Configuring Storm Control

This chapter describes how to configure port-based traffic control on the Catalyst 4500 series switch. This chapter consists of these sections:

- About Storm Control, page 54-1
- Enabling Broadcast Storm Control, page 54-3
- Enabling Multicast Storm Control, page 54-4
- Disabling Broadcast Storm Control, page 54-5
- Disabling Multicast Storm Control, page 54-5
- Displaying Storm Control, page 54-6

Note

For complete syntax and usage information for the switch commands used in this chapter, first look at the Cisco Catalyst 4500 Series Switch Command Reference and related publications at this location:


If the command is not found in the Catalyst 4500 Series Switch Command Reference, it will be found in the larger Cisco IOS library. Refer to the Cisco IOS Command Reference and related publications at this location:


About Storm Control

This section contains the following subsections:

- Hardware-Based Storm Control Implementation, page 54-2
- Software-Based Storm Control Implementation, page 54-2

Storm control prevents LAN interfaces from being disrupted by a broadcast storm. A broadcast storm occurs when broadcast packets flood the subnet, creating excessive traffic and degrading network performance. Errors in the protocol-stack implementation or in the network configuration can cause a broadcast storm.
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About Storm Control

Hardware-Based Storm Control Implementation

Broadcast suppression uses filtering that measures broadcast activity in a subnet over a one-second
interval and compares the measurement with a predefined threshold. If the threshold is reached, further
broadcast activity is suppressed for the duration of the interval. Broadcast suppression is disabled by
default.

Figure 54-1 shows the broadcast traffic patterns on a LAN interface over a given interval. In this
example, broadcast suppression occurs between times T1 and T2 and between T4 and T5. During those
intervals, the amount of broadcast traffic exceeded the configured threshold.

Figure 54-1  Storm Control Example—Hardware-based Implementation

The broadcast suppression threshold numbers and the time interval combination make the broadcast
suppression algorithm work with different levels of granularity. A higher threshold allows more
broadcast packets to pass through.

Broadcast suppression on the Catalyst 4500 series switches is implemented in hardware. The
suppression circuitry monitors packets passing from a LAN interface to the switching bus. If the packet
destination address is broadcast, then the broadcast suppression circuitry tracks the current count of
broadcasts within the one-second interval, and when a threshold is reached, it filters out subsequent
broadcast packets.

Because hardware broadcast suppression uses a bandwidth-based method to measure broadcast activity,
the most significant implementation factor is setting the percentage of total available bandwidth that can
be used by broadcast traffic. Because packets do not arrive at uniform intervals, the one-second interval
during which broadcast activity is measured can affect the behavior of broadcast suppression.

Software-Based Storm Control Implementation

When storm control is enabled on an interface, the switch monitors packets received on the interface and
determines whether the packets are broadcast. The switch monitors the number of broadcast packets
received within a one-second time interval. When the interface threshold is met, all incoming data traffic
on the interface is dropped. This threshold is specified as a percentage of total available bandwidth that
can be used by broadcast traffic. If the lower threshold is specified, all data traffic is forwarded as soon
as the incoming traffic falls below that threshold.
# Enabling Broadcast Storm Control

To enable storm control, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Switch# configure terminal</td>
</tr>
<tr>
<td></td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Switch(config)# interface interface-id</td>
</tr>
<tr>
<td></td>
<td>Enters interface configuration mode and enter the port to configure.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Switch(config-if)# storm-control broadcast level [high level]</td>
</tr>
<tr>
<td></td>
<td>Configures broadcast storm control.</td>
</tr>
<tr>
<td></td>
<td>Specifies the upper threshold levels for broadcast traffic. The storm control action occurs when traffic utilization reaches this level.</td>
</tr>
<tr>
<td></td>
<td>(Optional) Specifies the falling threshold level. The normal transmission restarts (if the action is filtering) when traffic drops below this level for interfaces that support software-based suppression.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> For ports that perform hardware-based suppression, the lower threshold is ignored.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> For the Catalyst 4500-X Series Switch, on ports operating at 1Gigabit, thresholds less than 0.02% are not supported.</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Switch(config-if)# storm-control action {shutdown</td>
</tr>
<tr>
<td></td>
<td>Specifies the action to be taken when a storm is detected.</td>
</tr>
<tr>
<td></td>
<td>The default is to filter out the broadcast traffic and not to send out traps.</td>
</tr>
<tr>
<td></td>
<td>The <strong>shutdown</strong> keyword sets the port to error-disable state during a storm. If the recover interval is not set, the port remains in shutdown state.</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>Switch(config-if)# exit</td>
</tr>
<tr>
<td></td>
<td>Returns to configuration mode.</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>Switch(config)# end</td>
</tr>
<tr>
<td></td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td>Switch# show storm-control [interface] broadcast</td>
</tr>
<tr>
<td></td>
<td>Displays the number of packets suppressed.</td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td>Switch# copy running-config startup-config</td>
</tr>
<tr>
<td></td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
</tbody>
</table>

The following example shows how to enable storm control on interface:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# interface fa3/1
Switch(config-if)# storm-control broadcast level 50
Switch(config-if)# end

Switch# show storm-control
Interface  Filter State  Broadcast Multicast Level
---------  --------------  --------------  ------
Fa3/1      Forwarding    Enabled     Disabled  50.00%

Switch# show int fa2/1 capabilities
FastEthernet2/1
  Model:    WS-X4148-RJ45V-RJ-45
  Type:     10/100BaseTX
  Speed:    10,100,auto
```
## Enabling Multicast Storm Control

Catalyst 4900M, Catalyst 4948E, Supervisor Engine 6-E, Supervisor Engine 6L-E, Supervisor Engine 7-E, and Supervisor Engine 7L-E support per-interface multicast suppression, which allows you to subject incoming multicast and broadcast traffic to interface-level suppression.

**Note**

Multicast and broadcast suppression share a common threshold per interface. Multicast suppression takes effect only if broadcast suppression is enabled. Disabling broadcast suppression on an interface also disables multicast suppression.

To enable multicast suppression, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> Switch# configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong> Switch(config)# interface interface-id</td>
<td>Enters interface configuration mode and enter the port to configure.</td>
</tr>
<tr>
<td><strong>Step 3</strong> Switch(config-if)# storm-control broadcast include multicast</td>
<td>Enables multicast suppression.</td>
</tr>
<tr>
<td><strong>Step 4</strong> Switch(config-if)# exit</td>
<td>Returns to configuration mode.</td>
</tr>
<tr>
<td><strong>Step 5</strong> Switch(config)# end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Step 6</strong> Switch# show storm-control</td>
<td>Verifies the configuration.</td>
</tr>
</tbody>
</table>

The following example shows how to enable multicast suppression on ports that have broadcast suppression already enabled:

```
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# int fa3/1
Switch(config-if)# storm-control broadcast include multicast
```
Disabling Broadcast Storm Control

To disable storm control, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch# configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config)# interface interface-id</td>
<td>Enters interface configuration mode and enter the port to configure.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config-if)# no storm-control broadcast level</td>
<td>Disables port storm control.</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config-if)# no storm-control action {shutdown</td>
<td>trap}</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config-if)# exit</td>
<td>Returns to configuration mode.</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config)# end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
<tr>
<td><strong>Step 7</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch# show storm-control broadcast</td>
<td>Verifies your entries.</td>
</tr>
<tr>
<td><strong>Step 8</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch# copy running-config startup-config</td>
<td>(Optional) Saves your entries in the configuration file.</td>
</tr>
</tbody>
</table>

The following example shows how to disable storm control on interface.

Switch# configure terminal
Enter configuration commands, one per line. End with CTRL/Z.
Switch(config)# int fa3/1
Switch(config-if)# no storm-control broadcast level
Switch(config-if)# end

Switch# show storm-control
Interface Filter State Broadcast Multicast Level
--------- ------------- --------- --------- -----
Fa3/1 Forwarding Enabled Enabled 50.00%

Switch#

Disabling Multicast Storm Control

To disable multicast suppression, perform this task:

<table>
<thead>
<tr>
<th>Command</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch# configure terminal</td>
<td>Enters global configuration mode.</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config)# [no] storm-control broadcast include multicast</td>
<td>Enables and disables multicast suppression.</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td><strong>Purpose</strong></td>
</tr>
<tr>
<td>Switch(config-if)# no storm-control broadcast level</td>
<td>Disables port storm control (broadcast and multicast).</td>
</tr>
</tbody>
</table>
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Displaying Storm Control

Note
Use the `show interface capabilities` command to determine the mode in which storm control is supported on an interface.

The following example shows an interface that supports broadcast suppression in software (sw):

```
Switch# show int fa2/1 capabilities
FastEthernet2/1
  Model:         WS-X4148-RJ45V-RJ-45
  Type:          10/100BaseTX
  Speed:         10,100,auto
  Duplex:        half,full,auto
  Auto-MDIX:     no
  Trunk encap. type: 802.1Q
  Trunk mode:    on,off,desirable,negotiate
  Channel:       yes
  Broadcast suppression: percentage(0-100), hw
  Multicast suppression: percentage(0-100), hw
  Flowcontrol:   rx-(none),tx-(none)
  VLAN Membership: static, dynamic
  Fast Start:    yes
  CoS rewrite:   yes
  ToS rewrite:   yes
  Inline power:  yes (Cisco Voice Protocol)
  SPAN:          source/destination
  UDLD:          yes
  Link Debounce: no
  Link Debounce Time: no
  Port Security: yes
  Dotlx:         yes
  Maximum MTU:   1552 bytes (Baby Giants)
  Multiple Media Types: no
  Diagnostic Monitoring: N/A
```

Note
Use the `show interfaces counters storm-control` command to display a count of discarded packets.

```
Switch# show interfaces counters storm-control
Port         Broadcast   Multicast   Level   TotalSuppressedPackets
-----------  ----------  ---------  ------  ----------------
Fa2/1        Enabled    Disabled  10.00%   46516510
Gi3/1        Enabled    Enabled   50.00%   0
```

```
Switch# show storm-control
Interface  Filter State  Broadcast Multicast Level
-----------  -----------  ---------  ----
Fa2/1       Blocking    Enabled   Disabled 10.00%
Gi3/1       Link Down   Enabled   Enabled  50.00%
```

Command Purpose

<table>
<thead>
<tr>
<th>Command</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 4 Switch(config-if)#   end</td>
<td>Returns to configuration mode.</td>
</tr>
<tr>
<td>Step 5 Switch(config)#      end</td>
<td>Returns to privileged EXEC mode.</td>
</tr>
</tbody>
</table>