



# Overview of IS-IS Fast Convergence

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This module provides information about the topics of Intermediate System-to-Intermediate System (IS-IS) fast convergence. The tasks in the modules that follow this overview can help you improve convergence times for IS-IS networks.

- [Finding Feature Information, page 1](#)
- [Prerequisites for IS-IS Fast Convergence, page 1](#)
- [Information About IS-IS Fast Convergence, page 2](#)
- [Where to Go Next, page 3](#)
- [Additional References, page 3](#)

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see 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 document.

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for IS-IS Fast Convergence

You should be familiar with the concepts described in the "Integrated IS-IS Routing Protocol Overview" module.

# Information About IS-IS Fast Convergence

- [Network Convergence, page 2](#)
- [Design Recommendations for Achieving Faster Network Convergence, page 2](#)

## Network Convergence

Convergence is the process of all routers coming to agreement on optimal routes in a network. When a network event causes routes to become available or unavailable, routers send routing update messages through the network that cause routing algorithms to recalculate optimal routes. Eventually all the routers agree on the routes as well as the network topology. Fast convergence benefits network performance. Routing algorithms that converge slowly may cause temporary routing loops or temporary network unavailability.

The process of network convergence can be divided into three separate stages:

- 1 Routing change detection: The speed at which a device on the network can detect and react to the failure or modification of one of its own components, or to a topology change caused by the failure or modification of a component on a routing protocol peer.
- 2 Routing change notification: The speed at which the failure or topology change in the previous stage can be communicated to other devices in the network.
- 3 Alternate path calculation: The speed at which all devices on the network, having been notified of the failure or topology change, can process the information and calculate an alternate path through which data can flow.

An improvement in any one of these stages provides an improvement in overall convergence. In addition to a basic configuration task that is recommended as a first step in configuring an IS-IS router with best practice parameters for achieving fast convergence, several recommended configuration tasks are grouped according to the stage of network convergence they can improve. For more information, see the following modules:

- "Setting Best Practice Parameters for IS-IS Fast Convergence"
- "Reducing Failure Detection Times in IS-IS Networks"
- "Reducing Link Failure and Topology Change Notification Times in IS-IS Networks"
- "Reducing Alternate-Path Calculation Times in IS-IS Networks"

## Design Recommendations for Achieving Faster Network Convergence

A faster processor can provide better performance for network convergence.

On some Cisco routers such as the Cisco 12000, 10000, 7600 and 6500 series Internet routers, the control-plane and forwarding-plane are separated. Tasks associated with network convergence such as shortest path first (SPF) calculation, routing table updates, and server functions for information distribution to line cards are supported separately from packet forwarding tasks. By leveraging the separated control-plane CPU, network convergence tasks are handled more efficiently.



### Note

For the Cisco 12000 series Internet routers, we recommend that you when you configure the **process-max-time** command, do not use a value lower than 60 milliseconds.

## Where to Go Next

To configure features to improve IS-IS network convergence times, complete the optional tasks in one or more of the following modules:

- "Setting Best Practice Parameters for IS-IS Fast Convergence"
- "Reducing Failure Detection Times in IS-IS Networks"
- "Reducing Link Failure and Topology Change Notification Times in IS-IS Networks"
- "Reducing Alternate-Path Calculation Times in IS-IS Networks"

To enhance IS-IS network security, see the "Enhancing Security in an IS-IS Network" module.

## Additional References

### Related Documents

Related Topic	Document Title
IS-IS commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples	<i>Cisco IOS IP Routing: ISIS Command Reference</i>
Overview of Cisco IS-IS conceptual information with links to all the individual IS-IS modules	"Integrated IS-IS Routing Protocol Overview" module

### Standards

Standard	Title
ISO 8473	CLNP, Connectionless Network Protocol
ISO 9542	<i>ES-IS Routing Information Exchange Protocol</i>
ISO/IEC 10589	IS-IS Protocol

### MIBs

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

**RFCs**

<b>RFC</b>	<b>Title</b>
None	--

**Technical Assistance**

<b>Description</b>	<b>Link</b>
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

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