



**NetApp Element Software**

# **Setup Guide**

Version 11.0

November 2018 | 215-13624\_A0  
doccomments@netapp.com

 **NetApp**<sup>®</sup>



# Contents

<b>SolidFire storage system .....</b>	<b>4</b>
<b>Configuring a storage node .....</b>	<b>5</b>
Configuring the node using the TUI .....	5
Configuring iDRAC on each new node .....	6
Configuring the node using the node UI .....	6
Node states .....	7
<b>Creating a new cluster .....</b>	<b>8</b>
<b>Using the Element software web UI .....</b>	<b>9</b>
<b>Adding drives to a cluster .....</b>	<b>10</b>
<b>Configuring a Fibre Channel node .....</b>	<b>11</b>
Adding Fibre Channel nodes to a cluster .....	11
Creating a new cluster with Fibre Channel nodes .....	12
Zoning for Fibre Channel nodes .....	13
<b>Creating a volume access group for Fibre Channel clients .....</b>	<b>14</b>
<b>Where to find additional information .....</b>	<b>15</b>
<b>Copyright information .....</b>	<b>16</b>
<b>Trademark information .....</b>	<b>17</b>
<b>How to send comments about documentation and receive update     notifications .....</b>	<b>18</b>
<b>Index .....</b>	<b>19</b>

## **SolidFire storage system**

---

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

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

## 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 creating 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

**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. 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.

#### Related information

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

## 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.

### 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**, if you approve.
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.



## Using the Element software web 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.

Before you access the UI, you must ensure that popup blockers and NoScript settings are disabled in your browser.

You can access the UI using IPv4 or IPv6 addressing.

### IPv4

Enter `https://<IPv4 MVIP address>`. For example, `https://10.123.456.789/`

### IPv6

Enter `https://[IPv6 MVIP address]`. For example, `https://[fd20:8b1e:b256:45a::1234]/`

### For DNS

Enter the host name.

You should 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. Select **Cluster > Drives**.
2. Click **Available** to view the list of available drives.
3. Choose one of the following options to add drives:

---

<b>Option</b>	<b>Steps</b>
To add individual drives	<ol style="list-style-type: none"><li>a. Click the <b>Actions</b> button for the drive you want to add.</li><li>b. Click <b>Add</b>.</li></ol>
To add multiple drives	<ol style="list-style-type: none"><li>a. Select the check boxes of the drives to add, and click <b>Bulk Actions</b>.</li><li>b. Click <b>Add</b>.</li></ol>

---

## 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 allow for 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 11

[Creating a new cluster with Fibre Channel nodes](#) on page 12

## 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 OS 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 OS than the version running on the cluster, the cluster asynchronously updates the node to the version of Element OS 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**, if you approve.
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 OS web UI, you can find the WWPN addresses from the WWPN column of the FC Ports tab, which you access from the Cluster tab.

## 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 NetApp's extensive 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 OS Documentation Library](#)*

Includes documentation for various releases of Element software.

### *[NetApp SolidFire Element OS Known Issues](#)*

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

### *[NetApp SolidFire Element OS 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.

## Copyright information

---

Copyright © 2018 NetApp, Inc. All rights reserved. Printed in the U.S.

No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

Data contained herein pertains to a commercial item (as defined in FAR 2.101) and is proprietary to NetApp, Inc. The U.S. Government has a non-exclusive, non-transferrable, non-sublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b).



## Trademark information

---

NETAPP, the NETAPP logo, and the marks listed on the NetApp Trademarks page are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.

<http://www.netapp.com/us/legal/netapptmlist.aspx>

## How to send comments about documentation and receive update notifications

---

You can help us to improve the quality of our documentation by sending us your feedback. You can receive automatic notification when production-level (GA/FCS) documentation is initially released or important changes are made to existing production-level documents.

If you have suggestions for improving this document, send us your comments by email.

[\*doccomments@netapp.com\*](mailto:doccomments@netapp.com)

To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

If you want to be notified automatically when production-level documentation is released or important changes are made to existing production-level documents, follow Twitter account @NetAppDoc.

You can also contact us in the following ways:

- NetApp, Inc., 1395 Crossman Ave., Sunnyvale, CA 94089 U.S.
- Telephone: +1 (408) 822-6000
- Fax: +1 (408) 822-4501
- Support telephone: +1 (888) 463-8277

# Index

## C

- clusters
  - adding drives to [10](#)
  - creating new [8](#)
  - creating new with Fibre Channel nodes [12](#)
- comments
  - how to send feedback about documentation [18](#)

## D

- Dell iDRAC Enterprise [6](#)
- documentation
  - how to receive automatic notification of changes to [18](#)
  - how to send feedback about [18](#)

## E

- Element UI
  - accessing [9](#)
  - accessing using MVIP [9](#)

## F

- FC nodes
  - configuring [11](#)
- feedback
  - how to send comments about documentation [18](#)
- Fibre Channel clients
  - creating a volume access group [14](#)
- Fibre Channel nodes
  - adding to a cluster [11](#)
  - configuring [11](#)
  - zoning [13](#)

## I

- information

- how to send feedback about improving documentation [18](#)

## N

- nodes
  - configuring [5](#)
  - configuring iDRAC [6](#)
  - configuring using Element software [5](#)
  - configuring using node UI [6](#)
  - configuring using TUI [5](#)
  - managing hardware [6](#)
  - monitoring hardware [6](#)
  - states [7](#)

## S

- SolidFire storage system
  - additional documentation about [15](#)
  - overview [4](#)
- storage nodes
  - configuring [5](#)
  - configuring using Element software [5](#)
  - configuring using TUI [5](#)
- suggestions
  - how to send feedback about documentation [18](#)

## T

- terminal user interface [5](#)
- TUI [5](#)
- Twitter
  - how to receive automatic notification of documentation changes [18](#)

## V

- volume access group for Fibre Channel clients
  - creating [14](#)