



# Configuring Flex Links

This document describes the Flex Link feature and configuration steps to implement Flex Links. They also describe how to configure the MAC address table move update feature.



## Note

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Flex Links does not currently support stacking, duo switches structure, or VLAN separation.

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## Prerequisites for Configuring Flex Links

- Disable STP before configuring Flex Links. If STP is disabled on the switch, make sure that there are no Layer 2 loops in the topology.
- Flex Links is supported on the Serval CEServices application.

### Default Configuration

Default Flex Links configuration is when there is no configuration for Flex Links pairs or for the MAC address move update transmit feature.

## Restrictions for Configuring Flex Links

- Only one Flex Links backup link can be configured for any active link, and it must be a different interface from the active interface.
- The backup link does not have to be the same type as the active link. However, they should be configured with similar characteristics so that there are no loops or changes in operation if the standby link becomes active.

- An active link cannot belong to another Flex Links pair.
- The Flex Links pair cannot belong to the same port channel. However, a Flex Links pair can be a port channel and a physical interface, or two port channels or physical interfaces.
- The port channel interface should be active when included in the Flex Links pair, for it to be configured properly.

## Information about Flex Links

Flex Links configuration provides link-level redundancy in the absence of Spanning Tree Protocol (STP). Flex Links consists of a pair of interfaces (ports or port channels) with one interface configured as the primary interface (forwarding status) and the other as the backup interface (standby status). When a failure occurs on the primary interface, the backup interface moves to forwarding status and starts to forward traffic.

Flex Links works by detecting link down on a primary interface and then bringing up the backup interface that has been defined as backup. It is most commonly implemented at the access layer where the switch has dual uplinks to the distribution layer.

Flex Links is designed to interact with supporting modules, such as the port module, the aggregation module, the packet module, and the configuration module. The basic Flex Links protocol functions are as follows:

- Initialize module configurations
- Interact with the packet module to transmit/receive MAC address table update frames
- Interact with the configuration module to read/write FL configurations
- Register with the port module to receive the port up/down event

The Flex Links API layer provides direct interaction with the switch for the implementation of the active and backup ports groups, the setup of the port status, and the MAC-address table read.

## MAC Address Table Move Update

The MAC address table move update is an optional Flex Links feature. It allows the switch to provide rapid bidirectional convergence when an active link goes down and the backup link starts forwarding traffic.

**Note**

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MAC address table move update enables fast recovery of network connectivity but consumes CPU resources.

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# How to Configure Flex Links

## Configuring Flexlink Ports

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters FlexlinksPortType mode to provision Flex Links.
Step 2	<b>flexlinkPortConfiguration flexlinksConfiguration {activePort backupPort flexlinkEnabled}</b>  <b>Example:</b> Switch(FlexlinkPortType) # flexlinkPortConfiguration flexlinksConfiguration activePort activePortId 4 flexlinkPortConfiguration flexlinksConfiguration backupPort backupPortId 6 flexlinkPortConfiguration flexlinksConfiguration flexlinkEnabled enable	<ul style="list-style-type: none"> <li>• <b>activePort</b>— Enter the Port number of interface to be configured .</li> <li>• <b>backupPort</b>— Enter the backup interface port number. It can be a physical port number or LLAG/LACP group ID.</li> <li>• <b>flexlinkEnabled</b>— Enter enable or disable to configure Flexlink port number.</li> </ul>
Step 3	<b>flexlinkPortConfiguration review</b>  <b>Example:</b> Switch(FlexlinksPotType) # flexlinkPortConfiguration review	Displays the Flexlink configuration commands in the queue.
Step 4	<b>flexlinkPortConfiguration commit</b>  <b>Example:</b> Switch(FlexlinksPotType) # flexlinkPortConfiguration commit	Sends the Flexlink port configuration to the NID.
Step 5	<b>exit</b>  <b>Example:</b> Switch(FlexLinksPortType) # <b>exit</b>	Exits the Flex Links mode.

## Provisioning Flex Link Ports

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters the FlexlinksPortType mode to provision Flex Links.
Step 2	<b>getFlexlinksConfiguration</b> <b>getFlexlinkConfigRequest {llagGroupId lagGroup-Id phyPortId phyPort-Id}</b>  <b>Example:</b> Switch (FlexlinksPotType) # getFlexlinksConfiguration Switch (FlexlinksPotType) # getFlexlinksConfiguration getFlexlinkConfigRequest port phyPortId 4 Switch (FlexlinksPotType) # getFlexlinksConfiguration getFlexlinkConfigRequest llagGroupId 2	Gets the activeport configuration using getcommand.
Step 3	<b>getFlexlinksConfiguration review</b>  <b>Example:</b> Switch (FlexlinksPotType) # getFlexlinksConfiguration review	Displays the activeport configuration using getcommand.
Step 4	<b>getFlexlinksConfiguration commit</b>  <b>Example:</b> Switch (FlexlinksPotType) # getFlexlinksConfiguration commit	Sends the activeport configuration to the NID.
Step 5	<b>exit</b>  <b>Example:</b> Switch (FlexLinksPortType) # <b>exit</b>	Exits the Flex Links mode.

## Viewing Flex Link Configuration at Port Level on the NID

### Before You Begin

- Perform the steps to provision Flex Links on the NID.

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters FlexlinksPortType mode to provision Flex Links.
Step 2	<b>getFlexlinksConfiguration</b> <b>getFlexlinkConfigRequestportllagGroupId phyPortId</b>  <b>Example:</b> Switch(FlexlinksPortType)# getFlexlinksConfiguration getFlexlinkConfigRequest port llagGroupId 2 Switch(FlexlinksPortType)# getFlexlinksConfiguration getFlexlinkConfigRequest port phyPortId 4	Retrieves the Flex Links configuration at port.  <ul style="list-style-type: none"> <li>• <b>llagGroupId</b> <i>llagGroup-Id</i>—Displays the targeted active LLAG Group Id.</li> <li>• <b>review</b>—Displays the targeted active physical port.</li> </ul>
Step 3	<b>getFlexlinksConfiguration review</b>  <b>Example:</b> Switch(FlexlinksPortType)# <b>getFlexlinksConfiguration review</b> Commands in queue: getFlexlinksConfiguration flexlinksPhysicalPort 4	Displays the Flex Links configuration.
Step 4	<b>getFlexlinksConfiguration commit</b>  <b>Example:</b> Switch(FlexlinksPortType)# <b>getFlexlinksConfiguration commit</b>	Sends the Flex Links configuration to the NID.
Step 5	<b>exit</b>  <b>Example:</b> Switch(FlexLinksPortType)# <b>exit</b>	Exits the Flex Links mode.

**Configuration Example**

The example retrieves the Flex Links configuration for port 4 on the NID:

```
Switch(FlexlinksPortType)# getFlexlinksConfigRequestportphyPortId 4
Switch(FlexlinksPortType)# getFlexlinksConfiguration review
Commands in queue:
    getFlexlinksConfigRequestportphyPortId 4
Switch(FlexlinksPortType)# getFlexlinksConfiguration commit
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.portNumber = 4
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.flexlinksEnable = false
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.key = 4
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.role.t = 4
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.role.u.active = true
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.portPriority = 32768
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.timeout.t = 4
GetFlexlinksConfiguration_Output.getFlexlinksConfiguration.timeout.u.fast = true

GetFlexlinksConfiguration Commit Success!!!
Switch(FlexlinksPortType)# exit
```

## Viewing Flexlink Active Port Configuration

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters FlexlinksPortType mode to provision Flex Links.
<b>Step 2</b>	<b>showFlexlinksConfigdisplayFlexlinksConfigport {llagGroupID phyPortId}</b>  <b>Example:</b> Switch(FlexlinksPortType)# showFlexlinksConfig displayFlexlinksConfig port phyPortId 4	<ul style="list-style-type: none"> <li>• <b>port</b>— Displays the targeted active port.</li> <li>• <b>llagGroupID</b>— Displays the active llagGroupID number.</li> <li>• <b>phyPortId</b>— Displays the active physical port number.</li> </ul>
<b>Step 3</b>	<b>showFlexlinksConfig review</b>  <b>Example:</b> Switch(FlexlinksPotType)# showFlexlinksConfig review	Displays the ports for Flexlink configuration.
<b>Step 4</b>	<b>showFlexlinksConfig commit</b>  <b>Example:</b> Switch(FlexlinksPotType)# showFlexlinksConfig commit	Sends the Flexlink configuration to the NID.
<b>Step 5</b>	<b>exit</b>  <b>Example:</b> Switch(FlexLinksPortType)# <b>exit</b>	Exits the Flex Links mode.

### Configuration Example

The example shows the flexlink configuration in active ports.

```
Switch# FlexlinksPortType
Switch(FlexlinksPortType)# showFlexlinksConfig displayFlexlinksConfig port phyPortId 4

(FlexlinksPortType)# showFlexlinksConfig commit
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].backupPort = 'GigabitEthernet 1/6'
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].activePort = 'GigabitEthernet 1/4'
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].backupState = 'Active Up/Backup Standby'
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].macUpdateEnabled = 'enabled'

(FlexlinksPortType)# showFlexlinksConfig commit
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].backupPort = 'GigabitEthernet 1/6'
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].activePort = 'GigabitEthernet 1/4'
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].backupState = 'Active Up/Backup Standby'
```

```
ShowFlexlinksConfig_Output.displayFlexlinksConfigResp[0].macUpdateEnabled = 'enabled'

ShowFlexlinksConfig Commit Success!!!(FlexlinksPortType)#
Commit Success!!!(FlexlinksPortType)#
```

## Enabling macMoveupdate on Active Port

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters the FlexlinksPortType mode to provision Flex Links.
<b>Step 2</b>	<b>macMoveUpdatePortConfig macMoveUpdateConfig { llagGroupId llagGroup-Id   mmuEnabled { enable disable }   portNumber portNumber }</b>  <b>Example:</b> Switch(FlexlinksPortType)# macMoveUpdatePortConfig macMoveUpdateConfig Switch(FlexlinksPortType)# macMoveUpdatePortConfig macMoveUpdateConfig llagGroup id 2 Switch(FlexlinksPortType)# macMoveUpdatePortConfig macMoveUpdateConfig portNumber 4 Switch(FlexlinksPortType)# macMoveUpdatePortConfig macMoveUpdateConfig mmuEnabled enable	Displays the macMoveUpdateConfig mode. <b>Note</b> User can enable macMoveUpdate, only after flex link is configured. <ul style="list-style-type: none"> <li>• <b>llagGroupId</b>— Configures llag as an active port in flex link. The range is from 1-4</li> <li>• <b>portNumber</b>— Configures port number in flex link. The range is from 1-124</li> <li>• <b>mmuEnabled</b>—Updates the MAC Move Transmitt in flex link to either enable or disable.</li> </ul>
<b>Step 3</b>	<b>macMoveUpdatePortConfig review</b>  <b>Example:</b> Switch(FlexlinksPotType)# macMoveUpdatePortConfig review	Displays the macMoveUpdatePortConfig commands.
<b>Step 4</b>	<b>macMoveUpdatePortConfig commit</b>  <b>Example:</b> Switch(FlexlinksPotType)# macMoveUpdatePortConfig commit	Sends the macMoveUpdatePortConfig commands to the NID.
<b>Step 5</b>	<b>exit</b>  <b>Example:</b> Switch(FlexLinksPortType)# <b>exit</b>	Exits the Flex Links mode.

## Viewing macMoveUpdate Active Port Configuration

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>FlexlinksPortType</b>  <b>Example:</b> Switch# FlexlinksPortType	Enters FlexlinksPortType mode to provision Flex Links.
Step 2	<b>getMACMoveUpdateConfiggetFlexlinkConfigRequestport {llagGroupId phyPortId}</b>  <b>Example:</b> Switch(FlexlinksPortType) # getMACMoveUpdateConfig getFlexlinkConfigRequest port phyPortId 4	<ul style="list-style-type: none"> <li>• <b>port</b>— Displays the targeted active port.</li> <li>• <b>llagGroupID</b>— Displays the active llagGroupID number.</li> <li>• <b>phyPortId</b>— Displays the active physical port number.</li> </ul>
Step 3	<b>getMACMoveUpdateConfig review</b>  <b>Example:</b> Switch(FlexlinksPotType) # getMACMoveUpdateConfig review	Displays the ports for Flexlink configuration.
Step 4	<b>getMACMoveUpdateConfig commit</b>  <b>Example:</b> Switch(FlexlinksPotType) # getMACMoveUpdateConfig review	Sends the Flexlink configuration to the NID.
Step 5	<b>exit</b>  <b>Example:</b> Switch(FlexLinksPortType) # <b>exit</b>	Exits the Flex Links provisioning mode.

### Configuration Example

The example shows the flexlink configuration in active ports.

```
Switch# FlexlinksPortType
Switch(FlexlinksPortType) # getMACMoveUpdateConfig getFlexlinkConfigRequest port phyPortId
4
(FlexlinksPortType) # getMACMoveUpdateConfig review

Commands in queue: 1

getMACMoveUpdateConfig getFlexlinkConfigRequest port phyPortId 4
(FlexlinksPortType) # getMACMoveUpdateConfig commit
GetMACMoveUpdateConfig_Output.macMoveUpdateConfig._choice1.t = 1
GetMACMoveUpdateConfig_Output.macMoveUpdateConfig._choice1.u.portNumber = 4
GetMACMoveUpdateConfig_Output.macMoveUpdateConfig.mmuEnabled = true

GetMACMoveUpdateConfig Commit Success!!!(FlexlinksPortType) #
```