Configuring Flex Links

This chapter describes how to configure Flex Links, a pair of Layer 2 interfaces, where one interface is configured to act as a backup to the other.

- Finding Feature Information, on page 1
- Restrictions for Configuring Flex Links, on page 1
- Information About Flex Links, on page 2
- Additional References, on page 8

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

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.

Restrictions for Configuring Flex Links

- You can configure only one Flex Link backup link for any active link, and it must be a different interface from the active interface.
- An interface can belong to only one Flex Link pair. An interface can be a backup link for only one active link. An active link cannot belong to another Flex Link pair.
- Neither of the links can be a port that belongs to an EtherChannel nor port channel
- A backup link does not have to be the same type (TenGigabit Ethernet, Gigabit Ethernet) as the active link.
- STP is disabled on Flex Link ports. If STP is configured on the switch, Flex Links do not participate in STP in all VLANs in which STP is configured. With STP not running, be sure that there are no loops in the configured topology.
- Flex link is only supported on trunk EFP.

- In bi-directional traffic, FlexLink Convergence will be high in one-direction due to mac address black holing.
- Admin shut has no effect on interfaces that are configured under flexlinks.
- Dynamically editing encapsulations using *add* and *remove* options is not supported.
- Dynamic editting or overwriting VLANs on Active and Backup causes traffic loop.

Note Remove **ethernet backup** command from primary flexlink interface and then edit the VLANs of primary and backup interfaces.

Information About Flex Links

The feature provides an alternative solution to the Spanning Tree Protocol (STP), allowing you to turn off STP and still provide basic link redundancy. Flex Links are typically configured in service provider or enterprise networks, where, you do not want to run STP on the router. If the router is running STP, it is not necessary to configure Flex Links, because STP already provides link-level redundancy or backup. Flex Links are supported only on Trunk EFP and are not supported on other EVCs.

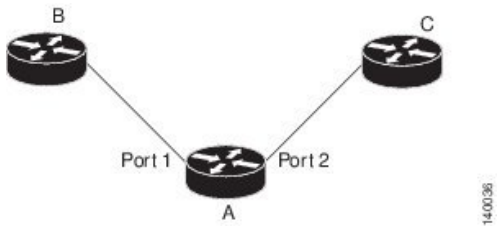
Following are the two flex link modes supported:

- Active-Alone Forwarding Method
- Active-Backup-Both Forwarding Method

Active-Alone forwarding Method

From the schematic representation, ports 1 and 2 on switch A are connected to uplink switches B and C. Because they are configured as Flex Links Active-Alone forwarding mode, only one of the interfaces forwards traffic; the other is in standby mode. If port 1 is the active link, it begins forwarding traffic between port 1 and switch B; the link between port 2 (the backup link) and switch C do not forward traffic. If port 1 goes down, port 2 comes up and starts forwarding traffic to switch C. Since pre-emption is not supported, even after port 1 comes back to operational state, traffic continues to be forwarded to port 2. Switch over back to port 1 happens only when port 2 goes down.

Figure 1: Active-Alone Forwarding Method



Configuring Active Alone Forwarding Method

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface-id*
4. **no shutdown**
5. **ethernet backup interface** *interface-id*
6. **end**

DETAILED STEPS

	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** *interface-id* **Example:** `Router(config)# interface gigabitEthernet 0/0/5`	Specify the interface, and enter interface configuration mode. The interface can be a physical Layer 2 interface.
Step 4	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enable the port, if necessary. By default, UNIs are disabled, and NNIs are enabled.
Step 5	**ethernet backup interface** *interface-id* **Example:** `Router(config)# ethernet backup interface gigabitEthernet 0/0/5`	Configure a physical Layer 2 interface as part of a Flex Link pair with the interface. When one link is forwarding traffic, the other interface is in standby mode.
Step 6	**end** **Example:** `Router(config-if)# end`	Return to privileged EXEC mode.

Configuration Example

```
On Active interface(Port 5)

Router> enable
Router# configure terminal
Router# service instance trunk 1000 ethernet
Router# encapsulation dot1q 1-1000
```

```
Router# rewrite ingress tag pop 1 symmetric
Router# bridge-domain from-encapsulation
```

Backup interface (Port 6)

```
Router> enable
Router# configure terminal
Router# service instance trunk 1000 ethernet
Router# encapsulation dot1q 1-1000
Router# rewrite ingress tag pop 1 symmetric
Router# bridge-domain from-encapsulation
```

Flexlink Configuration

```
Router> enable
Router# configure terminal
Router(config)# interface gigabitEthernet 0/0/5
Router(config-if)# no shutdown
Router(config-if)# ethernet backup interface gigabitEthernet 0/0/6
Router(config-if)# end
```

Verifying Active Alone Forwarding Method Configuration

SUMMARY STEPS

1. enable
2. configure terminal
3. show ethernet backup detail

DETAILED STEPS

	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	**show ethernet backup detail** **Example:** `Router# show ethernet backup detail`	This displays the flex link configuration.

Configuration Output

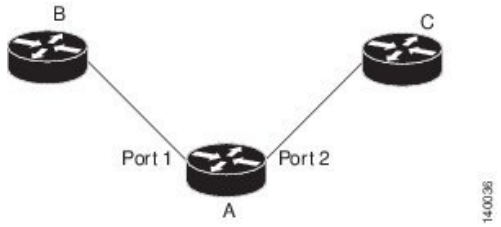
```
Switch Backup Interface Pairs:
```

```
Active Interface        Backup Interface        State
------------------------------------------------------------------------
GigabitEthernet0/0/5    Te0/0/12                Active Up/Backup Standby
        Preemption Mode  : off
        Multicast Fast Convergence  : Off
        Bandwidth : 1000000 Kbit (Gi0/0/3), 1000000 Kbit (Te0/0/12)
        Mac Address Move Update Vlan : auto
        Forwarding  : Active-Only
```

Active-Backup-Both forwarding Method

From the schematic representation, ports 1 and 2 on switch A are connected to uplink switches B and C. Because they are configured as Flex Link in active-backup both forwarding mode, both the interfaces will be forwarding traffic. If port 1 is the active link, all mutually inclusive vlans (common vlans configured in both active / backup interface) would be forwarded on active interface and mutually exclusive vlans would be forwarded from the respective active / backup interfaces. If port 1 goes down, then port 2 will start forwarding only the traffic for the common vlans along with its specific exclusive vlans. All traffic belonging to the exclusive vlans as part of active interface configuration would be dropped until port 1 comes back to operational state.

Figure 2: Active-Backup-Both Forwarding Method



Configuring Active Backup Both Forwarding Method

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *interface-id*
4. **no shutdown**
5. **ethernet backup interface** *interface-id* **prefer forwarding**
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:**	Enters global configuration mode.

	Command or Action	Purpose
	`Router# configure terminal`	
Step 3	**interface** *interface-id* **Example:** `Router(config)# interface gigabitEthernet 0/0/8`	Specify the interface, and enter interface configuration mode. The interface can be a physical Layer 2 interface .
Step 4	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enable the port, if necessary. By default, UNIs are disabled, and NNIs are enabled.
Step 5	**ethernet backup interface** *interface-id* **prefer forwarding** **Example:** `Router(config)# ethernet backup interface gigabitEthernet 0/0/8 prefer forwarding`	Configure a physical Layer 2 interface as part of a Flex Link pair with the interface. When one link is forwarding traffic, the other interface is in standby mode.
Step 6	**end** **Example:** `Router(config-if)# end`	Return to privileged EXEC mode.

Configuration Example

```
On Active interface(Port 7)

Router> enable
Router# configure terminal
Router# service instance trunk 1000 ethernet
Router# encapsulation dot1q 1-512
Router# rewrite ingress tag pop 1 symmetric
Router# bridge-domain from-encapsulation



Backup interface (Port 8)

Router> enable
Router# configure terminal
Router# service instance trunk 1000 ethernet
Router# encapsulation dot1q 512-1000
Router# rewrite ingress tag pop 1 symmetric
Router# bridge-domain from-encapsulation



Flexlink Configuration

Router> enable
Router# configure terminal
Router(config)# interface gigabitEthernet 0/0/7
Router(config-if)# no shutdown

Router(config-if)# ethernet backup interface gigabitEthernet 0/0/7 prefer forwarding
Router(config-if)# end
```

Verifying Active-Backup-Both Forwarding Method Configuration

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **show ethernet backup detail**

DETAILED STEPS

	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	**show ethernet backup detail** **Example:** `Router# show ethernet backup detail`	This displays the flex link configuration.

Configuration Output

```
Switch Backup Interface Pairs:
Active Interface        Backup Interface        State
------------------------------------------------------------------------
GigabitEthernet0/0/3    Te0/0/12                Active Up/Backup Standby
        Preemption Mode  : off
        Multicast Fast Convergence  : Off
        Bandwidth : 1000000 Kbit (Gi0/0/3), 1000000 Kbit (Te0/0/12)
        Mac Address Move Update Vlan : auto
        Forwarding  : Active-Backup-Both
```

Unsupported Functions

Following functions are not supported:

- MMU Notification
- IGMP Fast convergence
- Preemption Support
- Flex links support on a Port channel interface.
- Flex links support on EVC

- Flex links with VLB
- Flex links on IP configured Physical interface.
- Flexlink cannot be configured on a REP / G8032 configured interface and vice-versa.
- STP can be enabled globally but will not be applied on flex link configured interfaces alone.

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/mcl/allreleasemcl/all-book.html

Standards and RFCs

Standard/RFC	Title
No specific Standards and RFCs are supported by the features in this document.	—

MIBs

MIB	MIBs Link
—	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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