



NetApp Element Software

Setup Guide

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 **NetApp**[®]

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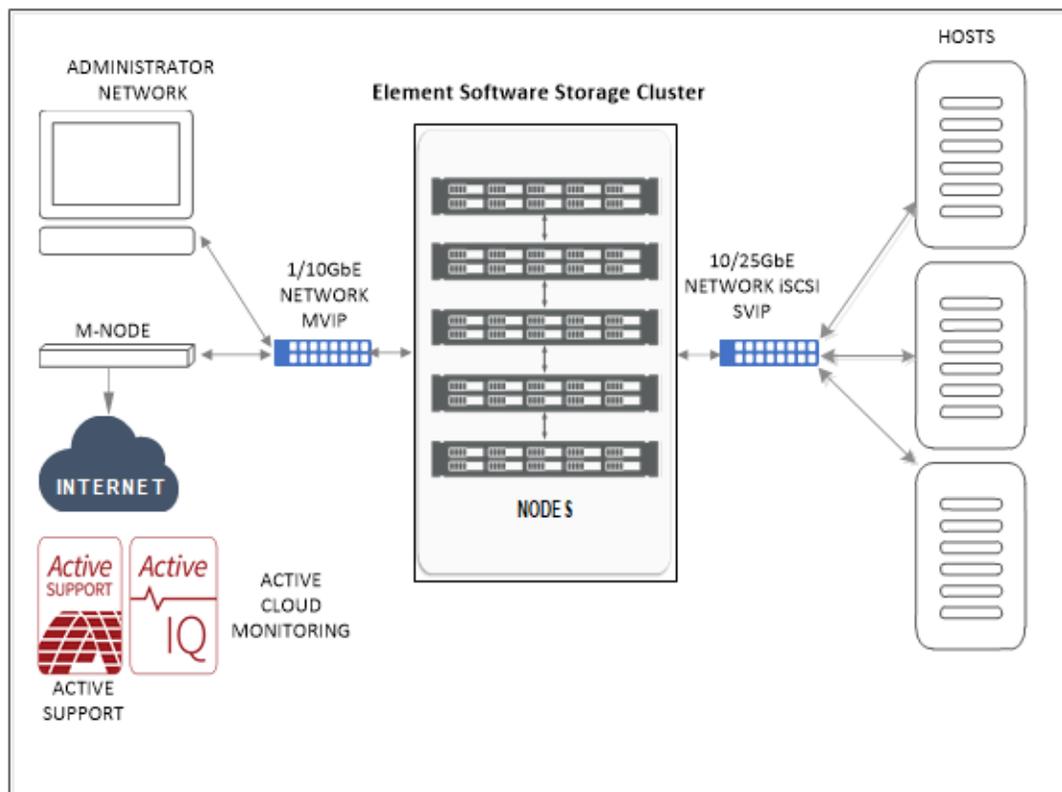
SolidFire storage system

The SolidFire storage system contains hardware and software designed for complete system automation and management.

Using the NetApp Element software user interface, you can set up and monitor SolidFire cluster storage capacity and performance, and manage storage activity across a multi-tenant infrastructure. The UI is built on the NetApp Element software API, which enables you to see system adjustments almost immediately.

The SolidFire storage system includes the following:

- Cluster, the hub of the SolidFire storage system, is made up of a collection of nodes
- Nodes are the hardware components grouped into a cluster. There are two types of nodes:
 - Storage nodes, which is a server containing a collection of drives
 - Fibre Channel (FC) nodes, which you use to connect to FC clients
- Drives are used in storage nodes and store data for the cluster. A storage node contains two types of drives:
 - Volume metadata drives store information that defines the volumes and other objects within a cluster.
 - Block drives store data blocks for application volumes.



Configuring a storage node

You must configure individual nodes before you can add them to a cluster. When you install and cable a node in a rack unit and power it on, the terminal user interface (TUI) displays the fields necessary to configure the node. Ensure that you have the necessary configuration information for the node before proceeding.

Alternatively, you can configure these settings by accessing the node via the Element UI using the Dynamic Host Configuration Protocol (DHCP) 1G management IP address displayed in the TUI. The DHCP address is located in the menu bar at the top of the TUI.

You cannot add a node with DHCP assigned IP addresses to a cluster. You can use the DHCP IP address to initially configure the node in the Element UI, TUI, or API. During this initial configuration, you can add the static IP address information so that you can add the node to a cluster.

After initial configuration, you can access the node using the node's management IP address. You can then change the node settings, add it to a cluster, or use the node to create a cluster. You can also configure a new node using Element software API methods.

Note: Beginning in Element version 11.0, nodes can be configured with IPv4, IPv6, or both addresses for their management network. This applies to both storage nodes and management nodes. When you create a cluster, only a single IPv4 or IPv6 address can be used for the MVIP and the corresponding address type must be configured on all nodes.

Related concepts

[Configuring iDRAC on each new node](#) on page 6

Related tasks

[Configuring the node using the TUI](#) on page 5

[Configuring the node using the node UI](#) on page 6

[Creating a new cluster](#) on page 8

Related references

[Node states](#) on page 7

Configuring the node using the TUI

You can use the terminal user interface (TUI) to perform initial configuration for new nodes.

About this task

You should configure the Bond1G and Bond10G interfaces for separate subnets. Bond1G and Bond10G interfaces configured for the same subnet causes routing problems when storage traffic is sent via the Bond1G interface. If you must use the same subnet for management and storage traffic, manually configure management traffic to use the Bond10G interface. You can do this for each node using the Cluster Settings page of the Element UI.

Steps

1. Attach a keyboard and monitor to the node and then power on the node.

The TUI appears on the tty1 terminal with the Network Settings tab. If a DHCP server is running on the network with available IP addresses, the 1GbE address appears in the Address field.

Note: If the node cannot reach your configuration server, the TUI displays an error message. Check your configuration server connection or the networking connection to resolve the error.

2. Use the on-screen navigation to configure the 1G and 10G network settings for the node.
Tip: To enter text, press **Enter** on the keyboard to open edit mode. After you enter text, press **Enter** again to close the edit mode. To navigate between fields, use the arrow keys.
3. Enter **s** to save the settings, and then enter **y** to accept the changes.
4. Enter **c** to navigate to the **Cluster** tab.
5. Use the on-screen navigation to configure the cluster settings for the node.
All the nodes in a cluster must have identical cluster names. Cluster names are case-sensitive.
6. Enter **s** to save the settings, and then enter **y** to accept the changes.
The node is put in a pending state and can be added to an existing cluster or a new cluster.

Related tasks

[Creating a new cluster](#) on page 8

Configuring iDRAC on each new node

NetApp installs Dell iDRAC Enterprise on each node. iDRAC enables you to remotely manage and monitor the underlying hardware of each node in the cluster.

Remember: You should change the default iDRAC credentials on each node.

Related information

[How to configure iDRAC on a SolidFire storage node](#)

[How to install an iDRAC Enterprise license](#)

Configuring the node using the node UI

You can configure nodes using the Node Configuration user interface.

About this task

- You can configure the node using IPv4 or IPv6 addressing.
- You need the DHCP address displayed in the TUI to access a node. You cannot use DHCP addresses to add a node to a cluster.

Attention: You should configure the Bond1G and Bond10G interfaces for separate subnets. Bond1G and Bond10G interfaces configured for the same subnet causes routing problems when storage traffic is sent via the Bond1G interface. If you must use the same subnet for management and storage traffic, manually configure management traffic to use the Bond10G interface. You can do this for each node using the Cluster Settings page of the Element UI.

Steps

1. In a browser window, enter the DHCP IP address of a node.
You must add the extension `:442` to access the node; for example, `https://172.25.103.6:442`.

The Network Settings tab opens with the Network Settings – Bond1G section.

2. Enter the 1G network settings.
3. Click **Save Changes**.
4. Click **Bond10G** to display the settings for the 10G network settings.
5. Enter the 10G network settings.
6. Click **Save Changes**.
7. Click **Cluster Settings**.
8. Enter the hostname for the 10G network.
9. Click **Save Changes**.

Related tasks

[Configuring the node using the TUI](#) on page 5

Node states

A node can be in one of several states depending on the level of configuration.

- Available: The node has no associated cluster name and is not yet part of a cluster.
- Pending: The node is configured and can be added to a designated cluster. Authentication is not required to access the node.
- PendingActive: The system is in the process of installing compatible Element software on the node. When complete, the node will move to the Active state.
- Active: The node is participating in a cluster. Authentication is required to modify the node.

In each of these states, some fields are read only.

Creating a new cluster

You can create a new cluster after you have configured individual nodes. When you create a cluster, a cluster administrator user account is automatically created for you. The cluster administrator has permission to manage all cluster attributes and can create other cluster administrator accounts.

Before you begin

- You have installed the management node.
- You have configured individual nodes.

About this task

During new node configuration, 1G or 10G Management IP (MIP) addresses are assigned to each node. You must use one of the node IP addresses created during configuration to open the Create a New Cluster page. The IP address you use depends on the network you have chosen for cluster management.

Note: When creating a new cluster, if you are using storage nodes that reside in a shared chassis, you might want to consider designing for chassis-level failure protection using the protection domains feature. Protection domains are automatically enabled with the appropriate node and chassis distribution.

Steps

1. In a browser window, enter a node MIP address.
2. In **Create a New Cluster**, enter the following information:
 - Management VIP: Routable virtual IP on the 1GbE or 10GbE network for network management tasks.
Note: You can create a new cluster using IPv4 or IPv6 addressing.
 - iSCSI (storage) VIP: Virtual IP on the 10GbE network for storage and iSCSI discovery.
Note: You cannot change the SVIP after you create the cluster.
 - User name: The primary cluster administrator user name for authenticated access to the cluster. You must save the user name for future reference.
Note: You can use uppercase and lowercase letters, special characters, and numbers for the user name.
 - Password: Password for authenticated access to the cluster. You must save the user name for future reference.

Two-way data protection is enabled by default. You cannot change this setting.

3. Read the End User License Agreement, and click **I Agree**.
4. Optional: In the Nodes list, ensure that the check boxes for nodes that should not be included in the cluster are not selected.
5. Click **Create Cluster**.

The system might take several minutes to create the cluster depending on the number of nodes in the cluster. On a properly configured network, a small cluster of five nodes should take less than

one minute. After the cluster is created, the Create a New Cluster window is redirected to the MVIP URL address for the cluster and displays the Element UI.

Managing storage with the Element software UI

You can use the NetApp Element software web user interface (Element UI) to monitor and perform common tasks on your SolidFire system.

You can access the UI by using the management virtual IP (MVIP) address of the primary cluster node.

Accessing the Element software user interface

You can access the Element UI by using the management virtual IP (MVIP) address of the primary cluster node.

Before you begin

You must ensure that popup blockers and NoScript settings are disabled in your browser.

About this task

You can access the UI using IPv4 or IPv6 addressing.

Steps

1. Choose one of the following:
 - IPv6: Enter `https://[IPv6 MVIP address]`For example:

```
https://[fd20:8b1e:b256:45a::1234]/
```
 - IPv4: Enter `https://<IPv4 MVIP address>`. For example:

```
https://10.123.456.789/
```
2. For DNS, enter the host name.
3. Click through any authentication certificate messages.

Adding drives to a cluster

When you add a node to the cluster or install new drives in an existing node, the drives automatically register as available. You must add the drives to the cluster using either the Element UI or API before it can participate in the cluster.

About this task

Drives are not displayed in the Available Drives list when the following conditions exist:

- Drives are in Active, Removing, Erasing, or Failed state.
- The node of which the drive is a part of is in Pending state.

Steps

1. From the Element user interface, select **Cluster > Drives**.
2. Click **Available** to view the list of available drives.
3. Do one of the following:
 - To add individual drives, click the **Actions** icon for the drive you want to add and click **Add**.
 - To add multiple drives, select the check boxes of the drives to add, click **Bulk Actions**, and click **Add**.

Configuring a Fibre Channel node

Fibre Channel nodes enable you to connect the cluster to a Fibre Channel network fabric. Fibre Channel nodes are added in pairs, and operate in active-active mode (all nodes actively process traffic for the cluster). Clusters running Element software version 9.0 and later support up to four nodes; clusters running previous versions support a maximum of two nodes.

You must ensure that the following conditions are met before you configure a Fibre Channel node:

- At least two Fibre Channel nodes are connected to Fibre Channel switches.
- All SolidFire Fibre Channel ports should be connected to your Fibre Channel fabric. The four SolidFire Bond10G network connections should be connected in one LACP bond group at the switch level. This will enable the best overall performance from the Fibre Channel systems.

Network and cluster configuration steps are the same for Fibre Channel nodes and storage nodes.

When you create a new cluster with Fibre Channel nodes and SolidFire storage nodes, the worldwide port name (WWPN) addresses for the nodes are available in the Element UI. You can use the WWPN addresses to zone the Fibre Channel switch.

WWPNs are registered in the system when you create a new cluster with nodes. In the Element UI, you can find the WWPN addresses from the WWPN column of the FC Ports tab, which you access from the Cluster tab.

Related tasks

[Adding Fibre Channel nodes to a cluster](#) on page 13

[Creating a new cluster with Fibre Channel nodes](#) on page 14

Adding Fibre Channel nodes to a cluster

You can add Fibre Channel nodes to a cluster when more storage is needed or during cluster creation. Fibre Channel nodes require initial configuration when they are first powered on. After the node is configured, it appears in the list of pending nodes and you can add it to a cluster.

About this task

The software version on each Fibre Channel node in a cluster must be compatible. When you add a Fibre Channel node to a cluster, the cluster installs the cluster version of Element on the new node as needed.

Steps

1. Select **Cluster > Nodes**.
2. Click **Pending** to view the list of pending nodes.
3. Do one of the following:
 - To add individual nodes, click the **Actions** icon for the node you want to add.
 - To add multiple nodes, select the check box of the nodes to add, and then **Bulk Actions**.

Note:

If the node you are adding has a different version of Element than the version running on the cluster, the cluster asynchronously updates the node to the version of Element running on the

cluster master. After the node is updated, it automatically adds itself to the cluster. During this asynchronous process, the node will be in a pendingActive state.

4. Click **Add.**

The node appears in the list of active nodes.

Creating a new cluster with Fibre Channel nodes

You can create a new cluster after you have configured the individual Fibre Channel nodes. When you create a cluster, a cluster administrator user account is automatically created for you. The cluster administrator has permission to manage all cluster attributes and can create other cluster administrator accounts.

Before you begin

You have configured the individual Fibre Channel nodes.

About this task

During new node configuration, 1G or 10G Management IP (MIP) addresses are assigned to each node. You must use one of the node IP addresses created during configuration to open the Create a New Cluster page. The IP address you use depends on the network you have chosen for cluster management.

Steps

1. In a browser window, enter a node MIP address.
2. In **Create a New Cluster**, enter the following information:
 - Management VIP: Routable virtual IP on the 1GbE or 10GbE network for network management tasks.
 - iSCSI (storage) VIP: Virtual IP on the 10GbE network for storage and iSCSI discovery.
 - Note:** You cannot change the SVIP after you create the cluster.
 - User name: The primary Cluster Admin user name for authenticated access to the cluster. You must save the user name for future reference.
 - Note:** You can use uppercase and lowercase letters, special characters, and numbers for the user name.
 - Password: Password for authenticated access to the cluster. You must save the user name for future reference.

Two-way data protection is enabled by default. You cannot change this setting.

3. Read the End User License Agreement, and click **I Agree**.
4. Optional: In the Nodes list, ensure that the check boxes for nodes that should not be included in the cluster are not selected.
5. Click **Create Cluster**.

The system might take several minutes to create the cluster depending on the number of nodes in the cluster. On a properly configured network, a small cluster of five nodes should take less than one minute. After the cluster is created, the Create a New Cluster window is redirected to the MVIP URL address for the cluster and displays the web UI.

Zoning for Fibre Channel nodes

When you create a new cluster with Fibre Channel nodes and SolidFire storage nodes, the worldwide port name (WWPN) addresses for the nodes are available in the web UI. You can use the WWPN addresses to zone the Fibre Channel switch.

WWPNs are registered in the system when you create a new cluster with nodes. In the Element UI, you can find the WWPN addresses from the WWPN column of the FC Ports tab, which you access from the Cluster tab.

For details, see the *SolidFire Fibre Channel Configuration Guide TR-4619*.

<https://www.netapp.com/us/media/tr-4619.pdf>

Creating a volume access group for Fibre Channel clients

Volume access groups enable communication between Fibre Channel clients and volumes on a SolidFire storage system. Mapping Fibre Channel client initiators (WWPN) to the volumes in a volume access group enables secure data I/O between a Fibre Channel network and a SolidFire volume.

About this task

You can also add iSCSI initiators to a volume access group; this gives the initiators access to the same volumes in the volume access group.

Steps

1. Click **Management > Access Groups**.
2. Click **Create Access Group**.
3. Enter a name for the volume access group in the **Name** field.
4. Select and add the Fibre Channel initiators from the **Unbound Fibre Channel Initiators** list.
Note: You can add or delete initiators at a later time.
5. Optional: Select and add an iSCSI initiator from the **Initiators** list.
6. To attach volumes to the access group, perform the following steps:
 - a. Select a volume from the **Volumes** list.
 - b. Click **Attach Volume**.
7. Click **Create Access Group**.

Where to find additional information

You can learn more about tasks related to the SolidFire storage system in the extensive NetApp documentation library.

[How to calculate max provisioned space in a SolidFire cluster](#)

Describes how to calculate the max provisioned space in a SolidFire storage cluster. Max provisioned space is the metadata drive capacity in a cluster.

[How to calculate SolidFire system error alert percentage](#)

Describes how to calculate the SolidFire storage cluster fullness percentage at which the system notifies you.

[NetApp SolidFire Element Documentation Library](#)

Includes documentation for various releases of Element software.

[NetApp SolidFire Element Known Issues](#)

Provides a list of known issues in the current and earlier versions of Element software.

[NetApp SolidFire Element Resolved Issues](#)

Provides a list of resolved issues in the current and earlier versions of Element software.

[NetApp SolidFire Resources page](#)

Provides resources about Element software, including links to video content and technical reports.

[NetApp Technical Report 4677: NetApp SolidFire Element OS Remote Replication](#)

Describes different types of remote replication supported by NetApp SolidFire storage clusters.

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