Cisco Unified SRST SNMP MIB Support

Last Updated: June 23, 2009

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Note Prior to version 4.0, this product was called Cisco Survivable Remote Site Telephony (SRST)

Cisco Unified Survivable Remote Site Telephony (Cisco Unified SRST) is used for the remote office routers that support from 24 to 720 users in a centralized Cisco Unified Communications Manager processing environment, to back up IP phone calls and provide 911 emergency access by the public switched telephone network (PSTN). Any Cisco Unified SRST user can leverage Cisco Unified SRST MIBs for better management with Simple Network Management Protocol (SNMP) support.

Feature History of the Cisco Unified SRST MIB Feature

Release	Modification
12.4(4)XC	This feature was integrated into Cisco IOS Release 12.4(4)XC.
12.4(4)T	This feature was introduced on the 12.4(4)T

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click Cancel at the login dialog box and follow the instructions that appear.

Contents

Compliance

Cisco MIBs are a set of variables that are private extensions to the Internet standard MIB-II. The MIB-II is documented in RFC 1213 (Management Information Base for Network Management of TCP/IP-based Internets: MIB-II). This RFC includes information on the benefits of the new feature, supported platforms, related documents, troubleshooting tips, configuration examples, and a detailed command reference.

Cisco Compliance

At present, Cisco implementations of standard MIBs are often read-only or have some objects or object groups missing because of security concerns or time requirements for implementation. Since Cisco IOS Release 10.2, developers must document such specifics with AGENT-CAPABILITIES from RFC 1904.

Implementation

To find what MIBs Cisco implements, start at ftp-eng.cisco.com with ftp://ftp-eng.cisco.com/pub/mibs/README.

This contains a list of MIBs available for various software versions. The MIB list cannot account for MIBs not included in a particular software subset or because a feature is turned off. Whether or not the MIB is included is the function of AGENT-CAPABILITIES descriptions and the snmpORTable (RFC 1907) in later software versions.

Information about SNMP and MIBs

The following sections provide an overview of SNMP:

Network Management Overview

Network management takes place between two major types of systems: those in control (called managing systems) and those observed and controlled (called managed systems). The most common managing system is called a network management system (NMS). Managed systems can include hosts, servers, or network components such as routers or intelligent repeaters.

To promote interoperability, the cooperating systems must adhere to a common framework and a common language, called a protocol. In the Internet network management framework, that protocol is the Simple Network Management Protocol (SNMP). SNMP is an application-layer protocol designed to facilitate the exchange of network management information between network devices. The SNMP system consists of three parts:

- SNMP manager
- SNMP agent
- MIB

The Internet network management framework is based on the idea of a managing the system interfacing to a managed system. The managing system (called a manager) runs a network management application (called an agent). The managed system runs an agent that answers status requests from the manager. The manager and the managed system exchange information using SNMP.

The information exchanged between the manager and the managed system is about the Management Information Base (MIB), which defines all the information that can be seen or changed by the manager. The MIB may be either standard or proprietary, and a similar concept of the MIB must be shared by both the manager and the agent.

SNMP and its MIBs are defined in a combination of system-specific language and Abstract Syntax Notation 1 (ASN.1) Although ASN.1 is a rich definition language, SNMP uses only a subset of ASN.1, which is defined in the SNMP Structure of Management Information (SMI). For transmission, SNMP is encoded according to the ASN.1 basic encoding rules (BER).

SNMP may be carried over a wide choice of transport protocols. The most common combination is the User Datagram Protocol over the Internet Protocol, UDP/IP. Other possibilities include AppleTalk, Netware, and Ethernet.

SNMP has facilities for identifying the requester and the operational context in which a request is to be performed by the agent, such as read-only or read-write, a MIB subset for a particular group of users, or a subset that may be elsewhere or obtained through other mechanisms (proxy). These are the facilities concerned with security.

SNMP has a small number of MIB management operations it can perform for observation and control of MIB information, comprising various ways of reading (get operations), and one way of modifying (set operations).

MIBs

In a managed device, specialized low-impact software modules, called agents access information about the device and make it available to the network management system (NMS). Managed devices maintain values for a number of variables and report those, as required, to the NMS. For example, an agent can report data such as the number of bytes and packets in and out of the device, or the number of broadcast messages sent and received. In the Internet network management framework, each variable, which is a managed object, is any information that an agent can access and report back to the NMS.

All managed objects are contained in the MIB database. The managed objects can be set or read to provide information on network devices and interfaces. An NMS can control a managed device by sending a message to an agent of that managed device requiring the device to change the value of one or more of its managed objects.

MIB Source

MIBs come from various sources:

- **Standard**—On the Internet Engineering Task Force (IETF) standards track at Proposed, Draft, or full standard. A Proposed Standard can change somewhat due to implementation experience. A Draft Standard changes somewhat less, with more attention to backward compatibility. A full Internet Standard doesn't change much. At all levels these are published as Requests for Comment (RFCs).

- **Internet Draft**—IETF work in progress. Sometimes the best way to instrument technology is with an Internet Draft MIB, which is typically being worked on by an IETF working group. Such MIBs are somewhat unstable, so it is necessary to capture the specific Internet Draft and to place the MIB within the Cisco Enterprise MIB space (not in the Experimental branch).

- **Cisco**—Cisco enterprise-specific (also called proprietary or private, even though publicly documented). Such MIBs add instrumentation not covered by standard MIBs. As of Cisco IOS Release 10.2, Cisco has old MIBs and new MIBs. The old MIBs are from older software versions and often have somewhat unconventional features.

- **Other companies**—Non-Cisco enterprise-specific. It is occasionally appropriate to implement a MIB defined by some other company, especially for technology they originated and instrumented. This presents problems like these associated with Internet Drafts in that a version of the MIB definition must be captured, but the MIB itself should remain wherever in the MIB space the originating company put it so as to easily support existing applications.

MIB Objects

A MIB is conceptually a tree (as shown in Figure 1), where the leaves are the individual data objects. An object can be, for example, a counter or a protocol status. The SNMP framework uses the term "object" in a way different from the way OSI management uses it. An OSI object is a network entity, such as a router or a protocol, which has attributes. These OSI attributes and SNMP objects are essentially the same concept, that is, individual data values. A MIB object consists of the following values:

- Object type—Identifies the type of MIB object.
- Syntax—Identifies the data type which models the object.
- Access—Identifies the maximum level of access and can have one of five values (listed from highest to lowest level of access):
  - Read-create—Indicates that instances of the object may be read, written, and created
  - Read-write—Indicates that instance of the object may be read or written, but not created
  - Read-only—Indicates that instances of the object may be read but not written or created
  - Accessible-for-notify—Indicates that instances of the object may only appear in notifications
  - Not-accessible—Indicates that instances of the object may not be directly read, written, or created
- Status—The status of a managed object can be:
  - Mandatory—Indicates that the definition is required and should be implemented
  - Current—Indicates that the definition is current
  - Deprecated—Indicates that the definition will soon be made obsolete and need no longer be implemented
  - Obsolete—Indicates that managed nodes should not implement the object
- Description—Provides a textual description of the managed object

The following is an example of a MIB object:

```
tpTDMIfCollectTimeInterval OBJECT-TYPE
```

```
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
This object shows measurement time interval seconds.
        ::= {tpTDMIfStatTableEntry 1}
```

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at
http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

MIB Archive

Cisco MIBs are archived in the Cisco FTP server and are accessible by anonymous FTP at the following
location: ftp://ftpeng.cisco.com/pub/mibs

Internet MIB Hierarchy

The MIB structure is logically represented by a tree hierarchy (see Figure 1). The structure uses branches
and the branches that fall below each category have short text strings and integers to identify them. Text
strings describe object names, and integers allow computer software to create compact, encoded
representations of the names. For example, the Cisco MIB variable authAddr is an object name and is
denoted by number 5, which is listed at the end of its object identifier number 1.3.6.1.4.1.9.2.1.5.

The object identifier in the Internet MIB hierarchy is the sequence of numeric labels on the nodes along
a path from the root to the object. The Internet standard MIB is represented by the object identifier
1.3.6.1.2.1. It also can be expressed as iso.org.dod.internet.mgmt.mib. (See Figure 1.)

Figure 1   Internet MIB Hierarchy
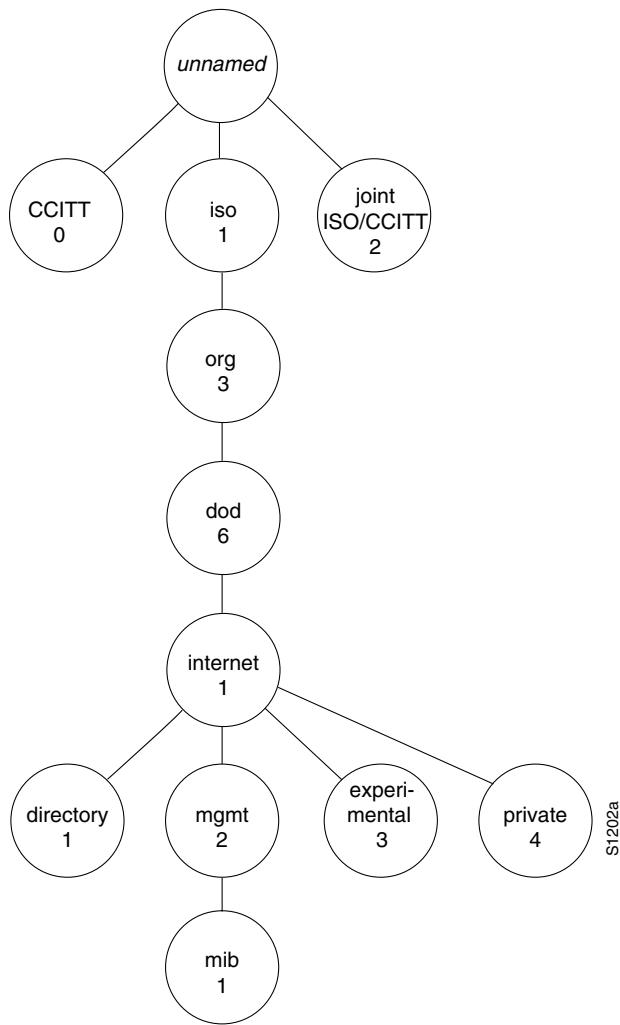
SNMP

Cisco MIB variables are accessible through SNMP, which is an application-layer protocol designed to facilitate the exchange of management information between network devices.

Instead of defining a large set of commands, SNMP places all operations in a get-request, get-next-request, or set-request format. For example, an SNMP manager can get a value from an SNMP agent or store a value in that SNMP agent. The SNMP manager can be part of an NMS, and the SNMP agent can reside on a networking device such as a router. You can compile the Cisco MIB with your network management software. If SNMP is configured on a Catalyst Switch, the SNMP agent can respond to MIB-related queries being sent by the NMS.

An example of an NMS is the CiscoWorks network management software. CiscoWorks uses the Cisco MIB variables to set device variables and to poll devices on the internetwork for specific information. The results of a poll can be displayed as a graph and analyzed for the troubleshooting of internetwork problems. Results can also be used to increase network performance, verify the configuration of devices, monitor traffic loads, and so on.

As shown in Figure 2, the SNMP agent gathers data from the MIB, which is the repository for information about device parameters and network data. The agent can send traps, or notifications of events of interest, to the manager. The Cisco trap file, mib.traps, which documents the format of the Cisco traps, is available on the Cisco host ftp.cisco.com.

Figure 2   *Simple Network Management Protocol Network*
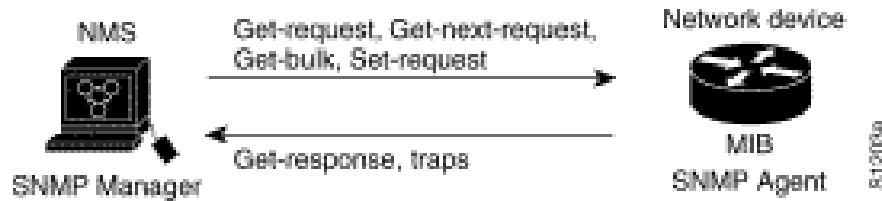
The SNMP manager uses information in the MIB to perform the operations described in Table 1.

Table 1   *SNMP Manager Operations*

Operation	Description
get-request	Retrieve a value from a specific variable.
get-next-request	Retrieve the value following the named variable. Often used to retrieve variables from within a table. [1]
get-response	The reply to a get-request, get-next-request, get-bulk-request, or set-request sent by an NMS.
get-bulk-request	Similar to a get-next-request, but fill the get-response with up to max-repetition number of get-next interactions.
set-request	Store a value in a specific variable.
trap	An unsolicited message sent by an SNMP agent to an SNMP manager indicating that some event has occurred.

1. With this operation, an SNMP manager does not need to know the exact variable
   name. A sequential search is performed to find the needed variable from within the MIB.

SNMP MIB

An SNMP MIB is an abstract database, that is, a conceptual specification for information that a management application may read and modify in a certain form. This does not imply that the information is kept in the managed system in that same form. The SNMP agent translates between the internal data structures and formats of the managed system and the external data structures and formats defined for the MIB.

The SNMP MIB is conceptually a tree structure with conceptual tables, described in more detail in the following sections. Relative to this tree structure, the term "MIB" is used in two ways. In one way, it is actually a MIB branch, usually containing information for a single aspect of technology, such as a transmission medium or a routing protocol. A MIB used in this way is more accurately called a MIB module, and is usually defined in a single document.

In the other way, a MIB is a collection of such branches. Such a collection of MIB branches might comprise, for example, all of the MIB modules implemented by a given agent, or the entire collection of MIB modules defined for SNMP.

MIBs can be standard or enterprise. Internet standard MIBs are defined by working groups of the IETF and published as RFCs. Enterprise MIBs are defined by other organizations, which are usually individual companies. Done properly, enterprise MIBs instrument technology not covered by standard MIBs, either completely or as an extension to a standard MIB.

The prototypical standard MIB is MIB-II, the second revision of the original SNMP MIB. MIB-II contains branches for the basic areas of instrumentation, such as the system, its network interfaces, IP, and TCP. All of these started out in a single MIB module, but as SNMPv2 evolves, they are being split into separate modules.

SNMP MIB Tables

Tables are a powerful and often confusing aspect of SNMP MIBs. Architectural purists say SNMP has conceptual tables, not real tables. This is because every object, whether in a table or not, is a leaf of the tree, identified by an object identifier (OID) that includes an instance. So, in an abstract sense, all objects are alike. But practically speaking, SNMP has tables, and using or implementing them gets somewhat more complex than implementing scalars, which are single object instances.

Tables have a rigid structure, defined in the SMI. Tables can contain only simple objects, not other tables, although multiple indexes can represent the concept of tables in tables. An entry, or row, in a table is uniquely identified by one or more table indexes, also called auxiliary objects. The OID of an object from a table is the OID for that object's position in the MIB tree concatenated with a representation of all the table indexes for an entry in the table.

For example, the Interface MIB (RFC 1573) has a key table called the ifTable. Its index object is ifIndex, an integer. Minus the instance, the OID for a counter from that table is:

iso.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifInOctets

Or, numerically:

1.3.6.1.2.1.2.2.1.10

For the interface with ifIndex 7, the full OID is:

iso.internet.mgmt.mib-2.interfaces.ifTable.ifEntry.ifInOctets.7

1.3.6.1.2.1.2.2.1.10.7

Observe that row selection (instance) comes after column selection. This can be particularly confusing when you are applying the principle of lexical order to a table. Using the GetNext protocol operation to walk a table, you can proceed by column, that is, all instances for a column are returned before the next column is started.

Table indexes can be much more complex than tables. Here is an example from the Cisco VINES MIB. The INDEX clause from the ASN.1 definition is:

INDEX { cvForwNeighborHost,

　　　ifIndex,

　　　cvForwNeighborPhysAddress }

The first two indexes are simple integers, with ifIndex being imported from the standard ifTable. The final index is a variable length octet string. Including the integers is simple and obvious. The variable-length index object gets more complex. RFC 1212 includes rules for encoding variable length index objects as instances. The general rule is that the value is preceded by a length, and the length and each part of the value are separate subidentifiers.

So, for example, if we have neighbor host number 9, ifIndex 3, and an Ethernet neighbor physical address 0000.0c03.1ef0, the instance portion of an object for that row is 9.3.6.0.0.12.3.30.240.

In RFC 1902, SNMPv2 extends the instance encoding rules to include an "IMPLIED" keyword that can be used on the final instance object if it is variable length. When "IMPLIED" is present, the string instance cannot have a zero length in front of it.

Because lexical ordering for variable length instance objects effectively sorts them by length, your ASCII text index will not come out naturally in alphabetical order.

Information about Cisco Unified SRST SNMP MIB Support

To configure Cisco Unified SRST SNMP MIB support, you must understand the following concepts:

- Dependencies, page 23
- Restrictions, page 23
- Performance Impact, page 24
- Cisco IOS SNMP Agent in Cisco Unified SRST 4.0, page 24
- CISCO-SRST-MIB, page 25
- Cisco Unified SRST MIB Notifications/Traps, page 47

Dependencies

When using an Cisco Unified SRST router, you can get information regarding Ephones, Ephone-dns, and related statistics from the CCME MIB. For example:

- To retrieve the total number of SCCP phones registered (EphoneTotalRegistered) to the Cisco Unified SRST router, get the total number of SCCP registered from the CCME MIB.
- To retrieve the total number of SCCP call legs (EphoneCallLegs) accumulated on the Cisco Unified SRST router, get the total number of SCCP call legs from the CCME MIB.
- To monitor the SCCP phone activities, retrieve the ccmeEphoneActTable from the CCME MIB.

Restrictions

Be aware of the following design limitations when implementing the CISCO-SRST-MIB:

- Configuring objects is not provided through SNMP.
- No password or encrypted objects are provided.
- Objects that are not part of the CISCO-SRST-MIB are out of the scope of this MIB.
- SIP phone details that cannot be seen by underlying Cisco Unified SRST layers, such as the Ethernet address, are not provided.

Performance Impact

The performance characteristics of the SRST SNMP module vary significantly depending on how often bulk data is requested by the SNMP managers.

SNMP bulk data can consume significant CPU and DRAM resources, and even network bandwidth. We recommend that management stations are to minimize the statistical sampling intervals as much as possible. Even though CISCO-SRST-MIB objects are grouped to reduce the unnecessary bulk data that can be fetched at a burst, the Cisco IOS SNMP agent does not enforce the data volume or the frequency at which SNMP managers make requests to the SNMP agent.

To reduce performance impact, the Cisco Unified SRST gateway managers can use the traps provided by these MIBs by using asynchronous fault notification and traps to help isolate a fault.

There are few leaf objects, and they are light weighted and important (specified in active Group of the MIBs). They can be sampled at relatively short intervals, which would help gather the load on the CISCO-SRST-MIB components.

The Cisco IOS software supports SNMP versions 1, 2c, and 3 (SNMPv1, SNMPv2c, and SNMPv3). The Cisco Unified SRST MIB is compliant with SNMPv2c and SNMPv3.

External SNMP managers are required; they issue SNMP queries and also accept SNMP notifications and traps. The SNMP managers include tools, such as basic Scotty command line tools, HP-OpenView, SunNet managers, IBM Netview, Tivoli, NetIQ, and so on.

To provide complete monitoring solutions, the SNMP managers can interface with existing Cisco IOS MIBs that address individual components and build a "schema" (or view) that helps monitor objects that suit their configuration or needs. For Cisco Unified SRST related scenarios, the CISCO-VOICE-DIAL-CONTROL-MIB, various hardware interface MIBs, and the CISCO-CCM-MIB are available.

Cisco IOS SNMP Agent in Cisco Unified SRST 4.0

The Cisco Unified SRST 4.0 component of Cisco IOS Release 12.4(4)T and later releases is not capable of participating in network management using SNMP. The Cisco Unified SRST 4.0 effort is to make these components SNMP visible and provide necessary network management functions. This feature can be used in the deployed customer scenarios that use SNMP managers. The Cisco IOS SNMP Agent can provide the following functions for the Cisco Unified SRST modules:

- Generate notifications/traps for various functionality failures
- Provide objects that help monitor performance/load of some of the key features
- Provide detailed configurations for help in fault isolation.
- Provide the active registrations of IP phones and Session Initiation Protocol (SIP) phones
- Publish statistics on Ephone lines and SIP phone lines
- Provide ability to mask/unmask notification

Cisco Unified SRST 4.0 does not have product-specific network management capabilities. The Cisco Unified SRST MIB addresses SNMP Management Information Base (MIB) development for generating asynchronous exception notifications/traps, displaying configurations, and monitoring performance for IP telephony management purposes.

The Cisco Unified SRST feature provides emergency back up IP phone call capabilities, as shown in Figure 3.

Figure 3   *Cisco Unified SRST Router Deployment with Network Management Components*
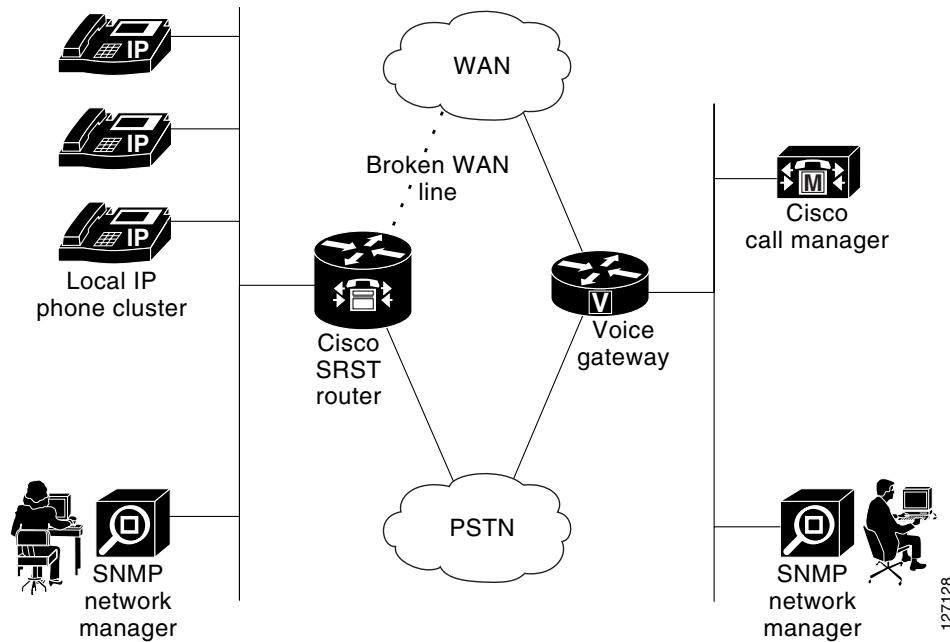
Cisco Unified SRST provides backup redundancy for broadband deployment of IP telephony to small branch offices. It can be used if Cisco Unified CallManager is no longer in service due to a loss of WAN connectivity. Cisco Unified SRST continues to provide basic call processing and IP telephony service to phones that fall back to Cisco Unified SRST.

The CISCO-SRST-MIB defines managed objects that pertain to Cisco Unified SRST, SIP Registrar, and SIP phones.

The CISCO-SRST-MIB has dependency on existing Cisco IOS MIBs, especially on the CISCO-CCME-MIB and the CISCO-VOICE-DIAL-CONTROL-MIB.

All of these MIBs are accessible from SNMP management software running on external SNMP managers.

CISCO-SRST-MIB

The CISCO-SRST-MIB enables you to display configurations and monitor and send traps and asynchronous notifications to the SNMP management applications.

The CISCO-SRST-MIB approach offers the following advantages over the CLI command approach:

- A more efficient use of network bandwidth
- Greater interoperability among vendors because standard SNMP protocols are used

This section contains the following topics:

Structure

The Structure of Management Information (SMI) is represented conceptually by a tree hierarchy. Branches along the tree have short text strings and integers to identify them. Text strings describe object names, and integers allow computer software to encode compact representations of the names.

The CISCO-SRST-MIB is part of the Cisco management group, which is part of private.enterprise.cisco.ciscoMgmt.

The CISCO-SRST-MIB structure is further divided into the following groups:

Cisco Unified SRST MIB Groups

ciscoSrstMIBNotifications

ciscoSrstMIBObjects

ciscoSrstMIBConformance

The CISCO-SRST-MIB structure further is divided into the following subgroups:

Cisco-SRST-MIB Object Groups

csrstConf

csrstNotifInfo

csrstSipConf

csrstActiveStats

csrstMIBNotifs

CISCO-SRST-MIB, which is uniquely identified by the number 441

Therefore the ciscoSrstMIB is1.3.6.1.4.1.9.9.441

Objects in the CISCO-SRST-MIB can be identified by either of the following methods.

- The object identifier is 1.3.6.1.4.1.9.9.441<SRST MIB-variable>
- The object name is iso(1).org(3).dod(6).internet(1).private(4).enterprise(1).cisco(9).ciscoMgmt(9) .ciscoSrstMIB(441).<MIB-variable>

Cisco-SRST-MIB in Internet MIB Hierarchy

Figure 4 shows the position of the CISCO-SRST-MIB in the Internet MIB hierarchy.

Figure 4   Cisco SRST MIB Hierarchy
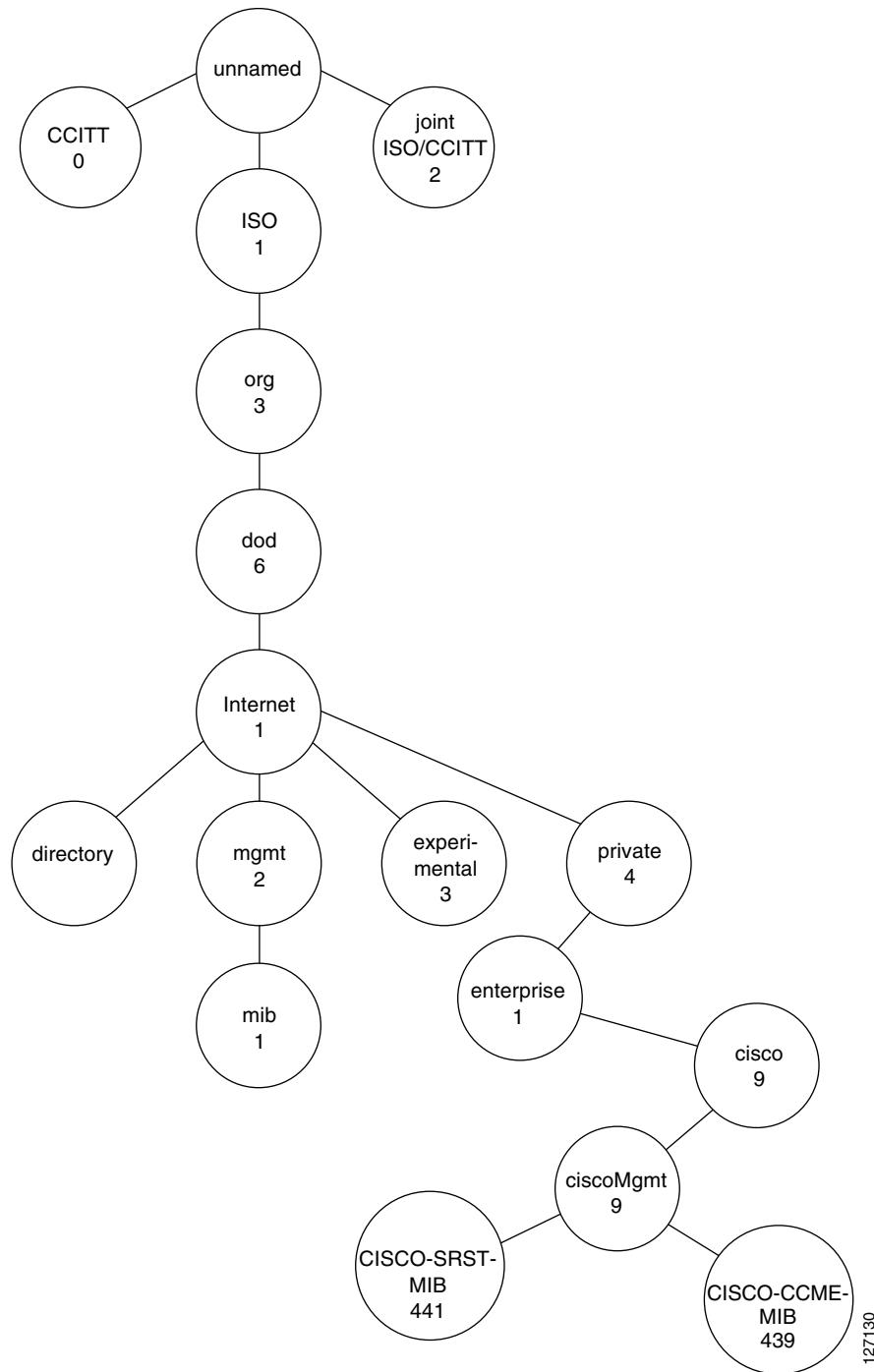
CISCO-SRST-MIB Features

The Cisco Unified SRST 4.0 features that are supported by the CISCO-SRST-MIB are:

- Cisco Unified SRST configuration
- Ephone registrations

- Ephone directory number (DN) (multiple lines per phone, multiple-line appearance per phone)
- Huntstop (alias, SIP number list, between DNs)
- Class of Restriction (COR)
- Translation Rule
- Music on Hold (MoH) (flash, multicast)
- Call-forward
- Phone number alias
- Voicemail number
- Dial-plan pattern
- User-locale information
- Secondary-dial tone
- Ringing timeout
- Date format
- Dual-line mode
- Customized system message
- Consultative call transfer
- Interactive Voice Response (IVR) Application

Cisco-SRST-MIB Object Groups

Table 2 lists the object groups provided in the CISCO-SRST-MIB, Table 3 lists the notifications/traps provided in the CISCO-SRST-MIB, Table 4 lists the CISCO-SRST-MIB objects, presented according to their group.

Table 2   Cisco Unified-SRST-MIB Object Groups

No.	Object Name	Comments
csrstConf		
1.	csrstEnabled	Indicates if SRST support is enabled or disabled. **Note** Supported for Cisco Unified SRST only. Not supported for Cisco Unified CME in SRST fallback mode.
2.	csrstVersion	Cisco Unified SRST version
3.	csrstIPAddressType	IP address type governing the address type format for objects in this MIB
4.	csrstIPAddress	IP address for the router to receive messages from IP phones
5.	csrstPortNumber	Indicates the TCP port number to use for SCCP and is range limited
6.	csrstMaxConferences	Maximum number of simultaneous three-party conference calls configured
7.	csrstMaxEphones	Maximum number of Cisco Unified IP phones configured on the Cisco Unified SRST router
8.	csrstMaxDN	Maximum number of IP phone extensions (Ephone-DNs) configured
9.	csrstSipPhoneUnRegThreshold	Indicates a threshold for the number of SIP phones unregistered to Cisco Unified SRST

Table 2   *Cisco Unified-SRST-MIB Object Groups (continued)*

No.	Object Name	Comments
10.	csrstCallFwdNoAnswer	Cisco Unified SRST call forwarding number when a Cisco Unified IP phone is not answered
11.	csrstCallFwdNoAnswerTo	Timeout, in seconds, if a Cisco Unified IP phone is not answered
12.	csrstCallFwdBusy	Cisco Unified SRST call forwarding number when a Cisco Unified IP phone is busy
13.	csrstMohFilename	Music-on-Hold is enabled or disabled
14.	csrstMohMulticastAddrType	Internet address type for the address type format for objects in this MIB
15.	csrstMohMulticastAddr	Indicates the Cisco Unified SRST Music-On-Hold multicast IP address
16.	csrstMohMulticastPort	Indicates Music-on-Hold multicast TCP port which is range limited
17.	csrstVoiceMailNumber	Voice mail number that is speed-dialed when the messages button is pressed
18.	csrstSystemMessagePrimary	System static text message displayed on Cisco Unified IP phone during fallback
19.	csrstSystemMessageSecondary	System message displayed on phones not supporting static text message
20.	csrstScriptName	SRST session-level IVR application script
21.	csrstSecondaryDialTone	SRST secondary dial tone digits
22.	csrstTransferSystem	SRST call transfer method using the ITU-T H.450.2 standard
23.	csrstUserLocaleInfo	SRST language for displays on Cisco Unified IP phone by country
24.	csrstDateFormat	Date display format on Cisco Unified IP phones in the Cisco Unified SRST system
25.	csrstTimeFormat	Time display format on Cisco Unified IP phones in the Cisco Unified SRST system
26.	csrstInterdigitTo	SRST interdigit timeout duration for Cisco Unified IP phones
27.	csrstBusyTo	Time before disconnect when destination is busy, without call-forwarding
28.	csrstAlertTo	Time before disconnect when call is not answered, without call-forwarding
29.	csrstXlateCalledNumber	Indicates the tag used to translate a called number on the Cisco Unified SRST router
30.	csrstXlateCallingNumber	Indicates the tag used to translate a calling number on the Cisco Unified SRST router
	csrstAliasTable	
31.	csrstAliasIndex	Table index
32.	csrstAliasTag	A number indicating an alias pattern configured on this Cisco Unified SRST router
33.	csrstAliasNumPattern	Indicates the pattern to match the incoming telephone number
34.	csrstAliasAltNumber	Alternate number to route incoming calls to match the number pattern
35.	csrstAliasPreference	Indicates the preference value of the associated dial-peer
36.	csrstAliasHuntStopEnabled	Hunt stops after trying the alternate number according to the alias pattern
	csrstAccessCodeTable	
37.	csrstAccessCodeType	Type of trunk line to which the access-code is applied

Table 2   *Cisco Unified-SRST-MIB Object Groups (continued)*

No.	Object Name	Comments
38.	csrstAccessCode	Access-code applied to the corresponding trunk line by creating dial-peers
39.	csrstAccessCodeDIDEnabled	Indicates the direct-inward-dial on a POTS dial-peer is enabled or disabled
	csrstLimitDNTable	
40.	csrstLimitDNType	Type of IP phone to which the limit-dn is applied
41.	csrstLimitDN	Maximum number of directory numbers available to each type of IP phone
42.	csrstNotificationEnabled	Indicates if this system produces the Cisco Unified SRST notifications
csrstNotifInfoGroup		
43.	csrstSysNotifSeverity	Severity of the alarm condition, for the most recent SNMP notification
44.	csrstSysNotifReason	Failure cause of the alarm condition for the most recent system notification
csrstActiveStats		
45.	csrstState	Current state of Cisco Unified SRST feature on this router
46.	csrstSipPhoneCurrentRegistered	Total number of SIP phones currently registered to the Cisco Unified SRST router
47.	csrstSipCallLegs	Total number of SIP call legs through the Cisco Unified SRST router since activation
48.	csrstTotalUpTime	Total number of minutes that router is active in SRST mode
csrstSipConf		
49.	csrstSipRegSrvExpMax	Max expiration time for the SIP registrar server to time out on a registration
50.	csrstSipRegSrvExpMin	Min. expiration time for the SIP registrar server to time out on a registration
51.	csrstSipIp2IpGlobalEnabled	Indicates if VoIP calls are redirected IP to IP globally
52.	csrstSipSend300MultSupport	Indicates if the redirect contact order is best or longest match
	csrstSipVoRegPoolTable	
53.	csrstSipVoRegPoolTag	Identifier tag configured for a voice register pool entry
54.	csrstSipNetId	Network identification information of the SIP voice register pool
55.	csrstSipVoRegPoolIpAddrType	IP address type for the address format of InetAddress objects in this MIB
56.	csrstSipNetMask	IP subnet configured for the SIP voice register pool
57.	csrstSipProxySrvIpAddr	IP address of the proxy server configured for the SIP voice register pool
58.	csrstSipProxySrvPref	Preference order for creating the VoIP dial-peers in the voice register pool
59.	csrstSipProxySrvMonitor	Configured proxy server monitoring protocol for the SIP voice register pool
60.	csrstSipProxySrvAltIpAddr	Alternate IP address monitored other than the proxy configured
61.	csrstSipDefaultPreference	Default preference of the proxy dial-peers created in the voice register pool
62.	csrstSipVoRegPoolAppl	Application for the SIP dial-peers configured under voice register pool
	csrstSipVoRegNumberListTable	
63.	csrstSipVoRegNumberListIndex	Table index
64.	csrstSipVoRegNumberListTag	Index of the number list configured for the voice register pool
65.	csrstSipVoRegNumberPattern	Number pattern the registrar permits to handle the register message
66.	csrstSipVoRegNumberPref	Number pattern preference configured for the voice register pool

Table 2   Cisco Unified-SRST-MIB Object Groups (continued)

No.	Object Name	Comments
67.	csrstSipVoRegNumberHuntstopEnabled	Huntstop for the number pattern configured for the voice register pool
	csrstSipEndpointTable	
68.	csrstSipEndpointTag	Number that indicates a SIP endpoint configured on this Cisco Unified SRST router
69.	csrstSipVoRegPoolEdptTag	Voice register pool tag from which the SIP endpoint (dial-peer) is created
70.	csrstSipEndpointIpAddrType	IP address for the address type for InetAddress objects in this MIB
71.	csrstSipEndpointIpAddress	SIP endpoint IP address configured on this router
72.	csrstSipEndpointDN	SIP phone's DN or line number assigned to the SIP endpoint

Table 3   CISCO-SRST-MIB Summary List of Notifications/Traps

No.	Object Name	Comments
73.	csrstStateChange	A Cisco Unified SRST up or down state change notification is generated.
74.	csrstFailNotif	Failure notification generated for a catastrophic failure.
75.	csrstSipPhoneUnRegThresholdExceed	Notification generated when the unregistration threshold is exceeded.
76.	csrstSipPhoneRegFailed	Notification generated when the SIP phone fails to register.
77.	csrstConferenceFailed	Notification generated when maximum number of conferences is exceeded.

The CISCO-SRST-MIB is organized by the following groups listed in Table 4

- csrstConf
- csrstNotifInfo
- csrstActiveStats
- csrstSipConf
- CiscoSrstMIBNotifs

Table 4   SRST MIB Objects by Group and with Descriptions

MIB Group	MIB Object	Max Access	Description
csrstConfGroup			
	csrstEnabled	read-only	Cisco Unified SRST support is enabled or disabled. When enabled, the router is in fallback mode to provide call-handling support to IP phones. If disabled, all of the objects in this group have no significance. **Note** Supported for Cisco Unified SRST only. Not supported for Cisco Unified CME in SRST fallback mode.
	csrstVersion	read-only	Cisco Unified SRST version.

Table 4   *SRST MIB Objects by Group and with Descriptions (continued)*

MIB Group	MIB Object	Max Access	Description
	csrstIPAddressType	read-only	Internet address type governing the address type format for one or more InetAddress objects in this MIB. The associated InetAddress objects' description will refer back to this type object as appropriate.
	csrstIPAddress	read-only	Cisco Unified SRST IP address for the router to receive messages from IP phones, typically one of the addresses of an Ethernet port of the router. The type of IP address used here is indicated by the csrstSysIPAddressType object.
	csrstPortNumber	read-only	This object indicates the TCP port number to use for Skinny Client Control Protocol (SCCP) and is range limited. This port also indicates through which IP phones communicate with Cisco Unified SRST.
	csrstMaxConferences	read-only	Maximum number of simultaneous three-party conference calls configured on the router. Range is Cisco IOS release and platform dependent. With Cisco SRST Version 3.0 and later, the following are the maximum values for each platform - Cisco 1751, Cisco 1760, Cisco 2600, Cisco 3640 - 8 conferences. Cisco 3660, Cisco 3725, Cisco 3745 - 16 conferences. Default is half the maximum number of simultaneous three-party conferences for each platform.
	csrstMaxEphones	read-only	Maximum number of Cisco Unified IP phones configured on the Cisco Unified SRST router. Range is IOS version and platform dependent.
	csrstMaxDN	read-only	Maximum number of IP phones extensions (Ephone-dns) or directory number configured on this Cisco Unified SRST router. Range is IOS version and platform dependent. Default is 0." -- This object is changeable by NMS to set a threshold -- for a trap to be reported. This refers to SIP phones -- only.
	csrstSipPhoneUnRegThreshold	read-write	This object indicates a threshold for the number of SIP phones unregistered to Cisco Unified SRST. This threshold is changeable by the NMS user.
	csrstCallFwdNoAnswer	read-only	Cisco Unified SRST call forwarding number when a Cisco Unified IP phone is not answered. This directory number is a fully qualified E.164 number.
	csrstCallFwdNoAnswerTo	read-only	Timeout in seconds if a Cisco Unified IP phone is not answered, Cisco Unified SRST will call forward to another directory number.

Table 4   *SRST MIB Objects by Group and with Descriptions (continued)*

MIB Group	MIB Object	Max Access	Description
	csrstCallFwdBusy	read-only	Cisco Unified SRST call forwarding number when a Cisco Unified IP phone is busy. This directory number is a fully qualified E.164 number.
	csrstMohFilename	read-only	Cisco Unified SRST Music-On-Hold is enabled with file on flash, or disabled without a file on flash. MOH is enabled by default.
	csrstMohMulticastAddrType	read-only	Internet address type governing the address type format for one or more InetAddress objects in this MIB. The associated InetAddress objects' description will refer back to this type object as appropriate.
	csrstMohMulticastAddr	read-only	This object indicates Cisco Unified SRST Music-On-Hold Multicast IP address. When configured, this feature enables continuous IP multicast output of MOH from a Flash MOH file. This object has no significance if MOH is not configured. Default is the csrstIPAddress object for Cisco Unified SRST. The type of IP address used here is indicated by the csrstMohMulticastAddrType object.
	csrstMohMulticastPort	read-only	This object indicates Cisco Unified SRST Music-On-Hold Multicast TCP port which is range limited When configured, this feature enables
	csrstVoiceMailNumber	read-only	Cisco Unified SRST voice mail number that is speed-dialed when the messages button on a Cisco Unified IP phone is pressed. This voice mail number is a fully qualified E.164 number. If voice-mail number is not configured, this object will have a string length of 2 with the value '**'.
	csrstSystemMessagePrimary	read-only	Cisco Unified SRST system static text message that is displayed on Cisco Unified IP phone during fallback. Length of text string is less than 32 characters. Default message is 'CM Fallback Service Operating'.
	csrstSystemMessageSecondary	read-only	Cisco Unified SRST system message that is displayed on Cisco Unified IP phone that does not support static text message and have a limited display space during fallback. Length of text string is less than 20 characters. Default messages is 'CM Fallback Service'.
	csrstScriptName	read-only	Cisco Unified SRST session-level IVR application script. This application can be written in Tool Command Language (TCL) and is applied to all Cisco Unified IP phone lines served by the Cisco Unified SRST router. If no application script name is configured, the default built-in IOS application will be applied to all phone lines served by the Cisco Unified SRST router and this object will be a zero-length string.

Table 4 **SRST MIB Objects by Group and with Descriptions (continued)**

MIB Group	MIB Object	Max Access	Description
	csrstSecondaryDialTone	read-only	Cisco Unified SRST secondary dial tone digits. When a Cisco Unified IP phone user dials a PSTN access prefix, defined by the secondary dial tone digits, the secondary dial tone is enabled.
	csrstTransferSystem	read-only	Cisco Unified SRST call transfer method using the ITU-T H.450.2 standard. Default setting is blind. blind (1), fullBlind (2), fullConsult (3), localConsult (4) blind - Calls are transferred without consultation using a single phone line and the Cisco proprietary method. fullBlind - Calls are transferred without consultation using H.450.2 standard methods. fullConsult - Calls are transferred using H.450.2 with consultation using the second phone line if available, or the calls fall back to full-blind if the second line is unavailable. localConsult - Calls are transferred with local consultation using the second phone line if available, or the calls fall back to blind for non- local consultation or transfer target. This mode is intended for use primarily in Voice over Frame Relay (VoFR) networks.
	csrstUserLocaleInfo	read-only	Cisco Unified SRST language for displays on Cisco Unified IP phone by country. denmark (1), france (2), germany (3), italy (4), netherlands (5), norway (6), portugal (7), russian (8), spain (9), sweden (10), us (11) - default

Table 4   *SRST MIB Objects by Group and with Descriptions (continued)*

MIB Group	MIB Object	Max Access	Description
	csrstDateFormat	read-only	Date display format on Cisco Unified IP phones in the Cisco Unified SRST system. mmddyy (1) - default, ddmmyy (2), yyddmm (3) yymmdd (4)
	csrstTimeFormat	read-only	Time display format on Cisco Unified IP phones in the Cisco Unified SRST system. twelveHour (1) - default, twentyFourHour (2)
	csrstInterdigitTo	read-only	Cisco Unified SRST interdigit timeout duration in seconds for Cisco Unified IP phones.
	csrstBusyTo	read-only	Cisco Unified SRST time in seconds before disconnect when destination is busy, without call-forwarding.
	csrstAlertTo	read-only	Cisco Unified SRST time in seconds before disconnect when call is not answered, without call-forwarding.
	csrstXlateCalledNumber	read-only	This object indicates the tag of a corresponding translation rule, which utilizes the number-translation mechanism of the IOS to translate a called number on the Cisco Unified SRST router.
	csrstXlateCallingNumber	read-only	This object indicates the tag of a corresponding translation rule, which utilizes the number-translation mechanism of the IOS to translate a calling number on the Cisco Unified SRST router.
	csrstAliasTag	read-only	A unique sequence number that indicates a particular alias pattern configured on this Cisco Unified SRST router.
	csrstAliasNumPattern	read-only	This object indicates the pattern to match the incoming telephone number. It may include wildcards.
	csrstAliasAltNumber	read-only	This object indicates the alternate telephone phone number to route incoming calls to match the number pattern. This has to be a valid extension for an IP phone actively registered on the Cisco Unified SRST router.
	csrstAliasPreference	read-only	This object indicates the preference value of the associated dial-peer. A value of 0 has the highest preference.
	csrstAliasHuntStopEnabled	read-only	This object specifies that if hunt stop is enabled, after the caller tried the alternate number according to the alias pattern, it will stop call hunting. If hunt stop is disabled, it will rollover to another directory number if available.

Table 4 **SRST MIB Objects by Group and with Descriptions (continued)**

MIB Group	MIB Object	Max Access	Description
	csrstAccessCodeType	read-only	This object indicates the type of trunk line to which the access-code is applied to. fxo (1), em (2), bri (3), pri (4) The type of trunk lines can be fxo, e&m, bri, and pri. fxo - Enables a foreign exchange office (FXO) interface. em - Enables an analog ear and mouth (E&M) interface. bri - Enables a BRI interface. pri - Enables a PRI interface.
	csrstAccessCode	read-only	This object indicates the access-code to be applied to the corresponding trunk line by creating dial-peers.
	csrstAccessCodeDIDEnabled	read-only	This object indicates the direct-inward- dial on a POTS dial-peer is enabled or disabled.
	csrstLimitDNType	read-only	This object indicates the type of IP phone to which the limit-dn is applied to. ipPhone7910 (1), ipPhone7935 (2), ipPhone7940 (3), ipPhone7960 (4), ipPhone7970 (5), ipPhone7936 (6)
	csrstLimitDN	read-only	This object indicates the maximum number of directory numbers available to each type of IP phone. The current range of maximum lines setting is from 1 to 34. The default is 6.
	csrstNotificationEnabled	read-write	This variable indicates whether this system produces the SRST notifications. A false value will prevent SRST notifications from being generated by this system.
csrstNotifInfoGroup			

Table 4　　　**SRST MIB Objects by Group and with Descriptions (continued)**

MIB Group	MIB Object	Max Access	Description
	csrstSysNotifSeverity	accessible-for-notify	The internally-defined severity of the particular alarm condition, associated with the most recent SNMP notification. A subsequent event in which the alarm condition changes from its failed state back to a 'normal' state has a severity of 'clear'. This severity-level value is supplied with each Cisco Unified SRST specific notification.
	csrstSysNotifReason	accessible-for-notify	The internally-defined failure cause of the particular alarm condition, associated with the most recent system notification.
csrstActiveStatsGroup			
	csrstState	read-only	This object indicates the current state of Cisco Unified SRST feature on this router. Active - At least one IP or SIP phone is registered Inactive - Cisco Unified SRST has no IP or SIP phones registered This object has no significance if csrstEnabled object is disabled.
	csrstSipPhoneCurrentRegistered	read-only	Total number of SIP phones currently registered to the Cisco Unified SRST router.
	csrstSipCallLegs	read-only	Total number of SIP call legs routed through the Cisco Unified SRST router since going active. This includes incoming and outgoing calls.
	csrstTotalUpTime	read-only	Accumulated total number of minutes that router is active in SRST mode.
csrstSipConfGroup			
	csrstSipRegSrvExpMax	read-only	This object indicates the maximum expiration time for the SIP Registrar Server to timeout on a registration.
	csrstSipRegSrvExpMin	read-only	This object indicates the minimum expiration time for the SIP Registrar Server to timeout on a registration.
	csrstSipIp2IpGlobalEnabled	read-only	This object indicates whether voip calls are re-directed IP to IP globally.
	csrstSipSend300MultSupport	read-only	This object indicates whether the redirect contact order is best or longest match. This applies globally for SIP. bestMatch (1), longestMatch (2) bestMatch - Uses the current system configuration to set the order of contacts. longestMatch - Sets the contact order by using the destination pattern longest match first, and then the second longest match, the third longest match, etc.

Table 4 **SRST MIB Objects by Group and with Descriptions (continued)**

MIB Group	MIB Object	Max Access	Description
	csrstSipVoRegPoolTag	not-accessible	A unique identifier tag configured for a voice register pool entry.
	csrstSipNetId	read-only	This object indicates the network identification information of the SIP voice register pool configured on this router. This object can be the network Id, IP address, or MAC address.
	csrstSipVoRegPoolIpAddrType	read-only	Internet address type governing the address type format for one or more InetAddress objects in this MIB. The associated InetAddress objects' description will refer back to this type object as appropriate.
	csrstSipNetMask	read-only	This object indicates the IP subnet configured for the SIP voice register pool. The type of IP subnet used here is indicated by the csrstSipVoRegPoolIpAddrType object.
	csrstSipProxySrvIpAddr	read-only	This object indicates the IP address of the proxy server configured for the SIP voice register pool. The type of IP address used here is indicated by the csrstSipVoRegPoolIpAddrType object.
	csrstSipProxySrvPref	read-only	This object indicates the preference order for creating the VoIP dial peers in the voice register pool. Setting the preference enables the desired dial peer to be selected when multiple dial peers within a hunt group are matched for a dial string. A value of 0 has the highest preference.
	csrstSipProxySrvMonitor	read-only	Cisco Unified SIP SRST monitoring protocol of the proxy server configured for the SIP voice register pool. This monitoring protocol can be ICMP ping or RTR probes. icmp (1), rtr (2)
	csrstSipProxySrvAltIpAddr	read-only	Cisco Unified SIP SRST monitoring of an alternate IP address other than the proxy configured for the SIP voice register pool. The type of IP address used here is indicated by the csrstSipVoRegPoolIpAddrType object.
	csrstSipDefaultPreference	read-only	This object indicates the default preference of the proxy dial-peers created in the voice register pool If csrstSipProxySrvPref object is not set, the default preference is applied to the dial-peers created. A value of 0 has the highest preference.
	csrstSipVoRegPoolAppl	read-only	Application for the SIP dial-peers configured under voice register pool.

Table 4　　　　*SRST MIB Objects by Group and with Descriptions (continued)*

MIB Group	MIB Object	Max Access	Description
	csrstSipVoRegNumberListTag	read-only	This object indicates the particular index of the number list configured for the corresponding voice register pool.
	csrstSipVoRegNumberPattern	read-only	This object indicates the number pattern that the registrar permits to handle the register message from the SIP phone. This number pattern is a fully qualified E.164 number.
	csrstSipVoRegNumberPref	read-only	This object indicates the preference of the number pattern configured for the corresponding voice register pool.
	csrstSipVoRegNumberHuntstopEnabled	read-only	This object indicates huntstop is enabled (true) or disabled (false) for the number pattern configured for the corresponding voice register pool. If enabled, the incoming call will stop hunting if the dial-peer is busy. If disabled, the incoming call will hunt further for dial-peers.
	csrstSipEndpointTag	not-accessible	This object is a number that indicates a SIP endpoint configured on this Cisco Unified SRST router
	csrstSipVoRegPoolEdptTag	read-only	This object indicates the voice register pool tag from which the corresponding SIP endpoint (dial-peer) is created.
	csrstSipEndpointIpAddrType	read-only	Internet address type governing the address type format for one or more InetAddress objects in this MIB. The associated InetAddress objects' description will refer back to this type object as appropriate.
	csrstSipEndpointIpAddress	read-only	This object indicates the SIP endpoint IP address configured on this router. The type of IP address used here is indicated by the csrstSipEndpointIpAddrType object.
	csrstSipEndpointDN	read-only	This object indicates the SIP phone's DN or line number assigned to the SIP endpoint.
csrstActiveStatsGroup			
	csrstSipVoRegNumberListTag	read-only	This object indicates the particular index of the number list configured for the corresponding voice register pool.
	csrstState	read-only	This object indicates the current state of Cisco Unified SRST feature on this router. Active - At least one IP or SIP phone is registered Inactive - Cisco Unified SRST has no IP or SIP phones registered
	csrstSipPhoneCurrentRegistered	read-only	Total number of SIP phones currently registered to the Cisco Unified SRST router.

Table 4   SRST MIB Objects by Group and with Descriptions (continued)

MIB Group	MIB Object	Max Access	Description
	csrstSipCallLegs	read-only	Total number of SIP call legs routed through the Cisco Unified SRST router since going active. This includes incoming and outgoing calls.
	csrstTotalUpTime	read-only	Accumulated total number of minutes that router is active in SRST mode.
csrstMIBNotifsGroup			
	csrstStateChange	notification	An SRST up or down state change notification is generated. This indicates one or more phones is registered to the Cisco Unified SRST router or none is registered. csrstSysNotifSeverity csrstState csrstSysNotifReason
	csrstFailNotif	notification	A failure notification is generated when the Cisco Unified SRST router encounters a catastrophic failure.
	csrstSipPhoneUnRegThresholdExceed	notification	A SIP phone unregistration notification is generated when the number of SIP phone unregistrations have exceeded the threshold. The number of currently registered SIP phones is provided here by csrstSipPhoneCurrentRegistered object as a reference such that if csrstSipPhoneCurrentRegistered falls below csrstSipPhoneUnRegThreshold, a notification will be generated to indicate that the number of unregistered SIP phones has crossed the threshold. csrstSipPhoneUnRegThreshold csrstSipPhoneCurrentRegistered
	csrstSipPhoneRegFailed	notification	A SIP phone fail registration notification is generated when the SIP phone fails to register. csrstSipEndpointIpAddress
	csrstConferenceFailed	notification	A conference failure notification is generated when the maximum number of conferences are exceeded. csrstMaxConferences

Objects for Cisco Unified CME MIB and Cisco Unified SRST MIB

The following objects are common to both the Cisco Unified CME and Cisco Unified SRST MIBs:

- ccmeEphoneUnRegistrationThreshold
- ccmeEphoneTot
- ccmeEphoneTotalRegistered
- ccmeEphoneCallLegs

Cisco-SRST-MIB Object Mappings

Table 5 lists the CISCO-SRST-MIB OID mappings.

Table 5   *Cisco-SRST-MIB OID Mappings*

Object Name	Object ID
ciscoMgmt	1.3.6.1.4.1.9.9
ciscoSrstMIB	1.3.6.1.4.1.9.9.441
ciscoSrstMIBNotifications	1.3.6.1.4.1.9.9.441.**0**
csrstStateChange	1.3.6.1.4.1.9.9.441.0.1
csrstFailNotif	1.3.6.1.4.1.9.9.441.0.2
csrstSipPhoneUnRegThresholdExceed	1.3.6.1.4.1.9.9.441.0.3
csrstSipPhoneRegFailed	1.3.6.1.4.1.9.9.441.0.4
csrstConferenceFailed	1.3.6.1.4.1.9.9.441.0.5
ciscoSrstMIBObjects	1.3.6.1.4.1.9.9.441.**1**
csrstGlobal	1.3.6.1.4.1.9.9.441.1.1
csrstConf	1.3.6.1.4.1.9.9.441.1.2
csrstEnabled	1.3.6.1.4.1.9.9.441.1.2.1
csrstVersion	1.3.6.1.4.1.9.9.441.1.2.2
csrstIPAddressType	1.3.6.1.4.1.9.9.441.1.2.3
csrstIPAddress	1.3.6.1.4.1.9.9.441.1.2.4
csrstPortNumber	1.3.6.1.4.1.9.9.441.1.2.5
csrstMaxConferences	1.3.6.1.4.1.9.9.441.1.2.6
csrstMaxEphones	1.3.6.1.4.1.9.9.441.1.2.7
csrstMaxDN	1.3.6.1.4.1.9.9.441.1.2.8
csrstSipPhoneUnRegThreshold	1.3.6.1.4.1.9.9.441.1.2.9
csrstCallFwdNoAnswer	1.3.6.1.4.1.9.9.441.1.2.10
csrstCallFwdNoAnswerTo	1.3.6.1.4.1.9.9.441.1.2.11
csrstCallFwdBusy	1.3.6.1.4.1.9.9.441.1.2.12
csrstMohFilename	1.3.6.1.4.1.9.9.441.1.2.13
csrstMohMulticastAddrType	1.3.6.1.4.1.9.9.441.1.2.14
csrstMohMulticastAddr	1.3.6.1.4.1.9.9.441.1.2.15
csrstMohMulticastPort	1.3.6.1.4.1.9.9.441.1.2.16
csrstVoiceMailNumber	1.3.6.1.4.1.9.9.441.1.2.17
csrstSystemMessagePrimary	1.3.6.1.4.1.9.9.441.1.2.18
csrstSystemMessageSecondary	1.3.6.1.4.1.9.9.441.1.2.19
csrstScriptName	1.3.6.1.4.1.9.9.441.1.2.20
csrstSecondaryDialTone	1.3.6.1.4.1.9.9.441.1.2.21
csrstTransferSystem	1.3.6.1.4.1.9.9.441.1.2.22

Table 5   *Cisco-SRST-MIB OID Mappings (continued)*

Object Name	Object ID
csrstUserLocaleInfo	1.3.6.1.4.1.9.9.441.1.2.23
csrstDateFormat	1.3.6.1.4.1.9.9.441.1.2.24
csrstTimeFormat	1.3.6.1.4.1.9.9.441.1.2.25
csrstInterdigitTo	1.3.6.1.4.1.9.9.441.1.2.26
csrstBusyTo	1.3.6.1.4.1.9.9.441.1.2.27
csrstAlertTo	1.3.6.1.4.1.9.9.441.1.2.28
csrstXlateCalledNumber	1.3.6.1.4.1.9.9.441.1.2.29
csrstXlateCallingNumber	1.3.6.1.4.1.9.9.441.1.2.30
csrstAlias**Table**	1.3.6.1.4.1.9.9.441.1.2.31
csrstAliasEntry	1.3.6.1.4.1.9.9.441.1.2.31.1
csrstAliasIndex	1.3.6.1.4.1.9.9.441.1.2.31.1.1
csrstAliasTag	1.3.6.1.4.1.9.9.441.1.2.31.1.2
csrstAliasNumPattern	1.3.6.1.4.1.9.9.441.1.2.31.1.3
csrstAliasAltNumber	1.3.6.1.4.1.9.9.441.1.2.31.1.4
csrstAliasPreference	1.3.6.1.4.1.9.9.441.1.2.31.1.5
csrstAliasHuntStopEnabled	1.3.6.1.4.1.9.9.441.1.2.31.1.6
csrstAccessCode**Table**	1.3.6.1.4.1.9.9.441.1.2.32
csrstAccessCodeEntry	1.3.6.1.4.1.9.9.441.1.2.32.1
csrstAccessCodeType	1.3.6.1.4.1.9.9.441.1.2.32.1.1
csrstAccessCode	1.3.6.1.4.1.9.9.441.1.2.32.1.2
csrstAccessCodeDIDEnabled	1.3.6.1.4.1.9.9.441.1.2.32.1.3
csrstLimitDN**Table**	1.3.6.1.4.1.9.9.441.1.2.33
csrstLimitDNEntry	1.3.6.1.4.1.9.9.441.1.2.33.1
csrstLimitDNType	1.3.6.1.4.1.9.9.441.1.2.33.1.1
csrstLimitDN	1.3.6.1.4.1.9.9.441.1.2.33.1.2
csrstNotificationEnabled	1.3.6.1.4.1.9.9.441.1.2.34
csrstActiveStats	1.3.6.1.4.1.9.9.441.1.**3**
csrstState	1.3.6.1.4.1.9.9.441.1.3.1
csrstSipPhoneCurrentRegistered	1.3.6.1.4.1.9.9.441.1.3.2
csrstSipCallLegs	1.3.6.1.4.1.9.9.441.1.3.3
csrstTotalUpTime	1.3.6.1.4.1.9.9.441.1.3.4
csrstSipConf	1.3.6.1.4.1.9.9.441.1.**4**
csrstSipRegSrvExpMax	1.3.6.1.4.1.9.9.441.1.4.1
csrstSipRegSrvExpMin	1.3.6.1.4.1.9.9.441.1.4.2
csrstSipIp2IpGlobalEnabled	1.3.6.1.4.1.9.9.441.1.4.3
csrstSipSend300MultSupport	1.3.6.1.4.1.9.9.441.1.4.4

Table 5   Cisco-SRST-MIB OID Mappings (continued)

Object Name	Object ID
csrstSipVoRegPool**Table**	1.3.6.1.4.1.9.9.441.1.4.5
csrstSipVoRegPoolEntry	1.3.6.1.4.1.9.9.441.1.4.5.1
csrstSipVoRegPoolTag	1.3.6.1.4.1.9.9.441.1.4.5.1.1
csrstSipNetId	1.3.6.1.4.1.9.9.441.1.4.5.1.2
csrstSipVoRegPoolIpAddrType	1.3.6.1.4.1.9.9.441.1.4.5.1.3
csrstSipNetMask	1.3.6.1.4.1.9.9.441.1.4.5.1.4
csrstSipProxySrvIpAddr	1.3.6.1.4.1.9.9.441.1.4.5.1.5
csrstSipProxySrvPref	1.3.6.1.4.1.9.9.441.1.4.5.1.6
csrstSipProxySrvMonitor	1.3.6.1.4.1.9.9.441.1.4.5.1.7
csrstSipProxySrvAltIpAddr	1.3.6.1.4.1.9.9.441.1.4.5.1.8
csrstSipDefaultPreference	1.3.6.1.4.1.9.9.441.1.4.5.1.9
csrstSipVoRegPoolAppl	1.3.6.1.4.1.9.9.441.1.4.5.1.10
csrstSipVoRegNumberList**Table**	1.3.6.1.4.1.9.9.441.1.4.6
csrstSipVoRegNumberListEntry	1.3.6.1.4.1.9.9.441.1.4.6.1
csrstSipVoRegNumberListIndex	1.3.6.1.4.1.9.9.441.1.4.6.1.1
csrstSipVoRegNumberListTag	1.3.6.1.4.1.9.9.441.1.4.6.1.2
csrstSipVoRegNumberPattern	1.3.6.1.4.1.9.9.441.1.4.6.1.3
csrstSipVoRegNumberPref	1.3.6.1.4.1.9.9.441.1.4.6.1.4
csrstSipVoRegNumberHuntstopEnabled	1.3.6.1.4.1.9.9.441.1.4.6.1.5
csrstSipEndpoint**Table**	1.3.6.1.4.1.9.9.441.1.4.7
csrstSipEndpointEntry	1.3.6.1.4.1.9.9.441.1.4.7.1
csrstSipEndpointTag	1.3.6.1.4.1.9.9.441.1.4.7.1.1
csrstSipVoRegPoolEdptTag	1.3.6.1.4.1.9.9.441.1.4.7.1.2
csrstSipEndpointIpAddrType	1.3.6.1.4.1.9.9.441.1.4.7.1.3
csrstSipEndpointIpAddress	1.3.6.1.4.1.9.9.441.1.4.7.1.4
csrstSipEndpointDN	1.3.6.1.4.1.9.9.441.1.4.7.1.5
ciscoSrstMIBConformance	1.3.6.1.4.1.9.9.441.**2**
ciscoSrstMIBCompliances	1.3.6.1.4.1.9.9.441.2.**1**
ciscoSrstMIBCompliance	1.3.6.1.4.1.9.9.441.2.1.1
ciscoSrstMIBGroups	1.3.6.1.4.1.9.9.441.2.**2**
csrstConfGroup	1.3.6.1.4.1.9.9.441.2.2.1
csrstNotifInfoGroup	1.3.6.1.4.1.9.9.441.2.2.2
csrstSysNotifSeverity	1.3.6.1.4.1.9.9.441.2.2.2.1
csrstSysNotifReason	1.3.6.1.4.1.9.9.441.2.2.2.2
csrstActiveStatsGroup	1.3.6.1.4.1.9.9.441.2.2.3

Table 5   Cisco-SRST-MIB OID Mappings (continued)

Object Name	Object ID
csrstSipConfGroup	1.3.6.1.4.1.9.9.441.2.2.4
csrstMIBNotifsGroup	1.3.6.1.4.1.9.9.441.2.2.5

Cisco Unified SRST MIB Tables

The following tables are common to both the Cisco Unified CME and Cisco Unified SRST MIBs:

- ccmeCorConfTable
- ccmeDialplanPatternTable
- ccmeTransferPatternTable
- ccmeEphoneBtnDNAssocConfTable
- ccmeEphoneActTable
- ccmeEphoneDnChStatsHistoryTable
- ccmeEphoneConfTable

Table 6 lists all the tables that are common to both the Cisco Unified CME and Cisco Unified SRST MIBs.

Table 6   Common Tables or Elements for the Cisco Unified CME and Cisco Unified SRST MIBs

Common Table or Element	Table or Element	Scope of Objects
Common COR table	COR table	
This Cisco Unified SRST COR feature is in the common COR table with scope set for srstSccp	ccmeCorTableIndex	ccme, srst-sccp, and srst-sip mode
	ccmeCorTag	ccme, srst-sccp, and srst-sip mode
	ccmeCorListName	ccme, srst-sccp, and srst-sip mode
	ccmeCorScope	ccme, srst-sccp, and srst-sip mode
	ccmeCorDirection	srst-sccp and srst-sip
	ccmeCorStartingNumber	srst-sccp and srst-sip
	ccmeCorEndingNumber	Srst-sccp and srst-sip
	ccmeCorVoiceRegPoolNumber	Applies only to srst-sip mode
	ccmeCorListDefaultEnabled	srst-sccp and srst-sip
Common Dial Plan table	Dial Plan table	
This Cisco Unified SRST dial plan feature is in the common Dial Plan table		
	ccmeDialplanPatternTag	ccme and srst mode
	ccmeDialplanPattern	ccme and srst mode
	ccmeDialplanExtLength	ccme and srst mode
	ccmeDialplanExtPattern	ccme and srst mode

Table 6   Common Tables or Elements for the Cisco Unified CME and Cisco Unified SRST MIBs (continued)

Common Table or Element	Table or Element	Scope of Objects
	ccmeDialplanAllowRegiEnabled	ccme and srst mode
Common Transfer Plan table	Transfer Plan table	
This Cisco Unified SRST Transfer plan feature is in the common Transfer Plan table		
	ccmeTransferPattern	ccme and srst mode
	ccmeTransferPatternType	ccme and srst mode
Common ccmeEphoneConfTable	ccmeEphoneConfTable	
	ccmeEphoneTag	ccme and srst mode
	ccmeEphoneIpAddressType	ccme and srst mode
	ccmeEphoneIpAddress	ccme and srst mode
	ccmeEphoneMacAddress	ccme and srst mode
	ccmeEphoneModel	ccme
	ccmeEphoneUsername	ccme
	ccmeEphoneKeepAlive	ccme
	ccmeEphoneAutoLineOut	ccme
	ccmeEphonePagingDn	ccme
	ccmeEphoneAddon	ccme
	ccmeEphoneTemplate	ccme
	ccmeEphonePagingPolicy	ccme
	ccmeEphoneKeyPhone	ccme
	ccmeEphoneAutoLineInEnabled	ccme
	ccmeEphoneAftHrsBlkExmptEnabled	ccme
	ccmeEphoneNightBellSvcEnabled	ccme
	ccmeEphoneKeepConfEnabled	ccme
Common ccmeEphoneButton Association tables		
	ccmeEphoneBtnDNAssocConfTable	
	ccmeEphoneButtonNumber	ccme and srst mode
	ccmeEphoneOverlayDN	ccme and srst mode
Common Ephone active table		
Implemented in CCME MIB—-this table is for displaying activities of Ephones	ccmeEphoneActTable	Common Ephone active table contents apply to ccme and srst mode

Table 6   *Common Tables or Elements for the Cisco Unified CME and Cisco Unified SRST MIBs (continued)*

Common Table or Element	Table or Element	Scope of Objects
	ccmeEphoneDevicename	
	ccmeEphoneRegState	
	ccmeEphoneActiveDN	
	ccmeEphoneActivityStatus	
	ccmeEphoneKeepAliveCnt	
	ccmeEphonePendingReset	
	ccmeEphoneRegTime	
	ccmeEphoneCurrentFirmwareRev	
	ccmeEphonePreviousFirmwareRev	
	ccmeEphoneLastError	
	ccmeEphoneObservedType	
	ccmeEphoneLoginStatus	
	ccmeEphoneDnDStatus	
	ccmeEphoneDebugStatus	
	ccmeEphoneMediaActive	
	ccmeEphoneTAPIClient	
	ccmeEphoneMediaCapability	
Ephone-DN history stats	ccmeEphoneDnChStatsHistoryTable	This table contents apply to ccme and srst
	ccmeEphoneDnChNum	
	ccmeEphoneDnChIncoming	
	ccmeEphoneDnChIncoming	
	ccmeEphoneDnChOutbound	
	ccmeEphoneDnChOutAnswered	
	ccmeEphoneDnChOutBusy	
	ccmeEphoneDnChDiscAtConn	
	ccmeEphoneDnChDiscAtAlert	
	ccmeEphoneDnChDiscAtHold	
	ccmeEphoneDnChDiscAtRing	
	ccmeEphoneDnChDiscAtCauseNearEnd	
	ccmeEphoneDnChDiscCauseFarEnd	
Common Ephone statistics	ccmeActiveStats	
Total number of Ephones present	ccmeEphoneTot	ccme and srst
This refers to total number of Skinny phones registered to Cisco Unified SRST	EphoneTotalRegistered	ccme and srst

Table 6   Common Tables or Elements for the Cisco Unified CME and Cisco Unified SRST MIBs (continued)

Common Table or Element	Table or Element	Scope of Objects
This refers to the total number of Ephone call legs routed through Cisco Unified SRST	EphoneCallLegs	ccme and srst
	ccmeEphoneTotKeyPhConfigured	ccme
	ccmeEphoneTotKeyPhRegistered	ccme
Trap	EphoneUnRegistrationThresholdExceed	ccme and srst mode
Trap	EphoneFailRegistration	ccme and srst mode
Trap	ccmeEphoneDeceased	ccme and srst mode
Read/Write object	EphoneUnRegistrationThreshold	ccme and srst mode

Cisco Unified SRST MIB Notifications/Traps

The following notifications/traps are common to both the Cisco Unified CME and Cisco Unified SRST MIBs:

- ccmeEphoneUnRegistrationThresholdExceed
- ccmeEPhoneRegFailed
- ccmeEPhoneDeceased

Using SNMP and MIBs to Extract CISCO-SRST-MIB Information

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-SRST-MIB feature uses SNMP to gather remote site status information.

The CISCO-SRST-MIB feature allows remote site status data for the managed devices on your system to be retrieved by SNMP. You can specify retrieval of CISCO-SRST-MIB information from a managed device (for example, a router) either by entering commands on that managed device or by entering SNMP commands from the NMS workstation to configure the router by the MIB. If the CISCO-SRST-MIB information is configured from the network management system (NMS) workstation, no access to the router is required and all configuration can be performed by SNMP. The CISCO-SRST-MIB request for information is sent from an NMS workstation by SNMP to the router and is retrieved from the router. This information can then be stored or viewed, thus allowing CISCO-SRST-MIB information to be easily accessed and transported across a multivendor programming environment.

SRST Traps

SRST traps are SNMP traps, which are unsolicited notifications of an unusual or a catastrophic system event sent to the system administrator. To configure SRST traps, see the "Enabling Traps in SRST Mode" section on page 53.

SRST traps or alerts are sent for the following:

- Notification (alarm/trap): SRST SCCP port is down.

- Threshold (trap and event correlation) on phones registering back and forth between CM and Cisco Unified SRST router due to flapping WAN link.

- Threshold (trap and event correlation) on phones registering back and forth between SIP server/proxy and Cisco Unified SIP SRST router due to flapping WAN link.

Note Send traps by modem or ISDN dial backup links to a secondary NMS when the primary NMS is down. (Do this through the configuration in the Cisco Unified SRST router.)

Receiving Notifications/Traps

Notifications and traps are asynchronously generated by Cisco Unified SRST to pass information about certain device status changes. Table 7 lists the Cisco Unified SRST notifications/traps and additional information regarding each notification or trap.

Table 7   SRST Notifications/Traps

Notification/Trap	Reason	Severity
csrstStateChange	SRST system state change up	Minor
csrstStateChange	SRST system state change down	Minor
csrstStateChange	SIP SRST system state change up	Minor
csrstStateChange	SIP SRST system state change down	Minor
csrstFailNotif	Skinny listening socket setup error	Minor (when system is running)
csrstFailNotif	Maximum number of allowed sockets has been exceeded	Minor (when system is running)
csrstFailNotif	Skinny server initialization failed Sockets initialization failed	Major (at initialization)
csrstFailNotif	Skinny server initialization failed Not enough memory	Major (at initialization)
csrstFailNotif	Not enough memory to create Registrar Control Block (rcb) for SIP Voice Register DNS	Minor
csrstFailNotif	Not enough memory to create Call Control Block (ccb) from SIP registrar outgoing	Minor

How to Configure Cisco Unified SRST SNMP MIB Support

This section contains the following topics:

- Monitoring SCCP Phone Statistics, page 54
- Retrieving SIP Phone Registrations, page 55

Enabling the SNMP Agent

The SNMP Agent for the SRST/CCME MIB is disabled by default. To enable the SNMP agent for the CISCO-SRST-MIB, perform the following steps on the router on which the CISCO-SRST-MIB feature is to be used.

Prerequisites

- Cisco Unified CallManager Fallback must be configured on your system.
- An SNMP manager must be available on the network. For information about configuring an SNMP server for use with a MIB, refer to the "Configuring SNMP Support" chapter of the *Cisco IOS Configuration Fundamentals and Network Management Configuration Guide*.
- Traps are defined in the NMS software.
- Alarm events are not put into "log only" mode and come up as an Alarm.

SUMMARY STEPS

1. **telnet** *ipaddress*
2. **enable**
3. **show running-config**
4. **config terminal**
5. **snmp-server community** *xxxxxx* **RO**
6. **snmp-server community** *xxxxxx* **RW**
7. **exit**
8. **write memory**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`telnet` *`ipaddress`*
	
	Example:
	`Prompt# telnet`
	`xxx.xxx.xxx.xxx`
		Telnets to the router identified by the specified IP address.

Step 2	`enable`
	
	Example:
	`Router# enable`
		Enters the privileged EXEC mode.
		
		- Enter your password if required.

	Command or Action	Purpose
Step 3	**show running-config** **Example:** `Router# show running-config`	Displays the running configuration. • Determine if an SNMP agent is already running. If no SNMP information is displayed, continue with next step. If SNMP information is already configured, modify the information or change if necessary.
Step 4	**config terminal** **Example:** `Router# config terminal`	Enters global configuration mode.
Step 5	**snmp-server community** *xxxxx* **RO** **Example:** `Router(config)# snmp-server community xxxxxx RO`	Enables the read-only (RO) community string, where *xxxxxx* represents the read-only community string
Step 6	**snmp-server community** *xxxxx* **RW** **Example:** `Router(config)# snmp-server community xxxxxx RW`	Enables the read-write (RW) community string, where *xxxxxx* represents the read-write community string.
Step 7	**exit** **Example:** `Router(config)# exit`	Exits global configuration mode and returns you to privileged EXEC mode.
Step 8	**write memory** **Example:** `Router# write memory`	Writes the modified configuration to nonvolatile memory (NVRAM), permanently saving the settings.

Verifying the Enabling of the SNMP Agent

To verify that the SNMP agent has been enabled on a given network device, perform the following steps:

Step 1   Telnet to the target device:

```
Router# telnet xxx.xxx.xxx.xxx
```
where `xxx.xxx.xxx.xxx` represents the IP address of the target device.

Step 2   Establish the enable mode on the device:

```
Router# enable
```

Step 3   Display the running configuration on the device and examine the output for any displayed SNMP information:

```
Router# show running-config
...
...
snmp-server community public RO
```

```
snmp-server community private RW
```

Any "snmp-server" statement appearing in the output that takes the form shown above verifies that SNMP has been enabled on the specified device.

Configuring Cisco Unified SRST Mode

Perform the following steps to configure Cisco Unified SRST mode.

Step 1 Have Ephones registered to Cisco Unified CME or CallManager before enabling Cisco Unified SRST.

Step 2 Have an Ephone-dn assigned to each Ephone.

Step 3 Have a button associated with each Ephone-dn.

Step 4 Configure and **show call-manager-fallback**.

Step 5 Verify the response to **show call-manager-fallback** is similar to the following:

```
SRST-Router#sh call-manager-fallback
CONFIG (Version=3.3)
=====================
Version 3.3
For on-line documentation please see:
www.cisco.com/univercd/cc/td/doc/product/access/ip_ph/ip_ks/index.htm

ip source-address 1.4.196.1 port 2000
max-ephones 10
max-dn 10
max-conferences 8 gain -6
dspfarm units 0
dspfarm transcode sessions 0
huntstop
dialplan-pattern 2 2222 extension-length 2 extension-pattern 20 no-reg
dialplan-pattern 4 4444 extension-length 4 extension-pattern 4040
dialplan-pattern 5 5555 extension-length 2 extension-pattern 50
access-code bri 333 direct-inward-dial
access-code pri 44 direct-inward-dial
time-format 24
date-format yy-mm-dd
timezone 0 Greenwich Standard Time
transfer-pattern 111 blind
transfer-pattern 202
transfer-pattern 301 blind
cor incoming eng default
cor incoming eng 1 2000
cor outgoing hr 1 1000
cor incoming eng 2 2000-2010
cor outgoing hr 2 2000
alias 1 1234 to 9988 huntstop
alias 2 2222 to 5552222
alias 4 4444 to 5554444
alias 8 8888 to 5558888
keepalive 30
timeout interdigit 10
timeout busy 10
timeout ringing 180
caller-id name-only: enable
Limit number of DNs per phone:
 7910: 34
```

```
 7935: 34
 7936: 34
 7940: 34
 7960: 20
 7970: 34
Log (table parameters):
    max-size: 150
    retain-timer: 15
local directory service: enabled.
```

Step 6 Simulate a link failure for Ephones to fall back to Cisco Unified SRST mode.

Step 7 Issue the following command to check call-manager-fallback configuration:

```
getmany -v2c <ip addr> test csrstConf
```

Step 8 Verify the response to **getmany** is similar to the following:

```
moki:1929> getmany -v2c 1.4.196.1 test csrstConf
csrstEnabled.0 = true(1)
csrstVersion.0 = 3.3
csrstIPAddressType.0 = ipv4(1)
csrstIPAddress.0 = 1.4.196.1
csrstPortNumber.0 = 2000
csrstMaxConferences.0 = 8
csrstMaxEphones.0 = 10
csrstMaxDN.0 = 10
csrstSipPhoneUnRegThreshold.0 = 480
csrstCallFwdNoAnswer.0 =
csrstCallFwdNoAnswerTo.0 = 180
csrstCallFwdBusy.0 =
csrstMohFilename.0 =
csrstMohMulticastAddrType.0 = ipv4(1)
csrstMohMulticastAddr.0 = 0.0.0.0
csrstMohMulticastPort.0 = 0
csrstVoiceMailNumber.0 =
csrstSystemMessagePrimary.0 =
csrstSystemMessageSecondary.0 =
csrstScriptName.0 =
csrstSecondaryDialTone.0 =
csrstTransferSystem.0 = blind(1)
csrstUserLocaleInfo.0 = us(11)
csrstDateFormat.0 = yymmdd(4)
csrstTimeFormat.0 = twentyFourHour(2)
csrstInterdigitTo.0 = 10
csrstBusyTo.0 = 10
csrstAlertTo.0 = 180
csrstXlateCalledNumber.0 = 0
csrstXlateCallingNumber.0 = 0
csrstAliasTag.0 = 1
csrstAliasTag.1 = 2
csrstAliasTag.2 = 4
csrstAliasTag.3 = 8
csrstAliasTag.4 = 2
csrstAliasTag.5 = 4
csrstAliasTag.6 = 1
csrstAliasTag.7 = 5
csrstAliasNumPattern.0 = 9988
csrstAliasNumPattern.1 = 5552222
csrstAliasNumPattern.2 = 5554444
csrstAliasNumPattern.3 = 5558888
csrstAliasNumPattern.4 = 2222
csrstAliasNumPattern.5 = 4444
csrstAliasNumPattern.6 = 1013
csrstAliasNumPattern.7 = 5013
```

```
csrstAliasAltNumber.0 = 1234
csrstAliasAltNumber.1 = 2222
csrstAliasAltNumber.2 = 4444
csrstAliasAltNumber.3 = 8888
csrstAliasAltNumber.4 = 2211
csrstAliasAltNumber.5 = 4411
csrstAliasAltNumber.6 = 1012
csrstAliasAltNumber.7 = 5012
csrstAliasPreference.0 = 0
csrstAliasPreference.1 = 0
csrstAliasPreference.2 = 0
csrstAliasPreference.3 = 0
csrstAliasPreference.4 = 2
csrstAliasPreference.5 = 4
csrstAliasPreference.6 = 2
csrstAliasPreference.7 = 4
csrstAliasHuntStopEnabled.0 = true(1)
csrstAliasHuntStopEnabled.1 = false(2)
csrstAliasHuntStopEnabled.2 = false(2)
csrstAliasHuntStopEnabled.3 = false(2)
csrstAliasHuntStopEnabled.4 = false(2)
csrstAliasHuntStopEnabled.5 = false(2)
csrstAliasHuntStopEnabled.6 = false(2)
csrstAliasHuntStopEnabled.7 = false(2)
csrstAccessCodeType.3 = bri(3)
csrstAccessCodeType.4 = pri(4)
csrstAccessCode.3 = 333
csrstAccessCode.4 = 44
csrstAccessCodeDIDEnabled.3 = true(1)
csrstAccessCodeDIDEnabled.4 = true(1)
csrstLimitDNType.1 = ipPhone7910(1)
csrstLimitDNType.2 = ipPhone7935(2)
csrstLimitDNType.3 = ipPhone7940(3)
csrstLimitDNType.4 = ipPhone7960(4)
csrstLimitDN.1 = 34
csrstLimitDN.2 = 34
csrstLimitDN.3 = 34
csrstLimitDN.4 = 20
csrstNotificationEnabled.0 = false(2)
```

Enabling Traps in SRST Mode

To enable traps in SRST mode, perform the following steps:

Step 1 Issue the following command:

Setany -v2c <ip addr> test csrstNotificationEnabled.0 -i 1

Step 2 When the Cisco Unified SRST has at least 1 SCCP phone with DN associated with it, an "SRST system state change up" trap is generated.

```
*Mar 10 23:13:15.632: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.1, gentrap 6,
spectrap 1
ciscoMgmt.441.2.2.2.1.2.1 = 2
ciscoMgmt.441.1.3.1.2.1 = 1
ciscoMgmt.441.2.2.2.2.2.1 = SRST system state change up
```

Monitoring SCCP Phone Statistics

To monitor SCCP phone statistics, perform the following steps:

Step 1 Register the Ephones to the Cisco Unified SRST router.

Step 2 Issue the following CLI command:

```
Show ephone summary
```

Step 3 Verify the response to **show Ephone summary** is similar to the following:

```
SRST-Router#sh ephone summary

ephone-1 Mac:000F.24BA.2C37 TCP socket:[1] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:1.4.196.42 7912   keepalive 2  1:1 2:2  CM Fallback

ephone-2 Mac:0011.BBEF.7554 TCP socket:[2] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:1.4.196.2 Telecaster 7960  keepalive 2   CM Fallback

ephone-3 Mac:000D.2808.427F TCP socket:[3] activeLine:0 REGISTERED
mediaActive:0 offhook:0 ringing:0 reset:0 reset_sent:0 debug:0
IP:1.4.196.3 Telecaster 7960  keepalive 1   CM Fallback

Max 10, Registered 3, Unregistered 0, Deceased 0, Sockets 3
ephone_send_packet process switched 0


Max Conferences 8 with 0 active (8 allowed)
Skinny Music On Hold Status
Active MOH clients 0 (max 480), Media Clients 0
No MOH file loaded
```

Step 4 Issue the following SNMP request:

```
Getmany -v2c <ip addr> test ccmeActiveStats
```

Step 5 Verify the response for the **getmany** request is similar to the following:

```
moki:1931> getmany -v2c 1.4.196.1 test ccmeActiveStats
ccmeEphoneCallLegs.0 = 0
ccmeEphoneTot.0 = 3
ccmeEphoneTotRegistered.0 = 3
ccmeEphoneTotKeyPhConfigured.0 = 0
ccmeEphoneTotKeyPhRegistered.0 = 0
ccmeEphoneDeviceName.1 = SEP000F24BA2C37
ccmeEphoneDeviceName.2 = SEP000D2808427F
ccmeEphoneDeviceName.3 = SEP0011BBEF7554
ccmeEphoneRegState.1 = registered(1)
ccmeEphoneRegState.2 = registered(1)
ccmeEphoneRegState.3 = registered(1)
ccmeEphoneActiveDN.1 = 0
ccmeEphoneActiveDN.2 = 0
ccmeEphoneActiveDN.3 = 0
ccmeEphoneActivityStatus.1 = onhook(1)
ccmeEphoneActivityStatus.2 = onhook(1)
ccmeEphoneActivityStatus.3 = onhook(1)
ccmeEphoneKeepAliveCnt.1 = 3
ccmeEphoneKeepAliveCnt.2 = 4
ccmeEphoneKeepAliveCnt.3 = 3
ccmeEphonePendingReset.1 = false(2)
```

```
ccmeEphonePendingReset.2 = false(2)
ccmeEphonePendingReset.3 = false(2)
ccmeEphoneRegTime.1 =
ccmeEphoneRegTime.2 =
ccmeEphoneRegTime.3 =
ccmeEphoneCurrentFirmwareRev.1 = CP7912010200SCCP031023
ccmeEphoneCurrentFirmwareRev.2 = 7.0(2.0)
ccmeEphoneCurrentFirmwareRev.3 = 7.0(2.0)
ccmeEphonePreviousFirmwareRev.1 =
ccmeEphonePreviousFirmwareRev.2 =
ccmeEphonePreviousFirmwareRev.3 =
ccmeEphoneLastError.1 = Initialized
ccmeEphoneLastError.2 = CM-closed-TCP
ccmeEphoneLastError.3 = CM-closed-TCP
ccmeEphoneObservedType.1 = 7912
ccmeEphoneObservedType.2 = Telecaster 7960
ccmeEphoneObservedType.3 = Telecaster 7960
ccmeEphoneLoginStatus.1 = false(2)
ccmeEphoneLoginStatus.2 = false(2)
ccmeEphoneLoginStatus.3 = false(2)
ccmeEphoneDnDStatus.1 = false(2)
ccmeEphoneDnDStatus.2 = false(2)
ccmeEphoneDnDStatus.3 = false(2)
ccmeEphoneDebugStatus.1 = false(2)
ccmeEphoneDebugStatus.2 = false(2)
ccmeEphoneDebugStatus.3 = false(2)
ccmeEphoneMediaActive.1 = false(2)
ccmeEphoneMediaActive.2 = false(2)
ccmeEphoneMediaActive.3 = false(2)
ccmeEphoneTAPIClient.1 = false(2)
ccmeEphoneTAPIClient.2 = false(2)
ccmeEphoneTAPIClient.3 = false(2)
ccmeEphoneMediaCapability.1 = audioOnly(1)
ccmeEphoneMediaCapability.2 = audioOnly(1)
ccmeEphoneMediaCapability.3 = audioOnly(1)
ccmeEphoneRemote.1 = true(1)
ccmeEphoneRemote.2 = true(1)
ccmeEphoneRemote.3 = true(1)
ccmeMohSource.0 = liveFeed(2)
ccmeNightServiceEnabled.0 = false(2)
```

Retrieving SIP Phone Registrations

To retrieve SIP phone registrations, perform the following steps:

Step 1   Register the SIP phones to the Cisco Unified SRST router.

Step 2   Issue the following CLI command:

Show voice register pool <pool #>

Step 3   Verify the **show voice register** response is similar to the following:

```
SRST-Router#sh voice regi pool 1
Pool Tag 1
Config:
 Network address is 1.4.196.0, Mask is 255.255.255.0
 Proxy Ip address is 1.4.196.1
 DTMF Relay is disabled
```

```
Dialpeers created:

dial-peer voice 40001 voip
destination-pattern 5001
redirect ip2ip
session target ipv4:1.4.196.41:25672
session protocol sipv2

dial-peer voice 40002 voip
destination-pattern 5001
redirect ip2ip
session target ipv4:1.4.196.1:5060
session protocol sipv2
monitor probe rtr 1.4.196.1

dial-peer voice 40003 voip
destination-pattern 5002
redirect ip2ip
session target ipv4:1.4.196.41:25672
session protocol sipv2

dial-peer voice 40004 voip
destination-pattern 5002
redirect ip2ip
session target ipv4:1.4.196.1:5060
session protocol sipv2
monitor probe rtr 1.4.196.1

Statistics:
 Active registrations  : 4

 Total Registration Statistics
   Registration requests  : 4
   Registration success   : 4
   Registration failed    : 0
   unRegister requests    : 0
   unRegister success     : 0
   unRegister failed      : 0
```

Step 4   Issue the following SNMP request:

`Getmany -v2c <ip addr> test csrstSipEndpointTable`

Step 5   Verify the response for the **getmany** request is similar to the following:

```
moki:1919> getmany -v2c 1.4.196.1 test csrstSipEndpointTable
csrstSipVoRegPoolEdptTag.0 = 1
csrstSipVoRegPoolEdptTag.1 = 1
csrstSipVoRegPoolEdptTag.2 = 1
csrstSipVoRegPoolEdptTag.3 = 1
csrstSipEndpointIpAddrType.0 = ipv4(1)
csrstSipEndpointIpAddrType.1 = ipv4(1)
csrstSipEndpointIpAddrType.2 = ipv4(1)
csrstSipEndpointIpAddrType.3 = ipv4(1)
csrstSipEndpointIpAddress.0 = ipv4:1.4.196.41:26057
csrstSipEndpointIpAddress.1 = ipv4:1.4.196.1:5060
csrstSipEndpointIpAddress.2 = ipv4:1.4.196.41:26057
csrstSipEndpointIpAddress.3 = ipv4:1.4.196.1:5060
csrstSipEndpointDN.0 = 5001
csrstSipEndpointDN.1 = 5001
csrstSipEndpointDN.2 = 5002
csrstSipEndpointDN.3 = 5002
```

Configuration Examples

This section contains the following examples:

Complete Cisco Unified SRST Configuration: Example

The following is a complete configuration example for Cisco Unified SRST. It is provided to give you an example of the commands used when configuring Cisco Unified SRST.

```
SRST-Router#sh run
.

.

.
!
hostname SRST-Router
!
.

.

.
ip subnet-zero
ip cef
!
!
voice service voip
sip
 registrar server expires max 600 min 60
!
!
voice class codec 1
codec preference 1 g711ulaw
codec preference 2 g729br8
!
!
!
!
!
!
!
voice register pool  1
id network 1.4.196.0 mask 255.255.255.0
proxy 1.4.196.1 monitor probe rtr
!
voice register pool  3
id network 1.4.4.1 mask 255.255.255.0
number 2 2020 preference 2
number 4 4040 preference 4
alias 2 2211 to 2222 preference 2
alias 4 4411 to 4444 preference 4
!
voice register pool  4
```

```
id network 1.4.199.1 mask 255.255.255.255
proxy 1.4.100.1
!
voice register pool  7
id mac 0002.0002.0002
number 3 3030 preference 3
number 10 10 preference 10
cor incoming eng 1 1000
cor incoming eng 3 3000
cor outgoing eng 4 4000
proxy 1.4.196.7 monitor probe rtr
alias 1 1012 to 1013 preference 2
alias 5 5012 to 5013 preference 4
!
!
!
!
!
!
!
!
interface FastEthernet0/0
ip address 1.4.196.1 255.255.0.0
no ip route-cache cef
no ip route-cache
no ip mroute-cache
duplex auto
speed auto
no cdp enable
!
interface FastEthernet0/1
ip address 3.0.0.1 255.255.255.0
no ip mroute-cache
duplex auto
speed auto
no keepalive
no cdp enable
!
interface Serial0/2:1
ip address 12.12.12.1 255.255.255.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 1.4.0.1
ip route 4.0.0.0 255.255.255.0 FastEthernet0/0
ip route 223.255.254.0 255.255.255.0 1.4.0.1
ip route 223.255.254.254 255.255.255.255 FastEthernet0/0
!
no ip http server
!
snmp-server community public RW
snmp-server community test RW
snmp-server contact helloall
snmp-server host 1.4.198.78 SNMP
snmp-server host 1.4.198.78 SNMPv2c
no cdp run
arp 3.3.3.3 0000.0000.001a ARPA
!
!
tftp-server flash:P0S30202.bin
tftp-server flash:SIP000F23AD6FBC.cnf
tftp-server flash:SIPDefault.cnf
tftp-server flash:OS79XX.TXT
tftp-server flash:P0S3-04-1-00.bin
tftp-server flash:P00305000300.bin
```

```
!
control-plane
!
!
!
voice-port 0/3:2
no   ignore rx-c-bit
no   ignore rx-d-bit
condition tx-a-bit off
condition tx-b-bit invert
condition tx-c-bit on
!
voice-port 0/3:3
!
voice-port 4/0/0
!
voice-port 4/0/1
!
!
!
!
dial-peer cor custom
name test_shanmukh_member
name liz
!
!
dial-peer cor list test
!
dial-peer cor list name
!
dial-peer cor list eng
member liz
!
dial-peer cor list hr
!
!
dial-peer voice 2001 pots
destination-pattern 2001
!
dial-peer voice 9002 voip
corlist incoming eng
destination-pattern ....
session target ipv4:1.4.196.77
dtmf-relay h245-alphanumeric
ip qos dscp cs5 media
!
dial-peer voice 9003 voip
destination-pattern ....
session target ipv4:1.4.196.78
dtmf-relay h245-alphanumeric
ip qos dscp cs5 media
!
dial-peer voice 9001 voip
!
gateway
timer receive-rtp 1200
security password 1511021F0725 level endpoint
!
sip-ua
sip-server ipv4:1.4.196.1
!
!
call-manager-fallback
```

```
max-conferences 8 gain -6
limit-dn 7960 20
ip source-address 1.4.196.1 port 2000
max-ephones 10
max-dn 10
dialplan-pattern 2 2222 extension-length 2 extension-pattern 20 no-reg
dialplan-pattern 4 4444 extension-length 4 extension-pattern 4040
dialplan-pattern 5 5555 extension-length 2 extension-pattern 50
transfer-pattern 111 blind
transfer-pattern 202
transfer-pattern 301 blind
access-code bri 333 direct-inward-dial
access-code pri 44 direct-inward-dial
alias 1 1234 to 9988 huntstop
alias 2 2222 to 5552222
alias 4 4444 to 5554444
alias 8 8888 to 5558888
time-format 24
date-format yy-mm-dd
cor incoming eng default
cor incoming eng 1 2000
cor incoming eng 2 2000 - 2010
cor outgoing hr 1 1000
cor outgoing hr 2 2000
!
!
line con 0
exec-timeout 0 0
line aux 0
line vty 0 4
login
!
!
end
```

There is no reason string or severity sent with the following traps:

- csrstSipPhoneUnRegThresholdExceed

- csrstSipPhoneRegFailed

- csrstConferenceFailed

The following list contains all the CISCO-SRST-MIB traps.

- csrstStatusChange - SRST status change trap (Up)

```
*Mar  7 20:56:23.207: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.10, gentrap
6, spectrap 1
ciscoMgmt.441.2.2.2.1.2.1 = 2
ciscoMgmt.441.1.3.1.2.1 = 1
ciscoMgmt.441.2.2.2.2.2.1 = SRST system state change up
```

- csrstStateChange - SRST status change trap (Down)

```
*Mar  7 20:57:23.199: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.10, gentrap
6, spectrap 1
ciscoMgmt.441.2.2.2.1.2.1 = 2
ciscoMgmt.441.1.3.1.2.1 = 2
ciscoMgmt.441.2.2.2.2.2.1 = SRST system state change down
```

- csrstStateChange - SIP-SRST status change trap (Up)

```
*Mar  7 20:56:23.459: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.10, gentrap
6, spectrap 1
ciscoMgmt.441.2.2.2.1.2.2 = 2
```

```
ciscoMgmt.441.1.3.1.2.2 = 1
ciscoMgmt.441.2.2.2.2.2.2 = SIP SRST system state change up
```

- csrstStateChange - SIP-SRST status change trap (Down)

```
*Mar  7 20:57:23.451: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.10, gentrap
6, spectrap 1
ciscoMgmt.441.2.2.2.1.2.2 = 2
ciscoMgmt.441.1.3.1.2.2 = 2
ciscoMgmt.441.2.2.2.2.2.2 = SIP SRST system state change down
```

- csrstSipPhoneUnRegThresholdExceeded Trap – SIP phone unregistration threshold exceeded

```
*Mar  8 23:53:01.480: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.1, gentrap 6,
spectrap 3
ciscoMgmt.441.1.2.9.1.1 = 1
ciscoMgmt.441.1.3.2.1.1 = 1
```

- csrstFailNotif – SRST System Failure Notification

```
*Mar  6 01:53:58.957: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.1, gentrap 6,
spectrap 2
ciscoMgmt.441.2.2.2.1.1 = 1
ciscoMgmt.441.2.2.2.2.1 = Skinny listening socket setup error
```

- csrstMaxConferenceExceeded – SRST maximum number of conferences exceeded

```
*Mar 10 19:16:56.165: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.1, gentrap 6,
spectrap 5
ciscoMgmt.441.1.2.6.0 = 8
```

- csrstSipPhoneRegFailed – SIP phone failed to register

```
*Mar 11 19:25:00.663: SNMP: V1 Trap, ent ciscoMgmt.441, addr 1.4.196.1, gentrap 6,
spectrap 4
ciscoMgmt.441.1.4.7.1.4.0 = 1.4.196.41
```

Command Reference

All Cisco IOScommands used with the CISCO-SRST-MIB feature are documented in the Cisco IOS Release command reference publications.

Glossary

The following terms are used in this document.

ATA — Analog Telephone Adaptor

BRI — Basic Rate Interface

ccb — Call Control Block

CCME — Cisco Unified CallManager Express

COR — Class of Restriction

CTI — Computer Telephony Integration

CUE — Cisco Unity Express

DN — directory number

DnD — do-not-disturb

E&M — ear and mouth (also recEive and transMit)

Ephone — Ethernet phone

FXO — foreign exchange office

GUI — Graphical User Interface

IETF — Internet Engineering Task Force

IVR — Interactive Voice Response

MIB — Management Information Base

MoH — Music on hold

MWI — message-waiting indicator

OID — Object Identifier

PLAR — private line, automatic ringdown

PRI — Primary Rate Interface

rcb — Registrar Control Block

RFC — Requests for Comment

SCCP — Skinny Client Control Protocol

SIP — Session Initiated Protocol

SNMP — Simple Network Management Protocol

SRST — Survivable Remote Site Telephony

TCL — Tool Command Language

VoFR — Voice over Frame Relay