02 (storage only vMotion).
   b. Migrate the vCenter Server to each of the compute nodes (compute only vMotion).
7. Go to the NetApp Element Plug-in for vCenter Server and ensure that the cluster is visible.
8. Ensure no alerts appear on the Dashboard.

Manage NetApp HCI using the vCenter Plug-in

After you install NetApp HCI, you can configure clusters, volumes, datastores, logs, access groups, initiators, and Quality of Service (QoS) policies by using the NetApp Element Plug-in for vCenter Server.

For details, see the *NetApp Element Plug-in for vCenter Server Guide*.



(Optional) Monitor, upgrade, or expand NetApp HCI with the Hybrid Cloud Control

You can use the NetApp HCI Hybrid Cloud Control to monitor, upgrade, or expand your system.

You log in to NetApp Hybrid Cloud Control by browsing to the IP address of the management node.

Using the Hybrid Cloud Control, you can do the following:

- Monitor your NetApp HCI installation
- Upgrade your NetApp HCI system
- Expand your NetApp HCI storage or compute resources

Steps

1. Open a web browser and browse to the IP address of the management node. For example:

   https://<*ManagementNodeIP*>

2. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI storage cluster administrator credentials.

   The NetApp Hybrid Cloud Control interface appears.

Find more information

- NetApp HCI Resources page
- NetApp HCI Documentation Center
- *NetApp HCI Installation and Setup Instructions*
- *TR-4820: NetApp HCI Networking Quick Planning Guide*
- *NetApp Element Plug-in for vCenter Server Guide*.
- NetApp Configuration Advisor 5.8.1 or later network validation tool
- NetApp SolidFire Active IQ Documentation

Install H-series hardware

Use these instructions to install rails and H-series nodes.

See the poster for a visual representation of the instructions.

- Workflow diagrams
- Prepare for installation

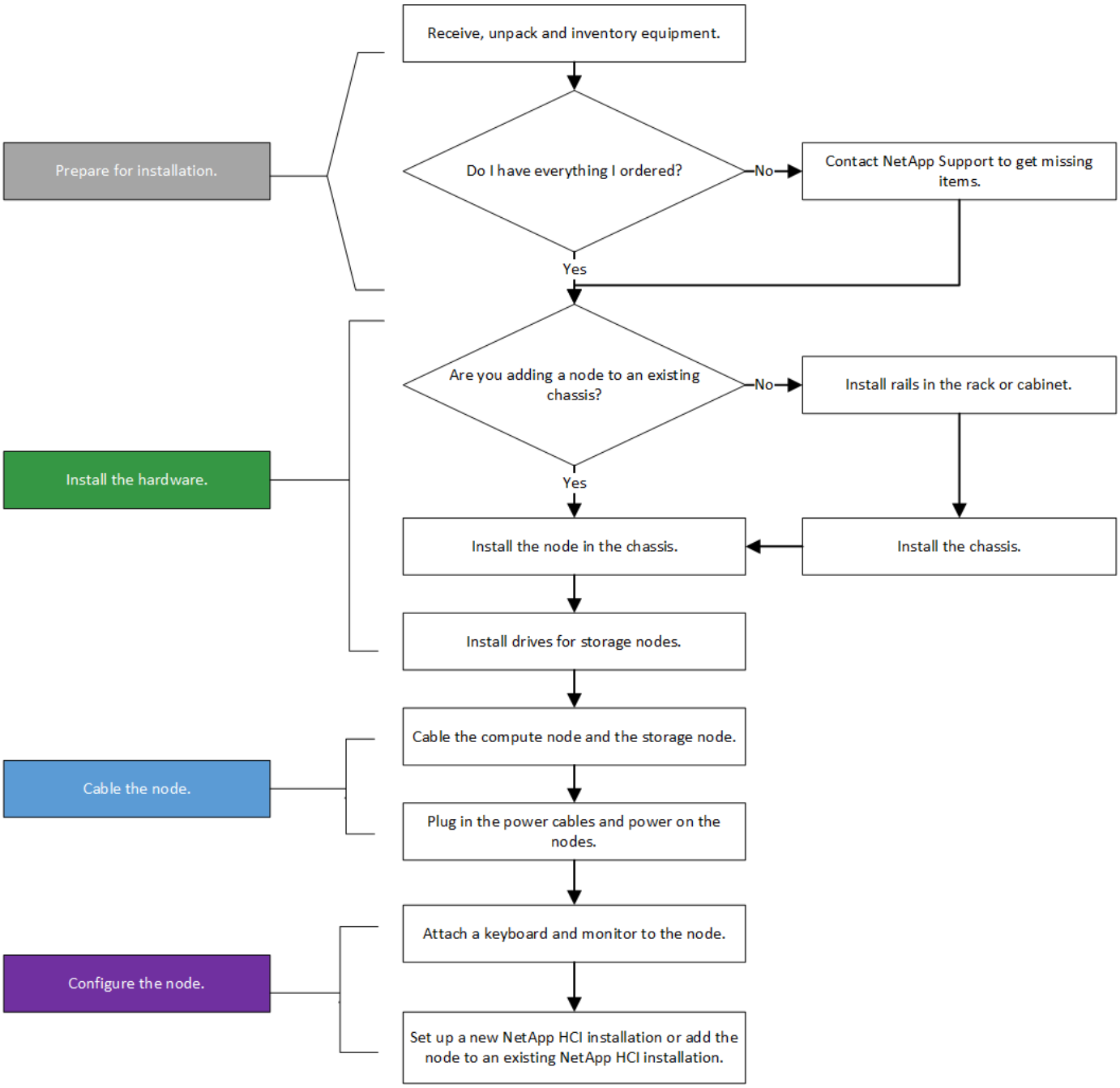
- Install rails
- Install the node/chassis
- Cable the nodes
- Power on the nodes
- Configure NetApp HCI
- Perform post-configuration tasks

Workflow diagrams

The workflow diagrams here provide a high-level overview of the installation steps. The steps vary slightly depending on the H-series model.

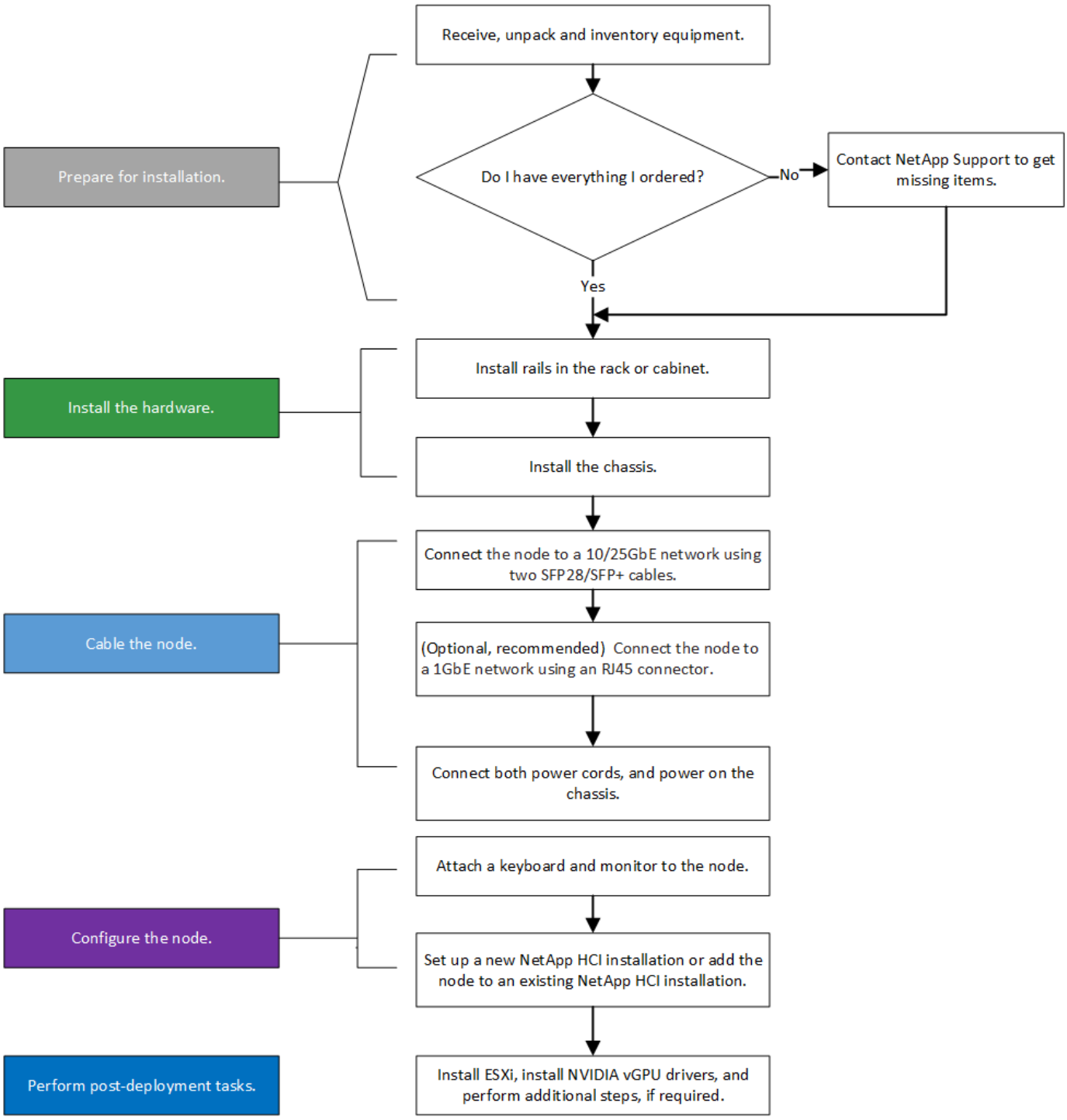
- H410C and H410S
- H610C and H615C
- H610S

H410C and H410S



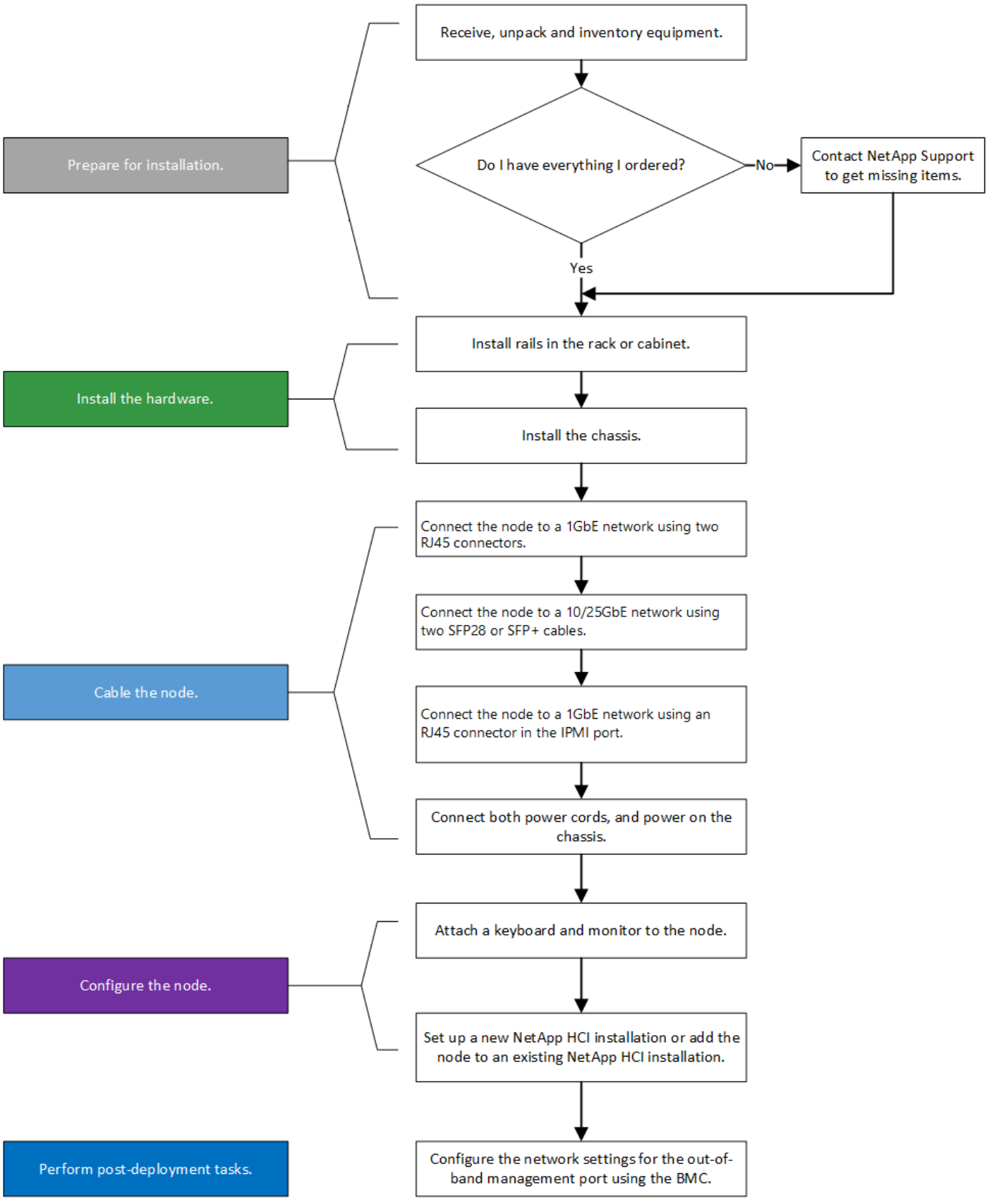
H610C and H615C

The terms "node" and "chassis" are used interchangeably in the case of H610C and H615C, because node and chassis are not separate components unlike in the case of a 2U, four-node chassis.



H610S

The terms "node" and "chassis" are used interchangeably in the case of H610C and H615C, because node and chassis are not separate components unlike in the case of a 2U, four-node chassis.



Prepare for installation

In preparation for installation, inventory the hardware that was shipped to you, and contact NetApp Support if any of the items are missing.

Ensure that you have the following items at your installation location:

- Rack space for the system.

Node type	Rack space
H410C and H410S nodes	Two rack unit (2U)
H610C node	2U
H615C and H610S nodes	One rack unit (1U)

- SFP28/SFP+ direct-attach cables or transceivers
- CAT5e or higher cables with RJ45 connector
- A keyboard, video, mouse (KVM) switch to configure your system
- USB stick (optional)

The hardware that is shipped to you depends on what you order. A new 2U, four-node order includes the chassis, bezel, slide rail kit, drives for storage nodes, storage and compute nodes, and power cables (two per chassis). If you order H610S storage nodes, the drives will come installed in the chassis.

Install rails

The hardware order that was shipped to you includes a set of slide rails. You will need a screwdriver to complete the rail installation. The installation steps vary slightly for each node model.

Install hardware from the bottom of the rack up to the top to prevent the equipment from toppling over. If your rack includes stabilizing devices, install them before you install the hardware.

- H410C and H410S
- H610C
- H610S and H615C

H410C and H410S

H410C and H410S nodes are installed in 2U, four-node H-Series chassis, which is shipped with two sets of adapters. If you want to install the chassis in a rack with round holes, use the adapters appropriate for a rack with round holes. The rails for H410C and H410S nodes fit a rack between 29 inches and 33.5 inches in depth. When the rail is fully contracted, it is 28 inches long, and the front and rear sections of the rail are held together by only one screw.

If you install the chassis onto a fully contracted rail, the front and rear sections of the rail might separate.

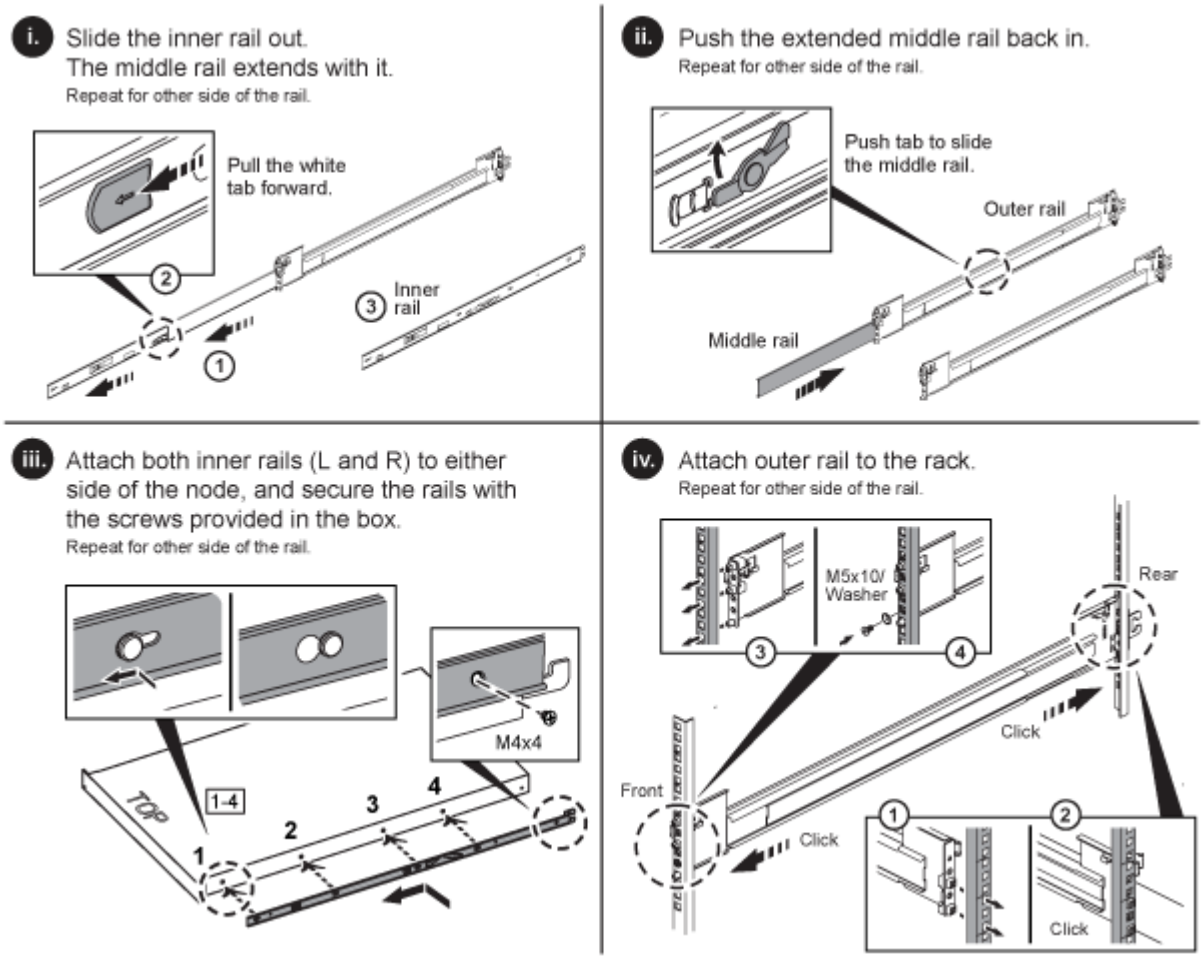
Steps

1. Align the front of the rail with the holes on the front post of the rack.
2. Push the hooks on the front of the rail into the holes on the front post of the rack and then down, until the spring-loaded pegs snap into the rack holes.
3. Attach the rail to the rack with screws. Here is an illustration of the left rail being attached to the front of the rack:

4. Extend the rear section of the rail to the rear post of the rack.
5. Align the hooks on the rear of the rail with the appropriate holes on the rear post ensuring that the front and the back of the rail are on the same level.
6. Mount the rear of the rail onto the rack, and secure the rail with screws.
7. Perform all the above steps for the other side of the rack.

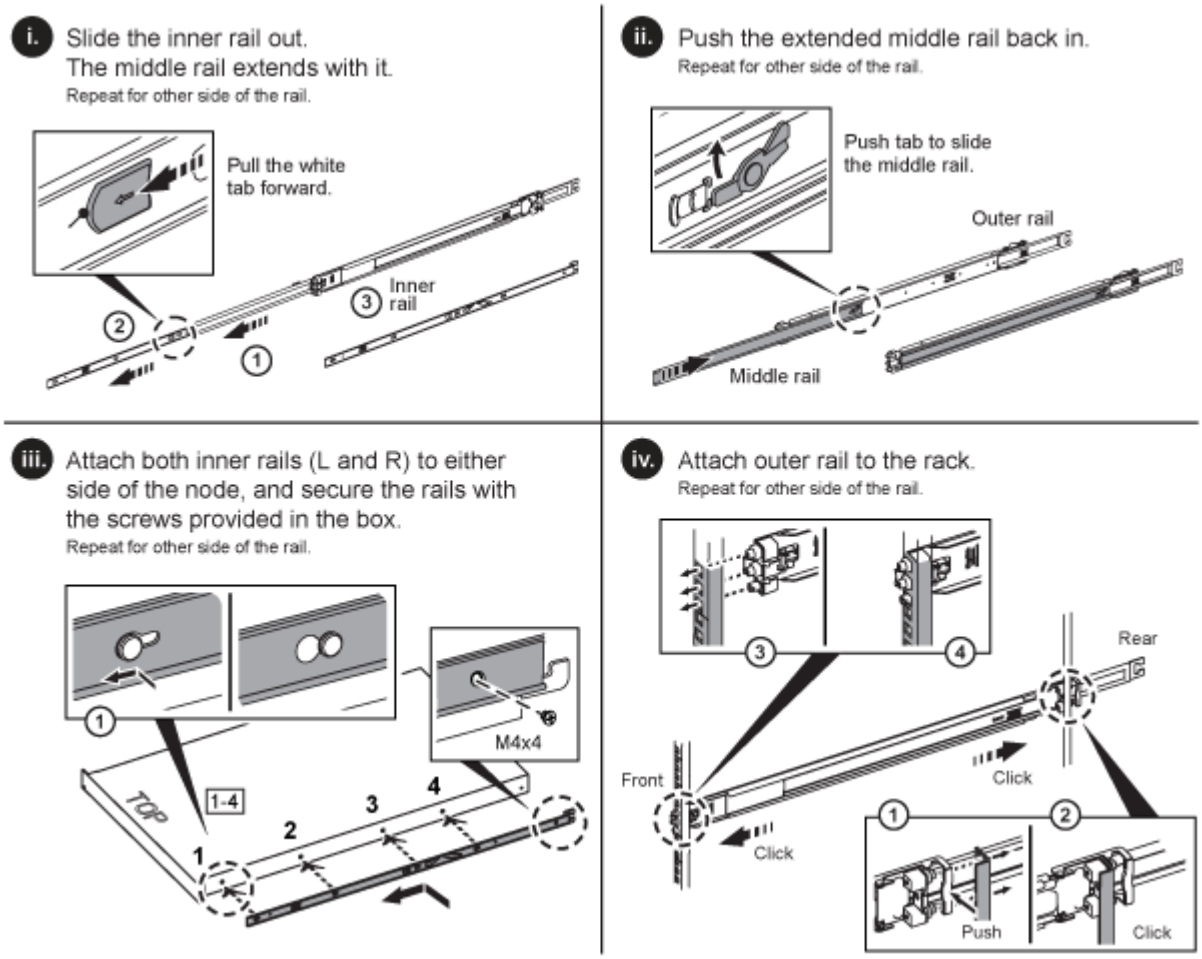
H610C

Here is an illustration for installing rails for an H61OC compute node:



H610S and H615C

Here is an illustration for installing rails for an H610S storage node or an H615C compute node:



Install the node/chassis

You will install the H410C compute node and H410S storage node in a 2U, four-node chassis. For H610C, H615C, and H610S, you will install the chassis/node directly onto the rails in the rack.

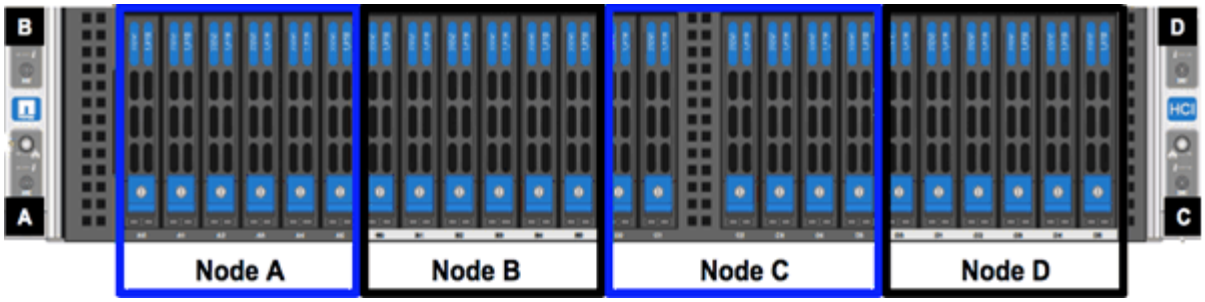
- H410C and H410S nodes
- H610C node/chassis
- H610S and H615C node/chassis

H410C and H410S nodes

Steps

1. Install the H410C and H410S nodes in the chassis. Here is a rear-view example of a chassis with four nodes installed:

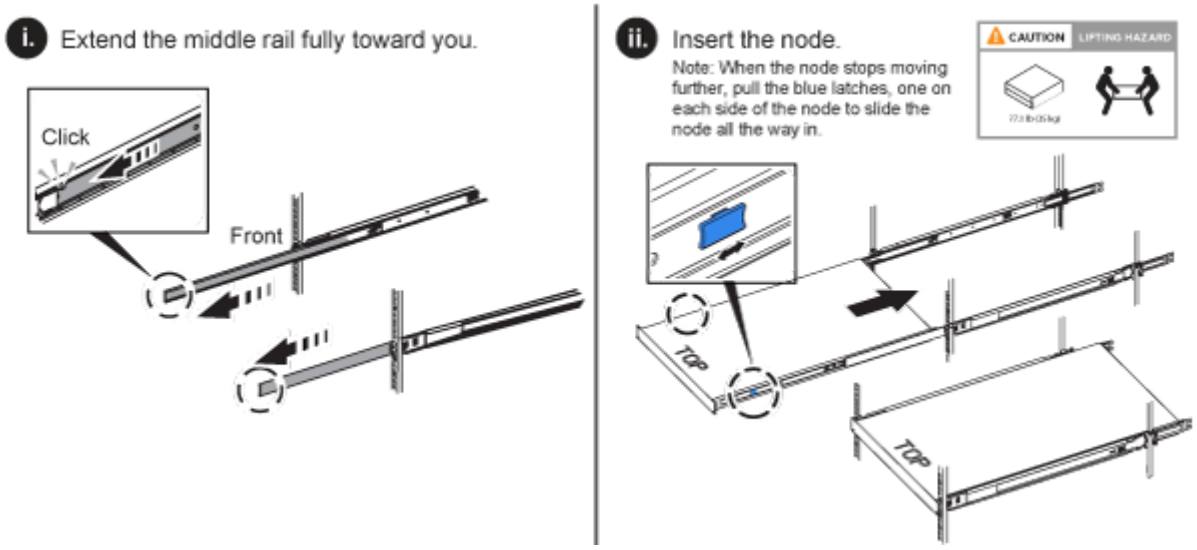
2. Install drives for H410S storage nodes.



H610C node/chassis

In the case of H610C, the terms "node" and "chassis" are used interchangeably because node and chassis are not separate components, unlike in the case of the 2U, four-node chassis.

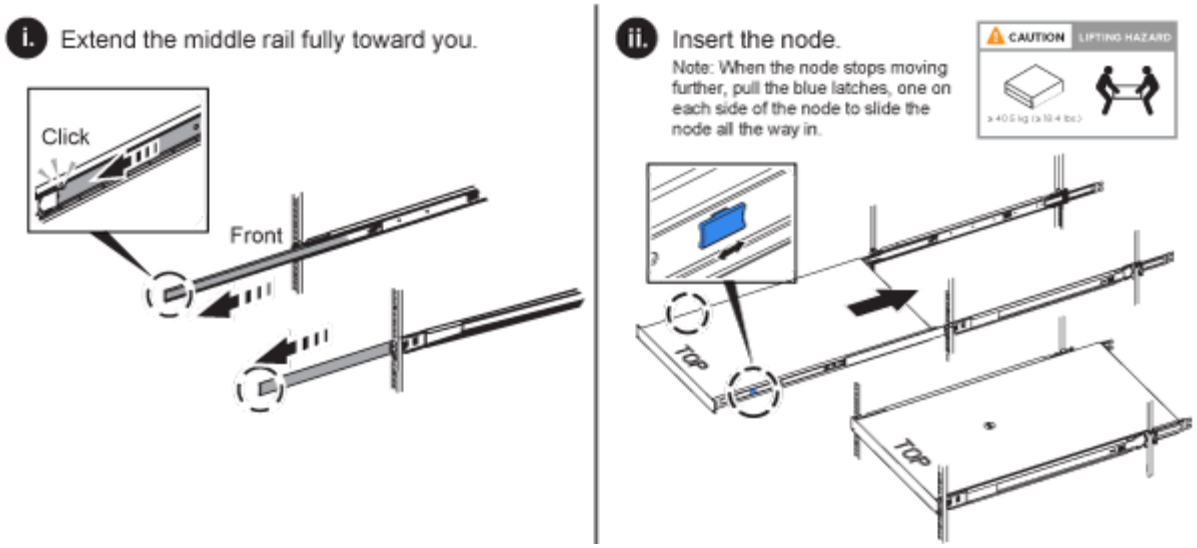
Here is an illustration for installing the node/chassis in the rack:



H610S and H615C node/chassis

In the case of H615C and H610S, the terms "node" and "chassis" are used interchangeably because node and chassis are not separate components, unlike in the case of the 2U, four-node chassis.

Here is an illustration for installing the node/chassis in the rack:



Cable the nodes

If you are adding nodes to an existing NetApp HCI installation, ensure that the cabling and network configuration of the nodes that you add are identical to the existing installation.

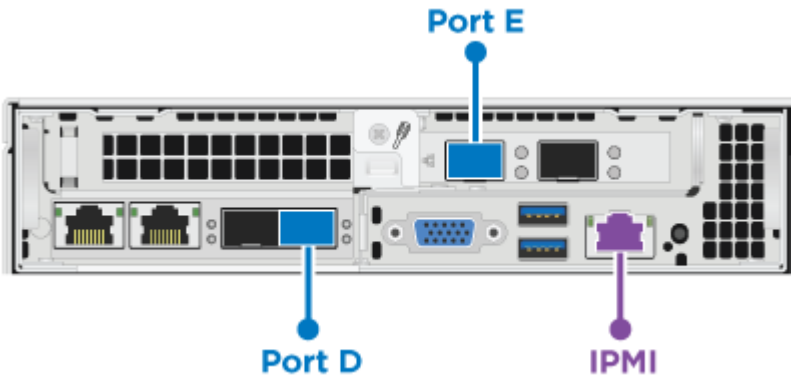
Ensure that the airflow vents at the rear of the chassis are not blocked by cables or labels. This can lead to premature component failures due to overheating.

- H410C compute node and H410S storage node
- H610C compute node
- H615C compute node
- H610S storage node

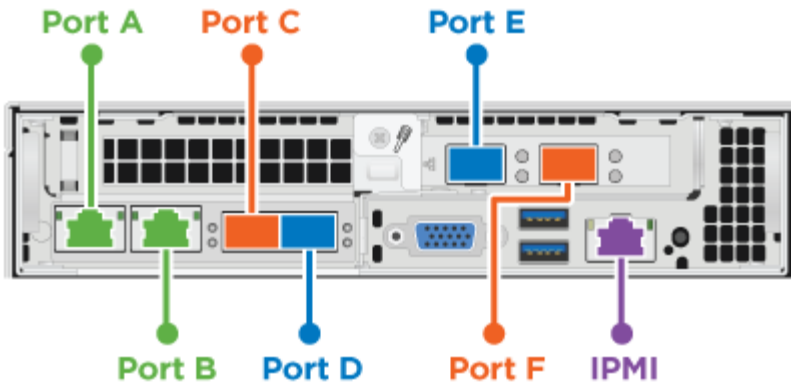
H410C compute node and H410S storage node

You have two options for cabling the H410C node: using two cables or using six cables.

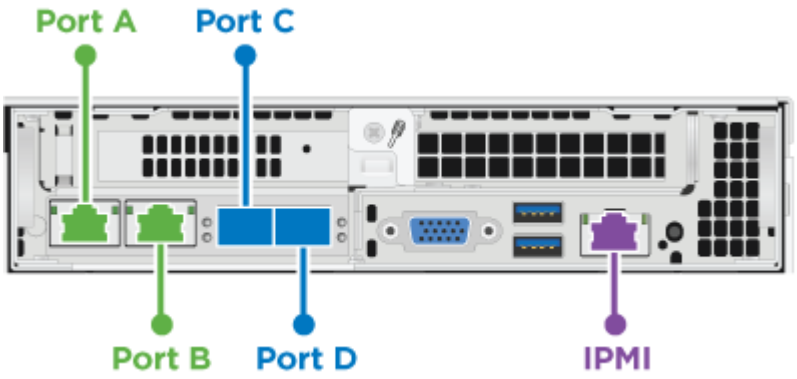
Here is the two-cable configuration:



Here is the six-cable configuration:



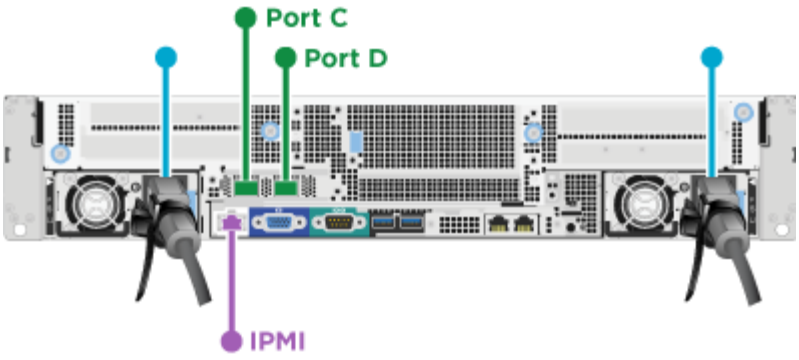
Here is the cabling for the H410S node:



After you cable the nodes, connect the power cords to the two power supply units per chassis and plug them into 240V PDU or power outlet.

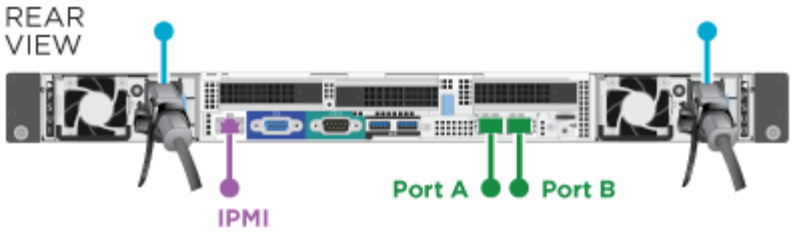
H610C compute node

Here is the cabling for the H610C node:



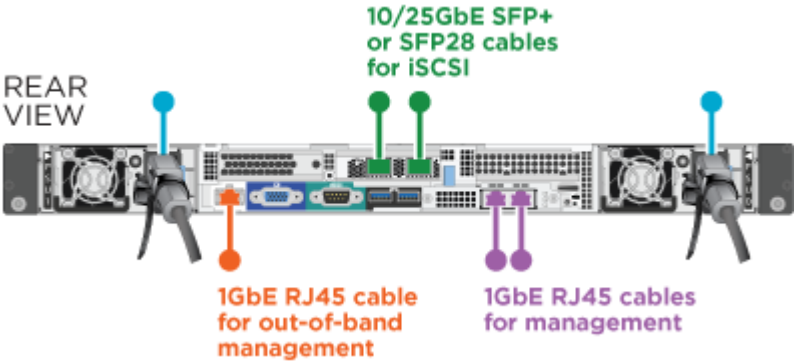
H615C compute node

Here is the cabling for the H615C node:



H610S storage node

Here is the cabling for the H610S node:



Power on the nodes

It takes approximately six minutes for the nodes to boot.

Here is an illustration that shows the power button on the NetApp HCI chassis that has H410C and H410S nodes:

Here is an illustration that shows the power button on the H610C node:

Here is an illustration that shows the power button on the H615C and H610S nodes:

Configure NetApp HCI

Choose from one of the following options:

- New NetApp HCI installation
- Expanding an existing NetApp HCI installation

New NetApp HCI installation

Steps

1. Configure an IPv4 address on the management network (Bond1G) on one NetApp HCI storage node.

   If you are using DHCP on the management network, you can connect to the DHCP-acquired IPv4 address of the storage system.

   a. Plug in a keyboard, video, mouse (KVM) to the back of one storage node.

   b. Configure the IP address, subnet mask, and gateway address for Bond1G in the user interface. You can also configure a VLAN ID for the Bond1G network.

2. Using a supported web browser (Mozilla Firefox, Google Chrome, or Microsoft Edge), navigate to the NetApp Deployment Engine by connecting to the IPv4 address that you configured in Step 1.
3. Use the NetApp Deployment Engine user interface (UI) to configure NetApp HCI.

   All the other NetApp HCI nodes will be discovered automatically.

Expanding an existing NetApp HCI installation

Steps

1. Open a web browser and browse to the IP address of the management node.
2. Log in to NetApp Hybrid Cloud Control by providing the NetApp HCI storage cluster administrator credentials.

   See Access NetApp Hybrid Cloud Control.

3. Follow the steps in the wizard to add storage and/or compute nodes to your NetApp HCI installation.

To add H410C compute nodes, the existing installation must run NetApp HCI 1.4 or later. To add H615C compute nodes, the existing installation must run NetApp HCI 1.7 or later.

The newly installed NetApp HCI nodes on the same network will be discovered automatically.

Perform post-configuration tasks

Depending on the type of node you have, you might need to perform additional steps after you install the hardware and configure NetApp HCI.

- H610C node
- H615C and H610S nodes

H610C node

Install the GPU drivers in ESXi for each H610C node that you installed, and validate their functionality.

H615C and H610S nodes

Steps

1. Use a web browser and navigate to the default BMC IP address: `192.168.0.120`
2. Log in using user name `root` and password `calvin`.
3. From the node management screen, navigate to **Settings** > **Network Settings**, and configure the network parameters for the out-of-band management port.

If your H615C node has GPUs in it, install GPU drivers in ESXi for each H615C node that you installed, and validate their functionality.

Find more information

- NetApp HCI Resources page
- NetApp HCI Documentation Center
- *TR-4820: NetApp HCI Networking Quick Planning Guide*
- NetApp Configuration Advisor 5.8.1 or later network validation tool
- NetApp SolidFire Active IQ Documentation