Prepare for cluster and SVM peering

ONTAP 9

NetApp
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Peering basics

You must create *peer relationships* between source and destination clusters and between source and destination SVMs before you can replicate Snapshot copies using SnapMirror. A peer relationship defines network connections that enable clusters and SVMs to exchange data securely.

Clusters and SVMs in peer relationships communicate over the intercluster network using *intercluster logical interfaces (LIFs)*. An intercluster LIF is a LIF that supports the "intercluster-core" network interface service and is typically created using the "default-intercluster" network interface service policy. You must create intercluster LIFs on every node in the clusters being peered.

Intercluster LIFs use routes that belong to the system SVM to which they are assigned. ONTAP automatically creates a system SVM for cluster-level communications within an IPspace.

Fan-out and cascade topologies are both supported. In a cascade topology, you need only create intercluster networks between the primary and secondary clusters and between the secondary and tertiary clusters. You need not create an intercluster network between the primary and the tertiary cluster.

> It is possible (but not advisable) for an administrator to remove the intercluster-core service from the default-intercluster service policy. If this occurs, LIFs created using "default-intercluster" will not actually be intercluster LIFs. To confirm that the default-intercluster service policy contains the intercluster-core service, use the following command:
>
> ```
> network interface service-policy show -policy default-intercluster
> ```

Prerequisites for cluster peering

Before you set up cluster peering, you should confirm that the connectivity, port, IP address, subnet, firewall, and cluster-naming requirements are met.

> Beginning with ONTAP 9.6, cluster peer encryption provides TLS 1.2 AES-256 GCM encryption support for data replication by default. The default security ciphers ("PSK-AES256-GCM-SHA384") are required for cluster peering to work even if encryption is disabled.
>
> Beginning with ONTAP 9.11.1, DHE-PSK security ciphers are available by default.

Connectivity requirements

Every intercluster LIF on the local cluster must be able to communicate with every intercluster LIF on the remote cluster.

Although it is not required, it is typically simpler to configure the IP addresses used for intercluster LIFs in the same subnet. The IP addresses can reside in the same subnet as data LIFs, or in a different subnet. The subnet used in each cluster must meet the following requirements:

- The subnet must belong to the broadcast domain that contains the ports that are used for intercluster communication.

- The subnet must have enough IP addresses available to allocate to one intercluster LIF per node.

  For example, in a four-node cluster, the subnet used for intercluster communication must have four available IP addresses.

Each node must have an intercluster LIF with an IP address on the intercluster network.

Intercluster LIFs can have an IPv4 address or an IPv6 address.

> ONTAP enables you to migrate your peering networks from IPv4 to IPv6 by optionally allowing both protocols to be present simultaneously on the intercluster LIFs. In earlier releases, all intercluster relationships for an entire cluster were either IPv4 or IPv6. This meant that changing protocols was a potentially disruptive event.

Port requirements

You can use dedicated ports for intercluster communication, or share ports used by the data network. Ports must meet the following requirements:

- All ports that are used to communicate with a given remote cluster must be in the same IPspace.

  You can use multiple IPspaces to peer with multiple clusters. Pair-wise full-mesh connectivity is required only within an IPspace.

- The broadcast domain that is used for intercluster communication must include at least two ports per node so that intercluster communication can fail over from one port to another port.

  Ports added to a broadcast domain can be physical network ports, VLANs, or interface groups (ifgrps).

- All ports must be cabled.
- All ports must be in a healthy state.
- The MTU settings of the ports must be consistent.

Firewall requirements

> Beginning with ONTAP 9.10.1, firewall policies are deprecated and wholly replaced with LIF service policies. For more information, see Configure firewall policies for LIFs.

Firewalls and the intercluster firewall policy must allow the following protocols:

- ICMP service
- TCP to the IP addresses of all the intercluster LIFs over the ports 11104 and 11105
- Bidirectional HTTPS between the intercluster LIFs

  Although HTTPS is not required when you set up cluster peering using the CLI, HTTPS is required later if you use System Manager to configure data protection.

The default `intercluster` firewall policy allows access through the HTTPS protocol and from all IP addresses (0.0.0.0/0). You can modify or replace the policy if necessary.

Cluster requirement

Clusters must meet the following requirement:

- A cluster cannot be in a peer relationship with more than 255 clusters.

Use shared or dedicated ports

You can use dedicated ports for intercluster communication, or share ports used by the data network. In deciding whether to share ports, you need to consider network bandwidth, the replication interval, and port availability.

You can share ports on one peered cluster while using dedicated ports on the other.

Network bandwidth

If you have a high-speed network, such as 10 GbE, you might have enough local LAN bandwidth to perform replication using the same 10 GbE ports used for data access.

Even then, you should compare your available WAN bandwidth to your LAN bandwidth. If the available WAN bandwidth is significantly less than 10 GbE, you might need to use dedicated ports.

The one exception to this rule might be when all or many nodes in the cluster replicate data, in which case bandwidth utilization is typically spread across nodes.

If you are not using dedicated ports, the maximum transmission unit (MTU) size of the replication network should typically be the same as the MTU size of the data network.

Replication interval

If replication takes place in off-peak hours, you should be able to use data ports for replication even without a 10-GbE LAN connection.

If replication takes place during normal business hours, you need to consider the amount of data that will be replicated and whether it requires so much bandwidth that it could cause contention with data protocols. If network utilization by data protocols (SMB, NFS, iSCSI) is above 50%, you should use dedicated ports for intercluster communication, to allow for non-degraded performance if node failover occurs.

Port availability

If you determine that replication traffic is interfering with data traffic, you can migrate intercluster LIFs to any other intercluster-capable shared port on the same node.

You can also dedicate VLAN ports for replication. The bandwidth of the port is shared between all VLANs and the base port.

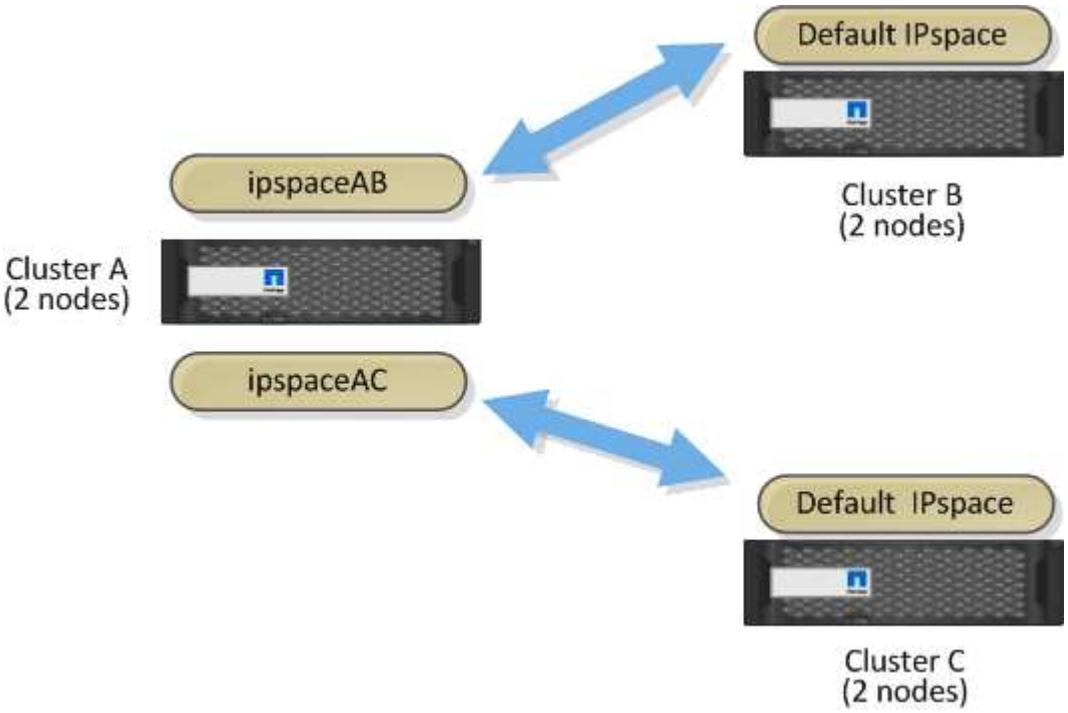
Use custom IPspaces to isolate replication traffic

You can use custom IPspaces to separate the interactions that a cluster has with its peers. Called *designated intercluster connectivity*, this configuration allows service

providers to isolate replication traffic in multitenant environments.

Suppose, for example, that you want replication traffic between Cluster A and Cluster B to be separated from replication traffic between Cluster A and Cluster C. To accomplish this, you can create two IPspaces on Cluster A.

One IPspace contains the intercluster LIFs that you use to communicate with Cluster B. The other contains the intercluster LIFs that you use to communicate with Cluster C, as shown in the following illustration.



For custom IPspace configuration, see the *Network Management Guide*.

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