∏ NetApp

Install or recover a management node

HCI

NetApp
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Table of Contents

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Install a management node

You can manually install the management node for your cluster running NetApp Element software using the appropriate image for your configuration.

This manual process is intended for SolidFire all-flash storage administrators and NetApp HCI administrators who are not using the NetApp Deployment Engine for management node installation.

What you'll need

- Your cluster version is running NetApp Element software 11.3 or later.

- Your installation uses IPv4. The management node 11.3 does not support IPv6.

    ⓘ   If you need to IPv6 support, you can use the management node 11.1.

- You have permission to download software from the NetApp Support Site.

- You have identified the management node image type that is correct for your platform:

Platform	Installation image type
Microsoft Hyper-V	.iso
KVM	.iso
VMware vSphere	.iso, .ova
Citrix XenServer	.iso
OpenStack	.iso

- (Management node 12.0 and later with proxy server) You have updated NetApp Hybrid Cloud Control to management services version 2.16 before configuring a proxy server.

About this task

The Element 12.2 management node is an optional upgrade. It is not required for existing deployments.

Prior to following this procedure, you should have an understanding of persistent volumes and whether or not you want to use them. Persistent volumes are optional but recommended for management node configuration data recovery in the event of a virtual machine (VM) loss.

Steps

1. Download ISO or OVA and deploy the VM
2. Create the management node admin and configure the network
3. Configure time sync
4. Set up the management node
5. Configure controller assets
6. (NetApp HCI only) Configure compute node assets

Download ISO or OVA and deploy the VM

1. Download the OVA or ISO for your installation from the NetApp HCI page on the NetApp Support Site:

   a. Select **Download Latest Release** and accept the EULA.

   b. Select the management node image you want to download.

2. If you downloaded the OVA, follow these steps:

   a. Deploy the OVA.

   b. If your storage cluster is on a separate subnet from your management node (eth0) and you want to use persistent volumes, add a second network interface controller (NIC) to the VM on the storage subnet (for example, eth1) or ensure that the management network can route to the storage network.

3. If you downloaded the ISO, follow these steps:

   a. Create a new 64-bit VM from your hypervisor with the following configuration:

      ▪ Six virtual CPUs

      ▪ 24GB RAM

      ▪ Storage adapter type set to LSI Logic Parallel

      > (i) The default for your management node might be LSI Logic SAS. In the **New Virtual Machine** window, verify the storage adapter configuration by selecting **Customize hardware** > **Virtual Hardware**. If required, change LSI Logic SAS to **LSI Logic Parallel**.

      ▪ 400GB virtual disk, thin provisioned

      ▪ One virtual network interface with internet access and access to the storage MVIP.

      ▪ (Optional for SolidFire all-flash storage) One virtual network interface with management network access to the storage cluster. If your storage cluster is on a separate subnet from your management node (eth0) and you want to use persistent volumes, add a second network interface controller (NIC) to the VM on the storage subnet (eth1) or ensure that the management network can route to the storage network.

      > (i) Do not power on the VM prior to the step indicating to do so later in this procedure.

   b. Attach the ISO to the VM and boot to the .iso install image.

      > (i) Installing a management node using the image might result in 30-second delay before the splash screen appears.

4. Power on the VM for the management node after the installation completes.

Create the management node admin and configure the network

1. Using the terminal user interface (TUI), create a management node admin user.

   > (light bulb) To move through the menu options, press the Up or Down arrow keys. To move through the buttons, press Tab. To move from the buttons to the fields, press Tab. To navigate between fields, press the Up or Down arrow keys.

2. If there is a Dynamic Host Configuration Protocol (DHCP) server on the network that assigns IPs with a maximum transmission unit (MTU) less than 1500 bytes, you must perform the following steps:

   a. Temporarily put the management node on a vSphere network without DHCP, such as iSCSI.

   b. Reboot the VM or restart the VM network.

   c. Using the TUI, configure the correct IP on the management network with an MTU greater than or equal to 1500 bytes.

   d. Re-assign the correct VM network to the VM.

   > (i) A DHCP that assigns IPs with an MTU less than 1500 bytes can prevent you configuring the management node network or using the management node UI.

3. Configure the management node network (eth0).

   > (i) If you need an additional NIC to isolate storage traffic, see instructions on configuring another NIC: Configure a storage Network Interface Controller (NIC).

Configure time sync

1. Ensure time is synced between the management node and the storage cluster using NTP:

   > (i) Starting with Element 12.3.1, substeps (a) to (e) are performed automatically. For management node 12.3.1, proceed to substep (f) to complete the time sync configuration.

   a. Log in to the management node using SSH or the console provided by your hypervisor.

   b. Stop NTPD:

   ```
   sudo service ntpd stop
   ```

   c. Edit the NTP configuration file `/etc/ntp.conf`:

   i. Comment out the default servers (`server 0.gentoo.pool.ntp.org`) by adding a # in front of each.

   ii. Add a new line for each default time server you want to add. The default time servers must be the same NTP servers used on the storage cluster that you will use in a later step.

   ```
   vi /etc/ntp.conf

   #server 0.gentoo.pool.ntp.org
   #server 1.gentoo.pool.ntp.org
   #server 2.gentoo.pool.ntp.org
   #server 3.gentoo.pool.ntp.org
   server <insert the hostname or IP address of the default time
   server>
   ```

   iii. Save the configuration file when complete.

d. Force an NTP sync with the newly added server.

```
sudo ntpd -gq
```

e. Restart NTPD.

```
sudo service ntpd start
```

f. Disable time synchronization with host via the hypervisor (the following is a VMware example):

> (i) If you deploy the mNode in a hypervisor environment other than VMware, for example, from the .iso image in an Openstack environment, refer to the hypervisor documentation for the equivalent commands.

   i. Disable periodic time synchronization:

```
vmware-toolbox-cmd timesync disable
```

   ii. Display and confirm the current status of the service:

```
vmware-toolbox-cmd timesync status
```

   iii. In vSphere, verify that the `Synchronize guest time with host` box is un-checked in the VM options.

   > (i) Do not enable this option if you make future changes to the VM.

> (i) Do not edit the NTP after you complete the time sync configuration because it affects the NTP when you run the setup command on the management node.

Set up the management node

1. Configure and run the management node setup command:

> (i) You will be prompted to enter passwords in a secure prompt. If your cluster is behind a proxy server, you must configure the proxy settings so you can reach a public network.

```
/sf/packages/mnode/setup-mnode --mnode_admin_user [username]
--storage_mvip [mvip] --storage_username [username] --telemetry_active
[true]
```

a. Replace the value in [ ] brackets (including the brackets) for each of the following required parameters:

> ⓘ The abbreviated form of the command name is in parentheses ( ) and can be substituted for the full name.

- **--mnode_admin_user (-mu) [username]**: The username for the management node administrator account. This is likely to be the username for the user account you used to log into the management node.

- **--storage_mvip (-sm) [MVIP address]**: The management virtual IP address (MVIP) of the storage cluster running Element software. Configure the management node with the same storage cluster that you used during NTP servers configuration.

- **--storage_username (-su) [username]**: The storage cluster administrator username for the cluster specified by the `--storage_mvip` parameter.

- **--telemetry_active (-t) [true]**: Retain the value true that enables data collection for analytics by Active IQ.

b. (Optional): Add Active IQ endpoint parameters to the command:

- **--remote_host (-rh) [AIQ_endpoint]**: The endpoint where Active IQ telemetry data is sent to be processed. If the parameter is not included, the default endpoint is used.

c. (Recommended): Add the following persistent volume parameters. Do not modify or delete the account and volumes created for persistent volumes functionality or a loss in management capability will result.

- **--use_persistent_volumes (-pv) [true/false, default: false]**: Enable or disable persistent volumes. Enter the value true to enable persistent volumes functionality.

- **--persistent_volumes_account (-pva) [account_name]**: If `--use_persistent_volumes` is set to true, use this parameter and enter the storage account name that will be used for persistent volumes.

> ⓘ Use a unique account name for persistent volumes that is different from any existing account name on the cluster. It is critically important to keep the account for persistent volumes separate from the rest of your environment.

- **--persistent_volumes_mvip (-pvm) [mvip]**: Enter the management virtual IP address (MVIP) of the storage cluster running Element software that will be used with persistent volumes. This is only required if multiple storage clusters are managed by the management node. If multiple clusters are not managed, the default cluster MVIP will be used.

d. Configure a proxy server:

- **--use_proxy (-up) [true/false, default: false]**: Enable or disable the use of the proxy. This parameter is required to configure a proxy server.

- **--proxy_hostname_or_ip (-pi) [host]**: The proxy hostname or IP. This is required if you want to use a proxy. If you specify this, you will be prompted to input `--proxy_port`.

- **--proxy_username (-pu) [username]**: The proxy username. This parameter is optional.

- **--proxy_password (-pp) [password]**: The proxy password. This parameter is optional.

- **--proxy_port (-pq) [port, default: 0]**: The proxy port. If you specify this, you will be prompted to input the proxy host name or IP (`--proxy_hostname_or_ip`).

- **--proxy_ssh_port (-ps) [port, default: 443]**: The SSH proxy port. This defaults to port 443.

e. (Optional) Use parameter help if you need additional information about each parameter:

- **--help (-h)**: Returns information about each parameter. Parameters are defined as required or optional based on initial deployment. Upgrade and redeployment parameter requirements might

vary.

    f. Run the `setup-mnode` command.

Configure controller assets

1. Locate the installation ID:

    a. From a browser, log into the management node REST API UI:

    b. Go to the storage MVIP and log in. This action causes the certificate to be accepted for the next step.

    c. Open the inventory service REST API UI on the management node:

```
https://<ManagementNodeIP>/inventory/1/
```

    d. Select **Authorize** and complete the following:

        i. Enter the cluster user name and password.

        ii. Enter the client ID as `mnode-client`.

        iii. Select **Authorize** to begin a session.

    e. From the REST API UI, select **GET /installations**.

    f. Select **Try it out**.

    g. Select **Execute**.

    h. From the code 200 response body, copy and save the `id` for the installation for use in a later step.

    Your installation has a base asset configuration that was created during installation or upgrade.

2. (NetApp HCI only) Locate the hardware tag for your compute node in vSphere:

    a. Select the host in the vSphere Web Client navigator.

    b. Select the **Monitor** tab, and select **Hardware Health**.

    c. The node BIOS manufacturer and model number are listed. Copy and save the value for `tag` for use in a later step.

3. Add a vCenter controller asset for NetApp HCI monitoring (NetApp HCI installations only) and Hybrid Cloud Control (for all installations) to the management node known assets:

    a. Access the mnode service API UI on the management node by entering the management node IP address followed by `/mnode`:

```
https:/<ManagementNodeIP>/mnode
```

    b. Select **Authorize** or any lock icon and complete the following:

        i. Enter the cluster user name and password.

        ii. Enter the client ID as `mnode-client`.

        iii. Select **Authorize** to begin a session.

        iv. Close the window.

c. Select **POST /assets/{asset_id}/controllers** to add a controller sub-asset.

> ℹ️ It is recommended that you create a new NetApp HCC role in vCenter to add a controller sub-asset. This new NetApp HCC role will limit the management node services view to NetApp-only assets. See Create a NetApp HCC role in vCenter.

d. Select **Try it out**.

e. Enter the parent base asset ID you copied to your clipboard in the **asset_id** field.

f. Enter the required payload values with type `vCenter` and vCenter credentials.

g. Select **Execute**.

(NetApp HCI only) Configure compute node assets

1. (For NetApp HCI only) Add a compute node asset to the management node known assets:

   a. Select **POST /assets/{asset_id}/compute-nodes** to add a compute node sub-asset with credentials for the compute node asset.

   b. Select **Try it out**.

   c. Enter the parent base asset ID you copied to your clipboard in the **asset_id** field.

   d. In the payload, enter the required payload values as defined in the Model tab. Enter `ESXi Host` as `type` and enter the hardware tag you saved during a previous step for `hardware_tag`.

   e. Select **Execute**.

Find more Information

- Persistent volumes
- Add compute and controller assets to the management node
- Configure a storage NIC
- NetApp Element Plug-in for vCenter Server
- NetApp HCI Resources Page

Configure a storage Network Interface Controller (NIC)

If you are using an additional NIC for storage, you can SSH in to the management node or use the vCenter console and run a curl command to set up a tagged or untagged network interface.

Before you begin

- You know your eth0 IP address.
- Your cluster version is running NetApp Element software 11.3 or later.
- You have deployed a management node 11.3 or later.

Configuration options

Choose the option that is relevant for your environment:

- Configure a storage Network Interface Controller (NIC) for an untagged network interface

Configure a storage Network Interface Controller (NIC) for an untagged network interface

Steps

1. Open an SSH or vCenter console.

2. Replace the values in the following command template and run the command:

> (i) Values are represented by $ for each of the required parameters for your new storage network interface. The `cluster` object in the following template is required and can be used for management node host name renaming. `--insecure` or `-k` options should not be used in production environments.

```
curl -u $mnode_user_name:$mnode_password --insecure -X POST \
https://$mnode_IP:442/json-rpc/10.0 \
-H 'Content-Type: application/json' \
-H 'cache-control: no-cache' \
-d ' {
    "params": {
            "network": {
                    "$eth1": {
                            "#default" : false,
                            "address" : "$storage_IP",
                            "auto" : true,
                            "family" : "inet",
                            "method" : "static",
                            "mtu" : "9000",
                            "netmask" : "$subnet_mask",
                            "status" : "Up"
                            }
                    },
            "cluster": {
                    "name": "$mnode_host_name"
                    }
            },
    "method": "SetConfig"
}
'
```

Configure a storage Network Interface Controller (NIC) for a tagged network interface

Steps

1. Open an SSH or vCenter console.

2. Replace the values in the following command template and run the command:

> (i) Values are represented by `$` for each of the required parameters for your new storage network interface. The `cluster` object in the following template is required and can be used for management node host name renaming. `--insecure` or `-k` options should not be used in production environments.

```
curl -u $mnode_user_name:$mnode_password --insecure -X POST \
https://$mnode_IP:442/json-rpc/10.0 \
-H 'Content-Type: application/json' \
-H 'cache-control: no-cache' \
-d ' {
     "params": {
             "network": {
                     "$eth1": {
                             "#default" : false,
                             "address" : "$storage_IP",
                             "auto" : true,
                             "family" : "inet",
                             "method" : "static",
                             "mtu" : "9000",
                             "netmask" : "$subnet_mask",
                             "status" : "Up",
                             "virtualNetworkTag" : "$vlan_id"
                             }
                     },
             "cluster": {
                     "name": "$mnode_host_name",
                     "cipi": "$eth1.$vlan_id",
                     "sipi": "$eth1.$vlan_id"
                     }
             },
     "method": "SetConfig"
}
'
```

Find more Information

- Add compute and controller assets to the management node
- NetApp Element Plug-in for vCenter Server
- NetApp HCI Resources Page

Recover a management node

You can manually recover and redeploy the management node for your cluster running NetApp Element software if your previous management node used persistent volumes.

You can deploy a new OVA and run a redeploy script to pull configuration data from a previously installed management node running version 11.3 and later.

What you'll need

- Your previous management node was running NetApp Element software version 11.3 or later with persistent volumes functionality engaged.
- You know the MVIP and SVIP of the cluster containing the persistent volumes.
- Your cluster version is running NetApp Element software 11.3 or later.
- Your installation uses IPv4. The management node 11.3 does not support IPv6.
- You have permission to download software from the NetApp Support Site.
- You have identified the management node image type that is correct for your platform:

Platform	Installation image type
Microsoft Hyper-V	.iso
KVM	.iso
VMware vSphere	.iso, .ova
Citrix XenServer	.iso
OpenStack	.iso

Steps

1. Download ISO or OVA and deploy the VM
2. Configure the network
3. Configure time sync
4. Configure the management node

Download ISO or OVA and deploy the VM

1. Download the OVA or ISO for your installation from the NetApp HCI page on the NetApp Support Site:

   a. Click **Download Latest Release** and accept the EULA.

   b. Select the management node image you want to download.

2. If you downloaded the OVA, follow these steps:

   a. Deploy the OVA.

   b. If your storage cluster is on a separate subnet from your management node (eth0) and you want to use persistent volumes, add a second network interface controller (NIC) to the VM on the storage subnet (for example, eth1) or ensure that the management network can route to the storage network.

3. If you downloaded the ISO, follow these steps:

   a. Create a new 64-bit virtual machine from your hypervisor with the following configuration:

- Six virtual CPUs
- 24GB RAM
- 400GB virtual disk, thin provisioned
- One virtual network interface with internet access and access to the storage MVIP.
- (Optional for SolidFire all-flash storage) One virtual network interface with management network access to the storage cluster. If your storage cluster is on a separate subnet from your management node (eth0) and you want to use persistent volumes, add a second network interface controller (NIC) to the VM on the storage subnet (eth1) or ensure that the management network can route to the storage network.

> (i) Do not power on the virtual machine prior to the step indicating to do so later in this procedure.

   b. Attach the ISO to the virtual machine and boot to the .iso install image.

> (i) Installing a management node using the image might result in 30-second delay before the splash screen appears.

4. Power on the virtual machine for the management node after the installation completes.

Configure the network

1. Using the terminal user interface (TUI), create a management node admin user.

> (💡) To move through the menu options, press the Up or Down arrow keys. To move through the buttons, press Tab. To move from the buttons to the fields, press Tab. To navigate between fields, press the Up or Down arrow keys.

2. Configure the management node network (eth0).

> (i) If you need an additional NIC to isolate storage traffic, see instructions on configuring another NIC: Configure a storage Network Interface Controller (NIC).

Configure time sync

1. Ensure time is synced between the management node and the storage cluster using NTP:

> (i) Starting with Element 12.3.1, substeps (a) to (e) are performed automatically. For management node 12.3.1, proceed to substep (f) to complete the time sync configuration.

   a. Log in to the management node using SSH or the console provided by your hypervisor.

   b. Stop NTPD:

```
sudo service ntpd stop
```

   c. Edit the NTP configuration file `/etc/ntp.conf`:

i. Comment out the default servers (`server 0.gentoo.pool.ntp.org`) by adding a # in front of each.

ii. Add a new line for each default time server you want to add. The default time servers must be the same NTP servers used on the storage cluster that you will use in a later step.

```
vi /etc/ntp.conf

#server 0.gentoo.pool.ntp.org
#server 1.gentoo.pool.ntp.org
#server 2.gentoo.pool.ntp.org
#server 3.gentoo.pool.ntp.org
server <insert the hostname or IP address of the default time server>
```

iii. Save the configuration file when complete.

d. Force an NTP sync with the newly added server.

```
sudo ntpd -gq
```

e. Restart NTPD.

```
sudo service ntpd start
```

f. Disable time synchronization with host via the hypervisor (the following is a VMware example):

> (i) If you deploy the mNode in a hypervisor environment other than VMware, for example, from the .iso image in an Openstack environment, refer to the hypervisor documentation for the equivalent commands.

i. Disable periodic time synchronization:

```
vmware-toolbox-cmd timesync disable
```

ii. Display and confirm the current status of the service:

```
vmware-toolbox-cmd timesync status
```

iii. In vSphere, verify that the `Synchronize guest time with host` box is un-checked in the VM options.

> (i) Do not enable this option if you make future changes to the VM.

> ⓘ Do not edit the NTP after you complete the time sync configuration because it affects the NTP when you run the redeploy command on the management node.

Configure the management node

1. Create a temporary destination directory for the management services bundle contents:

```
mkdir -p /sf/etc/mnode/mnode-archive
```

2. Download the management services bundle (version 2.15.28 or later) that was previously installed on the existing management node and save it in the `/sf/etc/mnode/` directory.

3. Extract the downloaded bundle using the following command, replacing the value in [ ] brackets (including the brackets) with the name of the bundle file:

```
tar -C /sf/etc/mnode -xvf /sf/etc/mnode/[management services bundle
file]
```

4. Extract the resulting file to the `/sf/etc/mnode-archive` directory:

```
tar -C /sf/etc/mnode/mnode-archive -xvf
/sf/etc/mnode/services_deploy_bundle.tar.gz
```

5. Create a configuration file for accounts and volumes:

```
echo '{"trident": true, "mvip": "[mvip IP address]", "account_name":
"[persistent volume account name]"}' | sudo tee /sf/etc/mnode/mnode-
archive/management-services-metadata.json
```

   a. Replace the value in [ ] brackets (including the brackets) for each of the following required parameters:
   - **[mvip IP address]**: The management virtual IP address of the storage cluster. Configure the management node with the same storage cluster that you used during NTP servers configuration.
   - **[persistent volume account name]**: The name of the account associated with all persistent volumes in this storage cluster.

6. Configure and run the management node redeploy command to connect to persistent volumes hosted on the cluster and start services with previous management node configuration data:

> ⓘ You will be prompted to enter passwords in a secure prompt. If your cluster is behind a proxy server, you must configure the proxy settings so you can reach a public network.

```
/sf/packages/mnode/redeploy-mnode --mnode_admin_user [username]
```

a. Replace the value in [ ] brackets (including the brackets) with the user name for the management node administrator account. This is likely to be the username for the user account you used to log into the management node.

> ⓘ You can add the user name or allow the script to prompt you for the information.

b. Run the `redeploy-mnode` command. The script displays a success message when the redeployment is complete.

c. If you access Element or NetApp HCI web interfaces (such as the management node or NetApp Hybrid Cloud Control) using the Fully Qualified Domain Name (FQDN) of the system, reconfigure authentication for the management node.

> ⓘ SSH capability that provides NetApp Support remote support tunnel (RST) session access is disabled by default on management nodes running management services 2.18 and later. If you had previously enabled SSH functionality on the management node, you might need to disable SSH again on the recovered management node.

Find more Information

- Persistent volumes
- NetApp Element Plug-in for vCenter Server
- NetApp HCI Resources Page