



FlexLink+

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FlexLink+ redundancy functions

FlexLink+ is a Layer 2 redundancy feature that

- provides a pair of interfaces where one acts as a backup to the other
- offers an alternative to the Spanning Tree Protocol (STP) for simple link redundancy, and
- supports switchover on both physical interfaces and EtherChannel bundles.

FlexLink+ provides redundancy by using one Layer 2 link as primary and another as backup. It can also improve bandwidth through VLAN load balancing, letting both links forward traffic at the same time for different VLANs while still maintaining redundancy.

In load balancing mode, both ports forward traffic for separate VLANs simultaneously, which boosts bandwidth and maintains redundancy.

Table 1: Feature history

Feature name	Release information	Description
FlexLink+	26.2.1	This feature provides link redundancy between Layer 2 interfaces without requiring Spanning Tree Protocol. It supports failover for active-standby configurations, VLAN load balancing across links, automatic or manual preemption, and physical interfaces or port channels. FlexLink+ is ideal for industrial networks requiring simple, reliable uplink redundancy with minimal configuration complexity.

Guidelines and restrictions

Guidelines

- Use the **spanning-tree portfast trunk** command on uplink interfaces connected to FlexLink+ ports to bypass STP listening and learning states.
- Enable either MSTP or Rapid PVST on upstream switches for networks that extend across a FlexLink+ node to prevent traffic blackholing. For more information about configuring MSTP, refer [Configuring Multiple Spanning-Tree Protocol](#) and for more information about configuring Rapid PVST, refer [Spanning-Tree Interoperability and Backward Compatibility](#).

Restrictions

- FlexLink+ supports physical Layer 2 interfaces and EtherChannel.
- VLAN load balancing requires the edge port to terminate the segment.

Configure active port for Flex Link+

Define the primary (active) interface in a FlexLink+ pair.

Before you begin

Configure the node connected to the FlexLink+ active link as the root bridge.

Procedure

Step 1 Use the **configure terminal** command to enter global configuration mode.

Example:

```
Switch# configure terminal
```

Step 2 Use the **interface interface-id** command to enter interface configuration mode.

Example:

```
Switch(config)# interface GigabitEthernet1/0/1
```

- Step 3** Use the **switchport trunk allowed vlan *vlan-list*** command to configure the allowed VLANs on the interface.

Example:

```
Switch(config-if)# switchport trunk allowed vlan 10 20
```

- Step 4** Use the **switchport mode trunk** command to set the interface to trunk mode.

Example:

```
Switch(config-if)# switchport mode trunk
```

- Step 5** Use the **rep segment *segment-id* edge no-neighbor primary** command to define the port as the primary edge port.

Example:

```
Switch(config-if)# rep segment 2 edge no-neighbor primary
```

Configure standby port for FlexLink+

Define the standby interface in a FlexLink+ pair.

Procedure

- Step 1** Use the **configure terminal** command to enter global configuration mode.

Example:

```
Switch# configure terminal
```

- Step 2** Use the **interface *interface-id*** command to specify the interface.

Example:

```
Switch(config)# interface GigabitEthernet1/0/1
```

- Step 3** Use the **switchport trunk allowed vlan *vlan-list*** command to configure the allowed VLANs on the interface.

Example:

```
Switch(config-if)# switchport trunk allowed vlan 10 20
```

- Step 4** Use the **switchport mode trunk** command to set the interface to trunk mode.

Example:

```
Switch(config-if)# switchport mode trunk
```

- Step 5** Use the **rep segment *segment-id* edge no-neighbor preferred** command to define the port as the standby edge port.

Example:

```
Switch(config-if)# rep segment 2 edge no-neighbor preferred
```

The **preferred** keyword influences which port becomes the blocking port, but the system selects the actual blocking port according to the timing of link state changes, such as when a port comes up later.

Configure VLAN load balancing on FlexLink+

This procedure enables traffic distribution across a FlexLink+ pair.

Procedure

-
- Step 1** Use the **configure terminal** command to enter global configuration mode.
- Example:**
- ```
Switch# configure terminal
```
- Step 2** Use the **interface interface-id** command to enter interface configuration mode.
- Example:**
- ```
Switch(config)# interface GigabitEthernet1/0/1
```
- Step 3** Use the **rep block port port-number vlan vlan-id** command to define the VLANs that are blocked on the standby port.
- Example:**
- ```
Switch(config-if)# rep block port 2 vlan 1-50
```
- This command blocks VLANs 1 to 50 on the standby port, which means these VLANs remain active on the primary port.
- Step 4** Use the **switchport mode trunk** command to set the interface to trunk mode.
- Example:**
- ```
Switch(config-if)# switchport mode trunk
```
- Step 5** Use the **exit** command to exit interface configuration mode.
- Example:**
- ```
Switch(config-if)# exit
```
- Step 6** Use the **interface interface-id** command to access the standby interface configuration.
- Example:**
- ```
Switch(config)# interface GigabitEthernet1/1
```
- Step 7** Use the **rep segment segment-id edge no-neighbor** command to confirm the standby interface role in the segment.
- Example:**
- ```
Switch(config)# rep segment 10 edge no-neighbor
```
-

## Configure time for VLAN load balancing on FlexLink+

You can configure the time to trigger VLAN load balancing automatically after a link recovers. For more information about preempt delay, see [VLAN load balancing](#).

This configuration is valid on the primary edge port only.

### Procedure

**Step 1** Use the **configure terminal** command to enter global configuration mode.

**Example:**

```
Switch# configure terminal
```

**Step 2** Use the **interface interface-id** command to enter interface configuration mode.

**Example:**

```
Switch(config)# interface GigabitEthernet1/0/1
```

**Step 3** Use the **rep preempt delay seconds** command to configure the preemption delay time.

**Example:**

```
Switch(config-if)# rep preempt delay 100
```

The valid range for the delay value is 15 to 300 seconds.

## Configure manual preemption for VLAN load balancing on FlexLink+

Manual preemption defines the process for manually restoring the configured VLAN load balancing state on a segment.

Configure manual preemption as described in the following procedure. For more information about VLAN load balancing using manual preemption, see [VLAN load balancing](#).

### Procedure

**Step 1** Use the **enable** command to enter privileged EXEC mode.

**Example:**

```
Switch> enable
```

**Step 2** Use the **rep preempt segment segment-id** command to manually trigger VLAN load balancing preemption for the specified segment.

**Example:**

```
Switch# rep preempt segment 10
```

Confirm the command when prompted to proceed with the preemption action.

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## Configure FlexLink+ topology change messages

Notify upstream devices of topology changes within the FlexLink+ segment.

Configure FlexLink+ in a larger network domain to ensure traffic convergence.

**Procedure**

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**Step 1** Use the **configure terminal** command to enter global configuration mode.

**Example:**

```
Switch# configure terminal
```

**Step 2** Use the **interface interface-id** command to enter interface configuration mode.

**Example:**

```
Switch(config)# interface GigabitEthernet1/0/1
```

**Step 3** Use the **rep stcn stp** command to enable propagation of topology change notifications on the active interface.

**Example:**

```
Switch(config-if)# rep stcn stp
```

Configure the **rep stcn stp** command on the FlexLink+ interface to send topology change notifications to upstream STP, MSTP, and REP devices when a topology change occurs in the FlexLink+ segment. If you do not configure this command, upstream devices do not receive notifications about link failures or topology changes in the FlexLink+ segment, which can cause traffic blackholing.

**Note**

Enable this command on each interface configured for FlexLink+.

**Step 4** Use the **exit** command to exit interface configuration mode.

**Example:**

```
Switch(config-if)# exit
```

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