CHAPTER 10

Threshold Commands

Interface alarm thresholds provide a way to monitor the quality of the client signal. Use the following commands to configure and monitor interface alarm threshold operations.

aps trigger

To enable y-cable line card protection signal switchover when the alarm thresholds are exceeded, use the **aps trigger** command. To disable y-cable protection signal switchover, use the **no** form of this command.

aps trigger

no aps trigger

Syntax Description

This command has no other arguments or keywords.

Defaults

Disabled

Command Modes

Threshold configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Use this command in a y-cable protection configuration to cause a signal switchover when the active signal error rates exceed the alarm thresholds. The signal switchover occurs only if the standby signal is acceptable.

Note The threshold list must be applied to both interfaces in the associated pair.

Examples

The following example shows how to configure an APS switchover trigger for an alarm threshold.

```
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 6
Switch(config-threshold)# aps trigger
Switch(config-threshold)# exit
```

```
Switch(config-t-list)# exit
Switch(config)# redundancy
Switch(config-red)# associate group chicago
Switch(config-red-aps)# aps working transparent 3/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps revertive
Switch(config-red-aps)# aps enable
Switch(config-red-aps)# exit
Switch(config-red)# exit
Switch(config)# interface transparent 3/0/0
Switch(config-if)# encap sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms
Switch(config-if)# exit
Switch(config)# interface transparent 4/0/0
Switch(config-if)# encap sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms
```

Related Commands

Command	Description
monitor enable	Enables protocol performance monitoring.
show threshold-list	Displays the contents of a threshold list.
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list to an interface.
threshold-list	creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

description

To configure a alarm threshold description, use the **description** command. To remove a threshold description, use the **no** form of the command.

description *text*

no description

Syntax Description

text	Threshold description for the MIB.

Defaults

None

Command Modes

Threshold configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

First use the **threshold-list** command to enter threshold list configuration mode and create a threshold list. Then use the **threshold** command to specify a threshold to modify and enter threshold configuration mode. This description can be accessed and displayed by network management systems that support SNMP.

Examples

The following example shows how to create a description for a threshold in a threshold list named temp.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# description This threshold is for SONET and SDH BIP1 errors
```

Related Commands

Command	Description
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list with an interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

notification-throttle timer

To modify the alarm threshold notification throttle timer, use the **notification-throttle timer** command. To return the notification throttle timer interval to its default value, use the **no** form of the command.

notification-throttle timer *seconds*

no notification-throttle timer

Syntax Description

seconds	Specifies, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed. The range is 5 to 500 seconds.

Defaults

5 seconds

Command Modes

Threshold list configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated from release 12.2(22)SV.

Usage Guidelines

Use this command to control the amount of alarm threshold notification activity that is generated on the system.

Examples

The following example shows how to set an alarm threshold list notification throttle timer to 10 seconds.

```
Switch# configure terminal
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# notification-throttle timer 10
```

Related Commands

Command	Description
show threshold-list	Displays the contents of a threshold list.
threshold-list	Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode.

show threshold-list

To display information about alarm threshold lists, use the **show threshold-list** command.

show threshold-list [*name*]

Syntax Description

name	Specifies the name of an alarm threshold list.

Defaults

Displays information about all threshold lists in the system.

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Use this command to display the threshold values configured for all alarm threshold lists or for a specific alarm threshold list.

Examples

The following example shows how to display information for alarm threshold list named sonet-counters. (See Table 10-1 for field descriptions.)

```
Switch# show threshold-list

Threshold List Name: sonet-counters
   Notification throttle timer : 5 (in secs)
   Threshold name : sonet-sdh section cv         Severity : Degrade
      Value : 10e-9
      APS Trigger : Not set
      Description : SONET BIP1 counter
   Threshold name : sonet-sdh section cv         Severity : Failure
      Value : 10e-6
      APS Trigger : Set
      Description : SONET BIP1 counter
```

Table 10-1 show threshold-list Field Descriptions

Field	Description
Threshold List Name	Shows the name of the threshold list.
Notification throttle timer	Shows, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed.
Threshold name	Shows the name of the threshold counter. See the **threshold** command for a list of threshold names.
Severity	Shows the threshold severity (Degrade or Failure).
Value	Shows the threshold rate value for the system to issue an alarm.
APS Trigger	Indicates whether the APS switchover trigger is set.
Description	Shows the description text for the counter.

Related Commands

Command	Description
aps trigger	Enables APS switchover trigger for threshold alarms.
description	Configures MIB description for threshold alarms.
notification-throttle timer	Modifies the alarms threshold notification throttle timer.
snmp-server enable traps threshold min-severity	Enables SNMP trap notification for threshold alarms.
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list to a transparent or wave interface.
threshold-list	Creates a list of thresholds.
value	Configures the value for threshold alarms.

threshold

To configure an alarm threshold in a threshold list, use the **threshold** command. To remove a threshold from a threshold list, use the **no** form of the command.

threshold name {**cvrd** | **crc** | **cdl hec** | **sonet-sdh section cv** | **tx-crc**} {**degrade** | **failure**} [**index** *value*]

no threshold name {**cvrd** | **cdl hec** | **crc** | **sonet-sdh section cv** | **tx-crc**} {**degrade** | **failure**} [**index** *value*]

Syntax Description

cvrd	Specifies the coding violation and running disparity counter. This counter is monitored for interfaces with the following encapsulation: • Gigabit Ethernet • ESCON • Fibre Channel • FICON
cdl hec	Specifies the in-band message channel HEC (header error control) error counter. This counter is monitored for wave interfaces that insert and delete in-band message channel headers.
crc	Specifies the cyclic redundancy error counter.
sonet-sdh section cv	Specifies the bit interleaved parity error. This counter is monitored for interfaces with either SONET or SDH encapsulation.
tx-crc	Specifies the transmit cyclic redundancy error counter.
degrade	Specifies that a signal degrade threshold alarm is generated.
failure	Specifies that a signal failure threshold alarm is generated.
index *value*	Specifies a MIB index. The range is 0 to 63.

Defaults

None

Command Modes

Threshold-list configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**

12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to enter threshold configuration mode for the specific threshold. In threshold configuration mode, you can modify the threshold attribute values.

Interfaces have no default alarm threshold values. When monitoring is enabled, alarm thresholds are only in effect when a threshold list is associated with the interface.

By default, the **threshold** command uses the next available threshold index number in the threshold list MIB. The **index** keyword and value allow you to explicitly assign an index for the threshold. This is particularly useful as index numbers become available when thresholds are deleted.

Examples

The following example shows how to configure an alarm threshold in a threshold list and enter threshold configuration mode.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name cvrd degrade
Switch(config-threshold)#
```

Related Commands

Command	Description
aps trigger	Enables APS switchover when the alarm threshold is crossed.
description	Specifies a threshold description for the SNMP MIB.
notification-throttle timer	Modifies the alarm threshold notification throttle timer.
show threshold-list	Displays the contents of a threshold list.
snmp-server enable traps threshold min-severity	Enables SNMP trap notifications for alarm threshold activity.
threshold-group	Associates a threshold list to an interface.
threshold-list	Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode.
value	Specifies the threshold value.

threshold-group

To associate a threshold list to an interface, use the **threshold-group** command. To remove a threshold list from an interface, use the **no** form of this command.

threshold-group *name*

no threshold-group *name*

Syntax Description

name	Specifies the name of a threshold list and associates it with a specified interface.

Defaults

The default list on gigabitphy interfaces raises signal failure alarms for CVRD errors. The default rate value is 5.

All other interfaces have no default threshold list.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy interfaces.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for wavesonetphy interfaces.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Use this command to associate a threshold list to a specified interface.

Even though a threshold list might contain the thresholds for all error counters, not all of these thresholds are applicable to the interface. Thresholds are recognized by the interface based on the interface type (for example, wave or waveethernetphy) and the encapsulation type (in the case of transparent interfaces).

You can associate more than one threshold list with an interface. The lists cannot contain overlapping thresholds. The system will not allow you to associate a threshold list if it contains a counter the interface already monitors for another threshold list.

If the interface is not associated with any threshold list, the threshold counters that are monitored on that interface are set to their default values.For y-cable protected interfaces, disable monitoring on the interface with the **no monitor** command before removing an alarm threshold. Use the **show aps** command to determine the protection configuration for the interface.

Note Threshold lists for gigabitphy interfaces must contain a signal failure threshold for CVRD.

Examples

The following example shows how to associate a threshold list to a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# threshold-group temp
```

Related Commands

Command	Description
show threshold-list	Displays the contents of a threshold list.
threshold	Creates failure and degrade thresholds for different error counters that are monitored on the interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

threshold-list

To create a list of thresholds, or modify an existing threshold list, use the **threshold-list** command. To delete the threshold list, use the **no** form of this command.

threshold-list *name*

no threshold-list *name*

Syntax Description

name	Specifies the name of the threshold list to be created and associated with a specified interface. The list name cannot begin with the text string “default”.

Defaults

None

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Use this command to create a list, or modify an existing list, of signal degrade and signal failure alarm thresholds for monitored error counters. After entering the command, the CLI enters threshold configuration mode where you can specify the threshold list attributes or threshold counters to add or modify.

Before deleting or modifying a threshold list, remove it from all the interfaces that use it.

Examples

The following example shows how to create a threshold list called temp.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)#
```

Related Commands

Command	Description
aps trigger	Enables APS switchover when the alarm threshold is crossed.
description	Specifies a threshold description for the SNMP MIB.
notification-throttle timer	Modifies the alarm threshold notification throttle timer.
show threshold-list	Displays the contents of a threshold list.
snmp-server enable traps threshold min-severity	Enables SNMP trap notifications for alarm threshold activity.
threshold	Creates failure and degrade thresholds for different error counters that are monitored on the interface.
threshold-group	Associates a threshold list to an interface.
value	Specifies the threshold value.

value

To configure the values of failure and degrade alarm threshold rates, use the **value** command. To remove a threshold rate, use the **no** form of the command.

value rate *value*

no value

Syntax Description

rate *value*	Enters the threshold value as 10^{-x}, where *value* is x in 10^{-x}. The range is 3 to 9.

Defaults

None

Command Modes

Threshold configuration

Command History

This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to specify a threshold to modify and enter threshold configuration mode.

The degrade rate value for a threshold must always be less than the failure rate value. For example, if the failure rate for a threshold is 7, or 10^{-7}, then the degrade value must be 8 or 9.

Table 10-2 lists the errors per second for the threshold rates for each of the protocol encapsulations.

Table 10-2 Thresholds for Monitored Protocols on Transponder Line Cards in Errors Per Second

Rate	SONET OC-3 / SDH STM-1	SONET OC-12 / SDH STM-4	SONET OC-48 / SDH STM-16	GE CVRD
3	31,753	32,000	32,000	125000
4	12,318	27,421	31,987	12500
5	1518	5654	17,296	1250
6	155	616	2394	125
7	15.5	62	248	13
8	1.55	6.2	24.8	1.3
9	0.155	0.62	2.48	0.13

Rate	ESCON	FC/FICON 1G CVRD	FC/FICON 2G CVRD	ISC[1]
3	199,102	110000	220000	1,057,731
4	19,991	11000	22000	106,202
5	2000	1100	2200	10,625
6	200	110	220	1062
7	20	11	22	106
8	2	1.1	2.2	10.6
9	0.2	0.11	0.22	1.06

1. Compatibility mode only.

Table 10-3 lists the threshold error rates in errors per second for ESCON signals on ESCON aggregation cards.

Table 10-3 Threshold Values for Monitored Rates on ESCON Aggregated Signals in Errors Per Second

Rate	ESCON CRC	ESCON CVRD
3	19999	20000
4	19999	20000
5	1999	2000
6	199	200
7	20	20
8	2	2
9	0.2	0.2

Table 10-4 lists the threshold error rates in errors per second for Fiber Channel 1G and 2G signals.

Table 10-4 Threshold Values for Monitored Rates for GE/FC/FICON Aggregated Signals in Errors Per Second

Rate	GE/FC/FICON 1G Tx-CRC	FC/FICON/ISC 1G CVRD	FC/FICON 2G Tx-CRC	FC/FICON/ISC 2G CVRD
3	83333	110000	166666	220000
4	58235	11000	116470	22000
5	9423	1100	18846	2200
6	994	110	1988	220
7	100	11	200	22
8	10	1.1	20	2.2
9	1	0.11	2	0.22

Table 10-5 lists the threshold error rates in errors per second for waveethernetphy interfaces on 2.5-Gbps ITU trunk cards and 10-Gbps ITU trunk cards.

Table 10-5 Threshold Values for Monitored Rates on 2.5-Gbps and 10-Gbps Signals in Errors Per Second

Rate	2.5-Gigabit CRC	2.5-Gigabit CVRD	2.5-Gigabit CDL HEC	10-Gigabit CRC	10-Gigabit CVRD	10-Gigabit CDL HEC
3	312396	19,968,416	1628	12,443,900	12,443,900	6512
4	172090	2,055,776	166	1,249,438	1,249,438	665
5	24026	206,176	17	124,944	124,944	67
6	2490	20,624	17	10,312	10,312	7
7	250	2,064	17	1031	1031	0.7
8	25	208	17	103	103	0.07
9	2.5	24	17	10	10	0.007

Examples

The following example shows how to create thresholds within a threshold list (temp) with the SONET and SDH section code violation error threshold signal degrade rate of 9 and signal failure rate of 7.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# value rate 9
Switch(config-threshold)# exit
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 7
Switch(config-threshold)# end
Switch#
```

Related Commands

Command	Description
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list with an interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.