

EtherChannel Flow-Based Limited 1 1 Redundancy

EtherChannel flow-based limited 1:1 redundancy provides MAC, or layer 2, traffic protection to avoid higher layer protocols from reacting to single link failures and re-converging. To use EtherChannel flow-based limited 1:1 redundancy, you configure an EtherChannel with two ports (one active and one standby). If the active link goes down, the EtherChannel stays up and the system performs fast switchover to the hot-standby link. Depending on how you have the priorities set, when the failed link becomes operational again, the EtherChannel performs another fast switchover to revert to the original active link. if all port-priorities are the same, it will not revert, but remain on the current active link.

With 1:1 redundancy configured, only one link is active at any given time so all flows are directed over the active link.

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Restrictions for EtherChannel Flow-based Limited 1:1 Redundancy

When you are using the Cisco ASR 1001-X, the following restrictions apply for collecting traffic statistics for VLAN egress on sub-interfaces. Obtaining input/output counters using SNMP is unsupported. This is because the Cisco ASR 1001-X has a built-in SPA.

Restrictions that apply when obtaining traffic statistics for two types of interfaces are shown below:

- **Physical sub-interfaces**

  For the Cisco ASR 1001-X, statistics for the VLAN egress are available for physical sub-interfaces. The output counter is used from cpp, not from the built-in SPA hardware. To show VLAN egress statistics, use the **show vlans** *vlan id* command.

  Example

```
# show vlans 10
VLAN ID: 10 (IEEE 802.1Q Encapsulation)
>
>    Protocols Configured:          Received:        Transmitted:
>                     IP             133                104
```

- **Port Channel sub-interfaces**

  For the Cisco ASR 1001-X, showing traffic statistics for the VLAN egress is not supported for port channel sub-interfaces.

  cpp or the built-in SPA can not be used to give an output counter value for port channel sub-interfaces.

Information About EtherChannel Flow-Based Limited 1 1 Redundancy

EtherChannel Flow-Based Limited 1 1 Redundancy

EtherChannel flow-based limited 1:1 redundancy provides an EtherChannel configuration with one active link and fast switchover to a hot standby link. To use EtherChannel flow-based limited 1:1 redundancy, you configure a Link Aggregation Control Protocol (LACP) EtherChannel with two ports (one active and one standby). If the active link goes down, the EtherChannel stays up and the system performs fast switchover to the hot standby link. Depending on how the priorities of the links are set, when the failed link becomes operational again, the EtherChannel performs another fast switchover to revert to the original active link, or to the link with the higher priority.

For EtherChannel flow-based limited 1:1 redundancy to work correctly (especially the fast switchover capability) the feature must be enabled at both ends of the link.

How to Configure EtherChannel Flow-Based Limited 1 1 Redundancy

Configuring EtherChannel Flow-Based Limited 1 1 Redundancy with Fast-Switchover

To configure an LACP EtherChannel with two ports (one active and one standby), perform the following steps. This feature must be enabled at both ends of the link.

You can control which link is the primary active link by setting the port priority on the links used for the redundancy. To configure a primary link and enable the EtherChannel to revert to the original link, one link must have a higher port priority than the other and the LACP max-bundle must be set to 1. This configuration results in link 1 being active and link 2 being in hot standby state.

To prevent the switchover to revert, you can assign both links the same priority.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface port-channel** *channel -number*
4. **lacp fast-switchover**
5. **lacp max-bundle 1**
6. **exit**
7. **interface tengigabitethernet** *slot / port / number*
8. **channel-group 1 mode** *mode*
9. **lacp port-priority** *priority*
10. **exit**
11. **interface tengigabitethernet** *slot / port / number*
12. **channel-group 1 mode** *mode*
13. **lacp port-priority** *priority*
14. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface port-channel** *channel -number* **Example:** `Router(config)# interface port-channel 1`	Selects an LACP port channel interface.
Step 4	**lacp fast-switchover** **Example:** `Router(config-if)# lacp fast-switchover`	Enables the fast switchover feature for this EtherChannel.
Step 5	**lacp max-bundle 1** **Example:** `Router(config-if)# lacp max-bundle 14`	Sets the maximum number of active member ports to 14. **Note** For Cisco ASR 1000 Series Aggregation Services Routers, the minimum number of active member ports is 1 and the maximum number is 14.

	Command or Action	Purpose
Step 6	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns to global configuration mode.
Step 7	**interface tengigabitethernet** *slot / port / number* **Example:** `Router(config)# interface tengigabitethernet 0/0/0`	Selects the first interface to add to the port channel.
Step 8	**channel-group 1 mode** *mode* **Example:** `Router(config-if)# channel-group 1 mode active`	Adds the member link to the port-channel and actively participates in LACP negotiation.
Step 9	**lacp port-priority** *priority* **Example:** `Router(config-if)# lacp port-priority 32768`	Sets the priority on the port-channel. This priority is set to the default value.
Step 10	**exit** **Example:** `Router(config-if)# exit`	Exits interface configuration mode and returns to global configuration mode.
Step 11	**interface tengigabitethernet** *slot / port / number* **Example:** `Router(config)# interface tengigabitethernet 1/0/0`	Selects the interface to add to the port channel.
Step 12	**channel-group 1 mode** *mode* **Example:** `Router(config-if)# channel-group 1 mode active`	Adds the member link to the port-channel and actively participates in LACP negotiation.
Step 13	**lacp port-priority** *priority* **Example:** `Router(config-if)# lacp port-priority 32767`	Sets the port priority higher than the other link by using a value lower than the default value of 32768. This forces this link to be the active link whenever it is capable of carrying traffic.
Step 14	**end** **Example:** `Router(config-if)# end`	Exits interface configuration mode.

Setting the Switchover Rate with Carrier Delay

Optionally, you can control the speed of the switchover between the active and standby links by setting the carrier delay on each link. The **carrier-delay** command controls how long it takes for Cisco IOS to propagate the information about the links status to other modules.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface tengigabitethernet** *slot* / *port* / *number*
4. **carrier-delay msec** *msec*
5. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface tengigabitethernet** *slot* / *port* / *number* **Example:** `Router(config)# interface tengigabitethernet 0/1/0`	Enters interface configuration mode and opens the configuration for the specified interface.
Step 4	**carrier-delay msec** *msec* **Example:** `Router(config-if)# carrier-delay msec 11`	Sets how long it takes to propagate the link status to other modules.
Step 5	**end** **Example:** `Router(config-if)# end`	Exits interface configuration mode.

Verifying EtherChannel Flow-Based Limited 1 1 Redundancy

Use these show commands to verify the configuration and to display information about the port channel.

SUMMARY STEPS

1. **enable**
2. **show running-config interface** *type slot / port / number*
3. **show interfaces port-channel** *channel-number* **etherchannel**
4. **show etherchannel** *channel-number* **port-channel**
5. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show running-config interface** *type slot / port / number* **Example:** `Router# show running-config interface tengigabitethernet 0/0/0`	Verifies the configuration. • *type* --**gigabitethernet** or **tengigabitethernet**.
Step 3	**show interfaces port-channel** *channel-number* **etherchannel** **Example:** `Router# show interfaces port-channel 1 etherchannel`	Displays the bucket distribution currently in use.
Step 4	**show etherchannel** *channel-number* **port-channel** **Example:** `Router# show etherchannel 1 port-channel`	Displays the port channel fast-switchover feature capability.
Step 5	**end** **Example:** `Router# end`	Exits privileged EXEC mode.

Configuration Examples for EtherChannel Flow-Based Limited1 1 Redundancy

EtherChannel 1 1 Active Standby Example

This example shows how to configure a port channel for 1:1 link redundancy for equal priority ports so there is no preference which port is active.

```
Router# enable
Router# configure terminal
Router(config)# interface port-channel 2
Router(config-if)# ip address 10.1.1.1 255.255.0.0
Router(config-if)# negotiation auto
Router(config-if)# lacp max-bundle 1
Router(config-if)# lacp fast-switchover
Router(config)# interface Tengigabitethernet0/1/0
Router(config-if)# channel-group 2 mode active
Router(config-if)# negotiation auto
Router(config)# interface Tengigabitethernet 2/1/0
Router(config-if)# channel-group 2 mode active
Router(config-if)# negotiation auto
Router(config)# interface GigabitEthernet0/1/6
Router(config-if)# negotiation auto
Router(config-if)# channel-group 19 mode active
Router(config)# interface GigabitEthernet0/1/7
Router(config-if)# negotiation auto
Router(config-if)# channel-group 19 mode active
Router(config-if)# interface Port-channel19
Router(config-if)# ip address 10.19.1.1 255.255.255.0
Router(config-if)# no negotiation auto
Router(config-if)# lacp fast-switchover
Router(config-if)# lacp max-bundle 1
Router(config-if)# end
```

Notice in the **show** command display the priorities are the same value.

```
Router# show lacp internal
Flags: S - Device is requesting Slow LACPDUs
 F - Device is requesting Fast LACPDUs
 A - Device is in Active mode P - Device is in Passive mode
Channel group 19
LACP port Admin Oper Port Port
Port Flags State Priority Key Key Number State
Gi0/1/6 SA bndl 32768 0x13 0x13 0x47 0x3D
Gi0/1/7 FA hot-sby 32768 0x13 0x13 0x48 0x7
```

Setting Priority for 1 1 Redundancy Using LACP Example

This example shows how to configure an LACP EtherChannel with 1:1 redundancy. GigabitEthernet 0/1/7 is the active link, because it is configured with a lower number which give it a higher port priority.

```
Router# configure terminal
Router(config)# interface GigabitEthernet0/1/6
```

```
Router(config-if)# lacp port-priority 32767
Router(config-if)# exit
Router(config)# interface GigabitEthernet0/1/7
Router(config-if)# lacp fast-switchover
Router(config-if)# lacp max-bundle 1
Router(config-if)# negotiation auto
Router(config-if)# channel-group 19 mode active
```

In this show display, notice that the bundled link is set at a higher priority. This will ensure that the bundled link is used as the first active link in the standby configuration.

```
Router# show lacp internal

Flags: S - Device is requesting Slow LACPDUs
 F - Device is requesting Fast LACPDUs
 A - Device is in Active mode P - Device is in Passive mode
Channel group 19
LACP port Admin Oper Port Port
Port Flags State Priority Key Key Number State
Gi0/1/6 FA hot-sby 32768 0x13 0x13 0x47 0x7
Gi0/1/7 SA bndl 32767 0x13 0x13 0x48 0x3D
```

Additional References

The following sections provide references related to the EtherChannel Flow-based Limited1:1 Redundancy feature.

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
LAN Switching commands	*Cisco IOS LAN Switching Command Reference*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing standards has not been modified by this feature.	--

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for EtherChannel Flow-based Limited 1 1 Redundancy

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 1: Feature Information for EtherChannel Flow-based Limited 1:1 Redundancy

Feature Name	Releases	Feature Information
EtherChannel Flow-Based Limited 1:1 Redundancy	Cisco IOS XE Release 2.4	EtherChannel flow-based limited 1:1 redundancy provides MAC, or layer 2, traffic protection to avoid higher layer protocols from reacting to single link failures and re-converging. To use EtherChannel flow-based limited 1:1 redundancy, you configure an EtherChannel with two ports (one active and one standby). If the active link goes down, the EtherChannel stays up and the system performs fast switchover to the hot-standby link. Depending on how you have the priorities set, when the failed link becomes operational again, the EtherChannel performs another fast switchover to revert to the original active link. if all port-priorities are the same, it will not revert, but remain on the current active link. No commands were modified or created to support this feature.