



# Manage virtual networks

Element Software

NetApp  
June 10, 2024

# Table of Contents

- Manage virtual networks ..... 1
  - Find more information ..... 1
  - Add a virtual network ..... 1
  - Enable virtual routing and forwarding ..... 2
  - Edit a virtual network ..... 3
  - Edit VRF VLANs ..... 3
  - Delete a virtual network ..... 4

# Manage virtual networks

Virtual networking in SolidFire storage enables traffic between multiple clients that are on separate logical networks to be connected to one cluster. Connections to the cluster are segregated in the networking stack through the use of VLAN tagging.

## Find more information

- [Add a virtual network](#)
- [Enable virtual routing and forwarding](#)
- [Edit a virtual network](#)
- [Edit VRF VLANs](#)
- [Delete a virtual network](#)

## Add a virtual network

You can add a new virtual network to a cluster configuration to enable a multi-tenant environment connection to a cluster running Element software.

### What you'll need

- Identify the block of IP addresses that will be assigned to the virtual networks on the cluster nodes.
- Identify a storage network IP (SVIP) address that will be used as an endpoint for all NetApp Element storage traffic.



You must consider the following criteria for this configuration:

- VLANs that are not VRF-enabled require initiators to be in the same subnet as the SVIP.
- VLANs that are VRF-enabled do not require initiators to be in the same subnet as the SVIP, and routing is supported.
- The default SVIP does not require initiators to be in the same subnet as the SVIP, and routing is supported.

When a virtual network is added, an interface for each node is created and each requires a virtual network IP address. The number of IP addresses you specify when creating a new virtual network must be equal to or greater than the number of nodes in the cluster. Virtual network addresses are bulk provisioned by and assigned to individual nodes automatically. You do not need to manually assign virtual network addresses to the nodes in the cluster.

### Steps

1. Click **Cluster > Network**.
2. Click **Create VLAN**.
3. In the **Create a New VLAN** dialog box, enter values in the following fields:
  - **VLAN Name**
  - **VLAN Tag**
  - **SVIP**

- **Netmask**
  - (Optional) **Description**
4. Enter the **Starting IP** address for the range of IP addresses in **IP Address Blocks**.
  5. Enter the **Size** of the IP range as the number of IP addresses to include in the block.
  6. Click **Add a Block** to add a non-continuous block of IP addresses for this VLAN.
  7. Click **Create VLAN**.

## View virtual network details

### Steps

1. Click **Cluster > Network**.
2. Review the details.
  - **ID**: Unique ID of the VLAN network, which is assigned by the system.
  - **Name**: Unique user-assigned name for the VLAN network.
  - **VLAN Tag**: VLAN tag assigned when the virtual network was created.
  - **SVIP**: Storage virtual IP address assigned to the virtual network.
  - **Netmask**: Netmask for this virtual network.
  - **Gateway**: Unique IP address of a virtual network gateway. VRF must be enabled.
  - **VRF Enabled**: Indication of whether virtual routing and forwarding is enabled or not.
  - **IPs Used**: The range of virtual network IP addresses used for the virtual network.

## Enable virtual routing and forwarding

You can enable virtual routing and forwarding (VRF), which allows multiple instances of a routing table to exist in a router and work simultaneously. This functionality is available for storage networks only.

You can enable VRF only at the time of creating a VLAN. If you want to switch back to non-VRF, you must delete and re-create the VLAN.

1. Click **Cluster > Network**.
2. To enable VRF on a new VLAN, select **Create VLAN**.
  - a. Enter relevant information for the new VRF/VLAN. See Adding a virtual network.
  - b. Select the **Enable VRF** check box.
  - c. **Optional**: Enter a gateway.
3. Click **Create VLAN**.

## Find more information

[Add a virtual network](#)

## Edit a virtual network

You can change VLAN attributes, such as VLAN name, netmask, and size of the IP address blocks. The VLAN tag and SVIP cannot be modified for a VLAN. The gateway attribute is not a valid parameter for non-VRF VLANs.

If any iSCSI, remote replication, or other network sessions exist, the modification might fail.

When managing the size of VLAN IP address ranges, you should note the following limitations:

- You can only remove IP addresses from the initial IP address range assigned at the time the VLAN was created.
- You can remove an IP address block that was added after the initial IP address range, but you cannot resize an IP block by removing IP addresses.
- When you try to remove IP addresses, from either the initial IP address range or in an IP block, that are in use by nodes in the cluster, the operation might fail.
- You cannot reassign specific in-use IP addresses to other nodes in the cluster.

You can add an IP address block by using the following procedure:

1. Select **Cluster > Network**.
2. Select the Actions icon for the VLAN you want to edit.
3. Select **Edit**.
4. In the **Edit VLAN** dialog box, enter the new attributes for the VLAN.
5. Select **Add a Block** to add a non-continuous block of IP addresses for the virtual network.
6. Select **Save Changes**.

### Link to troubleshooting KB articles

Link to the Knowledge Base articles for help with troubleshooting issues with managing your VLAN IP address ranges.

- [Duplicate IP warning after adding a storage node in VLAN on Element cluster](#)
- [How to determine which VLAN IP's are in use and which nodes those IP's are assigned to in Element](#)

## Edit VRF VLANs

You can change VRF VLAN attributes, such as VLAN name, netmask, gateway, and IP address blocks.

1. Click **Cluster > Network**.
2. Click the Actions icon for the VLAN you want to edit.
3. Click **Edit**.
4. Enter the new attributes for the VRF VLAN in the **Edit VLAN** dialog box.
5. Click **Save Changes**.

# Delete a virtual network

You can remove a virtual network object. You must add the address blocks to another virtual network before you remove a virtual network.

1. Click **Cluster > Network**.
2. Click the Actions icon for the VLAN you want to delete.
3. Click **Delete**.
4. Confirm the message.

## Find more information

[Edit a virtual network](#)

## Copyright information

Copyright © 2024 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.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, 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) (FEB 2014).

## Trademark information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.