



CHAPTER 5

Configuring Advanced FabricPath Features

This chapter describes how to configure advanced FabricPath features, such as using the Intermediate System-to-Intermediate System (IS-IS) protocol on Cisco NX-OS 5500 Series switches.

This chapter includes the following sections:

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- [Verifying the FabricPath Advanced Configurations, page 5-12](#)
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Note

For information about prerequisites, guidelines and limitations, and licensing requirements for FabricPath, see [Chapter 1, “Overview.”](#)

Information About Advanced FabricPath Layer 2 IS-IS Configurations

We recommend that you run the FabricPath network using the default Layer 2 IS-IS configurations.

However, you can change many of the IS-IS settings as follows:

- Globally on the entire switch and on each switch in the FabricPath network
- On specified FabricPath switches within the FabricPath network

If you change any of the FabricPath Layer 2 IS-IS settings, ensure that you make the same changes for those global parameters on every switch in the FabricPath network and for those parameters on every applicable FabricPath switch in the network.

Layer 2 IS-IS is based on Layer 3 IS-IS with enhancements to run on Layer 2. The commands for Layer 2 IS-IS and Layer 3 IS-IS are not the same. Layer 2 IS-IS is the control plane in FabricPath and a single protocol controls all unicast and multicast traffic. From a forwarding standpoint, FabricPath Layer 2 IS-IS forwards traffic for unicast, unknown unicast, broadcast, and multicast frames. Using Layer 2 IS-IS, the software maintains loop-free paths throughout the FabricPath network. (see [Chapter 2, “Configuring FabricPath Switching,”](#) for information on default FabricPath Layer 2 IS-IS behavior and [Chapter 4, “Configuring FabricPath Forwarding,”](#) for information on FabricPath forwarding.)

You can use these advanced FabricPath Layer 2 IS-IS configurations to fine-tune the operation of the FabricPath network.

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Setting Advanced FabricPath Layer 2 IS-IS Parameters

Although the Layer 2 IS-IS protocol works automatically once you enable FabricPath, you can optionally configure parameters. Some FabricPath Layer 2 IS-IS parameters you configure globally and some you configure per switch. This section includes the following topics:

- [Setting Advanced FabricPath Layer 2 IS-IS Parameters Globally, page 5-2](#)
- [Setting Advanced FabricPath Layer 2 IS-IS Parameters per Interface, page 5-6](#)
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Setting Advanced FabricPath Layer 2 IS-IS Parameters Globally

Although the FabricPath Layer 2 IS-IS protocol works automatically once you enable FabricPath, you can optionally configure the global parameters.



Note

Graceful restart of IS-IS is not supported in Cisco 5500 Series Switches. While the **graceful-restart** command exists in the CLI, it is not supported at this time.

SUMMARY STEPS

1. **configure terminal**
2. **fabricpath domain default**
3. (Optional) **authentication-check**
4. (Optional) **authentication key-chain** *auth-key-chain-name*
5. (Optional) **authentication type** { **cleartext** | **md5** }
6. (Optional) **log-adjacency-changes**
7. (Optional) **lsp-gen-interval** *msecs* [*msecs msecs*]
8. (Optional) **lsp-mtu** *mtu*
9. (Optional) **max-lsp-lifetime** *secs*
10. (Optional) **maximum-paths** *max-paths*
11. (Optional) **reference-bandwidth** { *ref-mbps* [**Mbps**] | *ref-gbps* [**Gbps**] }
12. (Optional) **spf-interval** *msecs* [*msecs msecs*]
13. (Optional) **hostname dynamic**
14. (Optional) **root-priority** *value*
15. **exit**
16. **exit**
17. (Optional) **show running-config**
18. (Optional) **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	<p>configure terminal</p> <p>Example: switch# configure terminal</p>	Enters global configuration mode.
Step 2	<p>fabricpath domain default</p> <p>Example: switch(config)# fabricpath domain default switch(config-fabricpath-isis)#</p>	Enters the global FabricPath Layer 2 IS-IS configuration mode.
Step 3	<p>authentication-check</p> <p>Example: switch(config-fabricpath-isis)# authentication-check switch(config-fabricpath-isis)#</p>	<p>(Optional) Configures an authentication check when the switch receives a protocol data unit (PDU). To turn the authentication check off, enter the no form of this command.</p> <p>Note The default is ON.</p>
Step 4	<p>authentication key-chain <i>auth-key-chain-name</i></p> <p>Example: switch(config-fabricpath-isis)# authentication key-chain trees switch(config-fabricpath-isis)#</p>	<p>(Optional) Configures the authentication keychain. To clear this parameter, enter the no form of this command.</p> <p>The maximum size for the name of an authentication keychain is 63 alphanumeric characters.</p> <p>An example of key chain creation is as follows:</p> <pre>key chain trees key 0 key-string cisco01 accept-lifetime 07:00:00 Sep 20 2011 infinite send-lifetime 07:00:00 Sep 20 2011 infinite</pre> <p>See the <i>Cisco Nexus 5000 Series NX-OS Security Configuration Guide</i> for information about key chains.</p>
Step 5	<p>authentication-type {cleartext md5}</p> <p>Example: switch(config-fabricpath-isis)# authentication-type md5 switch(config-fabricpath-isis)#</p>	<p>(Optional) Configures the authentication type. To clear this parameter, enter the no form of this command.</p> <p>You can set one of the following authentication types:</p> <ul style="list-style-type: none"> • cleartext—Specifies the cleartext authentication method. • md5—Specifies the Message Digest (MD5) authentication.
Step 6	<p>log-adjacency-changes</p> <p>Example: switch(config-fabricpath-isis)# log-adjacency-changes switch(config-fabricpath-isis)#</p>	<p>(Optional) Sets the switch to send a log message when the state of a FabricPath Layer 2 IS-IS neighbor changes. To stop the log messages, enter the no form of this command. The default is OFF.</p>

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	Command	Purpose
Step 7	<pre>lsp-gen-interval msec [msec msec]</pre> <p>Example: <pre>switch(config-fabricpath-isis)# lsp-gen-interval 100 switch(config-fabricpath-isis)#</pre></p>	<p>(Optional) Configures the link-state packet (LSP) generation interval. To return to the default values, enter the no form of this command. The optional parameters are as follows:</p> <ul style="list-style-type: none"> • max-wait—The initial wait between the trigger and LSP generation. The range is from 50 to 12000 milliseconds, and the default value is 8000 milliseconds. • lsp-initial-wait—The initial wait between the trigger and LSP generation. The range is from 50 to 12000 milliseconds, and the default value is 50 milliseconds. • lsp-second-wait—The second wait used for LSP throttle during backoff. The range is from 50 to 12000 milliseconds, and the default value is 50 milliseconds.
Step 8	<pre>lsp-mtu mtu</pre> <p>Example: <pre>switch(config-fabricpath-isis)# lsp-mtu 2000 switch(config-fabricpath-isis)#</pre></p>	<p>(Optional) Sets the LSP MTU. To return to the default values, enter the no form of this command. The range is from 128 to 4352, and the default value is 1492.</p>
Step 9	<pre>max-lsp-lifetime secs</pre> <p>Example: <pre>switch(config-fabricpath-isis)# max-lsp-lifetime 1000 switch(config-fabricpath-isis)#</pre></p>	<p>(Optional) Sets the maximum LSP lifetime in seconds. To return to the default values, enter the no form of this command. The range is from 128 to 4352, and the default value is 1492.</p>
Step 10	<pre>maximum-paths max-paths</pre> <p>Example: <pre>switch(config-fabricpath-isis)# maximum-paths 4 switch(config-fabricpath-isis)#</pre></p>	<p>(Optional) Sets the maximum number of paths per destination. To return to the default values, enter the no form of this command. The range is from 1 to 16, and the default value is 16.</p>
Step 11	<pre>reference-bandwidth {ref-mbps [Mbps] ref-gbps [Gbps]}</pre> <p>Example: <pre>switch(config-fabricpath-isis)# reference-bandwidth 200000 switch(config-fabricpath-isis)#</pre></p>	<p>(Optional) Configures the reference bandwidth, which is used to assign the FabricPath Layer 2 IS-IS cost. The default value is 400000 Mbps. To return to the default values, enter the no form of this command. The optional parameters are as follows:</p> <ul style="list-style-type: none"> • ref-mbps—The range is from 1 to 400000, and the default value is 400000. • ref-gbps—The range is from 1 to 4000, and the default value is 400.

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	Command	Purpose
Step 12	<p>spf-interval <i>msecs</i> [<i>msecs msecs</i>]</p> <p>Example: switch(config-fabricpath-isis)# spf-interval 10000 switch(config-fabricpath-isis)#</p>	<p>(Optional) Configures the interval between link-state advertisement (LSA) arrivals. To return to the default values, enter the no form of this command. The optional parameters are as follows:</p> <ul style="list-style-type: none"> • spf-max-wait—The maximum wait between the trigger and shortest path first (SPF) computation. The range is from 50 to 120000 milliseconds, and the default value is 8000 milliseconds. • spf-initial-wait—The initial wait between the trigger and SPF computation. The range is from 50 to 120000 milliseconds, and the default value is 50 milliseconds. • spf-second-wait—The second wait used for SPF computation during backoff. The range is from 50 to 120000 milliseconds, and the default value is 50 milliseconds.
Step 13	<p>hostname dynamic</p> <p>Example: switch(config-fabricpath-isis)# hostname dynamic switch(config-fabricpath-isis)#</p>	<p>(Optional) Enables dynamic hostname for the FabricPath Layer 2 IS-IS protocol. To disable the dynamic hostname, enter the no form of this command.</p>
Step 14	<p>root-priority <i>value</i></p> <p>Example: switch(config-fabricpath-isis)# root-priority 100 switch(config-fabricpath-isis)#</p>	<p>(Optional) Sets the priority for which node becomes the Layer 2 IS-IS protocol root in the FabricPath network. The highest numerical value for the priority is likely to become the root. To return to the default values, enter the no form of this command. The range is from 1 to 255, and the default value is 64.</p>
Step 15	<p>exit</p> <p>Example: switch(config-fabricpath-isis)# exit switch(config)#</p>	<p>Exits global FabricPath Layer 2 IS-IS configuration mode.</p>
Step 16	<p>exit</p> <p>Example: switch(config)# exit switch#</p>	<p>Exits global configuration mode.</p>
Step 17	<p>show running-config</p> <p>Example: switch# show running-config switch#</p>	<p>(Optional) Displays the running configuration.</p>
Step 18	<p>copy running-config startup-config</p> <p>Example: switch# copy running-config startup-config</p>	<p>(Optional) Copies the running configuration to the startup configuration.</p>

See the *Cisco Nexus 5000 Series NX-OS Unicast Routing Configuration Guide* for more information on IS-IS commands.

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Setting Advanced FabricPath Layer 2 IS-IS Parameters per Interface

Although the FabricPath Layer 2 IS-IS protocol works automatically once you enable FabricPath, you can optionally configure the interface parameters.

SUMMARY STEPS

1. **configure terminal**
2. **interface** { **ethernet** *mod/slot* | **port-channel** *channel-number* }
3. (Optional) **fabricpath isis authentication-check**
4. (Optional) **fabricpath isis authentication key-chain** *auth-key-chain-name*
5. (Optional) **fabricpath isis authentication type** { **cleartext** | **md5** }
6. (Optional) **fabricpath isis csnp-interval** *seconds*
7. (Optional) **fabricpath isis hello-interval** *seconds*
8. (Optional) **fabricpath isis hello-multiplier** *multiplier*
9. (Optional) **fabricpath isis hello-padding**
10. (Optional) **fabricpath isis lsp-interval** *milliseconds*
11. (Optional) **fabricpath isis metric** *metric*
12. (Optional) **fabricpath isis retransmit-interval** *seconds*
13. (Optional) **fabricpath isis retransmit-throttle- interval** *milliseconds*
14. (Optional) **fabricpath topology** *topo-id*
15. **exit**
16. (Optional) **show running-config**
17. (Optional) **copy running-config startup-config**

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DETAILED STEPS

	Command	Purpose
Step 1	<pre>configure terminal</pre> <p>Example: switch# configure terminal switch(config)#</p>	Enters configuration mode.
Step 2	<pre>interface {ethernet mod/slot port-channel channel-number}</pre> <p>Example: switch(config)# interface ethernet 5/2 switch(config-if)#</p>	<p>Enters interface configuration mode and specifies the interfaces that you want to configure.</p> <p>The slot can be from 1 to 3. The following list defines the slots available:</p> <ul style="list-style-type: none"> • Slot 1 includes all the fixed ports. A Fabric Extender only has one slot. • Slot 2 includes the ports on the upper expansion module (if populated). • Slot 3 includes the ports on the lower expansion module (if populated). <p>The port number within a particular slot can be from 1 to 128.</p> <p>The port channel number assigned to the EtherChannel logical interface can be from 1 to 4096.</p>
Step 3	<pre>fabricpath isis authentication-check</pre> <p>Example: switch(config-if)# fabricpath isis authentication-check switch(config-if)#</p>	<p>(Optional) Enables authentication checking on incoming FabricPath Layer 2 IS-IS hello protocol data units (PDUs) for the interface. The default is ON. To disable authentication, enter the no form of the command.</p> <p>Note Level specification is not required.</p>

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	Command	Purpose
Step 4	<p>fabricpath isis authentication key-chain <i>auth-key-chain-name</i></p> <p>Example: switch(config-if)# fabricpath isis authentication key-chain trees switch(config-if)#</p>	<p>(Optional) Assigns a password to authentication hello PDUs. To remove this password, enter the no form of the command.</p> <p>The maximum size for the name of an authentication keychain is 63 alphanumeric characters.</p> <p>Note Level specification is not required.</p> <p>An example of key chain creation is as follows:</p> <pre>key chain trees key 0 key-string cisco01 accept-lifetime 07:00:00 Sep 20 2011 infinite send-lifetime 07:00:00 Sep 20 2011 infinite</pre> <p>See the <i>Cisco Nexus 5000 Series NX-OS Security Configuration Guide</i>, for information about key chains.</p>
Step 5	<p>fabricpath isis authentication-type {cleartext md5}</p> <p>Example: switch(config-if)# fabricpath isis authentication-type md5 switch(config-if)#</p>	<p>(Optional) Specifies the authentication type for an interface for FabricPath Layer 2 IS-IS hello PDUs. To remove this type, enter the no form of the command.</p> <p>You can set one of the following authentication types:</p> <ul style="list-style-type: none"> • cleartext—Specifies the cleartext authentication method. • md5—Specifies the Message Digest (MD5) authentication. <p>Note Level specification is not required.</p>
Step 6	<p>fabricpath isis csnp-interval <i>seconds</i></p> <p>Example: switch(config-if)# fabricpath isis csnp-interval 60 switch(config-if)#</p>	<p>(Optional) Specifies the interval in seconds between Complete Sequence Number (CSNP) PDUs sent on the interface. To return to the default value, enter the no form of this command.</p> <p>The range is from 1 to 65535, and the default value is 10.</p>
Step 7	<p>fabricpath isis hello-interval <i>seconds</i></p> <p>Example: switch(config-if)# fabricpath isis hello-interval 20 switch(config-if)#</p>	<p>(Optional) Sets the hello interval between PDUs sent on the interface. To return to the default value, enter the no form of this command. The range is from 1 to 65535, and the default value is 10.</p> <p>Note Level specification is not required.</p>

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	Command	Purpose
Step 8	fabricpath isis hello-multiplier <i>multiplier</i> Example: switch(config-if)# fabricpath isis hello-multiplier 20 switch(config-if)#	(Optional) Specifies the multiplier used to calculate the interval within which hello PDUs must be received or adjacency goes down. To return to the default value, enter the no form of this command. The range is from 3 to 1000. The default is 3. Note Level specification is not required.
Step 9	fabricpath isis hello-padding Example: switch(config-if)# fabricpath hello-padding switch(config-if)#	(Optional) Enables padding on the hello PDUs. The default is ON. To disable authentication, enter the no form of the command. Note If you enter the always keyword with the no form of this command, the padding is always on.
Step 10	fabricpath isis lsp-interval <i>milliseconds</i> Example: switch(config-if)# fabricpath isis lsp-interval 100 switch(config-if)#	(Optional) Sets the interval in milliseconds between link-state packets (LSPs) sent on this interface during flooding. To return to the default value, enter the no form of this command. The range is from 10 to 65535. The default is 33.
Step 11	fabricpath isis metric <i>metric</i> Example: switch(config-if)# fabricpath isis metric 100 switch(config-if)#	(Optional) Configures the FabricPath Layer 2 IS-IS metric for this interface. The range is from 0 to 16777215. To return to the default value, enter the no form of this command. The default values are as follows: <ul style="list-style-type: none"> • 1 GB—400 • 10 GB—40
Step 12	fabricpath isis retransmit-interval <i>seconds</i> Example: switch(config-if)# fabricpath isis retransmit-interval 100 switch(config-if)#	(Optional) Sets the interval between initial LSP retransmissions. To return to the default value, enter the no form of this command. The range is from 1 to 65535. The default is 5.
Step 13	fabricpath isis retransmit-throttle-interval <i>milliseconds</i> Example: switch(config-if)# fabricpath isis retransmit-throttle-interval 100 switch(config-if)#	(Optional) Sets the interval between subsequent LSP retransmissions. To return to the default value, enter the no form of this command. The range is from 20 to 65535. The default is 66.
Step 14	exit Example: switch(config-if)# exit switch(config)#	Exits interface configuration mode.

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	Command	Purpose
Step 15	show running-config Example: switch(config)# show running-config switch(config)#	(Optional) Displays the running configuration.
Step 16	copy running-config startup-config Example: switch(config)# copy running-config startup-config switch(config)#	(Optional) Copies the running configuration to the startup configuration.

See the *Cisco Nexus 5000 Series NX-OS Unicast Routing Configuration Guide* and the *Cisco Nexus 5000 Series NX-OS FabricPath Command Reference* for more information on IS-IS commands.

Clearing Advanced FabricPath Layer 2 IS-IS Counters

You can clear the FabricPath Layer 2 IS-IS counters.

SUMMARY STEPS

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- Step 1** (Optional) **clear fabricpath isis adjacency** [* | system-id | interface { **ethernet mod/slot** | **port-channel channel-number** }]
 - Step 2** (Optional) **clear fabricpath isis statistics** *
 - Step 3** (Optional) **clear fabricpath isis traffic** [* | interface { **ethernet mod/slot** | **port-channel channel-number** }]

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DETAILED STEPS

	Command	Purpose
Step 1	<pre>clear fabricpath isis adjacency [* ethernet port-channel system-id {ethernet mod/slot port-channel channel-number system-id sid}]</pre> <p>Example: switch# clear fabricpath isis adjacency switch#</p>	<p>(Optional) Clears the FabricPath Layer 2 IS-IS adjacency state.</p> <ul style="list-style-type: none"> • *—Specifies the IS-IS adjacencies on all interfaces. • ethernet—Specifies the Ethernet interface. • mod/slot—The slot can be from 1 to 3. The port number within a particular slot can be from 1 to 128. • port-channel—Specifies the port channel interface. • channel-number—Port channel number. The range is from 1 to 4096. • system-id—Specifies the system ID. • sid—System ID in the form of XXXX.XXXX.XXXX. <p>Note If you enter the * variable, you affect forwarding which might interrupt traffic; this command tears down all adjacencies.</p>
Step 2	<pre>clear fabricpath isis statistics *</pre> <p>Example: switch# clear fabricpath statistics * switch#</p>	<p>(Optional) Clears all FabricPath Layer 2 IS-IS protocol statistics.</p>
Step 3	<pre>clear fabricpath isis traffic [* interface {ethernet mod/slot port-channel channel-number}]</pre> <p>Example: switch# clear fabricpath traffic switch#</p>	<p>(Optional) Clears FabricPath Layer 2 IS-IS traffic information.</p> <ul style="list-style-type: none"> • *—Specifies the IS-IS adjacencies on all interfaces. • ethernet—Specifies the Ethernet interface. • mod/slot—The slot can be from 1 to 3. The port number within a particular slot can be from 1 to 128. • port-channel—Specifies the port channel interface. • channel-number—Port channel number. The range is from 1 to 4096.

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Verifying the FabricPath Advanced Configurations

To display FabricPath information for advanced configurations perform one of the following tasks:

Command	Purpose
show fabricpath isis adjacency [interface {ethernet <i>mod/slot</i> port-channel <i>channel-number</i> } system-id detail summary]	Displays the FabricPath Layer 2 IS-IS adjacency database.
show fabricpath isis database [<i>level</i>] [mgroup] [detail summary] [<i>lid</i>] {zero-seq router-id adjacency}[<i>SID.XX-XX</i>]	Displays the FabricPath Layer 2 IS-IS database.
show fabricpath isis hostname [detail]	Displays the FabricPath Layer 2 IS-IS dynamic hostname exchange information.
show fabricpath isis interface [ethernet <i>mod/slot</i> port-channel <i>channel-number</i>] [brief]	Displays the FabricPath Layer 2 IS-IS related interface information.
show fabricpath isis route [summary detail]	Displays the FabricPath Layer 2 IS-IS routing table for unicast routes.
show fabricpath isis spf-log [detail]	Displays the FabricPath Layer 2 IS-IS SPF calculation statistics.
show fabricpath isis [statistics]	Displays the FabricPath Layer 2 IS-IS event counters.
show fabricpath isis ftag [multidestination <i>tree_id</i>]	Displays the FTag values associated with the trees in the topology.
show fabricpath isis vlan-range	Displays the congruent VLAN-set to topology mapping.
show fabricpath isis trees [multidestination <i>tree_id</i>]	Displays the nodes in the trees.
show fabricpath isis switch-id	Displays the switch IDs and reachability information for the topology.
show fabricpath isis ip redistribute mroute [vlan [group [source]]]	Displays the locally learned multicast routes.
show fabricpath isis ip mroute [vlan <i>vlan-id</i> [group <i>group-id</i> [source <i>source-id</i>]]]	Displays the multicast routes learned from neighbors.
show fabricpath isis [protocol]	Displays the FabricPath Layer 2 IS-IS process level information.
show fabricpath isis rrm [gm] interface {ethernet <i>mod/slot</i> port-channel <i>channel-number</i> }	Displays the FabricPath Layer 2 IS-IS retransmit-routing-message information.
show fabricpath isis srm [gm] interface {ethernet <i>mod/slot</i> port-channel <i>channel-number</i> }	Displays the FabricPath Layer 2 IS-IS send-routing-message information.
show fabricpath isis topology summary	Displays the FabricPath Layer 2 IS-IS topology database.

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Command	Purpose
<code>show fabricpath isis traffic [interface { ethernet mod/slot port-channel channel-number}]</code>	Displays the FabricPath Layer 2 IS-IS traffic information.
<code>show fabricpath isis ssn [gm] interface { ethernet mod/slot port-channel channel-number }</code>	Displays the FabricPath Layer 2 IS-IS send-sequence-number information.

Feature History for Configuring FabricPath Advanced Features

Table 5-1 lists the release history for these features.

Table 5-1 Feature History for FabricPath

Feature Name	Releases	Feature Information
Advanced FabricPath features	5.1(3)N1(1)	These features were introduced with support for IS-IS.

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