



## CHAPTER 43

# Configuring Link State Tracking

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## Finding Feature Information

Your software release may not support all the features documented in this chapter. For the latest feature information and caveats, see the release notes for your platform and software release.

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

## Restrictions for Configuring Link State Tracking

- To use this feature, the switch must be running the LAN Base image.
- An interface that is defined as an upstream interface cannot also be defined as a downstream interface in the same or a different link state group. The reverse is also true.
- An interface cannot be a member of more than one link state group.
- You can configure only two link state groups per switch.

## Information About Configuring Link State Tracking

### Link State Tracking

Link state tracking, also known as trunk failover, is a feature that binds the link state of multiple interfaces. For example, link state tracking provides redundancy in the network when used with server NIC adapter teaming. When the server network adapters are configured in a primary or secondary relationship known as teaming, if the link is lost on the primary interface, connectivity is transparently changed to the secondary interface.



#### Note

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An interface can be an aggregation of ports (an EtherChannel), a single physical port in access or trunk mode, or a routed port.

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Figure 43-1 on page 43-3 shows a network configured with link state tracking. To enable link state tracking, create a *link state group*, and specify the interfaces that are assigned to the link state group. In a link state group, these interfaces are bundled together. The *downstream interfaces* are bound to the *upstream interfaces*. Interfaces connected to servers are referred to as downstream interfaces, and interfaces connected to distribution switches and network devices are referred to as upstream interfaces.

The configuration in Figure 43-1 ensures that the network traffic flow is balanced as follows:

- For links to switches and other network devices
  - Server 1 and server 2 use switch A for primary links and switch B for secondary links.
  - Server 3 and server 4 use switch B for primary links and switch A for secondary links.
- Link state group 1 on switch A
  - Switch A provides primary links to server 1 and server 2 through link state group 1. Port 1 is connected to server 1, and port 2 is connected to server 2. Port 1 and port 2 are the downstream interfaces in link state group 1.
  - Port 5 and port 6 are connected to distribution switch 1 through link state group 1. Port 5 and port 6 are the upstream interfaces in link state group 1.
- Link state group 2 on switch A
  - Switch A provides secondary links to server 3 and server 4 through link state group 2. Port 3 is connected to server 3, and port 4 is connected to server 4. Port 3 and port 4 are the downstream interfaces in link state group 2.
  - Port 7 and port 8 are connected to distribution switch 2 through link state group 2. Port 7 and port 8 are the upstream interfaces in link state group 2.
- Link state group 2 on switch B
  - Switch B provides primary links to server 3 and server 4 through link state group 2. Port 3 is connected to server 3, and port 4 is connected to server 4. Port 3 and port 4 are the downstream interfaces in link state group 2.
  - Port 5 and port 6 are connected to distribution switch 2 through link state group 2. Port 5 and port 6 are the upstream interfaces in link state group 2.
- Link state group 1 on switch B
  - Switch B provides secondary links to server 1 and server 2 through link state group 1. Port 1 is connected to server 1, and port 2 is connected to server 2. Port 1 and port 2 are the downstream interfaces in link state group 1.
  - Port 7 and port 8 are connected to distribution switch 1 through link state group 1. Port 7 and port 8 are the upstream interfaces in link state group 1.

In a link state group, the upstream ports can become unavailable or lose connectivity because the distribution switch or router fails, the cables are disconnected, or the link is lost. These are the interactions between the downstream and upstream interfaces when link state tracking is enabled:

- If any of the upstream interfaces are in the link-up state, the downstream interfaces can change to or remain in the link-up state.
- If all of the upstream interfaces become unavailable, link state tracking automatically puts the downstream interfaces in the error-disabled state. Connectivity to and from the servers is automatically changed from the primary server interface to the secondary server interface.

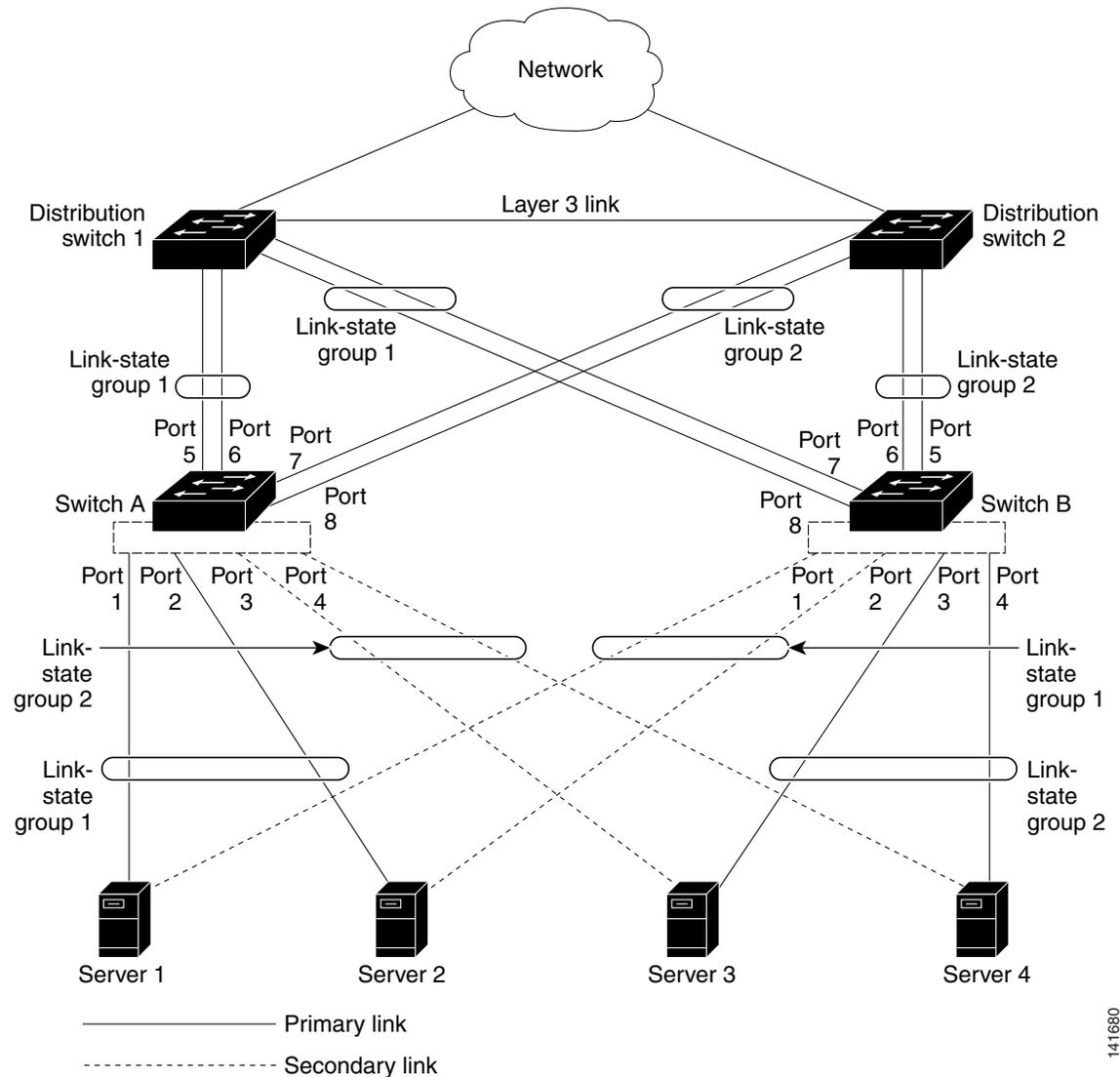
As an example of a connectivity change from link state group 1 to link state group 2 on switch A, see Figure 43-1 on page 43-3. If the upstream link for port 6 is lost, the link states of downstream ports 1 and 2 do not change. However, if the link for upstream port 5 is also lost, the link state of the

downstream ports changes to the link-down state. Connectivity to server 1 and server 2 is then changed from link state group 1 to link state group 2. The downstream ports 3 and 4 do not change state because they are in link-group 2.

- If the link state group is configured, link state tracking is disabled, and the upstream interfaces lose connectivity, the link states of the downstream interfaces remain unchanged. The server does not recognize that upstream connectivity has been lost and does not failover to the secondary interface.

You can recover a downstream interface link-down condition by removing the failed downstream port from the link state group. To recover multiple downstream interfaces, disable the link state group.

**Figure 43-1** Typical Link State Tracking Configuration



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## Default Link State Tracking Configuration

There are no link state groups defined, and link state tracking is not enabled for any group.

# How to Configure Link State Tracking

## Configuring Link State Tracking

	Command	Purpose
Step 1	<code>configure terminal</code>	Enters global configuration mode.
Step 2	<code>link state track <i>number</i></code>	Creates a link state group, and enables link state tracking. The group number can be 1 to 2; the default is 1.
Step 3	<code>interface <i>interface-id</i></code>	Specifies a physical interface or range of interfaces to configure, and enters interface configuration mode.  Valid interfaces include switch ports in access or trunk mode (IEEE 802.1q), routed ports, or multiple ports bundled into an EtherChannel interface (static or LACP), also in trunk mode.
Step 4	<code>link state group [<i>number</i>] {<b>upstream</b>   <b>downstream</b>}</code>	Specifies a link state group, and configures the interface as either an <b>upstream</b> or <b>downstream</b> interface in the group. The group number can be 1 to 2; the default is 1.
Step 5	<code>end</code>	Returns to privileged EXEC mode.

## Monitoring and Maintaining Link State Tracking

Command	Purpose
<code>show link state group</code>	Displays the link state group information.

## Configuration Examples for Configuring Link State Tracking

### Displaying Link State Information: Examples

Use the **show link state group** command to display the link state group information. Enter this command without keywords to display information about all link state groups. Enter the group number to display information specific to the group. Enter the detail keyword to display detailed information about the group.

This is an example of output from the **show link state group 1** command:

```
Switch> show link state group 1

Link State Group: 1      Status: Enabled, Down
```

This is an example of output from the **show link state group detail** command:

```
Switch> show link state group detail

(Up):Interface up      (Dwn):Interface Down  (Dis):Interface disabled
```

```

Link State Group: 1 Status: Enabled, Down
Upstream Interfaces : Fa1/7(Dwn) Fa1/8(Dwn)
Downstream Interfaces : Fa1/3(Dis) Fa1/4(Dis) Fa1/5(Dis) Fa1/6(Dis)

Link State Group: 2 Status: Enabled, Down
Upstream Interfaces : Fa1/6(Dwn) Fa1/7(Dwn) Fa1/8(Dwn)
Downstream Interfaces : Fa1/2(Dis) Fa1/3(Dis) Fa1/4(Dis) Fa1/5(Dis)

(Up):Interface up (Dwn):Interface Down (Dis):Interface disabled

```

## Creating a Link State Group: Example

This example shows how to create a link state group and configure the interfaces:

```

Switch# configure terminal
Switch(config)# link state track 1
Switch(config)# interface range gigabitethernet1/1 -2
Switch(config-if)# link state group 1 upstream
Switch(config-if)# interface gigabitethernet1/1
Switch(config-if)# link state group 1 downstream
Switch(config-if)# interface gigabitethernet1/1
Switch(config-if)# link state group 1 downstream
Switch(config-if)# interface gigabitethernet1/2
Switch(config-if)# link state group 1 downstream
Switch(config-if)# end

```

## Additional References

The following sections provide references related to switch administration:

### Related Documents

Related Topic	Document Title
Cisco IE 2000 commands	<i>Cisco IE 2000 Switch Command Reference</i> , Release 15.0(1)EY
Cisco IOS basic commands	<i>Cisco IOS Configuration Fundamentals Command Reference</i>
EtherChannel configuration	<a href="#">Chapter 40, “Configuring EtherChannels”</a>

### Standards

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

## MIBs

MIBs	MIBs Link
—	To locate and download MIBs using Cisco IOS XR software, use the Cisco MIB Locator found at the following URL and choose a platform under the Cisco Access Products menu: <a href="http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml">http://cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml</a>

## RFCs

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

## Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>