



Configure broadcast domains (cluster administrators only)

ONTAP 9

NetApp
June 13, 2023

This PDF was generated from https://docs.netapp.com/us-en/ontap/networking/configure_broadcast_domains_@cluster_administrators_only@_overview.html on June 13, 2023. Always check docs.netapp.com for the latest.

Table of Contents

- Configure broadcast domains (cluster administrators only) 1
 - ONTAP 9.8 and later 1
 - ONTAP 9.7 and earlier 9

Configure broadcast domains (cluster administrators only)

ONTAP 9.8 and later

About broadcast domains for ONTAP 9.8 and later

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.

The system creates additional broadcast domains in the Default IPspace when necessary. The "Default" broadcast domain contains the home-port of the management LIF, plus any other ports that have layer 2 reachability to that port. Additional broadcast domains are named "Default-1", "Default-2", and so forth.

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 system automatically creates any additional broadcast domains during cluster initialization based on layer 2 network reachability. These additional broadcast domains are named Default-1, Default-2, and so forth.



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.

Add a broadcast domain

Broadcast domains group network ports in the cluster that belong to the same layer 2 network. The ports can then be used by SVMs.

Beginning with ONTAP 9.8, broadcast domains are automatically created during the cluster create or join operation. Beginning with ONTAP 9.12.0, in addition to the automatically created broadcast domains, you can manually add a broadcast domain in System Manager.

Before you begin

The ports you plan to add to the broadcast domain must not belong to another broadcast domain. If the ports you want to use belong to another broadcast domain, but are unused, remove those ports from the original broadcast domain.

About this task

- All broadcast domain names must be unique within an IPspace.
- The ports added to a broadcast domain can be physical network ports, VLANs, or link aggregation groups/interface groups (LAGs/ifgrps).
- The maximum transmission unit (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 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.

System Manager

Steps

1. Select **Network > Overview > Broadcast domain**.
2. Click **+ Add**
3. Name the broadcast domain.
4. Set the MTU.
5. Select the IPspace.
6. Save the broadcast domain.

You can edit or delete a broadcast domain after it has been added.

CLI

In ONTAP 9.7 or earlier, you can manually create a broadcast domain.

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]
```

a. `broadcast_domain_name` is the name of the broadcast domain you want to create.

b. `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.

c. `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.

d. `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, use the `network port broadcast-domain rename` command.

Add or remove ports from a broadcast domain

Broadcast domains are automatically created during the cluster create or join operation. You do not need to manually remove ports from broadcast domains.

If network port reachability has changed, either through physical network connectivity or switch configuration, and a network port belongs in a different broadcast domain, see the following topic:

[Repair port reachability](#)

Split broadcast domains

If network port reachability has changed, either through physical network connectivity or switch configuration, and a group of network ports previously configured in a single broadcast domain has become partitioned into two different reachability sets, you can split a broadcast domain to synchronize the ONTAP configuration with the physical network topology.

To determine if a network port broadcast domain is partitioned into more than one reachability set, use the `network port reachability show -details` command and pay attention to which ports do not have connectivity to one another ("Unreachable ports"). Typically, the list of unreachable ports defines the set of ports that should be split into another broadcast domain, after you have verified that the physical and switch configuration is accurate.

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

If network port reachability has changed, either through physical network connectivity or switch configuration, and two group of network ports previously configured in multiple broadcast domains now all share reachability, then merging two broadcast domains can be used to synchronize the ONTAP configuration with the physical network topology.

To determine if multiple broadcast domains belong to one reachability set, use the "network port reachability show -details" command and pay attention to which ports that are configured in another broadcast domain actually have connectivity to one another ("Unexpected ports"). Typically, the list of unexpected ports defines the set of ports that should be merged into the broadcast domain after you have verified that the physical and switch configuration is accurate.

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.

Change the MTU value for ports in a broadcast domain

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

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
	Default-1	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 Default-1 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 Default-1 -port
-update-status error
```

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

For more information, see [ONTAP 9 commands](#).

Delete a broadcast domain

If you no longer need a broadcast domain, you can delete it. This moves the ports associated with that broadcast domain to the "Default" IPspace.

Before you begin

There must be no subnets, network interfaces, or SVMs associated with the broadcast domain you want to delete.

About this task

- The system-created "Cluster" broadcast domain cannot be deleted.
- All failover groups related to the broadcast domain are removed when you delete the broadcast domain.

The procedure you follow depends on the interface that you use—System Manager or the CLI:

System Manager

Beginning with ONTAP 9.12.0, you can use System Manager to delete a broadcast domain

The delete option is not shown when the broadcast domain contains ports or is associated with a subnet.

Steps

1. Select **Network > Overview > Broadcast domain**.
2. Select  > **Delete** beside the broadcast domain you want to remove.

CLI

Use the CLI to delete a broadcast domain

Step

Delete a broadcast domain:

```
network port broadcast-domain delete -broadcast-domain broadcast_domain_name
[-ipspace ipspace_name]
```

The following command deletes broadcast domain Default-1 in IPspace ipspace1:

```
network port broadcast-domain delete -broadcast-domain Default-1 -ipspace
ipspace1
```

ONTAP 9.7 and earlier

Overview for 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.



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.

Create a broadcast domain

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.

Before you begin

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

- 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

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.

Before you begin

- 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.



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	<code>network port broadcast-domain add-ports</code>
Remove ports from a broadcast domain	<code>network port broadcast-domain remove-ports</code>

For more information about these commands, see [ONTAP 9 commands](#).

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
```

Split broadcast domains

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

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

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

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 [ONTAP 9 commands](#).

Delete a broadcast domain

If you no longer need a broadcast domain, you can delete it. This moves the ports associated with that broadcast domain to the "Default" IPspace.

Before you begin

There must be no subnets, network interfaces, or SVMs associated with the broadcast domain you want to delete.

About this task

- The system-created "Cluster" broadcast domain cannot be deleted.
- All failover groups related to the broadcast domain are removed when you delete the broadcast domain.

Step

Delete a broadcast domain:

```
network port broadcast-domain delete -broadcast-domain
<broadcast_domain_name> [-ipspace <ipspace_name>]
```

The following command deletes broadcast domain bcast1 in IPspace ipspace1:

```
network port broadcast-domain delete -broadcast-domain <bcast1> -ipspace
<ipspace1>
```

Copyright information

Copyright © 2023 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.