Set up a cluster with storage nodes

Element Software

NetApp
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Setting up a cluster with Element storage nodes

You can set up a cluster with storage nodes and manage it using Element software after you install and cable nodes in a rack unit and power them on. You can then install and configure additional components in your storage system.

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Find more information

- SolidFire and Element Software Documentation

Configure a storage node

You must configure individual nodes before you can add them to a cluster. After you install and cable a node in a rack unit and power it on, you can configure the node network settings using the per-node UI or the node terminal user interface (TUI). Ensure that you have the necessary network configuration information for the node before proceeding.

There are two options for configuring storage nodes:

- Per-node UI: Use the per-node UI (https://<node_management_IP>:442) to configure node network settings.
- TUI: Use the node terminal user interface (TUI) to configure the node.

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 per-node UI, TUI, or API. During this initial configuration, you can add 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.

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, except for management node 11.3 and later which does not support IPv6. 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.

Configure a storage node using the per-node UI

You can configure nodes using the per-node user interface.

About this task

- You can configure the node to have either an IPv4 or IPv6 address.
- 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.

> ⓘ You should configure the management (Bond1G) and storage (Bond10G) interfaces for separate subnets. Bond1G and Bond10G interfaces configured for the same subnet cause 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 per-node 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 **Bond1G** section.

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

   > ⓘ This name must be added to the configuration for all nodes before a cluster can be created. All the nodes in a cluster must have identical cluster names. Cluster names are case-sensitive.

10. Click **Apply Changes**.

Configure a storage node using the TUI

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

You should configure the Bond1G (Management) and Bond10G (Storage) 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** > **Nodes** page of the Element UI.

Steps

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

   The NetApp Storage Main menu of the TUI appears on the tty1 terminal.

   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. Select **Network** > **Network Config**.

   To navigate through the menu, press the Up or Down arrow keys. To move to another button or to the fields from the buttons, press **Tab**. To navigate between fields, use the Up or Down arrow keys.

3. Select **Bond1G (Management)** or **Bond10G (Storage)** to configure the 1G and 10G network settings for the node.
4. For the Bond mode and Status fields, press **Tab** to select the Help button and identify the available options.

   All the nodes in a cluster must have identical cluster names. Cluster names are case-sensitive. If a DHCP server is running on the network with available IP addresses, the 1GbE address appears in the Address field.

5. Press **Tab** to select the **OK** button and save the changes.

   The node is put in a pending state and can be added to an existing cluster or a new cluster.

Find more information

- SolidFire and Element Software Documentation
- NetApp Element Plug-in for vCenter Server

Create a storage cluster

You can create a storage cluster after you have configured all of the 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.

What you'll need

- You have installed the management node.
- You have configured all of the 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.

If you want to enable cluster-wide software encryption at rest for SolidFire all-flash storage clusters, you must do so during cluster creation. Beginning with Element 12.5, you must enable software encryption at rest in the Create Cluster UI during cluster creation. For Element 12.3.x and earlier, you must create the cluster using the CreateCluster API method and change the enableSoftwareEncryptionAtRest parameter to `true`. After software encryption at rest is enabled on the cluster, it cannot be disabled. You can enable and disable Hardware-based encryption at rest after cluster creation.

When creating a new cluster, consider the following:

- 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.
- If a shared chassis in not in use, you can define a custom protection domain layout.

Steps

1. In a browser window, enter `https://MIP:443`, where MIP is the management node IP 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.

     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.

     You cannot change the MVIP, SVIP, or cluster name 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.

     You can use uppercase and lowercase letters, special characters, and numbers for the user name and password.

   - Password: Password for authenticated access to the cluster. You must save the password for future reference. Two-way data protection is enabled by default. You cannot change this setting.
3. Read the End User License Agreement, and select **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. Select **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.

For more information

- Managing storage with the Element API
- SolidFire and Element Software Documentation

- NetApp Element Plug-in for vCenter Server

Access the Element software user interface

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

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

You can access the UI using IPv4 or IPv6 addressing, depending on configuration during cluster creation.

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.

For more information

- SolidFire and Element Software Documentation
- NetApp Element Plug-in for vCenter Server

Add 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 by using either the Element UI or API before they can participate in the cluster.

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**.

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== Find more information
* https://docs.netapp.com/us-en/element-software/index.html[SolidFire
and Element Software Documentation]
* https://docs.netapp.com/us-en/vcp/index.html[NetApp Element Plug-in
for vCenter Server^]
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