NetApp

Broadcast domains (ONTAP 9.7 or earlier)

System Manager Classic

NetApp
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Broadcast domain overview (ONTAP 9.7 and earlier)

Broadcast domains are intended to group network ports that belong to the same layer 2 network. The ports in the group can then be used by a storage virtual machine (SVM) for data or management traffic.

A broadcast domain resides in an IPspace. During cluster initialization, the system creates two default broadcast domains:

- The Default broadcast domain contains ports that are in the Default IPspace.
  These ports are used primarily to serve data. Cluster management and node management ports are also in this broadcast domain.

- The Cluster broadcast domain contains ports that are in the Cluster IPspace.
  These ports are used for cluster communication and include all cluster ports from all nodes in the cluster.

If you have created unique IPspaces to separate client traffic, then you need to create a broadcast domain in each of those IPspaces.
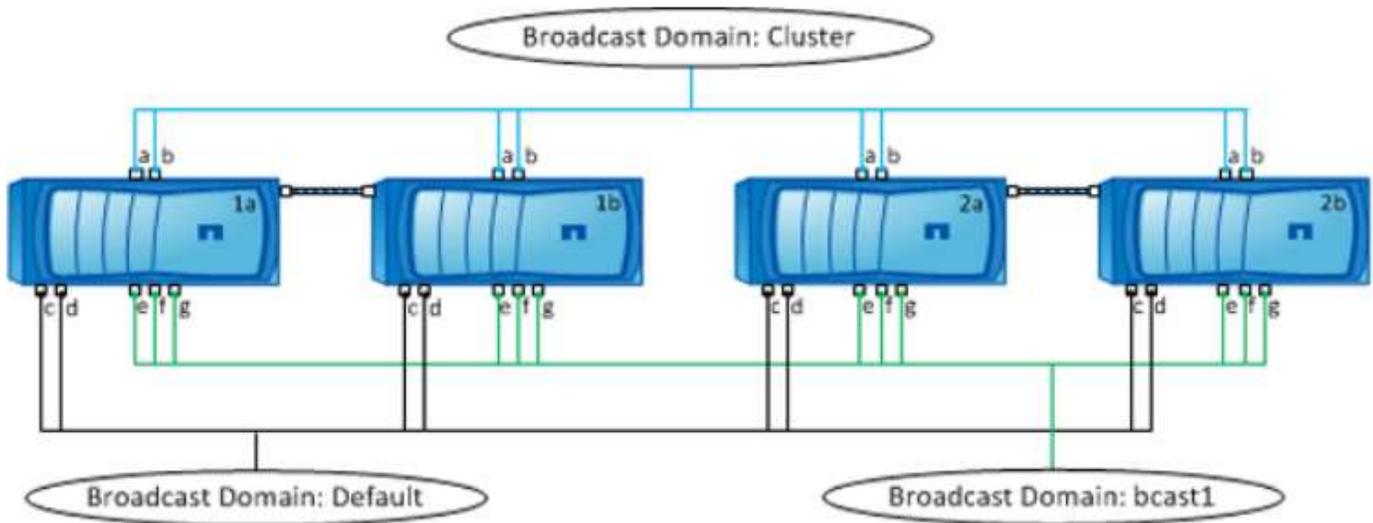
> (i) Create a broadcast domain to group network ports in the cluster that belong to the same layer 2 network. The ports can then be used by SVMs.

Example of using broadcast domains

A broadcast domain is a set of network ports in the same IPspace that also has layer 2 reachability to one another, typically including ports from many nodes in the cluster.

The illustration shows the ports assigned to three broadcast domains in a four-node cluster:

- The Cluster broadcast domain is created automatically during cluster initialization, and it contains ports a and b from each node in the cluster.

- The Default broadcast domain is also created automatically during cluster initialization, and it contains ports c and d from each node in the cluster.

- The bcast1 broadcast domain has been created manually, and it contains ports e, f, and g from each node in the cluster.
  This broadcast domain was created by the system administrator specifically for a new client to access data through a new SVM.

A failover group of the same name and with the same network ports as each of the broadcast domains is created automatically. This failover group is automatically managed by the system, meaning that as ports are added or removed from the broadcast domain, they are automatically added or removed from this failover group.

Determining which ports can be used for a broadcast domain (ONTAP 9.7 and earlier)

Before you can configure a broadcast domain to add to the new IPspace, you must determine what ports are available for the broadcast domain.

> (i) This task is relevant for ONTAP 9.0 - 9.7, not ONTAP 9.8.

Before you begin

You must be a cluster administrator to perform this task.

About this task

- Ports can be physical ports, VLANs, or interface groups (ifgroups).

- The ports that you want to add to the new broadcast domain cannot be assigned to an existing broadcast domain.

- If the ports that you want to add to the broadcast domain are already in another broadcast domain (for example, the Default broadcast domain in the Default IPspace), you must remove the ports from that broadcast domain before assigning them to the new broadcast domain.

- Ports that have LIFs assigned to them cannot be removed from a broadcast domain.

- Because the cluster management and node management LIFs are assigned to the Default broadcast domain in the Default IPspace, the ports assigned to these LIFs cannot be removed from the Default broadcast domain.

Steps

1. Determine the current port assignments.

```
network port show
```

```
Node    Port IPspace   Broadcast Domain Link   MTU   Admin/Oper
------  ---- -------    ---------------- -----  ----  ------------
node1
        e0a  Cluster   Cluster          up     9000  auto/1000
        e0b  Cluster   Cluster          up     9000  auto/1000
        e0c  Default   Default          up     1500  auto/1000
        e0d  Default   Default          up     1500  auto/1000
        e0e  Default   Default          up     1500  auto/1000
        e0f  Default   Default          up     1500  auto/1000
        e0g  Default   Default          up     1500  auto/1000
node2
        e0a  Cluster   Cluster          up     9000  auto/1000
        e0b  Cluster   Cluster          up     9000  auto/1000
        e0c  Default   Default          up     1500  auto/1000
        e0d  Default   Default          up     1500  auto/1000
        e0e  Default   Default          up     1500  auto/1000
        e0f  Default   Default          up     1500  auto/1000
        e0g  Default   Default          up     1500  auto/1000
```

In this example, the output from the command provides the following information:

- Ports `e0c`, `e0d`, `e0e`, `e0f`, and `e0g` on each node are assigned to the Default broadcast domain.
- These ports are potentially available to use in the broadcast domain of the IPspace that you want to create.

2. Determine which ports in the Default broadcast domain are assigned to LIF interfaces, and therefore cannot be moved to a new broadcast domain.

```
network interface show
```

```
          Logical        Status      Network         Current    Current Is
  Vserver Interface      Admin/Oper Address/Mask     Node       Port    Home
  ------- ----------     ---------- ------------     ---------  ------- ----
  Cluster
          node1_clus1    up/up       10.0.2.40/24     node1      e0a     true
          node1_clus2    up/up       10.0.2.41/24     node1      e0b     true
          node2_clus1    up/up       10.0.2.42/24     node2      e0a     true
          node2_clus2    up/up       10.0.2.43/24     node2      e0b     true

  cluster1
          cluster_mgmt  up/up       10.0.1.41/24     node1      e0c     true
          node1_mgmt    up/up       10.0.1.42/24     node1      e0c     true
          node2_mgmt    up/up       10.0.1.43/24     node2      e0c     true
```

In the following example, the output from the command provides the following information:

◦ The node ports are assigned to port `e0c` on each node and the cluster administrative LIF's home node is on `e0c` on `node1`.

◦ Ports `e0d`, `e0e`, `e0f`, and `e0g` on each node are not hosting LIFs and can be removed from the Default broadcast domain and then added to a new broadcast domain for the new IPspace.

Create a broadcast domain (ONTAP 9.7 and earlier)

In ONTAP 9.7 and earlier, you create a broadcast domain to group network ports in the cluster that belong to the same layer 2 network. The ports can then be used by SVMs. You must create a broadcast domain for a custom IPspace. The SVMs created in the IPspace use the ports in the broadcast domain.

ⓘ This task is relevant for ONTAP 9.0 - 9.7, not ONTAP 9.8.

Before you begin

You must be a cluster administrator to perform this task.

Beginning with ONTAP 9.8, broadcast domains are automatically created during the cluster create or join operation. If you are running ONTAP 9.8 or later, these steps are not needed.

In ONTAP 9.7 and earlier, the ports you plan to add to the broadcast domain must not belong to another broadcast domain.

About this task

The port to which a LIF fails over must be a member of the failover group for the LIF. When you create a broadcast domain, ONTAP automatically creates a failover group with the same name. The failover group contains all the ports assigned to the broadcast domain.

- All broadcast domain names must be unique within an IPspace.

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

- If the ports you want to use belong to another broadcast domain, but are unused, you use the `network port broadcast-domain remove-ports` command to remove the ports from the existing broadcast domain.

- The MTU of the ports added to a broadcast domain are updated to the MTU value set in the broadcast domain.

- The MTU value must match all of the devices connected to that layer 2 network except for the e0M port handling management traffic.

- If you do not specify an IPspace name, the broadcast domain is created in the "Default" IPspace.

To make system configuration easier, a failover group of the same name is created automatically that contains the same ports.

Steps

1. View the ports that are not currently assigned to a broadcast domain:

   `network port show`

   If the display is large, use the `network port show -broadcast-domain` command to view only unassigned ports.

2. Create a broadcast domain:

```
network port broadcast-domain create -broadcast-domain broadcast_domain_name
-mtu mtu_value [-ipspace ipspace_name] [-ports ports_list]
```

- ◦ *broadcast_domain_name* is the name of the broadcast domain you want to create.

- ◦ *mtu_value* is the MTU size for IP packets; 1500 and 9000 are typical values.

  This value is applied to all ports that are added to this broadcast domain.

- ◦ *ipspace_name* is the name of the IPspace to which this broadcast domain will be added.

  The "Default" IPspace is used unless you specify a value for this parameter.

- ◦ *ports_list* is the list of ports that will be added to the broadcast domain.

  The ports are added in the format *node_name:port_number*, for example, `node1:e0c`.

3. Verify that the broadcast domain was created as desired:
   ```
   network port show -instance -broadcast-domain new_domain
   ```

Example

The following command creates broadcast domain bcast1 in the Default IPspace, sets the MTU to 1500, and adds four ports:

```
network port broadcast-domain create -broadcast-domain bcast1 -mtu 1500 -ports
cluster1-01:e0e,cluster1-01:e0f,cluster1-02:e0e,cluster1-02:e0f
```

After you finish

You can define the pool of IP addresses that will be available in the broadcast domain by creating a subnet, or you can assign SVMs and interfaces to the IPspace at this time. For more information, see Cluster and SVM peering.

If you need to change the name of an existing broadcast domain, you use the `network port broadcast-domain rename` command.

Add or remove ports from a broadcast domain (ONTAP 9.7 and earlier)

You can add network ports when initially creating a broadcast domain, or you can add ports to, or remove ports from, a broadcast domain that already exists. This allows you to efficiently use all the ports in the cluster.

If the ports that you want to add to the new broadcast domain are already in another broadcast domain, you must remove the ports from that broadcast domain before assigning them to the new broadcast domain.

ⓘ   This task is relevant for ONTAP 9.0 - 9.7, not ONTAP 9.8.

Before you begin

- You must be a cluster administrator to perform this task.

- Ports you plan to add to a broadcast domain must not belong to another broadcast domain.
- Ports that already belong to an interface group cannot be added individually to a broadcast domain.

About this task

The following rules apply when adding and removing network ports:

When adding ports…	When removing ports…
The ports can be network ports, VLANs, or interface groups (ifgrps).	N/A
The ports are added to the system-defined failover group of the broadcast domain.	The ports are removed from all failover groups in the broadcast domain.
The MTU of the ports is updated to the MTU value set in the broadcast domain.	The MTU of the ports is unchanged.
The IPspace of the ports is updated to the IPspace value of the broadcast domain.	The ports are moved to the 'Default' IPspace with no broadcast domain attribute.

> (i) If you remove the last member port of an interface group using the `network port ifgrp remove-port` command, it causes the interface group port to be removed from the broadcast domain because an empty interface group port is not allowed in a broadcast domain.

Steps

1. Display the ports that are currently assigned or unassigned to a broadcast domain by using the `network port show` command.

2. Add or remove network ports from the broadcast domain:

If you want to…	Use…
Add ports to a broadcast domain	`network port broadcast-domain add-ports`
Remove ports from a broadcast domain	`network port broadcast-domain remove-ports`

3. Verify that the ports were added or removed from the broadcast domain:

   ```
   network port show
   ```

Examples of adding and removing ports

The following command adds port e0g on node cluster-1-01 and port e0g on node cluster-1-02 to broadcast domain bcast1 in the Default IPspace:

```
cluster-1::> network port broadcast-domain add-ports -broadcast-domain bcast1
-ports cluster-1-01:e0g,cluster1-02:e0g
```

The following command adds two cluster ports to broadcast domain Cluster in the Cluster IPspace:

```
cluster-1::> network port broadcast-domain add-ports -broadcast-domain Cluster
-ports cluster-2-03:e0f,cluster2-04:e0f -ipspace Cluster
```

The following command removes port e0e on node cluster1-01 from broadcast domain bcast1 in the Default IPspace:

```
cluster-1::> network port broadcast-domain remove-ports -broadcast-domain bcast1
-ports cluster-1-01:e0e
```

Related information
- [ONTAP command reference](#)

Split broadcast domains (ONTAP 9.7 or earlier)

You can modify an existing broadcast domain by splitting it into two different broadcast domains, with each broadcast domain containing some of the original ports assigned to the original broadcast domain.

About this task
- If the ports are in a failover group, all of the ports in a failover group must be split.
- If the ports have LIFs associated with them, the LIFs cannot be part of a subnet's ranges.

Step
Split a broadcast domain into two broadcast domains:

```
network port broadcast-domain split -ipspace <ipspace_name> -broadcast
-domain <broadcast_domain_name> -new-broadcast-domain
<broadcast_domain_name> -ports <node:port,node:port>
```

- `ipspace_name` is the name of the IPspace where the broadcast domain resides.
- `-broadcast-domain` is the name of the broadcast domain that will be split.
- `-new-broadcast-domain` is the name of the new broadcast domain that will be created.
- `-ports` is the node name and port to be added to the new broadcast domain.

Merge broadcast domains (ONTAP 9.7 and earlier)

You can move all of the ports from one broadcast domain into an existing broadcast domain using the merge command.

This operation reduces the steps required if you were to remove all ports from a broadcast domain and then add the ports to an existing broadcast domain.

Step
Merge the ports from one broadcast domain into an existing broadcast domain:

```
network port broadcast-domain merge -ipspace <ipspace_name> -broadcast
-domain <broadcast_domain_name> -into-broadcast-domain
<broadcast_domain_name>
```

- `ipspace_name` is the name of the IPspace where the broadcast domains reside.
- `-broadcast-domain` is the name of the broadcast domain that will be merged.
- `-into-broadcast-domain` is the name of the broadcast domain that will receive additional ports.

Example

The following example merges broadcast domain bd-data1 into broadcast domain bd-data2:

```
network port -ipspace Default broadcast-domain bd-data1 into-broadcast-domain bd-
data2
```

Change the MTU value for ports in a broadcast domain (ONTAP 9.7 and earlier)

You can modify the MTU value for a broadcast domain to change the MTU value for all ports in that broadcast domain. This can be done to support topology changes that have been made in the network.

Before you begin

The MTU value must match all the devices connected to that layer 2 network except for the e0M port handling management traffic.

About this task

Changing the MTU value causes a brief interruption in traffic over the affected ports. The system displays a prompt that you must answer with y to make the MTU change.

Step

Change the MTU value for all ports in a broadcast domain:

```
network port broadcast-domain modify -broadcast-domain
<broadcast_domain_name> -mtu <mtu_value> [-ipspace <ipspace_name>]
```

- `broadcast_domain` is the name of the broadcast domain.
- `mtu` is the MTU size for IP packets; 1500 and 9000 are typical values.
- `ipspace` is the name of the IPspace in which this broadcast domain resides. The "Default" IPspace is used unless you specify a value for this option. The following command changes the MTU to 9000 for all ports in the broadcast domain bcast1:

```
network port broadcast-domain modify -broadcast-domain <Default-1> -mtu <
9000 >
Warning: Changing broadcast domain settings will cause a momentary data-
serving interruption.
Do you want to continue? {y|n}: <y>
```

Display broadcast domains (ONTAP 9.7 and earlier)

You can display the list of broadcast domains within each IPspace in a cluster. The output also shows the list of ports and the MTU value for each broadcast domain.

Step

Display the broadcast domains and associated ports in the cluster:

```
network port broadcast-domain show
```

The following command displays all the broadcast domains and associated ports in the cluster:

```
network port broadcast-domain show
IPspace Broadcast                              Update
Name    Domain Name  MTU   Port List           Status Details
------- -----------  ----- ------------------- --------------
Cluster Cluster      9000
                           cluster-1-01:e0a      complete
                           cluster-1-01:e0b      complete
                           cluster-1-02:e0a      complete
                           cluster-1-02:e0b      complete
Default Default      1500
                           cluster-1-01:e0c      complete
                           cluster-1-01:e0d      complete
                           cluster-1-02:e0c      complete
                           cluster-1-02:e0d      complete
        bcast1       1500
                           cluster-1-01:e0e      complete
                           cluster-1-01:e0f      complete
                           cluster-1-01:e0g      complete
                           cluster-1-02:e0e      complete
                           cluster-1-02:e0f      complete
                           cluster-1-02:e0g      complete
```

The following command displays the ports in the bcast1 broadcast domain that have an update status of error, which indicate that the port could not be updated properly:

```
network port broadcast-domain show -broadcast-domain bcast1 -port-update
-status error

IPspace Broadcast                                        Update
Name    Domain Name  MTU   Port List              Status Details
------- ----------- -----  -------------------- --------------
Default bcast1       1500
                            cluster-1-02:e0g       error
```

For more information, see the ONTAP command reference.