Technical Report

IPv6 in Element Software

Configuration and Features of IPv6

Goutham Baru, NetApp
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Abstract

This guide describes the configuration, features, and services for IPv6 in NetApp® Element® software.

NetApp®

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1 Introduction

In some environments, IPv4 addresses are depleting rapidly because of the large number of services that are offered. As a result, it's becoming more difficult to obtain an IPv4 address. IPv6 is expected to alleviate the problem of IPv4 exhaustion because IPv6 uses 128-bit addresses. Companies can migrate to IPv6 and use various procedures to communicate between the existing IPv4 and the new IPv6 infrastructures. Dual stack configuration enables environments that are configured with both IPv4 and IPv6 addresses to coexist on a single interface. NetApp Element 11.0 supports dual stack configuration on the management interface on individual nodes and supports IPv6 for the management virtual IP address (MVIP address).

2 Features and Limitations

NetApp Element software includes the following features:

- A cluster MVIP address can be configured with either an IPv4 or an IPv6 address.
- An IPv6 address on a NetApp Element node can be configured statically and can be dynamically assigned through Dynamic Host Configuration Protocol version 6 (DHCPv6) for the initial configuration.
- DHCPv6 provides the node address, and the default gateway is obtained by using stateless address autoconfiguration (SLAAC).

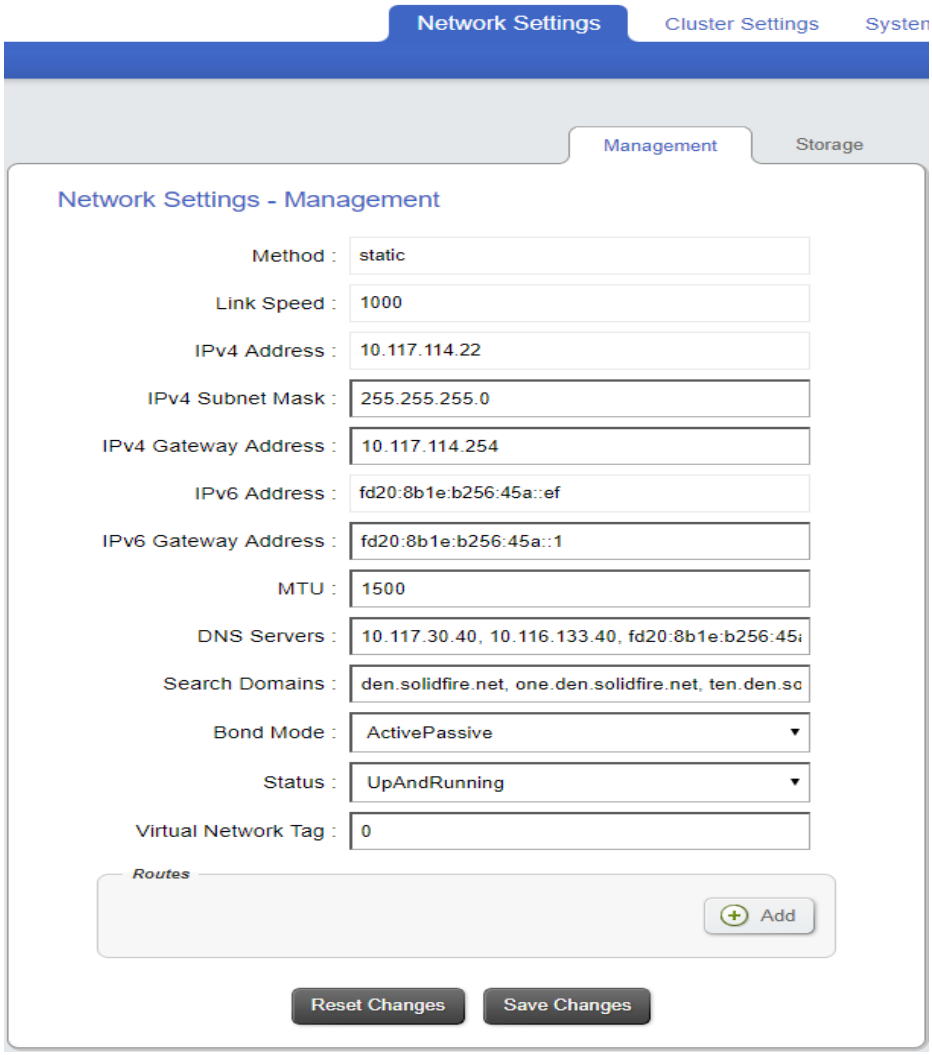
Following are the limitations in Element 11.0:

- Before a node is added to a cluster, the address and the gateway must be statically defined through the per-node UI or API.
- NetApp Element 11.0 currently supports only /64 subnet.
- Configuring IPv6 on a storage virtual IP address (SVIP address) or on the individual node storage IP address is not supported.
- Replication pairing is supported only between matching MVIP address type clusters. For example, a cluster with an IPv6 MVIP address can pair only with other clusters that are configured with an IPv6 MVIP address.
- NetApp SnapMirror® replication technology, NetApp Deployment Engine (NDE), and Virtual Volumes (VVols) do not support IPv6 in Element 11.0.

3 Configuring Per-Node Static (Dual Stack)

You can configure an IPv6 address through the per-node UI or API. NetApp Element 11.0 supports dual stack configuration. Follow these steps:

1. After you install Element software 11.0, configure the static IPv6 address on individual nodes along with the gateway IP address.



2. Configure the IPv6 address and the IPv6 gateway on all the addresses.

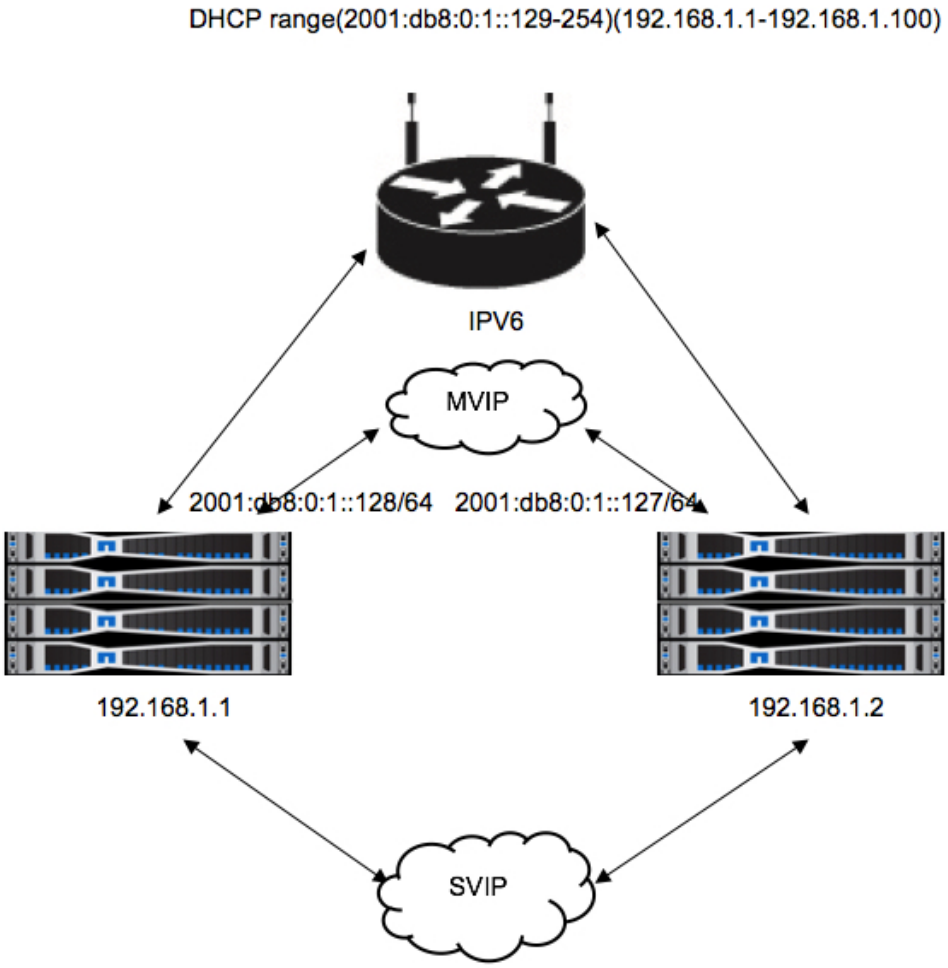
4 Configuring DHCP

The DHCP feature in NetApp Element software uses both SLAAC and stateful DHCP.

4.1 Source and Target Cluster with IPv6 MVIP Address

In this scenario, the DHCP router is configured to lease both IPv6 and IPv4 addresses. All the individual nodes in the cluster obtain an IPv6 address from DHCPv6. When all the nodes have been configured with an IP address, then the MVIP address of the cluster should be statically configured with either an IPv6 or an IPv4 address. The management IP addresses are configured with IPv6 and IPv4, and the storage IP addresses are configured with IPv4. The nodes obtain the IP prefix from the DHCP pool (a DHCPv6 feature). The default gateway is obtained by using certain features of the SLAAC. Both clusters can communicate with each other, and cluster pairing can be established between the clusters. See Figure 1.

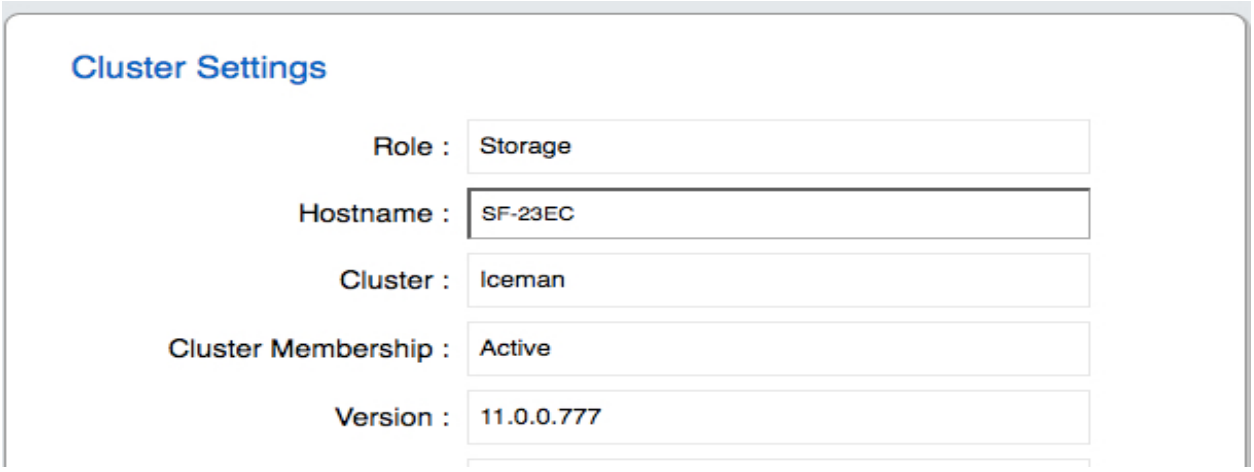
Figure 1) DHCP functionality.



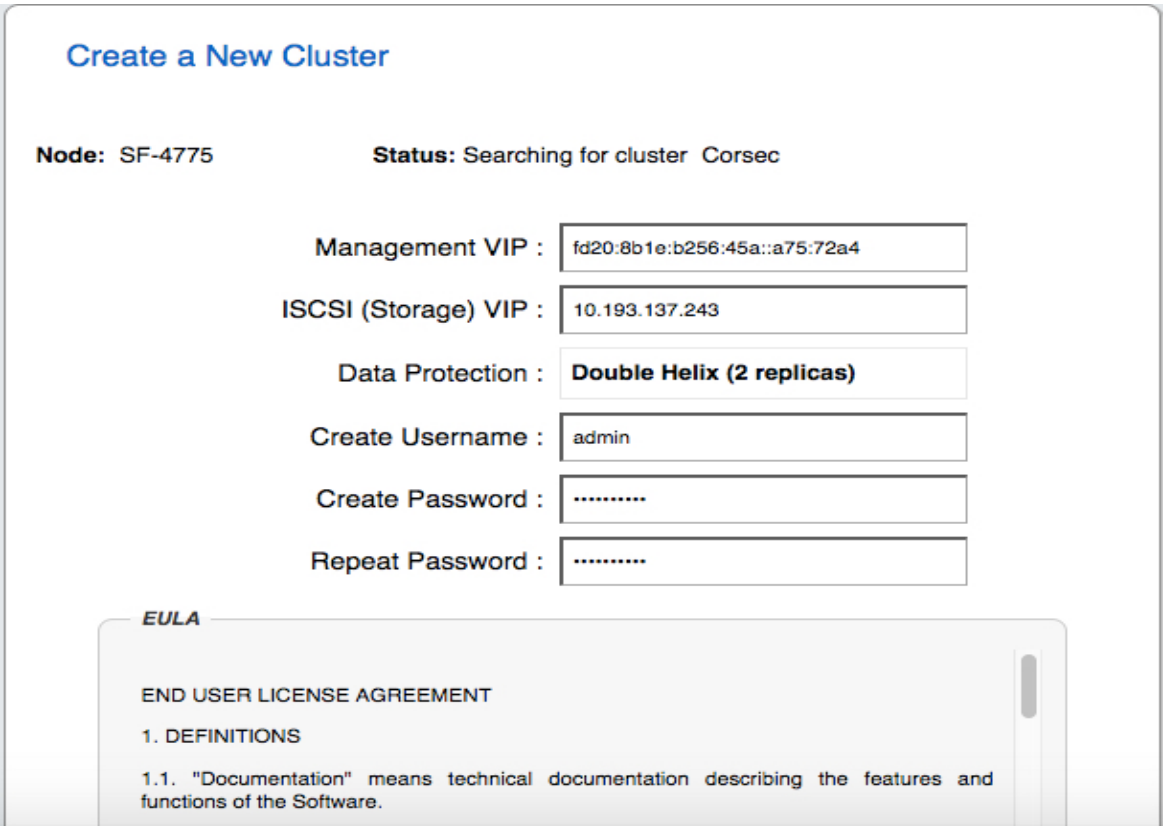
5 Creating a Cluster

To create a cluster:

1. Configure the name of the cluster by using the per-node configuration UI or API.



2. Configure the cluster through a cluster creation API call with the MVIP cluster IP address and the SVIP cluster IP address.



6 Accessing the Cluster UI

You can access the cluster by using the MVIP address of the cluster. The IPv6 MVIP address of the cluster should be enclosed in brackets, as shown in Figure 2. Figure 3 shows the GUI for the cluster.

Figure 2) Accessing the cluster UI.

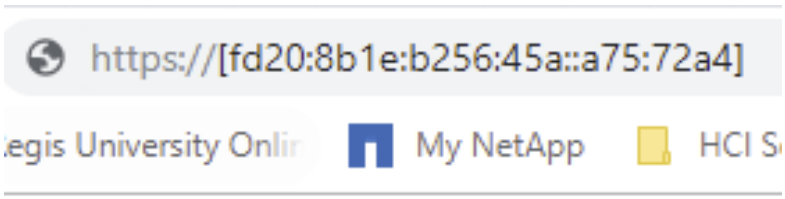
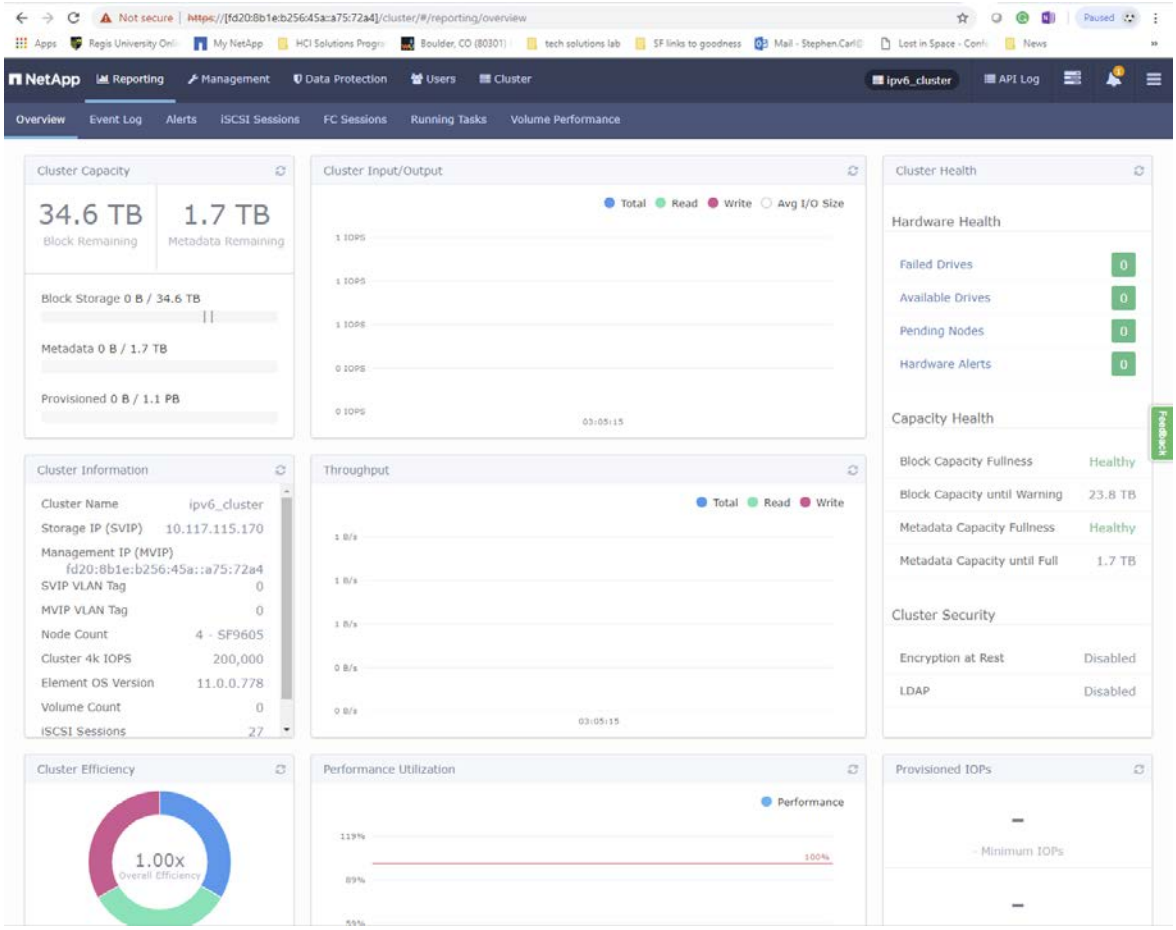


Figure 3) Cluster GUI.



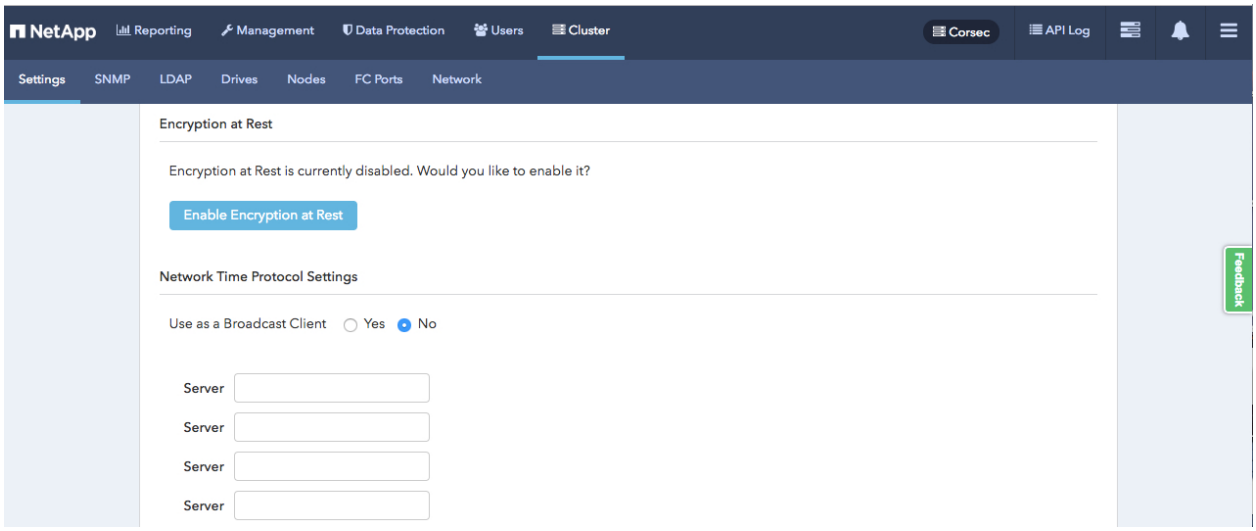
7 Configuring Other Services

NetApp Element IPv6 supports other services, such as Network Time Protocol (NTP), SNMP, and Advanced Disk Partitioning (ADP).

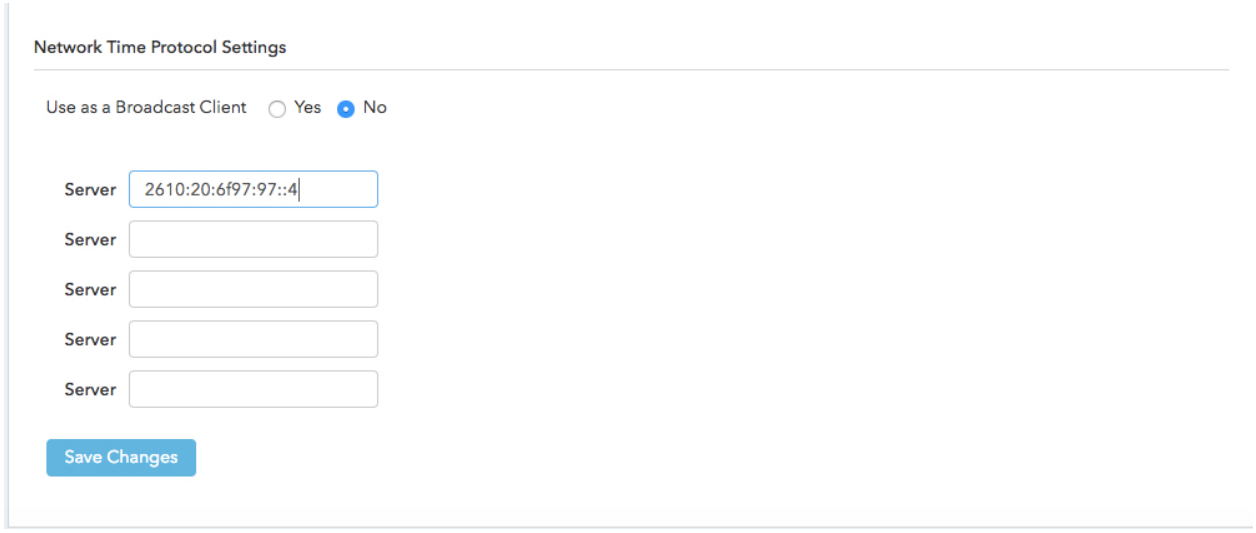
7.1 Configuring NTP

To configure NTP in NetApp Element software:

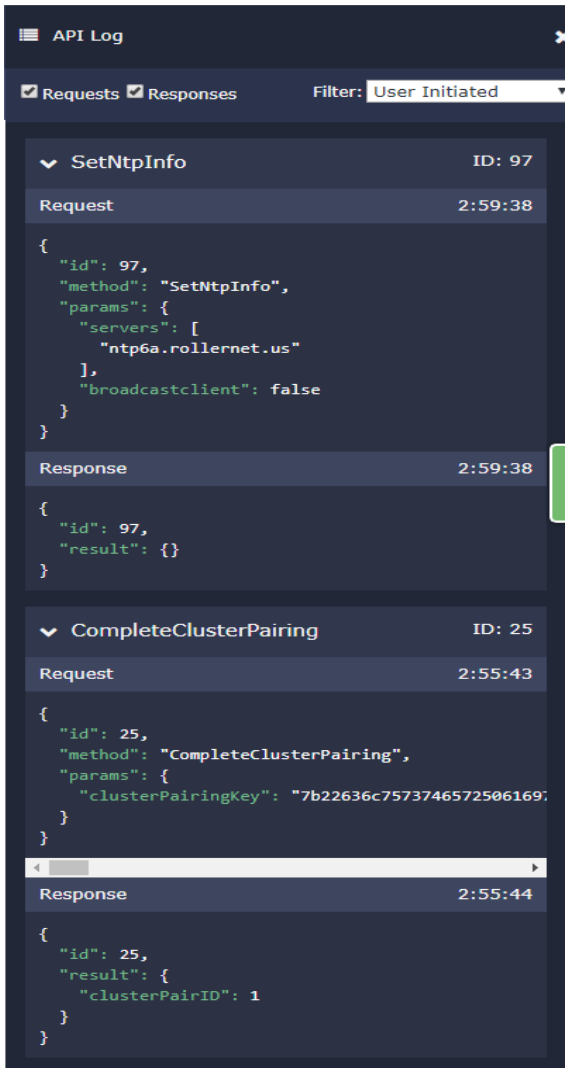
1. Click the Cluster tab and select Settings.



2. Configure the NTP server IP address in the Network Time Protocol Settings and save your changes.



3. Check the response for the API request on the cluster GUI.



4. The configuration of SNMP and active directory services remains the same.

Note: IPv6 is supported in OpenStack Cinder deployment.

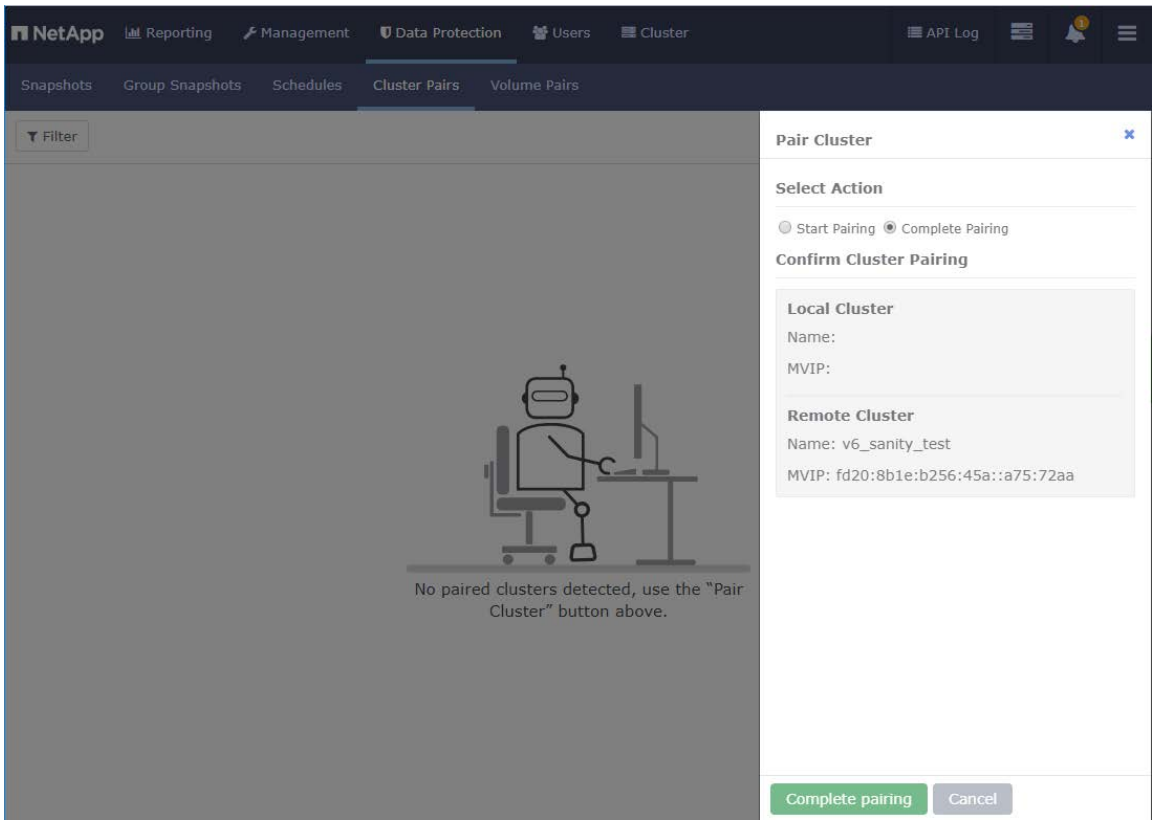
8 Cluster Pairing Through IPv6 MVIP Address

You can set up cluster pairing by using the IPv6 management address.

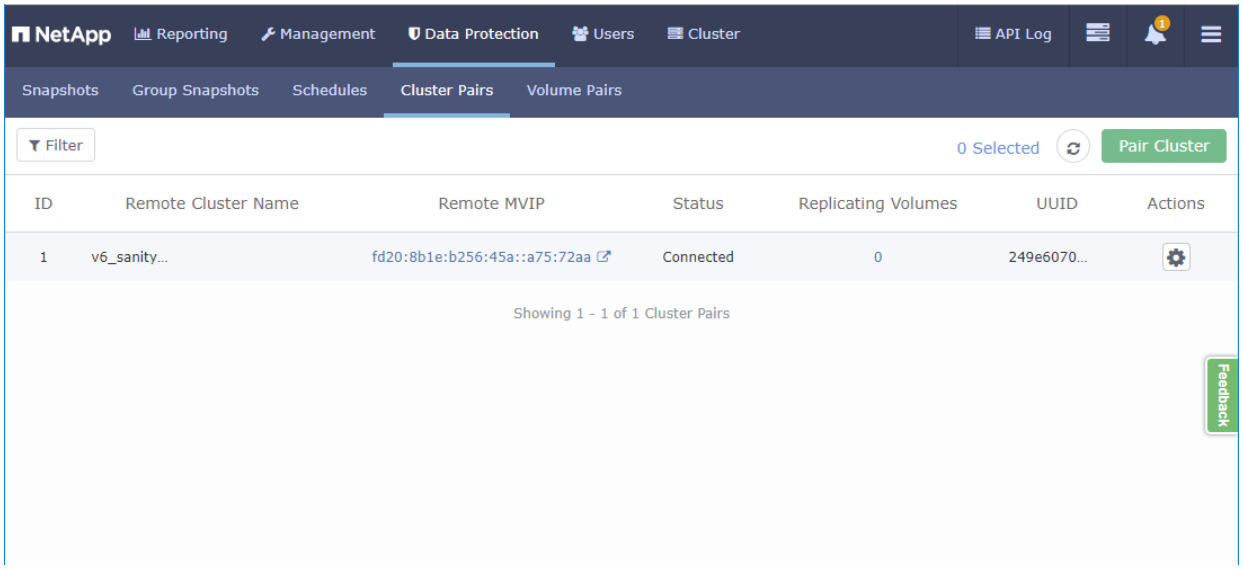
8.1 Configuring Cluster Pairing (Replication) with an IPv6 Address

Follow these steps:

1. Select the Data Protection tab in the cluster GUI.
2. Select the Pair Cluster option.
3. Enter the IPv6 address of the destination cluster and click Complete Pairing.



4. Check the paired clusters.



9 Summary

NetApp Element software provides limited support for IPv6 configuration. Dual stack configuration supports functioning between legacy infrastructure and the latest infrastructure.

Version History

Version	Date	Document Version History
Version 1.0	January 2019	Initial release

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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