

SNMP CEF-MIB Support

The Cisco Express Forwarding--SNMP CEF-MIB Support feature introduces the CISCO-CEF-MIB, which allows management applications through the use of the Simple Network Management Protocol (SNMP) to configure and monitor Cisco Express Forwarding operational data and to provide notification when Cisco Express Forwarding encounters specific configured events. This module describes how to use the CISCO-CEF-MIB to manage and monitor objects related to Cisco Express Forwarding operation.

Cisco Express Forwarding is an advanced Layer 3 IP switching technology. It optimizes network performance and scalability for all kinds of networks: those that carry small amounts of traffic and those that carry large amounts of traffic in complex patterns, such as the Internet and networks characterized by intensive web-based applications or interactive sessions.

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Finding Feature Information

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

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

Prerequisites for SNMP CEF-MIB Support

- Cisco Express Forwarding or distributed Cisco Express Forwarding must be configured on your system.
- The enhanced Cisco Express Forwarding infrastructure introduced in Cisco IOS XE, Release 2.1 must be included in the image on your system.

- The router on which the Cisco Express Forwarding--SNMP CEF-MIB Support features is to be used must be configured for SNMP access. See the Configuring the Router to Use SNMP, on page 14 of this document for more information.

Information About SNMP CEF-MIB Support

CEF Functional Overview

Cisco Express Forwarding is an advanced Layer 3 IP switching technology. It uses a Forwarding Information Base (FIB) to make IP destination prefix-based switching decisions. The FIB is conceptually similar to a routing table or information base. It maintains the forwarding information contained in the IP routing table. When routing or topology changes occur in the network, the IP routing table is updated, and those changes are propagated to the FIB. The FIB maintains next-hop address information based on the information in the IP routing table. The two main components of Cisco Express Forwarding operation are the FIB and adjacency tables.

Cisco Express Forwarding uses adjacency tables to prepend Layer 2 addressing information. An adjacency table maintains Layer 2 next-hop addresses for all FIB entries. Nodes in the network are said to be adjacent if they can reach each other with a single hop across a link layer. Cisco Express Forwarding discovers and solves adjacencies and populates the adjacency tables.

Note The CISCO-CEF-MIB prefix database and its related database can be very large. Therefore, executing a command that displays the prefix table could take a considerable amount of time.

Benefits of CISCO-CEF-MIB

Command-line interface (CLI) **show** commands are available to obtain Cisco Express Forwarding operational information. Managing Cisco Express Forwarding using the CLI can be a time-consuming task. The increasing capacity of Cisco routers makes parsing the **show** commands output to obtain the needed Cisco Express Forwarding operational parameters more and more difficult.

The CISCO-CEF-MIB allows you to manage and monitor the Cisco Express Forwarding operation using SNMP. In addition, you can configure SNMP to notify you if Cisco Express Forwarding encounters errors.

The CISCO-CEF-MIB introduced with the Cisco Express Forwarding--SNMP CEF-MIB Support feature gives you real-time access to operational information stored in the FIB and adjacency tables, switching statistics, and information on resource failures. The feature enables you to configure parameters related to Cisco Express Forwarding features by utilizing a MIB implementation based on SNMP. This information is accessed using **get** and **set** commands entered on the network management system (NMS) workstation or host system for which SNMP has been implemented. The NMS workstation is also known as the SNMP manager.

Cisco Express Forwarding is available in all Cisco routers. However, CISCO-CEF-MIB support of Cisco Express Forwarding management is dependent on the infrastructure introduced in Cisco IOS XE, Release 2.1.

The implementation of the CISCO-CEF-MIB in Cisco IOS XE, Release 2.1 manages Cisco Express Forwarding instances running on the Route Processor (RP). Information about Cisco Express Forwarding running on the line cards is available to the RP in reference to Cisco Express Forwarding peers only.

The CISCO-CEF-MIB supports configuration and monitoring for both IP versions, IP Version 4 (IPv4) and IP Version 6 (IPv6).

Information Managed by the CISCO-CEF-MIB

SNMP has historically been used to collect network information. SNMP permits retrieval of critical information from network elements such as routers, switches, and workstations.

The CISCO-CEF-MIB provides managed objects that enable a network administrator to monitor the following:

- Cisco Express Forwarding administrative and operational states as displayed in the output of the **show ip cef summary** command
- Notifications for Cisco Express Forwarding events: Cisco Express Forwarding state changes, Cisco Express Forwarding failures (with a predefined reason), and Route Processor (RP) and line card inconsistencies
- Parameters related to Cisco Express Forwarding for the associated interface as displayed by the **show cef interface** command
- Line card Cisco Express Forwarding states and line card Cisco Express Forwarding FIB states in the Linecard table as displayed by the **show cef linecard**command
- Cisco Express Forwarding statistics: switching statistics, punt counters and punt-to-host counters as displayed by the **show ip cef switching stats**command, and per-prefix counters and nonrecursive counters
- IPv4 and IPv6 notification, when Cisco Express Forwarding is switched between disable and enable and between Cisco Express Forwarding and distributed Cisco Express Forwarding

The SNMP CISCO-CEF-MIB provides managed objects that enable a network administrator to configure the following:

- Cisco Express Forwarding and distributed Cisco Express Forwarding administration status
- Cisco Express Forwarding accounting-related parameters
- Cisco Express Forwarding load sharing-related parameters
- Traffic-related configuration parameters

CISCO-CEF-MIB Object Groups

The SNMP CISCO-CEF-MIB allows the configuration and management of objects related to Cisco Express Forwarding. The MIB contains the following object groups:

- CEF FIB group
- CEF Adjacency group
- CEF Forwarding Element group
- CEF Cfg group
- CEF Interface group
- CEF Peer group

- CEF Consistency (CC) group
- CEF State Group
- CEF Notification Control group

In the CISCO-CEF-MIB, configuration objects are defined as read-write, and the other objects are defined as read only.

The CISCO-CEF-MIB contains tables related to the Cisco Express Forwarding object groups. These tables provide information about prefixes, forwarding paths, adjacencies, output chain elements (OCEs), prefix-based statistics, information about Cisco Express Forwarding configuration, consistency checkers, switching statistics, and managed objects specific to line card-specific.

The CISCO-CEF-MIB also defines Cisco Express Forwarding notifications that you can enable or disable through the MIB or CLI commands.

The index for most tables in the CISCO-CEF-MIB is entPhysicalIndex.

CISCO-CEF-MIB Tables

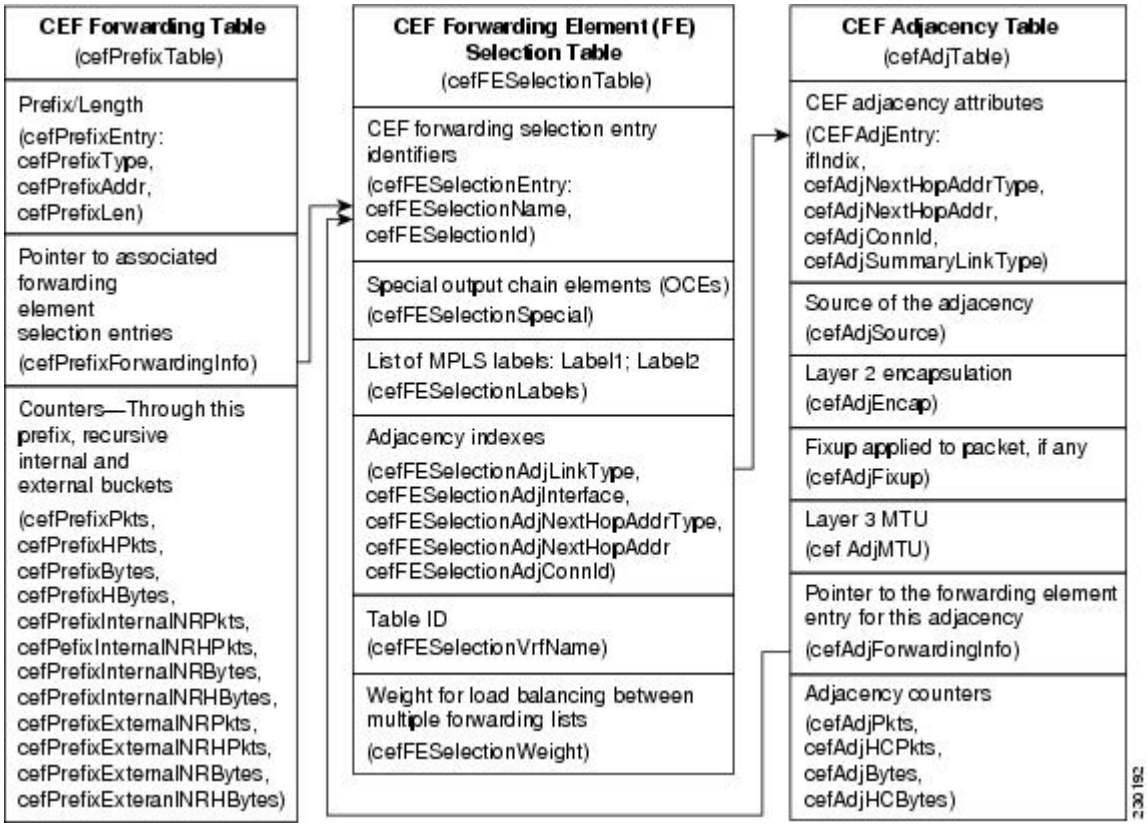
- The CEF FIB Summary table (cefFIBSummaryTable) contains the number of forwarding prefixes for both IPv4 and IPv6 protocols. It is a summary of the CEF Forwarding table.
- The CEF Forwarding table (cefPrefixTable) lists all the prefixes and related counters. It also contains a pointer to the CEF Forwarding Element Selection table.
- The CEF Longest Match Prefix table (cefLMPrefixTable) returns the longest prefix match for the given destination address. An optional cefLMPrefixSpinLock object is provided to reduce conflict in instances when more than one application acts on the CEF Longest Match Prefix table.
- The CEF Path table (cefPathTable) lists all the Cisco Express Forwarding paths.
- The CEF Adjacency Summary table (cefAdJSummaryTable) contains the total number of complete, incomplete, fixup, and redirect adjacencies for all link types.
- The CEF Adjacency table (cefAdjTable) lists all the adjacencies. It contains the adjacency source, encapsulation string, fixup, and Layer 3 maximum transmission unit (MTU) associated with the adjacency entry. It contains a pointer to the forwarding element selection table (if the adjacency is a MID chain adjacency).
- The CEF Forwarding Element Selection table (cefFESelectionTable) represents the OCE chains in flattened format. This table shows only the labels, table ID, and adjacency traversed in the OCE chain. It also contains the weight associated with each OCE chain.
- CEF Cfg table (cefCfgTable) contains all the global configuration parameters related to Cisco Express Forwarding: administration and operational status, accounting-related configuration parameters, load-sharing algorithms and IDs, and traffic statistics parameters.
- CEF Resource table (cefResourceTable) contains information about resources for Cisco Express Forwarding: the memory status of the process memory pool and reasons for the Cisco Express Forwarding resource failure notifications.
- CEF Interface table (cefIntTable) contains the interface-specific Cisco Express Forwarding parameters: interface switching state, interface load sharing (per packet and per destination), and interface nonrecursive routing (internal and external).

- CEF Peer table or Linecard table (cefPeerTable) contains Cisco Express Forwarding information related to peers on a managed line card: line card operational state and the number of times the line card session resets.
- CEF Peer FIB table (cefPeerFIBTable) contains information about the operational state of the Forwarding Information Bases (FIBs) on each line card.
- The CEF Prefix Length Statistics table (cefStatsPrefixTable) maintains prefix length-based statistics.
- CEF Switching Statistics table (cefSwitchingStatsTable) contains the switching statistics for each switching path: drop counters, punt counters, and punt-to-host counters.
- CEF IP Prefix Consistency Checker Global group (cefCCGlobalTable) contains all global configuration parameters for the consistency checkers: auto repair, enable and disable, delay, and hold down; enable or disable the passive consistency checkers; enable or disable the error messages for consistency detection; and the mechanism to activate the full scan consistency checkers. This table also displays the state of full scan consistency checkers.
- CEF Consistency Checker Type table (cefCCTypeTable) contains the consistency checker type specific parameters: frequency and count of scan for passive scanners and the queries sent, ignored, checked, and iterated.
- CEF Inconsistency Record table (cefInconsistencyRecordTable) contains the detected inconsistency records: prefix address and length, table ID, consistency checker type, slot ID, and the reason for the inconsistency (missing or checksum error).

See theOperations Available Through the CISCO-CEF-MIB, on page 6 for information about the specific objects available through the CISCO-CEF-MIB tables.

The figure below shows the contents of the CISCO-CEF-MIB main tables and the relationships of the tables to one another.

Figure 1: CISCO-CEF-MIB Main Tables, Table Contents, and Relationships



Operations Available Through the CISCO-CEF-MIB

You can use SNMP **get**and **set**commands to configure and monitor Cisco Express Forwarding operations that are available through the CISCO-CEF-MIB tables. This section describes the configuration and monitoring operations for each table.

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF FIB Summary table (cefFIBSummaryTable).

Table 1: CEF FIB Summary Table--Cisco Express Forwarding Operation and Associated MIB Object

Cisco Express Forwarding Operation	Description
Gets the number of forwarding prefixes for IPv4 and IPv6	cefFIBSummaryFwdPrefixes

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Forwarding table (cefPrefixTable).

Table 2: CEF Forwarding Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets the forwarding information for the entry	cefPrefixForwardingInfo

Cisco Express Forwarding Operation	MIB Object
Gets the number of packets forwarded by the prefix	cefPrefixPkts
Gets the number of packets forwarded by the prefix in a 64-bit value	cefPrefixHCPkts
Gets the number of bytes forwarded by the prefix	cefPrefixBytes
Gets the number of bytes forwarded by the prefix in a 64-bit value	cefPrefixHCBytes
Gets the number of internal nonrecursive packets forwarded by the prefix	cefPrefixInternalNRPkts
Gets the number of internal nonrecursive packets forwarded by the prefix in a 64-bit value	cefPrefixInternalNRHCPkts
Gets the number of internal nonrecursive bytes forwarded by the prefix	cefPrefixInternalNRBytes
Gets the number of internal nonrecursive bytes forwarded by the prefix in a 64-bit value	cefPrefixInternalNRHCBytes
Gets the number of external nonrecursive packets forwarded by the prefix	cefPrefixExternalNRPkts
Gets the number of external nonrecursive packets forwarded by the prefix in a 64-bit value	cefPrefixExternalNRHCPkts
Gets the number of external nonrecursive bytes forwarded by the prefix	cefPrefixExternalNRBytes
Gets the number of external nonrecursive bytes forwarded by the prefix in 64-bit value	cefPrefixExternalNRHCBytes

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Longest Match Prefix table (cefLMPrefixTable).

Table 3: CEF Longest Match Prefix Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets or sets the lock for creation or modification of the longest match prefix entries	cefLMPrefixSpinLock
Gets the state of the destination prefix request	cefLMPrefixState
Gets the network prefix address for the destination prefix request	cefLMPrefixAddr
Gets the network prefix length for the destination prefix request (the same display as the **show ip cef exact-route** command)	cefLMPrefixLen
Gets the status of a table entry	cefLMPrefixRowStatus

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Path table (cefPathTable).

Table 4: CEF Path Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets the type of Cisco Express Forwarding path for a prefix	cefPathType
Gets the interface associated with this Cisco Express Forwarding path	cefPathInterface
Gets the next-hop address for the Cisco Express Forwarding path	cefPathNextHopAddr
Gets the recursive Virtual Private Network (VPN) routing and forwarding (VRF) instance name associated with this path	cefPathRecurseVrfName

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Adjacency Summary table (cefAdjSummaryTable).

Table 5: CEF Adjacency Summary Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Gets the number of complete adjacencies	cefAdjSummaryComplete
Gets the number of incomplete adjacencies	cefAdjSummaryInComplete
Gets the number of adjacencies for Layer 2 encapsulation	cefAdjSummaryFixup
Gets the number of adjacencies for IP redirect	cefAdjSummaryRedirect

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Adjacency table (cefAdjTable).

Table 6: CEF Adjacency Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets the adjacency source	cefAdjSource
Gets the adjacency Layer 2 encapsulation	cefAdjEncap
Gets the adjacency fixup	cefAdjFixup
Gets the Layer 3 maximum transmission unit (MTU) for the adjacency	cefAdjMTU
Gets the forwarding information in cefFESelectionTable	cefAdjForwardingInfo
Gets the number of packets transmitted	cefAdjPkts
Gets the number of packets transmitted in a 64-bit version	cefAdjHCPkts
Gets the number of bytes transmitted	cefAdjBytes
Gets the number of bytes transmitted in a 64-bit version	cefAdjHCBytes

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Forwarding Element Selection table (cefFESelectionTable).

Table 7: CEF Forwarding Element Selection Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets any special processing for a forwarding element	cefFESelectionSpecial
Gets the Multiprotocol Label Switching (MPLS) labels for a forwarding element	cefFESelectionLabels
Gets the adjancency type for a forwarding element	cefFESelectionAdjLinkType
Gets the interface for the adjacency for a forwarding element	cefFESelectionAdjInterface
Gets the next-hop address type for the adjacency for a forwarding element	cefFESelectionAdjNextHopAddrType
Gets the next-hop address for the adjacency for a forwarding element	cefFESelectionAdjNextHopAddr
Gets the connection ID for the adjacency for a forwarding element	cefFESelectionAdjConnId
Gets the VRF name for the lookup for a forwarding element	cefFESelectionVrfName
Gets the weighting for load balancing for a forwarding element	cefFESelectionWeight

The table below lists the Cisco Express Forwarding configuration and monitoring operations and associated MIB objects provided by the CEF Cfg table (cefCfgTable).

Table 8: CEF Cfg Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Enables or disables a Cisco Express Forwarding instance	cefCfgAdminState
Queries a Cisco Express Forwarding operational instance	cefCfgOperState
Enables or disables a distributed Cisco Express Forwarding instance	cefCfgDistributionAdminState
Queries a distributed Cisco Express Forwarding operational instance	cefCfgDistributionOperState
Gets or sets Cisco Express Forwarding network accounting options	cefCfgAccountingMap • nonRecursive (0) • perPrefix (1) • prefixLength (2)
Gets or sets Cisco Express Forwarding load sharing algorithm options	cefCfgLoadSharingAlgorithm • none (1) - Load sharing is disabled. • original (2) • tunnel (3) • universal (4)

Cisco Express Forwarding Operation	MIB Objects
Gets or sets a load sharing ID	cefCfgLoadSharingID
Gets or sets a traffic interval timer for Cisco Express Forwarding traffic statistics	cefCfgTrafficStatsLoadInterval
Gets or sets a frequency timer for the line card to send traffic statistics to the RP	cefCfgTrafficStatsUpdateRate

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Resource table (cefResourceTable).

Table 9: CEF Resource Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets the memory status of process memory pool for Cisco Express Forwarding	cefResourceMemoryUsed
Gets the reason for the Cisco Express Forwarding resource failure notification	cefResourceFailureReason

The table below lists the Cisco Express Forwarding configuration and monitoring operations and associated MIB objects provided by the CEF Interface table (cefIntTable).

Table 10: CEF Interface Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Gets or sets the Cisco Express Forwarding switching state of the interface	cefIntSwitchingState • cefEnabled (1) • distCefEnabled (2) • cefDisabled (3)
Gets or sets the type of Cisco Express Forwarding Load sharing on the interface	cefIntLoadSharing • perPacket (1) • perDestination (2)
Gets or sets Cisco Express Forwarding nonrecursive accounting on the interface	cefIntNonrecursiveAccouting • internal (1) • external (2)

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Peer table (or Linecard table) (cefPeerTable).

Table 11: CEF Peer Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Gets the Cisco Express Forwarding operational instance of the peer entity	cefPeerOperState
Gets how many times the session with the Peer resets	cefPeerNumberOfResets

The table below lists the Cisco Express Forwarding monitoring operation and associated MIB object provided by the CEF Peer FIB table (cefPeerFIBTable).

Table 12: CEF Peer FIB Table--Cisco Express Forwarding Operation and Associated MIB Object

Cisco Express Forwarding Operation	MIB Objects
Gets the current Cisco Express Forwarding FIB operation state of the peer entity	cefPeerFIBOperState

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Prefix Length Statistics table (cefStatsPrefixTable).

Table 13: CEF Prefix Length Statistics Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Object
Gets the number of queries (lookups) in the FIB database for a prefix length	cefStatsPrefixQueries
Gets the number of queries (lookups) in the FIB database for a prefix length in a 64-bit value	cefStatsPrefixHCQueries
Gets the number of inserts in the FIB database for a prefix length	cefStatsPrefixInserts
Gets the number of inserts in the FIB database for a prefix length in a 64-bit value	cefStatsPrefixHCInsert
Gets the number of deletes in the FIB database for a prefix length	cefStatsPrefixDeletes
Gets the number of deletes in the FIB database for a prefix length in a 64-bit version	cefStatsPrefixHCDeletes
Gets the number of elements in the FIB database for a prefix length	cefStatsPrefixElements
Gets the number of elements in the FIB database for a prefix length in a 64-bit value	cefStatsPrefixHCElements

The table below lists the Cisco Express Forwarding monitoring operations and associated MIB objects provided by the CEF Switching Statistics table (cefSwitchingStatsTable).

Table 14: CEF Switching Statistics Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Gets the switching path of a Cisco Express Forwarding instance	cefSwitchingPath
Gets the number of packets dropped by a Cisco Express Forwarding instance	cefSwitchingDrop

Cisco Express Forwarding Operation	MIB Objects
Gets the number of packets dropped by a Cisco Express Forwarding instance in a 64-bit value	cefSwitchingHCDrop
Gets the number of packets that could be punted	cefSwitchingPunt
Gets the number of packets that could be punted in a 64-bit value	cefSwitchingHCPunt
Gets the number of packets that are punted to the host	cefSwitchingPunt2Host
Gets the number of packets that are punted to the host in a 64-bit value	cefSwitchingHCPunt2Host

The table below lists the Cisco Express Forwarding configuration and monitoring operations and associated MIB objects provided by the CEF IP Prefix Consistency Global Checker group (cefCCGlobalTable).

Table 15: CEF IP Prefix Consistency Global Checker Group--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Enables or disables auto repairing of the consistency checkers	cefCCGlobalAutoRepairEnabled
Gets or sets the consistency checker wait time before fixing the inconsistency	cefCCGlobalAutoRepairDelay
Gets or sets the consistency checker wait time to reenable auto repair after auto repair runs	cefCCGlobalAutoRepairHoldDown
Enables or disables error message generation for an inconsistency	cefCCGlobalErrorMsgEnabled

The table below lists the Cisco Express Forwarding configuration and monitoring operations and associated MIB objects provided by the CEF Consistency Checker Type table (cefCCTypeTable).

Table 16: CEF Consistency Checker Type Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Enables or disables the passive consistency checker	cefCCEnabled
Gets or sets the maximum number of prefixes per scan	cefCCCount
Gets or sets the period between scans for the consistency checker	cefCCPeriod
Gets the number of prefix consistency queries sent to the Cisco Express Forwarding FIB	cefCCQueriesSent
Gets the number of prefix consistency queries ignored by the consistent checker	cefCCQueriesIgnored
Gets the number of prefix consistent queries iterated back to the database	cefCCQueriesIterated
Gets the number of prefix consistent queries processed	cefCCQueriesChecked

The table below lists the Cisco Express Forwarding configuration and monitoring operations and associated MIB objects provided by the CEF Inconsistency Record table (cefInconsistencyRecordTable).

Table 17: CEF Inconsistency Record Table--Cisco Express Forwarding Operations and Associated MIB Objects

Cisco Express Forwarding Operation	MIB Objects
Gets the network prefix type for the inconsistency	cefInconsistencyPrefixType
Gets the network prefix address for the inconsistency	cefInconsistencyPrefixAddr
Gets the network prefix length for the inconsistency	cefInconsistencyPrefixLen
Gets the VRF name for the inconsistency	cefInconsistencyVrfName
Gets the consistency checker type that found the inconsistency	cefInconsistencyCCType
Gets the entity in which this inconsistency occurred	cefInconsistencyEntity
Gets the reason for generating the inconsistency	cefInconsistencyReason • missing (1) • checksumErr (2) • unknown (3)
Global Objects for Cisco Express Forwarding Inconsistency	
Gets the value of the system uptime at the time an inconsistency was detected	entLastInconsistencyDetectTime
Sets an object to restart all active consistency checkers	cefInconsistencyReset
Gets the status of the inconsistency reset request	cefInconsistencyResetStatus

CISCO-CEF-MIB Notifications

The table below lists the Cisco Express Forwarding operations associated with the CISCO-CEF-MIB objects that enable the sending of Cisco Express Forwarding notifications.

Table 18: Cisco Express Forwarding Notifications--Cisco Express Forwarding Operations and CISCO-CEF-MIB Objects That Enable Them

Cisco Express Forwarding Operation	MIB Object
Enables the sending of a notification on the detection of a Cisco Express Forwarding resource failure	cefResourceFailureNotifEnable
Enables the sending of a notification on the detection of a Cisco Express Forwarding peer state change	cefPeerStateChangeNotifEnable
Enables the sending of a notification on the detection of a Cisco Express Forwarding FIB peer state change	cefPeerFIBStateChangeNotifEnable
Sets the period of time after the sending of each notification event	cefNotifThrottlingInterval
Enables the sending of a notification on the detection of an inconsistency	cefInconcsistencyNotifEnable

You can enable or disable these notifications through the MIB or by entering a CLI command. The table below contains a description of the notifications and the commands you use to enable each notification.



Note You must enter a **snmp-server host** command before you enter a command to enable or disable a CISCO-CEF-MIB notification.

Table 19: Description of Notifications and Enabling Commands for the CEF-PROVISION-MIB Notifications

Notification	Generated for	Commands
Cisco Express Forwarding resource failure notification	A malloc failure, an Inter-Process Communication (IPC) failure, and any other type of failure related to External Data Representation (XDR) messages	CLI: **snmp-server enable traps cef resource-failure** MIB: **setany** *version ip-address community-string* **cefResourceFailureNotifEnable.0 -i 1**
Cisco Express Forwarding peer state change notification	A change in the operational state of a peer on the line cards	CLI: **snmp-server enable traps cef peer-state-change** MIB: **setany** *version ip-address community-string* **cefPeerStateChangeNotifEnable.0 -i 1**
Cisco Express Forwarding peer FIB state change notification	A change in the operational state of the peer FIB	CLI: **snmp-server enable traps cef peer-fib-state-change** MIB: **setany** *version ip-address community-string* **cefPeerFIBStateChangeNotifEnable.0 -i 1**
Cisco Express Forwarding inconsistency detection notification	An inconsistency detected by the consistency checkers	CLI: **snmp-server enable traps cef inconsistency** MIB: **setany** *version ip-address community-string* **cefInconsistencyNotifEnable.0 -i 1**

How to Configure SNMP CEF-MIB Support

Configuring the Router to Use SNMP

Perform the following task to configure a router to use SNMP.

Before you can use the Cisco Express Forwarding--SNMP CEF-MIB Support feature, you must configure the SNMP server for the router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server community** *string* [**view** *view-name*] [**ro** | **rw**] [**ipv6 nacl**] [*access-list-number*]
4. **snmp-server community** *string2* **rw**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**snmp-server community** *string* [**view** *view-name*] [**ro** | **rw**] [**ipv6 nacl**] [*access-list-number*] **Example:** `Router(config)# snmp-server community public ro`	Sets up the community access string to permit access to SNMP. • The *string* argument is a community string that consists of from 1 to 32 alphanumeric characters and functions much like a password, permitting access to the SNMP protocol. Blank spaces are not permitted in the community string. • The **view** *view-name* keyword-argument pair is the name of a previously defined view. The view defines the objects available to the SNMP community. • The **ro** keyword specifies read-only access. Authorized management stations can only retrieve MIB objects. • The **rw** keyword specifies read-write access. Authorized management stations can retrieve and modify MIB objects. • The **ipv6 nacl**keywords specify the IPv6 named access list. • The *access-list-number* argument is an integer from 1 to 99. It specifies a standard access list of IP addresses or a string (not to exceed 64 characters) that is the name of a standard access list of IP addresses that are allowed access to the SNMP agent. Alternatively, an integer from 1300 to 1999 that specifies a list of IP addresses in the expanded range of standard access list numbers. Devices at these addresses are allowed to use the community string to gain access to the SNMP agent.

	Command or Action	Purpose
		Note The *string*argument (Step 3) and *string2*argument (Step 4) provide a minimal level of security. It is advisable to provide the string for read-only access to others who need only to view and not to modify the MIB objects, and reserve the read-write access string for administrators only. The *string2* argument (Step 4) should be different from the read-only *string* argument specified in this step.
Step 4	**snmp-server community** *string2* **rw** **Example:** `Router(config)# snmp-server community private rw`	Sets up the community access string to permit access to SNMP. • The *string2* argument is a community string that consists of from 1 to 32 alphanumeric characters and functions much like a password, permitting access to the SNMP protocol. Blank spaces are not permitted in the community string. • The **rw** keyword specifies read-write access. Authorized management stations can retrieve and modify MIB objects. This example allows MIB objects to be retrieved and set because a string is specified with read-write access. **Note** The *string*argument (Step 3) and *string2*argument (Step 4) provide a minimal level of security. It is advisable to provide the string for read-only access to others who need only to view and not to modify the MIB objects, and reserve the read-write access string for administrators only. The *string2* argument (Step 4) should be different from the read-only *string* argument specified in the preceding step (Step 3).
Step 5	**end** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.

Configuring a Host to Receive Notifications

Perform the following task to configure an SNMP host to receive CISCO-CEF-MIB notifications. Notifications provide information to assist you in the monitoring and managing of Cisco Express Forwarding operations.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server community** *string* [**ro** | **rw**]
4. **snmp-server community** *string2* **rw**
5. **snmp-server host** *ip-address* [**vrf** *vrf-name*] [**traps** | **informs**] [**version** {**1**| **2c** | **3** [**auth** | **noauth** | **priv**]}] *community-string* [**udp-port** *port*] **cef**
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**snmp-server community** *string* [**ro**	**rw**] **Example:** `Router(config)# snmp-server community public ro`	Sets up the community access string to permit access to SNMP. • The *string* argument is a community string that consists of from 1 to 32 alphanumeric characters and functions much like a password, permitting access to the SNMP protocol. Blank spaces are not permitted in the community string. • The **ro** keyword specifies read-only access. Authorized management stations can only retrieve MIB objects. • The **rw** keyword specifies read-write access. Authorized management stations can retrieve and modify MIB objects.
Step 4	**snmp-server community** *string2* **rw** **Example:** `Router(config)# snmp-server community private rw`	Sets up the community access string to permit access to SNMP. • The *string2* argument is a community string that consists of from 1 to 32 alphanumeric characters and functions much like a password, permitting access to the SNMP protocol. Blank spaces are not permitted in the community string. • The **rw** keyword specifies read-write access. Authorized management stations can retrieve and modify MIB objects.

	Command or Action	Purpose
		This example allows MIB objects to be retrieved and set because a string is specified with read-write access. **Note** The *string*argument (Step 3) and *string2*argument (Step 4) provide a minimal level of security. It is advisable to provide the string for read-only access to others who need only to view and not to modify the MIB objects, and retain the read-write access string for administrators only. The *string2* argument (Step 4) should be different from the read-only *string* argument specified in the preceding step (Step 3).
Step 5	**snmp-server host** *ip-address* [**vrf** *vrf-name*] [**traps** | **informs**] [**version** {**1**| **2c** | **3** [**auth** | **noauth** | **priv**]}] *community-string* [**udp-port** *port*] **cef** **Example:** `Router(config)# snmp-server host 10.56.125.47 informs version 2c public cef`	Specifies the recipient of an SNMP notification operation. • The *ip-address* argument is the IP address or IPv6 address of the SNMP notification host. The SNMP notification host is typically a network management station (NMS or SNMP manager). This host is the recipient of the SNMP traps or informs. • The **vrf** *vrf-name* keyword and argument specify that the specified VRF be used to send SNMP notifications. • The **traps** keyword specifies that notifications should be sent as traps. This is the default. • The **informs** keyword specifies that notifications should be sent as informs. • The version keyword specifies the version of the SNMP used to send the traps. The default is 1. If you use the **version** keyword, one of the following keywords must be specified: • • **1** --SNMPv1. This option is not available with informs. • **2c** --SNMPv2c. • **3** --SNMPv3. The most secure model because it allows packet encryption with the **priv** keyword. The default is **noauth**. • One of the following three optional security level keywords can follow the **version 3** keywords: • **auth**--Enables Message Digest 5 (MD5) and Secure Hash Algorithm (SHA) packet authentication.

	Command or Action	Purpose
		• **noauth**--Specifies that the noAuthNoPriv security level applies to this host. This is the default security level for SNMPv3. • **priv**--Enables Data Encryption Standard (DES) packet encryption (also called "privacy"). • The *community-string* argument specifies that a password-like community string be sent with the notification operation. • The **udp-port** *port* keyword and argument specify that SNMP notifications or informs are to be sent to the User Datagram Protocol (UDP) port number of the NMS host. The default is 162. • The **cef** keyword specifies that the Cisco Express Forwarding notification type is to be sent to the host. If no type is specified, all available notifications are sent.
Step 6	**end** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.

Configuring SNMP Notifications with the CLI

Perform the following task to configure SNMP notifications for Cisco Express Forwarding events. To configure this feature using SNMP commands instead of the CLI, see the Configuring SNMP Notifications with SNMP Commands, on page 21.

Before you begin

You must have configured an NMS or SNMP agent to receive the SNMPCISCO-CEF-MIB notification. See the Configuring a Host to Receive Notifications, on page 16.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server enable traps cef** [**peer-state-change**] [**resource-failure**] [**inconsistency**] [**peer-fib-state-change**]
4. **snmp-server host** *ip-address* [**traps** | **informs**] [**version** {**1**| **2c** | **3** [**auth** | **noauth** | **priv**]}] *community-string* **cef**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**snmp-server enable traps cef** [**peer-state-change**] [**resource-failure**] [**inconsistency**] [**peer-fib-state-change**] **Example:** `Router(config)# snmp-server enable traps cef resource-failure`	Enables Cisco Express Forwarding support of SNMP notifications on an NMS. • The **peer-state change** keyword enables the sending of CISCO-CEF-MIB SNMP notifications for changes in the operational state of Cisco Express Forwarding peers. • The **resource-failure** keyword enables the sending of CISCO-CEF-MIB SNMP notifications for resource failures that affect Cisco Express Forwarding operations. • The **inconsistency**keyword enables the sending of CISCO-CEF-MIB SNMP notifications for inconsistencies that occur when routing information is updated from the Routing Information Base (RIB) to the CISCO-CEF-MIB on the RP and to the CISCO-CEF-MIB on the line cards. You can set the throttling interval for sending inconsistency notifications. See the Configuring the Throttling Interval with the CLI, on page 23. • The **peer-fib-state-change** keyword enables the sending of CISCO-CEF-MIB SNMP notifications for changes in the operational state of the Cisco Express Forwarding peer FIB.
Step 4	**snmp-server host** *ip-address* [**traps** | **informs**] [**version** {**1**| **2c** | **3** [**auth** | **noauth** | **priv**]}] *community-string* **cef** **Example:** `Router(config)# snmp-server host 10.56.125.47 informs version 2c public cef`	Specifies the recipient of an SNMP notification operation. • The *ip-address* argument is the IP address or IPv6 address of the SNMP notification host. The SNMP notification host is typically a network management station (NMS or SNMP manager). This host is the recipient of the SNMP traps or informs. • The **traps** keyword specifies that notifications should be sent as traps. This is the default.

	Command or Action	Purpose
		• The **informs** keyword specifies that notifications should be sent as informs. • The **version** keyword specifies the version of the SNMP used to send the traps or informs. The default is 1. If you use the **version** keyword, one of the following keywords must be specified: • • **1** --SNMPv1. This option is not available with informs. • **2c** --SNMPv2C. • **3** --SNMPv3. The most secure model because it allows packet encryption with the **priv** keyword. The default is **noauth**. • One of the following three optional security level keywords can follow the **version 3** keywords: • **auth**--Enables Message Digest 5 (MD5) and Secure Hash Algorithm (SHA) packet authentication. • **noauth**--Specifies that the noAuthNoPriv security level applies to this host. This is the default security level for SNMPv3. • **priv**--Enables Data Encryption Standard (DES) packet encryption (also called "privacy"). • The *community-string* argument specifies that a password-like community string be sent with the notification operation. • The **cef** keyword specifies that the Cisco Express Forwarding notification type is to be sent to the host. If no type is specified, all available notifications are sent.
Step 5	**end** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.

Configuring SNMP Notifications with SNMP Commands

Perform the following task to configure SNMP notifications for Cisco Express Forwarding events. To configure this feature using the CLI instead of SNMP commands, see the Configuring SNMP Notifications with the CLI, on page 19.

Before you begin

You must have configured an NMS or SNMP agent to receive the SNMPCISCO-CEF-MIB notification. See the Configuring a Host to Receive Notifications, on page 16.

SUMMARY STEPS

1. **setany** *version ip-address community-string* **cefPeerStateChangeNotifEnable.0 -i** *TruthValue*
2. **setany** *version ip-address community-string* **cefPeerFIBStateChangeNotifEnable .0 -i** *TruthValue*
3. **setany** *version ip-address* community-string **cefResourceFailureNotifEnable. 0 -i** *TruthValue*
4. **setany** *version ip-address community-string* **cefInconsistencyNotifEnable .0 -i** *TruthValue*

DETAILED STEPS

	Command or Action	Purpose

Step 1	**setany** *version ip-address community-string* **cefPeerStateChangeNotifEnable.0 -i** *TruthValue*
	Example:
	`workstation% setany -v2c 10.56.125.47 public cefPeeStateStateChangeNotifEnable.0 -1 1`
		Enables the sending of CISCO-CEF-MIB SNMP notifications for changes in operational state of Cisco Express Forwarding peers.
		• The *version* argument specifies the version of SNMP that is used. Options are
		  • **-v1**--SNMPv1
		  • **-v2c**--SNMPv2C
		  • **-v3**--SNMPv3
		• The *ip-address* argument is the IP address or IPv6 address of the SNMP notification host.
		The SNMP notification host is typically a network management station (NMS or SNMP manager). This host is the recipient of the SNMP traps or informs.
		• The *community-string* argument specifies that a password-like community string be sent with the notification operation.
		• The **-i**keywords indicate that the variable that follows is an integer.
		• Values for the *TruthValue* argument are:
		  • 1--enable sending of the notification
		  • 2--disable sending of the notification
		These arguments and keywords apply to the Cisco-CEF-MIB notifications in Steps 2, 3, and 4.

Step 2	**setany** *version ip-address community-string* **cefPeerFIBStateChangeNotifEnable .0 -i** *TruthValue* **Example:** `workstation% setany -v2c 10.56.125.47 public cefPeerFIBStateChangeNotifEnable.0 -1 1`	Enables the sending of CISCO-CEF-MIB SNMP notifications for changes in the operational state of the Cisco Express Forwarding peer FIB. • See Step 1 for a description of the command arguments and keywords.

	Command or Action	Purpose
Step 3	**setany** *version ip-address* community-string **cefResourceFailureNotifEnable. 0 -i** *TruthValue* **Example:** `workstation% setany -v2c 10.56.125.47 public cefResourceFailureNotifEnable.0 -i 1`	Enables the sending of CISCO-CEF-MIB SNMP notifications for resource failures that affect Cisco Express Forwarding operations. • See Step 1 for a description of the command arguments and keywords.
Step 4	**setany** *version ip-address community-string* **cefInconsistencyNotifEnable** .**0 -i** *TruthValue* **Example:** `workstation% setany -v2c 10.56.125.47 public cefInconsistencyNotifEnable.0 -i 1`	Enables the sending of CISCO-CEF-MIB SNMP notifications for inconsistencies that occur when routing information is updated from the RIB to the Cisco Express Forwarding FIB on the RP and to the Cisco Express Forwarding FIB on the line cards. • See Step 1 for a description of the command arguments and keywords.

Configuring the Throttling Interval with the CLI

Perform the following task to configure the throttling interval for CISCO-CEF-MIB inconsistency notifications. To configure this feature using SNMP commands instead of the CLI, see the Configuring the Throttling Interval with SNMP Commands section.

Configuring a throttling interval allows some time before an inconsistency notification is sent during the process of updating forwarding information from the Routing Information Base (RIB) to the RP and to the line card databases. As these databases are updated, inconsistencies might occur as a result of the asynchronous nature of the distribution mechanism for these databases. The throttling interval allows fleeting inconsistencies to resolve themselves before an inconsistency notification is sent.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server enable traps cef inconsistency**
4. **snmp mib cef throttling-interval** *seconds*
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:**	Enters global configuration mode.

	Command or Action	Purpose
	`Router# configure terminal`	
Step 3	**snmp-server enable traps cef inconsistency** **Example:** `Router(config)# snmp-server enable traps cef inconsistency`	Enables the sending of CISCO-CEF-MIB SNMP notifications for inconsistencies in Cisco Express Forwarding.
Step 4	**snmp mib cef throttling-interval** *seconds* **Example:** `Router(config)# snmp mib cef throttling-interval 2500`	Sets the throttling interval for the CISCO-CEF-MIB inconsistency notifications. • The *seconds* argument is the time to allow before an inconsistency notification is sent during the process of updating forwarding information from the RIB to the RP and to the line card databases. A valid value is from 0 to 3600 seconds. A value of 0 disables throttle control.
Step 5	**end** **Example:** `Router(config)# end`	Exits to privileged EXEC mode.

Configuring the Throttling Interval with SNMP Commands

Perform the following task to configure the throttling interval for CISCO-CEF-MIB inconsistency notifications. To configure this feature using the CLI instead of SNMP commands, see the Configuring the Throttling Interval with the CLI, on page 23.

Configuring a throttling interval allows some time before an inconsistency notification is sent during the process of updating forwarding information from the Routing Information Base (RIB) to the RP and to the line card databases. As these databases are updated, inconsistencies might occur as a result of the asynchronous nature of the distribution mechanism for these databases. The throttling interval allows fleeting inconsistencies to resolve themselves before an inconsistency notification is sent.

SUMMARY STEPS

1. **setany** *version ip-address community-string* **cefNotifThrottlingInterval.0** **-i** *seconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**setany** *version ip-address community-string* **cefNotifThrottlingInterval.0** **-i** *seconds* **Example:** `workstation% setany -v2c 10.56.125.47 public cefNotifThrottlingInterval.0 -1 3600`	Sets the throttling interval for the CISCO-CEF-MIB inconsistency notifications. • The *version* argument specifies the version of SNMP that is used. Options are • **-v1**--SNMPv1

	Command or Action	Purpose
		• **-v2c**--SNMPv2C • **-v3**--SNMPv3 • The *ip-address* argument is the IP address or IPv6 address of the SNMP notification host. The SNMP notification host is typically a network management station (NMS or SNMP manager). This host is the recipient of the SNMP traps or informs. • The *community-string* argument specifies that a password-like community string be sent with the notification operation. • The **-i**keywords indicate that the variable that follows is an integer. • The *seconds* argument is the time to allow before an inconsistency notification is sent during the process of updating forwarding information from the RIB to the RP and to the line card databases. A valid value is from 0 to 3600 seconds. A value of 0 disables throttle control.

Configuration Examples for SNMP CEF-MIB Support

Example Configuring a Host to Receive Notifications

The following example shows how to configure an SNMP host to receive CISCO-CEF-MIB notifications:

```
configure terminal
!

snmp-server community public ro

snmp-server community private rw

snmp-server host 10.56.125.47 informs version 2vc public cef

end
```

This example sets up SNMP host 10.56.125.47 to receive CISCO-CEF-MIB notifications as informs.

Example Configuring SNMP Notifications

This section contains examples for configuring SNMP notifications for Cisco Express Forwarding events using the CLI and using SNMP commands.

Configuring SNMP Notifications for Cisco Express Forwarding Events Using the CLI

This example shows how to use the CLI to configure CISCO-CEF-MIB SNMP notifications to be sent to host 10.56.125.47 as informs for changes in Cisco Express Forwarding peer states and peer FIB states, for Cisco Express Forwarding resource failures, and for inconsistencies in Cisco Express Forwarding events:

```
configure terminal
!

snmp-server community public ro

snmp-server host 10.56.125.47 informs version 2c public cef

!
snmp-server enable traps cef peer-state-change
snmp-server enable traps cef peer-fib-state-change
snmp-server enable traps cef inconsistency
snmp-server enable traps cef resource-failure
end
```

Configuring SNMP Notifications for Cisco Express Forwarding Events Using SNMP Commands

This example shows the use of SNMP command to configure CISCO-CEF-MIB SNMP notifications to be sent to host 10.56.125.47 for changes in Cisco Express Forwarding peer states and peer FIB states, for Cisco Express Forwarding resource failures, and for inconsistencies in Cisco Express Forwarding events:

```
setany -v2c 10.56.125.47 public cefPeerStateChangeNotifEnable.0 -i 1

setany -v2c 10.56.125.47 public cefPeerFIBStateChangeNotifEnable.0 -i 1

setany -v2c 10.56.125.47 public cefResourceFailureNotifEnable.0 -i 1
setany -v2c 10.56.125.47 public cefInconsistencyNotifEnabled.0 -i 1
```

Example Configuring the Throttling Interval

This example shows the configuration of a throttling interval for the sending of Cisco Express Forwarding inconsistency notifications to the SNMP host using CLI commands and SNMP commands. The throttling interval is the amount of time that passes between the time that the inconsistency occurs and the sending of the notification to the SNMP host.

Configuring the Throttling Interval for CISCO-CEF-MIB Inconsistency Notifications Using CLI Commands

This example shows the addition of a throttling interval of 1000 seconds for the sending of Cisco Express Forwarding inconsistency notifications to the SNMP host using CLI commands:

```
configure terminal
!

snmp-server community public ro

snmp-server host 10.56.125.47 informs version 2c public cef
```

```
!
snmp-server enable traps cef peer-state-change
snmp-server enable traps cef peer-fib-state-change
snmp-server enable traps cef inconsistency
snmp-server enable traps cef resource-failure
!
snmp mib cef throttling-interval 1000
end
```

Configuring the Throttling Interval for CISCO-CEF-MIB Inconsistency Notifications Using SNMP Commands

This example shows the addition of a throttling interval of 1000 seconds for the sending of Cisco Express Forwarding inconsistency notifications to the SNMP host using an SNMP command:

```
setany -v2c 10.56.125.47 public cefNotifThrottlingInterval.0 -1 1000
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
Commands for configuring and managing Cisco Express Forwarding	*Cisco IOS IP Switching Command Reference*
Tasks for verifying basic Cisco Express Forwarding and distributed Cisco Express Forwarding operation	Configuring Basic Cisco Express Forwarding for Improved Performance, Scalability, and Resiliency in Dynamic Networks
Tasks for enabling or disabling Cisco Express Forwarding or distributed Cisco Express Forwarding	Enabling or Disabling Cisco Express Forwarding or Distributed Cisco Express Forwarding to Customize Switching and Forwarding for Dynamic Network
Tasks for configuring load-balancing schemes for Cisco Express Forwarding	Configuring a Load-Balancing Scheme for Cisco Express Forwarding Traffic
Tasks for configuring Cisco Express Forwarding consistency checkers	Configuring Cisco Express Forwarding Consistency Checkers for Route Processors and Line Cards
Tasks for configuring epochs for Cisco Express Forwarding tables	Configuring Epochs to Clear and Rebuild Cisco Express Forwarding and Adjacency Tables
Tasks for configuring and verifying Cisco Express Forwarding network accounting	Configuring Cisco Express Forwarding Network Accounting

Standards

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

MIBs

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

RFCs

RFC	Title
RFC 3291	*Textual Conventions for Internet Network Addresses*
RFC 3413	*Simple Network Management Protocol (SNMP) Applications*

Technical Assistance

Description	Link
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.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for SNMP CEF-MIB Support

Table 20: Feature Information for Cisco Express Forwarding--SNMP CEF-MIB Support

Feature Name	Release	Feature Information
Cisco Express Forwarding--SNMP CEF-MIB Support	Cisco IOS XE Release 2.1	The Cisco Express Forwarding--SNMP CEF-MIB Support feature introduces the CISCO-CEF-MIB that allows management applications through the use of the Simple Network Management Protocol (SNMP) to configure and monitor Cisco Express Forwarding operational data and to provide notification when Cisco Express Forwarding encounters specific configured events. This module describes how to use the CISCO-CEF-MIB to manage and monitor objects related to Cisco Express Forwarding operation. In Cisco IOS XE, Release 2.1, this feature was introduced on the Cisco ASR 1000 Series Aggregation Services Routers. The following commands were introduced or modified: **snmp mib cef throttling-interval**, **snmp-server enable traps cef**, **snmp-server host**.

Glossary

inform --A type of notification message that is more reliable than a conventional trap notification message because the informs message notification requires acknowledgment, but a trap notification does not.

IPC --Inter-Process Communication. The protocol used by routers that support distributed packet forwarding. The Cisco IOS XE version of IPC provides a reliable ordered delivery of messages using an underlying platform driver transport or User Date Protocol (UDP) transport protocol. Cisco IOS XE software IPC services allow line cards (LCs) and the central route processor (RP) in a distributed system, to communicate with each other by exchanging messages from the RP to the LCs. Communication messages are also exchanged between active and standby RPs. The IPC messages include configuration commands, responses to the configuration commands, and other events that are reported by an LC to the RP.

MIB --Management Information Base. A database of network management information that is used and maintained by a network management protocol such as Simple Network Management Protocol (SNMP). The value of a MIB object can be changed or retrieved by the use of SNMP commands, usually through a network management system. MIB objects are organized in a tree structure that includes public (standard) and private (proprietary) branches.

NMS --network management station. A powerful, well-equipped computer (typically an engineering workstation) that is used by a network administrator to communicate with other devices in the network. An NMS is typically used to manage network resources, gather statistics, and perform a variety of network administration and configuration tasks. In the context of SNMP, an NMS is a device that performs SNMP queries to the SNMP agent of a managed device to retrieve or modify information.

notification --A message sent by a Simple Network Management Protocol (SNMP) agent to a network management station, console, or terminal to indicate that a significant network event has occurred.

SNMP --Simple Network Management Protocol. A network management protocol used almost exclusively in TCP/IP networks. SNMP enables a user to monitor and control network devices, manage configurations, collect statistics, monitor performance, and ensure network security.

SNMP community --An authentication scheme that enables an intelligent network device to validate SNMP requests.

SNMPv2c --Version 2c of the Simple Network Management Protocol. SNMPv2c supports centralized as well as distributed network management strategies and includes improvements in the Structure of Management Information (SMI), protocol operations, management architecture, and security.

SNMPv3 --Version 3 of the Simple Network Management Protocol. Interoperable standards-based protocol for network management. SNMPv3 provides secure access to devices by a combination of authenticating and encrypting packets over the network.

trap --A message sent by an SNMP agent to a network management station, console, or terminal to indicate that a significant network event has occurred. Traps are less reliable than inform requests, because the receiver of the trap does not send an acknowledgment of receipt; furthermore, the sender of the trap cannot determine if the trap was received.