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Management Information Base for  
the Session Initiation Protocol (SIP)

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes a set of managed objects that are used to manage Session Initiation Protocol (SIP) entities, which include User Agents, and Proxy, Redirect and Registrar servers.

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## 1. Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes a set of managed objects that are used to manage Session Initiation Protocol (SIP) entities, which include User Agents, and Proxy, Redirect and Registrar servers. The managed objects defined in this document are intended to provide basic SIP protocol management for SIP entities. The management of application-specific or service-specific SIP configuration is out of scope.

## 2. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

## 3. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a set of MIB modules that are compliant to the SMIV2, which is described in STD 58, comprised of RFC 2578 [RFC2578], RFC 2579 [RFC2579], and RFC 2580 [RFC2580].

#### 4. Overview

SIP [RFC3261] is an application-layer control (signaling) protocol for creating, modifying, and terminating sessions with one or more participants. These sessions include Internet telephone calls, multimedia distribution, and multimedia conferences.

This MIB provides some managed objects for SIP entities defined in RFC 3261 [RFC3261] - User Agents (UA), and Proxy, Redirect, and Registrar servers. It is intended to provide management of the basic SIP entities. It provides for monitoring of status and protocol statistics, as well as for configuration of SIP entities.

#### 5. Structure of the SIP MIB

Four MIB modules are specified: SIP-COMMON-MIB, SIP-SERVER-MIB, SIP-UA-MIB, and SIP-TC-MIB. SIP-COMMON-MIB contains common MIB objects used in all the SIP entities. SIP-SERVER-MIB contains objects specific to Proxy, Redirect, and Registrar servers. SIP-UA-MIB includes objects specific to User Agents. SIP-TC-MIB defines the textual conventions used throughout the MIB modules.

The MIB modules contain the following groups of objects:

SIP-COMMON-MIB: Management objects common to all the SIP entities

- o sipCommonMIBObjects

- \* sipCommonCfgBase: This object group defines configuration objects common to all SIP entities, including the SIP protocol version, the type of SIP entity (UA, proxy, redirect, registrar servers), the operational and administrative status, the SIP organization name, the maximum number of SIP transactions an entity can manage, etc.
- \* sipCommonCfgTimer: This object group defines timer configuration objects applicable to SIP user agent and stateful SIP proxy entities.

- \* sipCommonSummaryStats: This object group defines a table containing the summary statistics objects applicable to all SIP entities, including the total number of all SIP requests and responses in/out and the total number of transactions.
- \* sipCommonMethodStats: This object group defines a table containing the SIP method statistics objects applicable to all SIP entities, including the number of outbound and inbound requests on a per method basis. Retransmissions, where appropriate, are also included in these statistics.
- \* sipCommonStatusCode: This object group defines a table indicating the number of SIP responses (in and out) that the SIP entity has been requested to monitor on a per-method basis (100, 200, 302, etc.).
- \* sipCommonStatsTrans: This object group defines a table containing a gauge reflecting the number of transactions currently awaiting definitive responses by the managed SIP entity.
- \* sipCommonStatsRetry: This object group defines statistic objects indicating the number of retransmissions sent on a per-method basis.
- \* sipCommonOtherStats: This object group defines additional statistics objects including the number of SIP requests received with unsupported URIs, the number of requests received with unsupported SIP methods, and the number of discarded messages.
- \* sipCommonNotifObjects: This object group defines objects accessible only via a notification (MAX ACCESS clause of accessible-for-notify): they are related to the SNMP notifications defined in this MIB module.

The SIP-COMMON-MIB also contains notifications, including:

- o sipCommonStatusCodeNotif: indicates that a specific status code has been sent or received by the system.
- o sipCommonStatusCodeThreshExceededNotif: indicates that a specific status code has been sent or received by the system frequently enough to exceed the configured threshold.

SIP-SERVER-MIB: Groups of objects for SIP Proxy, Redirect, and Registrar servers

o sipServerMIBObjects

- \* sipServerCfg: This object group defines common server configuration objects including the SIP server host address.
- \* sipServerProxyCfg: This object group defines configuration objects for SIP Proxy Servers including the proxy mode of operation (stateless, stateful, call stateful), the proxy authentication method(s), realm, etc.
- \* sipServerProxyStats: This object group defines a table containing the statistics objects applicable to SIP Proxy Servers. It includes the number of occurrences of unsupported options being specified in received Proxy-Require headers.
- \* sipServerRegCfg: This object group defines common configuration objects for SIP Registrar servers, including the ability to accept third-party registrations, such as the maximum registration expiry that may be requested by user agents, the maximum number of users the registrar can support, the number of currently registered users, per contact registration information, etc.
- \* sipServerRegStats: This object group contains summary statistics objects for SIP Registrar servers. Precisely, it contains the number of REGISTER requests that have been accepted or rejected.

SIP-UA-MIB: Group of objects for SIP User Agents

o sipUAMIBObjects

- \* sipUACfgServer: This object group specifies SIP server configuration objects applicable to SIP user agents including the Internet address of the SIP Server the UA uses to register, proxy, or redirect calls.

To conform with this specification, an SNMP agent MUST implement the SIP-TC-MIB module, plus the SIP-COMMON-MIB module and one of the SIP entity-type-specific MIB modules (SIP-SERVER-MIB or SIP-UA-MIB) as applicable for each instance of a SIP entity being managed. If a device has more than one SIP entity or multiple instances of the same entity type, it MUST implement multiple SIP modules. Section 5.2 describes handling of multiple instances in detail.

### 5.1. Textual Conventions

The data types `SipTCTransportProtocol`, `SipTCEntityRole`, `SipTCOptionTagHeaders`, and `SipTCMethodName` are defined in the SIP-TC-MIB module and used as Textual Conventions in this document.

### 5.2. Relationship to the Network Services MIB

In the design of the SIP MIB, the authors considered the following requirement: the SIP MIB must allow a single system with a single SNMP agent to support multiple instances of various SIP MIB modules. This requirement is met by using the framework provided by the Network Services Monitoring MIB, `NETWORK-SERVICES-MIB`, RFC 2788 [RFC2788].

A device implementing the SIP MIB MUST support the `NETWORK-SERVICES-MIB` and, at a minimum, MUST support the index and name objects (`applIndex` and `applName`) in the application table (`applTable`). In order to allow each instance of a SIP entity to be managed as a separate network service application, a naming convention SHOULD be used to make the application name unique. For example, if a system is running 2 SIP UAs that need to be managed as 2 separate SIP entities, by convention, the application names used in the Network Services Monitoring MIB application table should be `"sip_ual"` and `"sip_ua2"`. This convention allows each instance to have its own row in the application table (`applTable`).

It is therefore RECOMMENDED that the following application name conventions be adopted:

- o for a SIP Proxy entity, the `applName` value SHOULD be equal to a character string starting with `"sip_proxy"` followed by a unique application instance identifier, for example, `"sip_proxy1"`, `"sip_proxy17"`.
- o for a SIP Registrar entity, the `applName` value SHOULD be equal to a character string starting with `"sip_registrar"` followed by a unique application instance identifier, for example, `"sip_registrar1"`, `"sip_registrar2"`.
- o for a SIP User Agent entity, the `applName` value SHOULD be equal to a character string starting with `"sip_ua"` followed by a unique application instance identifier, for example, `"sip_ual"`, `"sip_ua2"`.

- o for any combination of Proxy, Registrar, or Redirect Server being managed as a single aggregate entity, the applName value for the combined server entity SHOULD reflect the appropriate combination followed by a unique application instance identifier. In order to facilitate consistent agent behavior and management application expectations, the following order of names is RECOMMENDED:

- \* if Proxy exists, list first.
- \* if Proxy and Redirect exists, list Redirect second.
- \* if Registrar exists, always list last.

For example "sip\_proxy1", "sip\_proxy\_registrar1", "sip\_proxy\_redirect5", "sip\_proxy\_redirect\_registrar2", or "sip\_registrar1".

- o Note: the value of the network service application index (applIndex) may be different from the instance identifier used in the system (the applIndex is dynamically created and is the value assigned by the SNMP agent at the creation of the table entry, whereas the value of the instance identifier to be used in the application name is provided as part of the application name applName by the system administrator or configuration files of the SIP entity). This note is illustrated in the first example provided below.

Finally, the SNMP agent MAY support any combination of the other attributes in applTable. If supported, the following objects SHOULD have values populated as follows:

- o applVersion: version of the SIP application.
- o applUptime: the value of applUptime MUST be identical to the value of sipCommonCfgServiceStartTime defined in the SIP-COMMON-MIB module.
- o applOperStatus: the value of applOperStatus SHOULD reflect the operational status of sipCommonCfgServiceOperStatus, at least by means of a mapping.
- o applLastChange: the value of applLastChange MUST be identical to the value of sipCommonCfgServiceLastChange defined in the SIP-COMMON module.

A number of other objects are defined as part of the applTable. They are not included for the sake of brevity and due to the fact that they do not enhance the concept being presented.

## Example 1:

The tables below illustrate how a system acting as both Proxy and Registrar server might be configured to maintain separate SIP-COMMON-MIB instances.

The NETWORK-SERVICES-MIB applTable might be populated as follows:

applIndex	applName	applDescription
1	"sip_proxy10"	"ACME SIP Proxy"
2	"sip_registrar17"	"ACME SIP Registrar"

The SIP-COMMON-MIB sipCommonCfgTable would have two rows: one for the proxy (applIndex=1) and one for the registrar (applIndex=2). The SIP-SERVER-MIB tables would, however, only be populated with one row indexed by applIndex=1 and applIndex=2, respectively, if the server provides either proxy or registrar.

The SIP-COMMON-MIB sipCommonCfgTable might be populated as:

applIndex	sipCommonCfgProtocol Version	sipCommonCfgServiceOper Status	...
1	"SIP/2.0"	up(1)	
2	"SIP/2.0"	restarting(4)	

while the sipServerProxyCfgTable in SIP-SERVER-MIB might be populated as:

applIndex	sipServerCfgProxyStatefulness	...
1	stateless(1)	



and the sipServerRegUserTable in SIP-SERVER-MIB might be populated as:

applIndex	sipServerRegUserIndex	sipServerRegUserUri	...
2	1	bob@example.com	
2	2	alice@example.com	
2	3	jim@example.com	
2	4	john@example.com	

#### Example 2:

This example illustrates how to represent a system acting as both Proxy and Registrar server, where the two entities share a single instance of SIP-COMMON-MIB.

The NETWORK-SERVICES-MIB applTable might be populated as follows:

applIndex	applName	applDescription
1	"sip_proxy_registrar1"	"ACME SIP Proxy and Registrar"

The SIP-COMMON-MIB sipCommonCfgTable would have only one row to cover both the proxy and the registrar.

The SIP-COMMON-MIB sipCommonCfgTable might be populated as:

applIndex	sipCommonCfgProtocolVersion	sipCommonCfgServiceOperStatus
1	"SIP/2.0"	up(1)

while the sipServerRegUserTable in SIP-SERVER-MIB might be populated as:

applIndex	sipServerRegUserIndex	sipServerRegUserUri	...
2	1	bob@example.com	
2	2	alice@example.com	
2	3	kevin@example.com	
2	4	jf@example.com	

The NETWORK-SERVICES-MIB assocTable is not considered a requirement for SIP systems. It is not a mandatory group for compliance with the NETWORK-SERVICES-MIB module.

The relationship between the value of applOperStatus and sipCommonCfgServiceOperStatus is as follows:

sipCommonCfgServiceOperStatus	-- corresponds to -->	applOperStatus
up	-->	up
down	-->	down
congested	-->	congested
restarting	-->	restarting
quiescing	-->	quiescing
testing	-->	up
unknown	-->	--indeterminate--

If the sipOperStatus is 'unknown', there is no corresponding value of applOperStatus. Therefore, the last known value of applOperStatus SHOULD be maintained until the sipOperStatus transitions to a value that can be mapped appropriately.

### 5.3. IMPORTed MIB Modules and REFERENCE Clauses

The SIP MIB modules defined in this document IMPORT definitions normatively from the following MIB modules, beyond [RFC2578], [RFC2579], and [RFC2580]: INET-ADDRESS-MIB [RFC4001], NETWORK-SERVICES-MIB [RFC2788], SNMP-FRAMEWORK-MIB [RFC3411].

This MIB module also includes REFERENCE clauses that normatively refer to SIP [RFC3261] and INET-ADDRESS-MIB [RFC4001].

Finally, this MIB module makes informative references to several RFCs in some of the examples described in the DESCRIPTION clauses, including Reliability of Provisional Responses in SIP [RFC3262] and SIP over SCTP [RFC4168].

## 6. Accommodating SIP Extension Methods

The core set of SIP methods is defined in RFC 3261 [RFC3261]. Other IETF RFCs define additional methods. In the future, additional methods may be defined. In order to avoid having to update the SIP-COMMON-MIB module to accommodate these extension methods, we use a method identifier name (SipTCMethodName TEXTUAL-CONVENTION) to represent all SIP methods registered with IANA.

For example, the sipCommonMethodSupportedTable is the main table for listing all of the SIP methods supported by a system, including the SIP methods defined in RFC 3261 [RFC3261] and other SIP methods registered with IANA. The table is informational in nature and populated by the system. Entries cannot be added or deleted by an SNMP manager.

The SIP specification (RFC 3261 [RFC3261], Section 27.4) establishes the sub-registries for SIP Methods and Response Codes under <http://www.iana.org/assignments/sip-parameters>. This document uses the existing sub-registry for the names of registered SIP methods.

For example, in the sipCommonMethodSupportedTable of SIP-COMMON-MIB, the sipCommonMethodSupportedName values can be represented as follows:

```

+-----+
| sipCommonMethodSupportedName |
+-----+
|                                     |
|          "ACK"                     |
|          "BYE"                     |
|          "CANCEL"                  |
|          "INVITE"                  |
|          "OPTIONS"                 |
|                                     |
+-----+

```

## 7. Definitions

### 7.1. SIP Textual Conventions

SIP-TC-MIB DEFINITIONS ::= BEGIN

#### IMPORTS

```
MODULE-IDENTITY,  
mib-2  
    FROM SNMPv2-SMI          -- RFC 2578  
  
TEXTUAL-CONVENTION  
    FROM SNMPv2-TC;         -- RFC 2579
```

#### sipTC MODULE-IDENTITY

```
LAST-UPDATED "200704200000Z"  
ORGANIZATION "IETF Session Initiation Protocol Working Group"  
CONTACT-INFO  
    "SIP WG email: sip@ietf.org
```

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#### DESCRIPTION

```
"Session Initiation Protocol (SIP) MIB TEXTUAL-CONVENTION  
module used by other SIP-related MIB Modules.
```

```
Copyright (C) The IETF Trust (2007).  This version of  
this MIB module is part of RFC 4780; see the RFC itself for
```

```
        full legal notices."
REVISION      "200704200000Z"
DESCRIPTION
    "Initial version of the IETF SIP-TC-MIB module.  This version
    published as part of RFC 4780."
 ::= { mib-2 148 }

--
-- Textual Conventions
--

SipTCTransportProtocol ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This convention is a bit map.  Each bit represents a transport
        protocol.  If a bit has value 1, then that selected transport
        protocol is in some way dependent on the context of the object
        using this convention.  If a bit has value 0, then that
        transport protocol is not selected.  Combinations of bits can
        be set when multiple transport protocols are selected.

        bit 0: a protocol other than those defined here
        bit 1: User Datagram Protocol
        bit 2: Transmission Control Protocol
        bit 3: Stream Control Transmission Protocol
        bit 4: Transport Layer Security Protocol over TCP
        bit 5: Transport Layer Security Protocol over SCTP
        "
    REFERENCE   "RFC 3261, Section 18 and RFC 4168"
    SYNTAX      BITS {
        other(0),  -- none of the following
        udp(1),
        tcp(2),
        sctp(3),   -- RFC4168
        tlsTcp(4),
        tlsSctp(5) -- RFC 4168
    }

SipTCEntityRole ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "This convention defines the role of a SIP entity.  Examples of
        SIP entities are proxies, user agents, redirect servers,
        registrars, or combinations of the above.

        User Agent (UA): A logical entity that can act as both a user
        agent client and user agent server.
```

User Agent Client (UAC): A logical entity that creates a new request, and then uses the client transaction state machinery to send it. The role of UAC lasts only for the duration of that transaction. In other words, if a piece of software initiates a request, it acts as a UAC for the duration of that transaction. If it receives a request later, it assumes the role of a user agent server for the processing of that transaction.

User Agent Server (UAS): A logical entity that generates a response to a SIP request. The response accepts, rejects, or redirects the request. This role lasts only for the duration of that transaction. In other words, if a piece of software responds to a request, it acts as a UAS for the duration of that transaction. If it generates a request later, it assumes the role of a user agent client for the processing of that transaction.

Proxy, Proxy Server: An intermediary entity that acts as both a server and a client for the purpose of making requests on behalf of other clients. A proxy server primarily plays the role of routing, which means its job is to ensure that a request is sent to another entity 'closer' to the targeted user. Proxies are also useful for enforcing policy. A proxy interprets and, if necessary, rewrites specific parts of a request message before forwarding it.

Redirect Server: A redirect server is a user agent server that generates 3xx responses to requests it receives, directing the client to contact an alternate set of URIs.

Registrar: A registrar is a server that accepts REGISTER requests and places the information it receives in those requests into the location service for the domain it handles."

#### REFERENCE

"RFC 3261, Section 6"

```
SYNTAX      BITS {
                other(0),
                userAgent(1),
                proxyServer(2),
                redirectServer(3),
                registrarServer(4)
            }
```

SipTCOptionTagHeaders ::= TEXTUAL-CONVENTION

STATUS current

#### DESCRIPTION

"This convention defines the header fields that use the option

tags per Section 19.2 of RFC 3261. These tags are used in Require (Section 20.32), Proxy-Require (Section 20.29), Supported (Section 20.37), and Unsupported (Section 20.40) header fields."

## REFERENCE

"RFC 3261, Sections 19.2, 20.32, 20.29, 20.37, and 20.40"

```
SYNTAX      BITS {
                require(0),          -- Require header
                proxyRequire(1),     -- Proxy-Require header
                supported(2),        -- Supported header
                unsupported(3)       -- Unsupported header
            }
```

SipTCMethodName ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"This TEXTUAL-CONVENTION is a string that uniquely identifies a SIP method. The scope of uniqueness is the context of all defined SIP methods.

Experimental support of extension methods is acceptable and expected. Extension methods are those defined in Internet-Draft documents but not yet allocated and officially sanctioned by IANA.

To support experimental extension methods, any object using this TEXTUAL-CONVENTION as syntax MAY return/accept a method identifier value other than those sanctioned by IANA. That system MUST ensure no collisions with officially assigned method names."

## REFERENCE

"RFC 3261, Section 27.4"

```
SYNTAX      OCTET STRING (SIZE (1..100))
```

END

## 7.2. SIP Common MIB Module

SIP-COMMON-MIB DEFINITIONS ::= BEGIN

## IMPORTS

```
MODULE-IDENTITY,
OBJECT-TYPE,
NOTIFICATION-TYPE,
Counter32,
Gauge32,
TimeTicks,
Unsigned32,
```

```
mib-2
    FROM SNMPv2-SMI                -- RFC 2578

RowStatus,
TimeStamp,
TruthValue
    FROM SNMPv2-TC                -- RFC 2579

MODULE-COMPLIANCE,
OBJECT-GROUP,
NOTIFICATION-GROUP
    FROM SNMPv2-CONF              -- RFC 2580

SnmAdminString
    FROM SNMP-FRAMEWORK-MIB        -- RFC 3411

SipTCTransportProtocol,
SipTCMethodName,
SipTCEntityRole,
SipTCOptionTagHeaders
    FROM SIP-TC-MIB                -- RFC 4780

applIndex
    FROM NETWORK-SERVICES-MIB      -- RFC 2788

InetPortNumber
    FROM INET-ADDRESS-MIB;         -- RFC 4001

sipCommonMIB MODULE-IDENTITY
    LAST-UPDATED "200704200000Z"
    ORGANIZATION "IETF Session Initiation Protocol Working Group"
    CONTACT-INFO
        "SIP WG email: sip@ietf.org

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## DESCRIPTION

"Session Initiation Protocol (SIP) Common MIB module. This module defines objects that may be common to all SIP entities.

SIP is an application-layer signaling protocol for creating, modifying and terminating multimedia sessions with one or more participants. These sessions include Internet multimedia conferences and Internet telephone calls. SIP is defined in RFC 3261 (June 2002).

This MIB is defined for managing objects that are common to SIP User Agents (UAs), Proxy, Redirect, and Registrar servers. Objects specific to each of these entities MAY be managed using entity specific MIBs defined in other modules.

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REVISION "200704200000Z"

## DESCRIPTION

"Initial version of the IETF SIP-COMMON-MIB module. This version published as part of RFC 4780."

::= { mib-2 149 }

-- Top-Level Components of this MIB.

sipCommonMIBNotifications OBJECT IDENTIFIER ::= { sipCommonMIB 0 }

sipCommonMIBObjects OBJECT IDENTIFIER ::= { sipCommonMIB 1 }

sipCommonMIBConformance OBJECT IDENTIFIER ::= { sipCommonMIB 2 }

--

-- This MIB contains objects that are common to all SIP entities.

--

-- Common basic configuration

sipCommonCfgBase OBJECT IDENTIFIER ::= { sipCommonMIBObjects 1 }

-- Protocol timer configuration

sipCommonCfgTimer OBJECT IDENTIFIER ::= { sipCommonMIBObjects 2 }

-- SIP message summary statistics

```

sipCommonSummaryStats OBJECT IDENTIFIER ::= { sipCommonMIBObjects 3 }

-- Per method statistics
sipCommonMethodStats OBJECT IDENTIFIER ::= { sipCommonMIBObjects 4 }

-- Per Status code or status code class statistics
sipCommonStatusCode OBJECT IDENTIFIER ::= { sipCommonMIBObjects 5 }

-- Transaction statistics
sipCommonStatsTrans OBJECT IDENTIFIER ::= { sipCommonMIBObjects 6 }

-- Method retry statistics
sipCommonStatsRetry OBJECT IDENTIFIER ::= { sipCommonMIBObjects 7 }

-- Other statistics
sipCommonOtherStats OBJECT IDENTIFIER ::= { sipCommonMIBObjects 8 }

-- Accessible-for-notify objects
sipCommonNotifObjects OBJECT IDENTIFIER ::= { sipCommonMIBObjects 9 }

--
-- Common Configuration Objects
--
sipCommonCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the common configuration objects applicable
         to all SIP entities."
    ::= { sipCommonCfgBase 1 }

sipCommonCfgEntry OBJECT-TYPE
    SYNTAX      SipCommonCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A row of common configuration.

        Each row represents objects for a particular SIP entity
        instance present in this system.  applIndex is used to uniquely
        identify these instances of SIP entities and correlate them
        through the common framework of the NETWORK-SERVICES-MIB (RFC
        2788)."
```

INDEX { applIndex }

```

    ::= { sipCommonCfgTable 1 }

SipCommonCfgEntry ::= SEQUENCE {
```

```

        sipCommonCfgProtocolVersion      SnmpAdminString,
        sipCommonCfgServiceOperStatus    INTEGER,
        sipCommonCfgServiceStartTime     TimeTicks,
        sipCommonCfgServiceLastChange    TimeTicks,
        sipCommonCfgOrganization         SnmpAdminString,
        sipCommonCfgMaxTransactions      Unsigned32,
        sipCommonCfgServiceNotifEnable   BITS,
        sipCommonCfgEntityType           StpTCEntityRole
    }

```

#### sipCommonCfgProtocolVersion OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"This object will reflect the version of SIP supported by this SIP entity. It will follow the same format as SIP version information contained in the SIP messages generated by this SIP entity. For example, entities supporting SIP version 2 will return 'SIP/2.0' as dictated by the standard."

#### REFERENCE

"RFC 3261, Section 7.1"

::= { sipCommonCfgEntry 1 }

#### sipCommonCfgServiceOperStatus OBJECT-TYPE

```

SYNTAX      INTEGER {
                unknown(1),
                up(2),
                down(3),
                congested(4),
                restarting(5),
                quiescing(6),
                testing(7)
            }

```

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"This object contains the current operational state of the SIP application.

```

unknown      : The operational status cannot be determined
                for some reason.
up           : The application is operating normally and is
                processing (receiving and possibly issuing) SIP
                requests and responses.
down        : The application is currently unable to process
                SIP messages.
congested   : The application is operational but no additional

```

inbound transactions can be accommodated at the moment.

restarting : The application is currently unavailable, but it is in the process of restarting and will presumably, soon be able to process SIP messages.

quiescing : The application is currently operational but has been administratively put into quiescence mode. Additional inbound transactions MAY be rejected.

testing : The application is currently in test mode and MAY not be able to process SIP messages.

The operational status values defined for this object are not based on any specific information contained in the SIP standard."

::= { sipCommonCfgEntry 2 }

sipCommonCfgServiceStartTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time the SIP entity was last started. If started prior to the last re-initialization of the local network management subsystem, then this object contains a zero value."

::= { sipCommonCfgEntry 3 }

sipCommonCfgServiceLastChange OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time the SIP entity entered its current operational state. If the current state was entered prior to the last re-initialization of the local network management subsystem, then this object contains a zero value."

::= { sipCommonCfgEntry 4 }

sipCommonCfgOrganization OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains the organization name that the SIP entity inserts into Organization headers of SIP messages processed by this system. If the string is empty, no Organization header is to be generated."

## REFERENCE

"RFC 3261, Section 20.25"

::= { sipCommonCfgEntry 5 }

## sipCommonCfgMaxTransactions OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object indicates the maximum number of simultaneous transactions per second that the SIP entity can manage. In general, the value of this object SHOULD reflect a level of transaction processing per second that is considered high enough to impact the system's CPU and/or memory resources to the point of deteriorating SIP call processing but not high enough to cause catastrophic system failure."

::= { sipCommonCfgEntry 6 }

## sipCommonCfgServiceNotifEnable OBJECT-TYPE

SYNTAX BITS {  
    sipCommonServiceColdStart(0),  
    sipCommonServiceWarmStart(1),  
    sipCommonServiceStatusChanged(2)  
}

MAX-ACCESS read-write

STATUS current

## DESCRIPTION

"This object specifies which SIP service related notifications are enabled. Each bit represents a specific notification. If a bit has a value 1, the associated notification is enabled and will be generated by the SIP entity at the appropriate time.

Support for these notifications is OPTIONAL: either none or all notification values are supported. If an implementation does not support this object, it should return a 'noSuchObject' exception to an SNMP GET operation. If notifications are supported, this object's default value SHOULD reflect sipCommonServiceColdStart and sipCommonServiceWarmStart enabled and sipCommonServiceStatusChanged disabled.

This object value SHOULD persist across reboots."

DEFVAL { { sipCommonServiceColdStart,  
          sipCommonServiceWarmStart } }

::= { sipCommonCfgEntry 7 }

## sipCommonCfgEntityType OBJECT-TYPE

SYNTAX StpTCEntityRole

MAX-ACCESS read-only

```

STATUS      current
DESCRIPTION
    "This object identifies the list of SIP entities to which this
    row is related.  It is defined as a bit map.  Each bit
    represents a type of SIP entity.  If a bit has value 1, the
    SIP entity represented by this row plays the role of this
    entity type.  If a bit has value 0, the SIP entity represented
    by this row does not act as this entity type.  Combinations
    of bits can be set when the SIP entity plays multiple SIP
    roles."
 ::= { sipCommonCfgEntry 8 }

--
-- Support for multiple ports
--
sipCommonPortTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the list of ports that each SIP entity in
        this system is allowed to use.  These ports can be advertised
        using the Contact header in a REGISTER request or response."
    ::= { sipCommonCfgBase 2 }

sipCommonPortEntry OBJECT-TYPE
    SYNTAX      SipCommonPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Specification of a particular port.

        Each row represents those objects for a particular SIP entity
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP entities and correlate them through
        the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."
```

INDEX { applIndex, sipCommonPort }

```

 ::= { sipCommonPortTable 1 }

SipCommonPortEntry ::= SEQUENCE {
    sipCommonPort          InetPortNumber,
    sipCommonPortTransportRcv  SipTCTransportProtocol
}

sipCommonPort OBJECT-TYPE
    SYNTAX      InetPortNumber (1..65535)
    MAX-ACCESS  not-accessible
    STATUS      current

```

## DESCRIPTION

"This object reflects a particular port that can be used by the SIP application."

::= { sipCommonPortEntry 1 }

sipCommonPortTransportRcv OBJECT-TYPE

SYNTAX StpTCTransportProtocol

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object will specify the transport protocol the SIP entity will use to receive SIP messages."

This object is a bit map. Each bit represents a transport protocol. If a bit has value 1, then that transport protocol is currently being used. If a bit has value 0, then that transport protocol is currently not being used."

::= { sipCommonPortEntry 2 }

--

-- Support for SIP option tags (SIP extensions).

-- SIP extensions MAY be supported or required by SIP entities.

--

sipCommonOptionTagTable OBJECT-TYPE

SYNTAX SEQUENCE OF SipCommonOptionTagEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains a list of the SIP option tags (SIP extensions) that are either required, supported, or unsupported by the SIP entity. These option tags are used in the Require, Proxy-Require, Supported, and Unsupported header fields."

Example: If a user agent client supports, and requires the server to support, reliability of provisional responses (RFC 3262), this table contains a row with the option tag string '100rel' in sipCommonOptionTag and the OCTET STRING value of '1010 0000' or '0xA0' in sipCommonOptionTagHeaderField.

If a server does not support the required feature (indicated in a Require header to a UAS, or in a Proxy-Require to a Proxy Server), the server returns a 420 Bad Extension listing the feature in an Unsupported header.

Normally, the list of such features supported by an entity is static (i.e., will not change over time)."

## REFERENCE

"RFC 3261, Sections 19.2, 20.32, 20.29, 20.37, and 20.40"

```
::= { sipCommonCfgBase 3 }
```

## sipCommonOptionTagEntry OBJECT-TYPE

SYNTAX SipCommonOptionTagEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"A particular SIP option tag (extension) supported or unsupported by the SIP entity, and which may be supported or required by a peer.

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

INDEX { applIndex, sipCommonOptionTagIndex }

```
::= { sipCommonOptionTagTable 1 }
```

```
SipCommonOptionTagEntry ::= SEQUENCE {
```

```
    sipCommonOptionTagIndex      Unsigned32,
```

```
    sipCommonOptionTag          SnmpAdminString,
```

```
    sipCommonOptionTagHeaderField SiptCOptionTagHeaders
```

```
}
```

## sipCommonOptionTagIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This object uniquely identifies a conceptual row in the table."

```
::= { sipCommonOptionTagEntry 1 }
```

## sipCommonOptionTag OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object indicates the SIP option tag. The option tag names are registered with IANA and available at <http://www.iana.org>."

REFERENCE "RFC 3261, Section 27.1"

```
::= { sipCommonOptionTagEntry 2 }
```

## sipCommonOptionTagHeaderField OBJECT-TYPE

SYNTAX SiptCOptionTagHeaders

MAX-ACCESS read-only

STATUS current



## DESCRIPTION

"This object indicates whether the SIP option tag is supported (Supported header), unsupported (Unsupported header), or required (Require or Proxy-Require header) by the SIP entity. A SIP option tag may be both supported and required."

```
::= { sipCommonOptionTagEntry 3 }
```

```
--
```

```
-- Supported SIP Methods
```

```
--
```

```
sipCommonMethodSupportedTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF SipCommonMethodSupportedEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

## DESCRIPTION

"This table contains a list of methods supported by each SIP entity in this system (see the standard set of SIP methods in Section 7.1 of RFC 3261). Any additional methods that may be incorporated into the SIP protocol can be represented by this table without any requirement to update this MIB module.

The table is informational in nature and conveys capabilities of the managed system to the SNMP Manager.

From a protocol point of view, the list of methods advertised by the SIP entity in the Allow header (Section 20.5 of RFC 3261) MUST be consistent with the methods reflected in this table."

```
::= { sipCommonCfgBase 4 }
```

```
sipCommonMethodSupportedEntry OBJECT-TYPE
```

```
SYNTAX      SipCommonMethodSupportedEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

## DESCRIPTION

"A particular method supported by the SIP entity.

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

```
INDEX { applIndex, sipCommonMethodSupportedIndex }
```

```
::= { sipCommonMethodSupportedTable 1 }
```

```
SipCommonMethodSupportedEntry ::= SEQUENCE {
```

```
    sipCommonMethodSupportedIndex    Unsigned32,
```

```
    sipCommonMethodSupportedName      SipTCMethodName
```

```
}
```

```
sipCommonMethodSupportedIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This object uniquely identifies a conceptual row in the table
        and reflects an assigned number used to identify a specific
        SIP method.

        This identifier is suitable for referencing the associated
        method throughout this and other MIBs supported by this managed
        system."
    ::= { sipCommonMethodSupportedEntry 1 }

sipCommonMethodSupportedName OBJECT-TYPE
    SYNTAX      StpTCMethodName
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object reflects the supported method's name.  The method
        name MUST be all upper case (e.g., 'INVITE')."
    ::= { sipCommonMethodSupportedEntry 2 }

--
-- SIP Timer Configuration
--

sipCommonCfgTimerTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonCfgTimerEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains timer configuration objects applicable to
        SIP user agent and SIP stateful Proxy Server entities."
    ::= { sipCommonCfgTimer 1 }

sipCommonCfgTimerEntry OBJECT-TYPE
    SYNTAX      SipCommonCfgTimerEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "A row of timer configuration.

        Each row represents those objects for a particular SIP entity
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP entities and correlate them through
        the common framework of the NETWORK-SERVICES-MIB (RFC 2788).
        The objects in this table entry SHOULD be non-volatile and
        their value SHOULD be kept at reboot."
```

```

INDEX { applIndex }
 ::= { sipCommonCfgTimerTable 1 }

```

```

SipCommonCfgTimerEntry ::= SEQUENCE {
    sipCommonCfgTimerA      Unsigned32,
    sipCommonCfgTimerB      Unsigned32,
    sipCommonCfgTimerC      Unsigned32,
    sipCommonCfgTimerD      Unsigned32,
    sipCommonCfgTimerE      Unsigned32,
    sipCommonCfgTimerF      Unsigned32,
    sipCommonCfgTimerG      Unsigned32,
    sipCommonCfgTimerH      Unsigned32,
    sipCommonCfgTimerI      Unsigned32,
    sipCommonCfgTimerJ      Unsigned32,
    sipCommonCfgTimerK      Unsigned32,
    sipCommonCfgTimerT1     Unsigned32,
    sipCommonCfgTimerT2     Unsigned32,
    sipCommonCfgTimerT4     Unsigned32
}

```

sipCommonCfgTimerA OBJECT-TYPE

SYNTAX Unsigned32 (100..1000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the initial value for the retransmit timer for the INVITE method. The retransmit timer doubles after each retransmission, ensuring an exponential backoff in network traffic. This object represents the initial time a SIP entity will wait to receive a provisional response to an INVITE before resending the INVITE request."

REFERENCE

"RFC 3261, Section 17.1.1.2"

DEFVAL { 500 }

::= { sipCommonCfgTimerEntry 1 }

sipCommonCfgTimerB OBJECT-TYPE

SYNTAX Unsigned32 (32000..300000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the maximum time a SIP entity will wait to receive a final response to an INVITE. The timer is started upon transmission of the initial INVITE request."

REFERENCE

"RFC 3261, Section 17.1.1.2"

```
    DEFVAL { 32000 }
 ::= { sipCommonCfgTimerEntry 2 }

sipCommonCfgTimerC OBJECT-TYPE
    SYNTAX      Unsigned32 (180000..300000)
    UNITS       "milliseconds"
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the maximum time a SIP Proxy Server will
        wait to receive a provisional response to an INVITE. The Timer
        C MUST be set for each client transaction when an INVITE
        request is proxied."
    REFERENCE
        "RFC 3261, Section 16.6"
    DEFVAL { 180000 }
 ::= { sipCommonCfgTimerEntry 3 }

sipCommonCfgTimerD OBJECT-TYPE
    SYNTAX      Unsigned32 (0..300000)
    UNITS       "milliseconds"
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the amount of time that the server
        transaction can remain in the 'Completed' state when unreliable
        transports are used. The default value MUST be equal to or
        greater than 32000 for UDP transport, and its value MUST be 0
        for TCP/SCTP transport."
    REFERENCE
        "RFC 3261, Section 17.1.1.2"
    DEFVAL { 32000 }
 ::= { sipCommonCfgTimerEntry 4 }

sipCommonCfgTimerE OBJECT-TYPE
    SYNTAX      Unsigned32 (100..1000)
    UNITS       "milliseconds"
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the initial value for the retransmit timer
        for a non-INVITE method while in 'Trying' state. The
        retransmit timer doubles after each retransmission until it
        reaches T2 to ensure an exponential backoff in network traffic.
        This object represents the initial time a SIP entity will wait
        to receive a provisional response to the request before
        resending the non-INVITE request."
    REFERENCE
```

```
    "RFC 3261, Section 17.1.2.2"
    DEFVAL { 500 }
    ::= { sipCommonCfgTimerEntry 5 }
```

```
sipCommonCfgTimerF OBJECT-TYPE
    SYNTAX      Unsigned32 (32000..300000)
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object reflects the maximum time a SIP entity will wait to
        receive a final response to a non-INVITE request. The timer is
        started upon transmission of the initial request."
    REFERENCE
        "RFC 3261, Section 17.1.2.2"
    DEFVAL { 32000 }

    ::= { sipCommonCfgTimerEntry 6 }
```

```
sipCommonCfgTimerG OBJECT-TYPE
    SYNTAX      Unsigned32 (0..1000)
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object reflects the initial value for the retransmit timer
        for final responses to INVITE requests. If timer G fires, the
        response is passed to the transport layer again for
        retransmission, and timer G is set to fire in MIN(2*T1, T2)
        seconds. From then on, when timer G fires, the response is
        passed to the transport layer again for transmission, and timer G is
        reset with a value that doubles, unless that value exceeds T2,
        in which case, it is reset with the value of T2. The default
        value MUST be T1 for UDP transport, and its value MUST be 0 for
        reliable transport like TCP/SCTP."
    REFERENCE
        "RFC 3261, Section 17.2.1"
    DEFVAL { 500 }
    ::= { sipCommonCfgTimerEntry 7 }
```

```
sipCommonCfgTimerH OBJECT-TYPE
    SYNTAX      Unsigned32 (32000..300000)
    UNITS        "milliseconds"
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object reflects the maximum time a server will wait to
        receive an ACK before it abandons retransmitting the response."
```

The timer is started upon entering the 'Completed' state."

## REFERENCE

"RFC 3261, Section 17.2.1"

DEFVAL { 32000 }

::= { sipCommonCfgTimerEntry 8 }

sipCommonCfgTimerI OBJECT-TYPE

SYNTAX Unsigned32 (0..10000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the maximum time a SIP entity will wait to receive additional ACK message retransmissions.

The timer is started upon entering the 'Confirmed' state. The default value MUST be T4 for UDP transport and its value MUST be 0 for reliable transport like TCP/SCTP."

## REFERENCE

"RFC 3261, Section 17.2.1"

DEFVAL { 5000 }

::= { sipCommonCfgTimerEntry 9 }

sipCommonCfgTimerJ OBJECT-TYPE

SYNTAX Unsigned32 (32000..300000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the maximum time a SIP server will wait to receive retransmissions of non-INVITE requests. The timer is started upon entering the 'Completed' state for non-INVITE transactions. When timer J fires, the server MUST transition to the 'Terminated' state."

## REFERENCE

"RFC 3261, Section 17.2.2"

DEFVAL { 32000 }

::= { sipCommonCfgTimerEntry 10 }

sipCommonCfgTimerK OBJECT-TYPE

SYNTAX Unsigned32 (0..10000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the maximum time a SIP client will wait to receive retransmissions of responses to non-INVITE requests. The timer is started upon entering the 'Completed' state for

non-INVITE transactions. When timer K fires, the server MUST transition to the 'Terminated' state. The default value MUST be T4 for UDP transport, and its value MUST be 0 for reliable transport like TCP/SCTP."

## REFERENCE

"RFC 3261, Section 17.1.2.2"

DEFVAL { 5000 }

::= { sipCommonCfgTimerEntry 11 }

## sipCommonCfgTimerT1 OBJECT-TYPE

SYNTAX Unsigned32 (200..10000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the T1 timer for a SIP entity. T1 is an estimate of the round-trip time (RTT) between the client and server transactions."

## REFERENCE

"RFC 3261, Section 17"

DEFVAL { 500 }

::= { sipCommonCfgTimerEntry 12 }

## sipCommonCfgTimerT2 OBJECT-TYPE

SYNTAX Unsigned32 (200..10000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the T2 timer for a SIP entity. T2 is the maximum retransmit interval for non-INVITE requests and INVITE responses. It's used in various parts of the protocol to reset other Timer\* objects to this value."

## REFERENCE

"RFC 3261, Section 17"

DEFVAL { 4000 }

::= { sipCommonCfgTimerEntry 13 }

## sipCommonCfgTimerT4 OBJECT-TYPE

SYNTAX Unsigned32 (200..10000)

UNITS "milliseconds"

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the T4 timer for a SIP entity. T4 is the maximum duration a message will remain in the network. It represents the amount of time the network will take to clear messages between client and server transactions. It's used in

```

        various parts of the protocol to reset other Timer* objects to
        this value."
REFERENCE
    "RFC 3261, Section 17"
DEFVAL { 5000 }
 ::= { sipCommonCfgTimerEntry 14 }

--
-- Common Statistics Objects
--

--
-- Summary Statistics
--
sipCommonSummaryStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonSummaryStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the summary statistics objects applicable
        to all SIP entities.  Each row represents those objects for a
        particular SIP entity present in this system."
    ::= { sipCommonSummaryStats 1 }

sipCommonSummaryStatsEntry OBJECT-TYPE
    SYNTAX      SipCommonSummaryStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A row of summary statistics.

        Each row represents those objects for a particular SIP entity
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP entities and correlate them through
        the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."
```

INDEX { applIndex }	
::= { sipCommonSummaryStatsTable 1 }	

```

SipCommonSummaryStatsEntry ::= SEQUENCE {
    sipCommonSummaryInRequests      Counter32,
    sipCommonSummaryOutRequests     Counter32,
    sipCommonSummaryInResponses     Counter32,
    sipCommonSummaryOutResponses    Counter32,
    sipCommonSummaryTotalTransactions Counter32,
    sipCommonSummaryDisconTime      TimeStamp
}

sipCommonSummaryInRequests OBJECT-TYPE
```



SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"This object indicates the total number of SIP request messages received by the SIP entity, including retransmissions.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonSummaryDisconTime object in the same row."

::= { sipCommonSummaryStatsEntry 1 }

sipCommonSummaryOutRequests OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"This object contains the total number of SIP request messages sent out (originated and relayed) by the SIP entity. Where a particular message is sent more than once, for example as a retransmission or as a result of forking, each transmission is counted separately.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonSummaryDisconTime object in the same row."

::= { sipCommonSummaryStatsEntry 2 }

sipCommonSummaryInResponses OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"This object contains the total number of SIP response messages received by the SIP entity, including retransmissions.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonSummaryDisconTime object in the same row."

::= { sipCommonSummaryStatsEntry 3 }

sipCommonSummaryOutResponses OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"This object contains the total number of SIP response messages sent (originated and relayed) by the SIP entity including retransmissions.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonSummaryDisconTime object in the same row."

::= { sipCommonSummaryStatsEntry 4 }

sipCommonSummaryTotalTransactions OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"This object contains a count of the number of transactions that are in progress and transactions that have reached the 'Terminated' state. It is not applicable to stateless SIP Proxy Servers.

A SIP transaction occurs between a client and a server, and comprises all messages from the first request sent from the client to the server, up to a final (non-1xx) response sent from the server to the client.

If the request is INVITE and the final response is a non-2xx, the transaction also include an ACK to the response. The ACK for a 2xx response to an INVITE request is a separate transaction.

The branch ID parameter in the Via header field values serves as a transaction identifier.

A transaction is identified by the CSeq sequence number within a single call leg. The ACK request has the same CSeq number as the corresponding INVITE request, but comprises a transaction of its own.

In the case of a forked request, each branch counts as a single transaction.

For a transaction stateless Proxy Server, this counter is always 0.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonSummaryDisconTime object in the same row."

```
::= { sipCommonSummaryStatsEntry 5 }
```

```
sipCommonSummaryDisconTime OBJECT-TYPE
```

```
SYNTAX          TimeStamp
```

```
MAX-ACCESS      read-only
```

```
STATUS          current
```

```
DESCRIPTION
```

"The value of the sysUpTime object when the counters for the summary statistics objects in this row last experienced a discontinuity."

```
::= { sipCommonSummaryStatsEntry 6 }
```

```
--
```

```
-- SIP Method Statistics
```

```
-- Total counts for each SIP method.
```

```
--
```

```
sipCommonMethodStatsTable OBJECT-TYPE
```

```
SYNTAX          SEQUENCE OF SipCommonMethodStatsEntry
```

```
MAX-ACCESS      not-accessible
```

```
STATUS          current
```

```
DESCRIPTION
```

"This table contains the method statistics objects for SIP entities. Each row represents those objects for a particular SIP entity present in this system."

```
::= { sipCommonMethodStats 1 }
```

```
sipCommonMethodStatsEntry OBJECT-TYPE
```

```
SYNTAX          SipCommonMethodStatsEntry
```

```
MAX-ACCESS      not-accessible
```

```
STATUS          current
```

```
DESCRIPTION
```

"A row of per entity method statistics.

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

```
INDEX { applIndex, sipCommonMethodStatsName }
```

```
::= { sipCommonMethodStatsTable 1 }
```

```
SipCommonMethodStatsEntry ::= SEQUENCE {
```

```
    sipCommonMethodStatsName  SipTCMethodName,
```

```
    sipCommonMethodStatsOutbounds Counter32,
```

```
        sipCommonMethodStatsInbounds      Counter32,
        sipCommonMethodStatsDisconTime    TimeStamp
    }

sipCommonMethodStatsName OBJECT-TYPE
    SYNTAX      StpTCMethodName
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object uniquely identifies the SIP method related to the
         objects in a particular row."
    ::= { sipCommonMethodStatsEntry 1 }

sipCommonMethodStatsOutbounds OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the total number of requests sent by the
         SIP entity, excluding retransmissions. Retransmissions are
         counted separately and are not reflected in this counter. A
         Management Station can detect discontinuities in this counter
         by monitoring the sipCommonMethodStatsDisconTime object in the
         same row."
    REFERENCE
        "RFC 3261, Section 7.1"
    ::= { sipCommonMethodStatsEntry 2 }

sipCommonMethodStatsInbounds OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the total number of requests received by
         the SIP entity. Retransmissions are counted separately and are
         not reflected in this counter. A Management Station can detect
         discontinuities in this counter by monitoring the
         sipCommonMethodStatsDisconTime object in the same row."
    REFERENCE
        "RFC 3261, Section 7.1"
    ::= { sipCommonMethodStatsEntry 3 }

sipCommonMethodStatsDisconTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```

        "The value of the sysUpTime object when the counters for the
        method statistics objects in this row last experienced a
        discontinuity."
 ::= { sipCommonMethodStatsEntry 4 }

--
-- Support for specific status codes
--
sipCommonStatusCodeTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonStatusCodeEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains the list of SIP status codes that each SIP
        entity in this system has been requested to monitor. It is the
        mechanism by which specific status codes are monitored.
        Entries created in this table must not persist across reboots."
 ::= { sipCommonStatusCode 1 }

sipCommonStatusCodeEntry OBJECT-TYPE
    SYNTAX      SipCommonStatusCodeEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This row contains information on a particular SIP status code
        that the SIP entity has been requested to monitor. Entries
        created in this table must not persist across reboots.

        Each row represents those objects for a particular SIP entity
        present in this system. applIndex is used to uniquely identify
        these instances of SIP entities and correlate them through
        the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."
```

INDEX { applIndex, sipCommonStatusCodeMethod,  
       sipCommonStatusCodeValue }

```

 ::= { sipCommonStatusCodeTable 1 }

SipCommonStatusCodeEntry ::= SEQUENCE {
    sipCommonStatusCodeMethod    SipTCMethodName,
    sipCommonStatusCodeValue     Unsigned32,
    sipCommonStatusCodeIns       Counter32,
    sipCommonStatusCodeOuts      Counter32,
    sipCommonStatusCodeRowStatus RowStatus,
    sipCommonStatusCodeDisconTime TimeStamp
}

sipCommonStatusCodeMethod OBJECT-TYPE
    SYNTAX      SipTCMethodName
    MAX-ACCESS   not-accessible

```

STATUS current

DESCRIPTION

"This object uniquely identifies a conceptual row in the table."

::= { sipCommonStatusCodeEntry 1 }

sipCommonStatusCodeValue OBJECT-TYPE

SYNTAX Unsigned32 (100..999)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This object contains a SIP status code value that the SIP entity has been requested to monitor. All of the other information in the row is related to this value."

::= { sipCommonStatusCodeEntry 2 }

sipCommonStatusCodeIns OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the total number of response messages received by the SIP entity with the status code value contained in the sipCommonStatusCodeValue column."

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service, or when the monitoring of the status code is temporarily disabled. A Management Station can detect discontinuities in this counter by monitoring the sipCommonStatusCodeDisconTime object in the same row."

::= { sipCommonStatusCodeEntry 3 }

sipCommonStatusCodeOuts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the total number of response messages sent by the SIP entity with the status code value contained in the sipCommonStatusCodeValue column."

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service, or when the monitoring of the Status code is temporarily disabled. A Management Station can detect discontinuities in this counter by monitoring the sipCommonStatusCodeDisconTime object in the same row."

```
 ::= { sipCommonStatusCodeEntry 4 }

sipCommonStatusCodeRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The row augmentation in sipCommonStatusCodeNotifTable will be
        governed by the value of this RowStatus.

        The values 'createAndGo' and 'destroy' are the only valid
        values allowed for this object.  If a row exists, it will
        reflect a status of 'active' when queried."
    ::= { sipCommonStatusCodeEntry 5 }

sipCommonStatusCodeDisconTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The value of the sysUpTime object when the counters for the
        status code statistics objects in this row last experienced
        a discontinuity."
    ::= { sipCommonStatusCodeEntry 6 }

--
-- Support for specific status code notifications
--

sipCommonStatusCodeNotifTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonStatusCodeNotifEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains objects to control notifications related to
        particular status codes that each SIP entity in this system has
        been requested to monitor.

        There is an entry in this table corresponding to each entry in
        sipCommonStatusCodeTable.  Therefore, this table augments
        sipCommonStatusCodeTable and utilizes the same index
        methodology.

        The objects in this table are not included directly in the
        sipCommonStatusCodeTable simply to keep the status code
        notification control objects separate from the actual status
        code statistics."
    ::= { sipCommonStatusCode 2 }
```

```

sipCommonStatusCodeNotifEntry OBJECT-TYPE
    SYNTAX      SipCommonStatusCodeNotifEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This row contains information controlling notifications for a
        particular SIP status code that the SIP entity has been
        requested to monitor."
    AUGMENTS { sipCommonStatusCodeEntry }
    ::= { sipCommonStatusCodeNotifTable 1 }

SipCommonStatusCodeNotifEntry ::= SEQUENCE {
    sipCommonStatusCodeNotifSend      TruthValue,
    sipCommonStatusCodeNotifEmitMode  INTEGER,
    sipCommonStatusCodeNotifThresh    Unsigned32,
    sipCommonStatusCodeNotifInterval  Unsigned32
}

sipCommonStatusCodeNotifSend OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This object controls whether a sipCommonStatusCodeNotif is
        emitted when the status code value specified by
        sipCommonStatusCodeValue is sent or received.  If the value of
        this object is 'true', then a notification is sent.  If it is
        'false', no notification is sent.
        Note well that a notification MAY be emitted for every message
        sent or received that contains the particular status code.
        Depending on the status code involved, this can cause a
        significant number of notification emissions that could be
        detrimental to network performance.  Managers are forewarned to
        be prudent in the use of this object to enable notifications.
        Look to sipCommonStatusCodeNotifEmitMode for alternative
        controls for sipCommonStatusCodeNotif emissions."
    DEFVAL { false }
    ::= { sipCommonStatusCodeNotifEntry 1 }

sipCommonStatusCodeNotifEmitMode OBJECT-TYPE
    SYNTAX      INTEGER {
        normal(1),
        oneShot(2),
        triggered(3)  -- read-only
    }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION

```



"The object sipCommonStatusCodeNotifSend MUST be set to 'true' for the values of this object to have any effect. It is RECOMMENDED that the desired emit mode be established by this object prior to setting sipCommonStatusCodeNotifSend to 'true'. This object and the sipCommonStatusCodeNotifSend object can obviously be set independently, but their respective values will have a dependency on each other and the resulting notifications.

This object specifies the mode for emissions of sipCommonStatusCodeNotif notifications.

normal : sipCommonStatusCodeNotif notifications will be emitted by the system for each SIP response message sent or received that contains the desired status code.

oneShot : Only one sipCommonStatusCodeNotif notification will be emitted. It will be the next SIP response message sent or received that contains the desired status code.

No more notifications are emitted until this object is set to 'oneShot' again or set to 'normal'. This option is provided as a means of quelling the potential promiscuous behavior that can be associated with the sipCommonStatusCodeNotif.

triggered : This value is only readable and cannot be set. It reflects that the 'oneShot' case has occurred, and indicates that the mode needs to be reset to get further notifications. The mode is reset by setting this object to 'oneShot' or 'normal'."

DEFVAL { oneShot }  
::= { sipCommonStatusCodeNotifEntry 2 }

sipCommonStatusCodeNotifThresh OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object specifies the number of response messages sent or received by this system that are considered excessive. Based on crossing that threshold, a sipCommonStatusCodeThreshExceededInNotif notification or a sipCommonStatusCodeThreshExceededOutNotif will be sent. The sipCommonStatusCodeThreshExceededInNotif and

sipCommonStatusCodeThreshExceededOutNotif notifications can be used as an early warning mechanism in lieu of using sipCommonStatusCodeNotif.

Note that the configuration applied by this object will be applied equally to inbound and outbound response messages."

```
DEFVAL { 500 }  
::= { sipCommonStatusCodeNotifEntry 3 }
```

sipCommonStatusCodeNotifInterval OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"This object specifies the time interval over which, if sipCommonStatusCodeThresh is exceeded with respect to sent or received messages, a sipCommonStatusCodeThreshExceededInNotif or sipCommonStatusCodeThreshExceededOutNotif notification will be sent.

Note that the configuration applied by this object will be applied equally to inbound and outbound response messages."

```
DEFVAL { 60 }  
::= { sipCommonStatusCodeNotifEntry 4 }
```

--

-- Transaction Statistics

--

sipCommonTransCurrentTable OBJECT-TYPE

SYNTAX SEQUENCE OF SipCommonTransCurrentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains information on the transactions currently awaiting definitive responses by each SIP entity in this system.

This table does not apply to transaction stateless Proxy Servers."

```
::= { sipCommonStatsTrans 1 }
```

sipCommonTransCurrentEntry OBJECT-TYPE

SYNTAX SipCommonTransCurrentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information on a particular SIP entity's current transactions.

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

```
INDEX { applIndex }
 ::= { sipCommonTransCurrentTable 1 }
```

```
SipCommonTransCurrentEntry ::= SEQUENCE {
    sipCommonTransCurrentactions Gauge32
}
```

```
sipCommonTransCurrentactions OBJECT-TYPE
SYNTAX      Gauge32 (0..4294967295)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This object contains the number of transactions awaiting
    definitive (non-lxx) response. In the case of a forked
    request, each branch counts as a single transaction
    corresponding to the entity identified by applIndex."
 ::= { sipCommonTransCurrentEntry 1 }
```

```
--
```

```
-- SIP Retry Statistics
```

```
--
```

```
-- This group contains various statistics objects about
-- retransmission counts.
```

```
--
```

```
sipCommonStatsRetryTable OBJECT-TYPE
SYNTAX      SEQUENCE OF SipCommonStatsRetryEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table contains retry statistics objects applicable to each
    SIP entity in this system."
 ::= { sipCommonStatsRetry 1 }
```

```
sipCommonStatsRetryEntry OBJECT-TYPE
SYNTAX      SipCommonStatsRetryEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "A row of retry statistics.
```

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

```

INDEX { applIndex, sipCommonStatsRetryMethod }
 ::= { sipCommonStatsRetryTable 1 }

```

```

SipCommonStatsRetryEntry ::= SEQUENCE {
    sipCommonStatsRetryMethod          SipTCMethodName,
    sipCommonStatsRetries              Counter32,
    sipCommonStatsRetryFinalResponses Counter32,
    sipCommonStatsRetryNonFinalResponses Counter32,
    sipCommonStatsRetryDisconTime      TimeStamp
}

```

```

sipCommonStatsRetryMethod OBJECT-TYPE
    SYNTAX      SipTCMethodName
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object uniquely identifies the SIP method related to the
        objects in a row."
    ::= { sipCommonStatsRetryEntry 1 }

```

```

sipCommonStatsRetries OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the total number of request
        retransmissions that have been sent by the SIP entity. Note
        that there could be multiple retransmissions per request.

        Discontinuities in the value of this counter can occur at
        re-initialization of the SIP entity or service. A Management
        Station can detect discontinuities in this counter by
        monitoring the sipCommonStatsRetryDisconTime object in the same
        row."
    ::= { sipCommonStatsRetryEntry 2 }

```

```

sipCommonStatsRetryFinalResponses OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the total number of Final Response retries
        that have been sent by the SIP entity. Note that there could
        be multiple retransmissions per request.

        Discontinuities in the value of this counter can occur at
        re-initialization of the SIP entity or service. A Management
        Station can detect discontinuities in this counter by

```

```
        monitoring the sipCommonStatsRetryDisconTime object in the same
        row."
 ::= { sipCommonStatsRetryEntry 3 }

sipCommonStatsRetryNonFinalResponses OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object reflects the total number of non-Final Response
        retries that have been sent by the SIP entity.

        Discontinuities in the value of this counter can occur at
        re-initialization of the SIP entity or service.  A Management
        Station can detect discontinuities in this counter by
        monitoring the sipCommonStatsRetryDisconTime object in the same
        row."
 ::= { sipCommonStatsRetryEntry 4 }

sipCommonStatsRetryDisconTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The value of the sysUpTime object when the counters for the
        retry statistics objects in this row last experienced a
        discontinuity."
 ::= { sipCommonStatsRetryEntry 5 }

--
-- Other Common Statistics
--

sipCommonOtherStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipCommonOtherStatsEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains other common statistics supported by each
        SIP entity in this system."
 ::= { sipCommonOtherStats 1 }

sipCommonOtherStatsEntry OBJECT-TYPE
    SYNTAX      SipCommonOtherStatsEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "Information on a particular SIP entity's other common
        statistics."
```

Each row represents those objects for a particular SIP entity present in this system. applIndex is used to uniquely identify these instances of SIP entities and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788)."

INDEX { applIndex }

::= { sipCommonOtherStatsTable 1 }

```
SipCommonOtherStatsEntry ::= SEQUENCE {
    sipCommonOtherStatsNumUnsupportedUris      Counter32,
    sipCommonOtherStatsNumUnsupportedMethods   Counter32,
    sipCommonOtherStatsOtherwiseDiscardedMsgs Counter32,
    sipCommonOtherStatsDisconTime              TimeStamp
}
```

sipCommonOtherStatsNumUnsupportedUris OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of RequestURIs received with an unsupported scheme. A server normally responds to such requests with a 400 Bad Request status code.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonOtherStatsDisconTime object in the same row."

::= { sipCommonOtherStatsEntry 1 }

sipCommonOtherStatsNumUnsupportedMethods OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of SIP requests received with unsupported methods. A server normally responds to such requests with a 501 (Not Implemented) or 405 (Method Not Allowed).

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonOtherStatsDisconTime object in the same row."

::= { sipCommonOtherStatsEntry 2 }

sipCommonOtherStatsOtherwiseDiscardedMsgs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only  
 STATUS current  
 DESCRIPTION

"Number of SIP messages received that, for any number of reasons, was discarded without a response.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipCommonOtherStatsDisconTime object in the same row."

::= { sipCommonOtherStatsEntry 3 }

sipCommonOtherStatsDisconTime OBJECT-TYPE

SYNTAX TimeStamp  
 MAX-ACCESS read-only  
 STATUS current  
 DESCRIPTION

"The value of the sysUpTime object when the counters for the statistics objects in this row last experienced a discontinuity."

::= { sipCommonOtherStatsEntry 4 }

--

-- Notification related objects

--

--

-- Status code related notification objects.

--

sipCommonStatusCodeNotifTo OBJECT-TYPE

SYNTAX SnmpAdminString  
 MAX-ACCESS accessible-for-notify  
 STATUS current  
 DESCRIPTION

"This object contains the value of the To header in the message containing the status code that caused the notification. The header name will be part of this object value. For example, 'To: Watson '."

::= { sipCommonNotifObjects 1 }

sipCommonStatusCodeNotifFrom OBJECT-TYPE

SYNTAX SnmpAdminString  
 MAX-ACCESS accessible-for-notify  
 STATUS current  
 DESCRIPTION

"This object contains the value of the From header in the message containing the status code that caused the

notification. The header name will be part of this object value. For example, 'From: Watson'."

```
::= { sipCommonNotifObjects 2 }
```

sipCommonStatusCodeNotifCallId OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object contains the value of the Call-ID in the message containing the status code that caused the notification. The header name will be part of this object value. For example, 'Call-ID: 5551212@example.com'."

```
::= { sipCommonNotifObjects 3 }
```

sipCommonStatusCodeNotifCSeq OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object contains the CSeq value in the message containing the status code that caused the notification. The header name will be part of this object value. For example, 'CSeq: 1722 INVITE'."

```
::= { sipCommonNotifObjects 4 }
```

--

-- General notification related objects.

--

sipCommonNotifApplIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..2147483647)

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object contains the applIndex as described in RFC 2788. This object is created in order to allow a variable binding containing a value of applIndex in a notification."

```
::= { sipCommonNotifObjects 5 }
```

sipCommonNotifSequenceNumber OBJECT-TYPE

SYNTAX Unsigned32 (1..2147483647)

MAX-ACCESS accessible-for-notify

STATUS current

DESCRIPTION

"This object contains a sequence number for each notification generated by this SIP entity. Each notification SHOULD have a unique sequence number. A network manager can use this information to determine whether notifications from a



```
        particular SIP entity have been missed.  The value of this
        object MUST start at 1 and increase by 1 with each generated
        notification.  If a system restarts, the sequence number MAY
        start again from 1."
 ::= { sipCommonNotifObjects 6 }

--
-- Notifications
--
sipCommonStatusCodeNotif NOTIFICATION-TYPE
    OBJECTS {
        sipCommonNotifSequenceNumber,
        sipCommonNotifApplIndex,
        sipCommonStatusCodeNotifTo,
        sipCommonStatusCodeNotifFrom,
        sipCommonStatusCodeNotifCallId,
        sipCommonStatusCodeNotifCSeq,
        sipCommonStatusCodeIns,
        sipCommonStatusCodeOuts
    }
    STATUS      current
    DESCRIPTION
        "Signifies that a specific status code has been sent or received
        by the system."
    ::= { sipCommonMIBNotifications 1 }

sipCommonStatusCodeThreshExceededInNotif NOTIFICATION-TYPE
    OBJECTS {
        sipCommonNotifSequenceNumber,
        sipCommonNotifApplIndex,
        sipCommonStatusCodeIns
    }
    STATUS      current
    DESCRIPTION
        "Signifies that a specific status code was found to have been
        received by the system frequently enough to exceed the
        configured threshold.  This notification can be used as
        an early warning mechanism in lieu of using
        sipCommonStatusNotif."
    ::= { sipCommonMIBNotifications 2 }

sipCommonStatusCodeThreshExceededOutNotif NOTIFICATION-TYPE
    OBJECTS {
        sipCommonNotifSequenceNumber,
        sipCommonNotifApplIndex,
        sipCommonStatusCodeOuts
    }
    STATUS      current
```

## DESCRIPTION

"Signifies that a specific status code was found to have been sent by the system enough to exceed the configured threshold. This notification can be used as an early warning mechanism in lieu of using sipCommonStatusCodeNotif."

::= { sipCommonMIBNotifications 3 }

## sipCommonServiceColdStart NOTIFICATION-TYPE

## OBJECTS {

sipCommonNotifSequenceNumber,  
sipCommonNotifApplIndex,  
sipCommonCfgServiceStartTime

}

STATUS current

## DESCRIPTION

"Signifies that the SIP service has reinitialized itself or started for the first time. This SHOULD result from a hard 'down' to 'up' administrative status change. The configuration or behavior of the service MAY be altered."

::= { sipCommonMIBNotifications 4 }

## sipCommonServiceWarmStart NOTIFICATION-TYPE

## OBJECTS {

sipCommonNotifSequenceNumber,  
sipCommonNotifApplIndex,  
sipCommonCfgServiceLastChange

}

STATUS current

## DESCRIPTION

"Signifies that the SIP service has reinitialized itself and is restarting after an administrative 'reset'. The configuration or behavior of the service MAY be altered."

::= { sipCommonMIBNotifications 5 }

## sipCommonServiceStatusChanged NOTIFICATION-TYPE

## OBJECTS {

sipCommonNotifSequenceNumber,  
sipCommonNotifApplIndex,  
sipCommonCfgServiceLastChange,  
sipCommonCfgServiceOperStatus

}

STATUS current

## DESCRIPTION

"Signifies that the SIP service operational status has changed."

::= { sipCommonMIBNotifications 6 }

--

-- Conformance

```
--
sipCommonMIBCompliances
  OBJECT IDENTIFIER ::= { sipCommonMIBConformance 1 }
sipCommonMIBGroups
  OBJECT IDENTIFIER ::= { sipCommonMIBConformance 2 }

--
-- Compliance Statements
--
sipCommonCompliance MODULE-COMPLIANCE
  STATUS          current
  DESCRIPTION
    "The compliance statement for SIP entities."

  MODULE -- this module
    MANDATORY-GROUPS { sipCommonConfigGroup,
                        sipCommonStatsGroup
                      }

  OBJECT          sipCommonStatusCodeRowStatus
  SYNTAX          RowStatus { active(1) }
  WRITE-SYNTAX    RowStatus { createAndGo(4), destroy(6) }
  DESCRIPTION
    "Support for createAndWait and notInService is not required."

  OBJECT          sipCommonCfgServiceNotifEnable
  MIN-ACCESS      not-accessible
  DESCRIPTION
    "This object is optional and does not need to be supported."

  GROUP          sipCommonInformationalGroup
  DESCRIPTION
    "This group is OPTIONAL. A SIP entity can elect to not provide
    any support for these objects, as they provide optional
    information."

  GROUP          sipCommonConfigTimerGroup
  DESCRIPTION
    "This group is OPTIONAL. A SIP entity can elect to not provide
    any timer configuration."

  GROUP          sipCommonStatsRetryGroup
  DESCRIPTION
    "This group is OPTIONAL. A SIP entity can elect to not provide
    any retry statistics."

  GROUP          sipCommonNotifGroup
  DESCRIPTION
```

"This group is OPTIONAL. A SIP entity can elect to not provide any notifications. If implemented, the sipCommonStatusCodeNotifGroup and sipCommonNotifObjectsGroup MUST also be implemented."

GROUP sipCommonStatusCodeNotifGroup

DESCRIPTION

"This group is OPTIONAL. A SIP entity can elect to not provide any notifications. If implemented, the sipCommonNotifGroup and sipCommonNotifObjectsGroup MUST also be implemented."

GROUP sipCommonNotifObjectsGroup

DESCRIPTION

"This group is OPTIONAL. A SIP entity can elect to not provide any notifications. If implemented, the sipCommonStatusCodeNotifGroup and sipCommonNotifGroup MUST also be implemented."

::= { sipCommonMIBCompliances 1 }

--

-- Units of Conformance

--

sipCommonConfigGroup OBJECT-GROUP

```
OBJECTS {
    sipCommonCfgProtocolVersion,
    sipCommonCfgServiceOperStatus,
    sipCommonCfgServiceStartTime,
    sipCommonCfgServiceLastChange,
    sipCommonPortTransportRcv,
    sipCommonOptionTag,
    sipCommonOptionTagHeaderField,
    sipCommonCfgMaxTransactions,
    sipCommonCfgServiceNotifEnable,
    sipCommonCfgEntityType,
    sipCommonMethodSupportedName
}
```

STATUS current

DESCRIPTION

"A collection of objects providing configuration common to all SIP entities."

::= { sipCommonMIBGroups 1 }

sipCommonInformationalGroup OBJECT-GROUP

```
OBJECTS {
    sipCommonCfgOrganization
}
```

STATUS current

## DESCRIPTION

"A collection of objects providing configuration common to all SIP entities."

::= { sipCommonMIBGroups 2 }

## sipCommonConfigTimerGroup OBJECT-GROUP

OBJECTS {  
    sipCommonCfgTimerA,  
    sipCommonCfgTimerB,  
    sipCommonCfgTimerC,  
    sipCommonCfgTimerD,  
    sipCommonCfgTimerE,  
    sipCommonCfgTimerF,  
    sipCommonCfgTimerG,  
    sipCommonCfgTimerH,  
    sipCommonCfgTimerI,  
    sipCommonCfgTimerJ,  
    sipCommonCfgTimerK,  
    sipCommonCfgTimerT1,  
    sipCommonCfgTimerT2,  
    sipCommonCfgTimerT4  
}

STATUS current

## DESCRIPTION

"A collection of objects providing timer configuration common to all SIP entities."

::= { sipCommonMIBGroups 3 }

## sipCommonStatsGroup OBJECT-GROUP

OBJECTS {  
    sipCommonSummaryInRequests,  
    sipCommonSummaryOutRequests,  
    sipCommonSummaryInResponses,  
    sipCommonSummaryOutResponses,  
    sipCommonSummaryTotalTransactions,  
    sipCommonSummaryDisconTime,  
    sipCommonMethodStatsOutbounds,  
    sipCommonMethodStatsInbounds,  
    sipCommonMethodStatsDisconTime,  
    sipCommonStatusCodeIns,  
    sipCommonStatusCodeOuts,  
    sipCommonStatusCodeRowStatus,  
    sipCommonStatusCodeDisconTime,  
    sipCommonTransCurrentactions,  
    sipCommonOtherStatsNumUnsupportedUris,  
    sipCommonOtherStatsNumUnsupportedMethods,  
    sipCommonOtherStatsOtherwiseDiscardedMsgs,  
    sipCommonOtherStatsDisconTime  
}

```
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects providing statistics common to all SIP
        entities."
    ::= { sipCommonMIBGroups 4 }

sipCommonStatsRetryGroup OBJECT-GROUP
    OBJECTS {
        sipCommonStatsRetries,
        sipCommonStatsRetryFinalResponses,
        sipCommonStatsRetryNonFinalResponses,
        sipCommonStatsRetryDisconTime
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects providing retry statistics."
    ::= { sipCommonMIBGroups 5 }

sipCommonNotifGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        sipCommonStatusCodeNotif,
        sipCommonStatusCodeThreshExceededInNotif,
        sipCommonStatusCodeThreshExceededOutNotif,
        sipCommonServiceColdStart,
        sipCommonServiceWarmStart,
        sipCommonServiceStatusChanged
    }

    STATUS    current
    DESCRIPTION
        "A collection of notifications common to all SIP entities."
    ::= { sipCommonMIBGroups 6 }

sipCommonStatusCodeNotifGroup OBJECT-GROUP
    OBJECTS {
        sipCommonStatusCodeNotifSend,
        sipCommonStatusCodeNotifEmitMode,
        sipCommonStatusCodeNotifThresh,
        sipCommonStatusCodeNotifInterval
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects related to the control and attribution
        of notifications common to all SIP entities."
    ::= { sipCommonMIBGroups 7 }

sipCommonNotifObjectsGroup OBJECT-GROUP
```

```

OBJECTS {
    sipCommonStatusCodeNotifTo,
    sipCommonStatusCodeNotifFrom,
    sipCommonStatusCodeNotifCallId,
    sipCommonStatusCodeNotifCSeq,
    sipCommonNotifApplIndex,
    sipCommonNotifSequenceNumber
}
STATUS    current
DESCRIPTION
    "A collection of accessible-for-notify objects related to the
    notification defined in this MIB module."
 ::= { sipCommonMIBGroups 8 }

```

END

### 7.3. SIP User Agent MIB Module

SIP-UA-MIB DEFINITIONS ::= BEGIN

```

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32,
    mib-2
        FROM SNMPv2-SMI                -- RFC 2578

    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF                -- RFC 2580

    applIndex
        FROM NETWORK-SERVICES-MIB      -- RFC 2788

    InetAddressType,
    InetAddress
        FROM INET-ADDRESS-MIB          -- RFC 4001

    SipTCEntityRole
        FROM SIP-TC-MIB;                 -- RFC 4780

sipUAMIB MODULE-IDENTITY
    LAST-UPDATED      "200704200000Z"
    ORGANIZATION      "IETF Session Initiation Protocol Working Group"
    CONTACT-INFO
        "SIP WG email: sip@ietf.org

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```

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## DESCRIPTION

"Session Initiation Protocol (SIP) User Agent (UA) MIB module.

SIP is an application-layer signaling protocol for creating, modifying, and terminating multimedia sessions with one or more participants. These sessions include Internet multimedia conferences and Internet telephone calls. SIP is defined in RFC 3261 (June 2002).

A User Agent is an application that contains both a User Agent Client (UAC) and a User Agent Server (UAS). A UAC is an application that initiates a SIP request. A UAS is an application that contacts the user when a SIP request is received and that returns a response on behalf of the user. The response accepts, rejects, or redirects the request.

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REVISION "200704200000Z"

## DESCRIPTION

"Initial version of the IETF SIP-UA-MIB module. This version published as part of RFC 4780."

::= { mib-2 150 }

-- Top-Level Components of this MIB.

sipUAMIBObjects OBJECT IDENTIFIER ::= { sipUAMIB 1 }



```

sipUAMIBConformance      OBJECT IDENTIFIER ::= { sipUAMIB 2 }

--
-- This MIB contains objects related to SIP User Agents.
--
sipUACfgServer            OBJECT IDENTIFIER ::= { sipUAMIBObjects 1 }

--
-- SIP Server Configuration
--
sipUACfgServerTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipUACfgServerEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains SIP server configuration objects applicable
         to each SIP user agent in this system."
    ::= { sipUACfgServer 1 }

sipUACfgServerEntry OBJECT-TYPE
    SYNTAX      SipUACfgServerEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A row of server configuration.

        Each row represents those objects for a particular SIP user
        agent present in this system.  applIndex is used to uniquely
        identify these instances of SIP user agents and correlate
        them through the common framework of the NETWORK-SERVICES-MIB
        (RFC 2788).  The same value of applIndex used in the
        corresponding SIP-COMMON-MIB is used here."
    INDEX { applIndex, sipUACfgServerIndex }
    ::= { sipUACfgServerTable 1 }

SipUACfgServerEntry ::= SEQUENCE {
    sipUACfgServerIndex      Unsigned32,
    sipUACfgServerAddressType InetAddressType,
    sipUACfgServerAddress    InetAddress,
    sipUACfgServerRole       SipTCEntityRole
}

sipUACfgServerIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A unique identifier of a server address when multiple addresses

```

are configured by the SIP entity. If one address isn't reachable, then another can be tried."

::= { sipUACfgServerEntry 1 }

sipUACfgServerAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the type of address contained in the associated instance of sipUACfgServerAddress."

REFERENCE

"INET-ADDRESS-MIB (RFC 4001)"

::= { sipUACfgServerEntry 2 }

sipUACfgServerAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the address of a SIP server this user agent will use to proxy/redirect calls. The type of this address is determined by the value of the sipUACfgServerAddressType object."

REFERENCE "INET-ADDRESS-MIB (RFC 4001)"

::= { sipUACfgServerEntry 3 }

sipUACfgServerRole OBJECT-TYPE

SYNTAX SiptCEntityRole

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the function of the SIP server this user agent should communicate with: registrar, proxy (outbound proxy), etc."

::= { sipUACfgServerEntry 4 }

--

-- Conformance

--

sipUAMIBCompliances OBJECT IDENTIFIER ::= { sipUAMIBConformance 1 }

sipUAMIBGroups OBJECT IDENTIFIER ::= { sipUAMIBConformance 2 }

--

-- Compliance Statements

--

sipUACompliance MODULE-COMPLIANCE

STATUS current

```

DESCRIPTION
    "The compliance statement for SIP entities that implement the
    SIP-UA-MIB module."
MODULE -- this module
    MANDATORY-GROUPS { sipUAConfigGroup }

    ::= { sipUAMIBCompliances 1 }

--
-- Units of Conformance
--
sipUAConfigGroup OBJECT-GROUP
    OBJECTS {
        sipUACfgServerAddressType,
        sipUACfgServerAddress,
        sipUACfgServerRole
    }
    STATUS current
    DESCRIPTION
        "A collection of objects providing information about the
        configuration of SIP User Agents."
    ::= { sipUAMIBGroups 1 }

END

```

#### 7.4. SIP Server MIB Module (Proxy, Redirect, and Registrar Servers)

```

SIP-SERVER-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Counter32,
    Unsigned32,
    Gauge32,
    mib-2
        FROM SNMPv2-SMI
        -- RFC 2578

    TruthValue,
    TimeStamp, DateAndTime
        FROM SNMPv2-TC
        -- RFC 2579

    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF
        -- RFC 2580

    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB
        -- RFC 3411

```

applIndex  
FROM NETWORK-SERVICES-MIB -- RFC 2788

InetAddressType,  
InetAddress  
FROM INET-ADDRESS-MIB; -- RFC 4001

sipServerMIB MODULE-IDENTITY  
LAST-UPDATED "200704200000Z"  
ORGANIZATION "IETF Session Initiation Protocol  
Working Group"  
CONTACT-INFO  
"SIP WG email: sip@ietf.org

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#### DESCRIPTION

"Session Initiation Protocol (SIP) Server MIB module. SIP is an application-layer signaling protocol for creating, modifying, and terminating multimedia sessions with one or more participants. These sessions include Internet multimedia conferences and Internet telephone calls. SIP is defined in RFC 3261 (June 2002).

This MIB is defined for the management of SIP Proxy, Redirect, and Registrar Servers.

A Proxy Server acts as both a client and a server. It accepts requests from other clients, either responding to them or passing them on to other servers, possibly after modification.

A Redirect Server accepts requests from clients and returns zero or more addresses to that client. Unlike a User Agent Server, it does not accept calls.

A Registrar is a server that accepts REGISTER requests. A Registrar is typically co-located with a Proxy or Redirect Server.

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REVISION "200704200000Z"

DESCRIPTION

"Initial version of the IETF SIP-SERVER-MIB module. This version published as part of RFC 4780."

::= { mib-2 151 }

-- Top-Level Components of this MIB.

sipServerMIBObjects OBJECT IDENTIFIER ::= { sipServerMIB 1 }  
sipServerMIBConformance OBJECT IDENTIFIER ::= { sipServerMIB 2 }

--

-- These groups contain objects common to all SIP servers.

--

sipServerCfg OBJECT IDENTIFIER ::= { sipServerMIBObjects 1 }

--

-- Common Server Configuration Objects

--

sipServerCfgTable OBJECT-TYPE

SYNTAX SEQUENCE OF SipServerCfgEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains configuration objects applicable to SIP Redirect and Proxy Servers."

::= { sipServerCfg 1 }

sipServerCfgEntry OBJECT-TYPE

SYNTAX SipServerCfgEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A row of common configuration.

Each row represents those objects for a particular SIP server present in this system. applIndex is used to uniquely identify these instances of SIP servers and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788). The same value of applIndex used in the corresponding SIP-COMMON-MIB is used here."

```
INDEX { applIndex }
 ::= { sipServerCfgTable 1 }
```

```
SipServerCfgEntry ::=
  SEQUENCE {
    sipServerCfgHostAddressType      InetAddressType,
    sipServerCfgHostAddress          InetAddress
  }
```

sipServerCfgHostAddressType OBJECT-TYPE

```
SYNTAX      InetAddressType
MAX-ACCESS  read-only
```

```
STATUS      current
```

DESCRIPTION

"The type of Internet address by which the SIP server is reachable."

REFERENCE

"RFC 3261, Section 19.1.1"

```
::= { sipServerCfgEntry 1 }
```

sipServerCfgHostAddress OBJECT-TYPE

```
SYNTAX      InetAddress
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

DESCRIPTION

"This is the host portion of a SIP URI that is assigned to the SIP server. It MAY contain a fully qualified domain name or an IP address. The length of the value will depend on the type of address specified. The type of address given by this object is controlled by sipServerCfgHostAddressType."

REFERENCE

"RFC 3261, Section 19.1.1"

```
::= { sipServerCfgEntry 2 }
```

--

-- This group contains MIB objects  
-- related to SIP Proxy Servers.

--

```
sipServerProxyCfg      OBJECT IDENTIFIER ::= { sipServerMIBObjects 3 }
```

```
sipServerProxyStats      OBJECT IDENTIFIER ::= { sipServerMIBObjects 4 }
```

```
--
```

```
-- Proxy Server Configuration
```

```
--
```

```
sipServerProxyCfgTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF SipServerProxyCfgEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "This table contains configuration objects applicable to SIP
        Proxy Servers."
```

```
    ::= { sipServerProxyCfg 1 }
```

```
sipServerProxyCfgEntry OBJECT-TYPE
```

```
    SYNTAX      SipServerProxyCfgEntry
```

```
    MAX-ACCESS  not-accessible
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "A row of common proxy configuration.
```

```

        Each row represents those objects for a particular SIP server
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP servers and correlate them through the
        common framework of the NETWORK-SERVICES-MIB (RFC 2788).  The
        same value of applIndex used in the corresponding
        SIP-COMMON-MIB is used here."
```

```
    INDEX { applIndex }
```

```
    ::= { sipServerProxyCfgTable 1 }
```

```
SipServerProxyCfgEntry ::=
```

```
    SEQUENCE {
```

```
        sipServerCfgProxyStatefulness      INTEGER,
        sipServerCfgProxyRecursion          TruthValue,
        sipServerCfgProxyRecordRoute        TruthValue,
        sipServerCfgProxyAuthMethod         BITS,
        sipServerCfgProxyAuthDefaultRealm   SnmpAdminString
```

```
    }
```

```
sipServerCfgProxyStatefulness OBJECT-TYPE
```

```
    SYNTAX      INTEGER {
```

```
        stateless(1),
```

```
        transactionStateful(2),
```

```
        callStateful(3)
```

```
    }
```

```
    MAX-ACCESS  read-only
```

```
    STATUS      current
```

```
    DESCRIPTION
```

"This object reflects the default mode of operation for the Proxy Server entity.

A stateless proxy is a logical entity that does not maintain the client or server transaction state machines when it processes requests. A stateless proxy forwards every request it receives downstream and every response it receives upstream. If the value of this object is stateless(1), the proxy defaults to stateless operations.

A transaction stateful proxy, or simply a 'stateful proxy', is a logical entity that maintains the client and server transaction state machines during the processing of a request. A (transaction) stateful proxy is not the same as a call stateful proxy. If the value of this object is transactionStateful(2), the proxy is stateful on a transaction basis.

A call stateful proxy is a logical entity if it retains state for a dialog from the initiating INVITE to the terminating BYE request. A call stateful proxy is always transaction stateful, but the converse is not necessarily true. If the value of this object is callStateful(3), the proxy is call stateful."

#### REFERENCE

"RFC 3261, Section 16"

::= { sipServerProxyCfgEntry 1 }

#### sipServerCfgProxyRecursion OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"This object reflects whether or not the Proxy performs a recursive search on the Contacts provided in 3xx redirects.

If the value of this object is 'true', a recursive search is performed. If the value is 'false', no search is performed, and the 3xx response is sent upstream towards the source of the request."

#### REFERENCE

"RFC 3261 Sections 16.5 and 16.6"

::= { sipServerProxyCfgEntry 2 }

#### sipServerCfgProxyRecordRoute OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current



## DESCRIPTION

"This object reflects whether or not the proxy adds itself to the Record-Route header as a default action. This header is used to list the proxies that insist on being in the signaling path for subsequent requests related to the call leg.

If the value of this object is 'true', the proxy adds itself to the end of the Record-Route header, creating the header if required. If the value is 'false', the proxy does not add itself to the Record-Route header."

## REFERENCE

"RFC 3261, Section 20.30"

::= { sipServerProxyCfgEntry 3 }

--

-- Security

--

sipServerCfgProxyAuthMethod OBJECT-TYPE

SYNTAX BITS {  
     none(0),  
     tls(1),  
     digest(2)  
 }

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the authentication methods that MAY be used to authenticate request originators.

bit 0 no authentication is performed

bit 1 TLS is used

bit 2 HTTP Digest is used."

## REFERENCE

"RFC 3261 Sections 22, 23, 26, 26.2.3"

::= { sipServerProxyCfgEntry 4 }

sipServerCfgProxyAuthDefaultRealm OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object reflects the default realm value used in Proxy-Authenticate headers. Note that this MAY need to be stored per user, in which case, this default value is ignored.  
 "

## REFERENCE

"RFC 3261, Section 22.1"

::= { sipServerProxyCfgEntry 5 }

```
--
-- Proxy Server Statistics
--
sipServerProxyStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipServerProxyStatsEntry
    MAX-ACCESS   not-accessible

    STATUS      current
    DESCRIPTION
        "This table contains the statistics objects applicable to all
        SIP Proxy Servers in this system."
    ::= { sipServerProxyStats 1 }

sipServerProxyStatsEntry OBJECT-TYPE
    SYNTAX      SipServerProxyStatsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "A row of summary statistics.

        Each row represents those objects for a particular SIP server
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP servers and correlate them through the
        common framework of the NETWORK-SERVICES-MIB (RFC 2788).  The
        same value of applIndex used in the corresponding
        SIP-COMMON-MIB is used here."
    INDEX { applIndex }
    ::= { sipServerProxyStatsTable 1 }

SipServerProxyStatsEntry ::=
    SEQUENCE {
        sipServerProxyStatProxyReqFailures Counter32,
        sipServerProxyStatsDisconTime      TimeStamp
    }

sipServerProxyStatProxyReqFailures OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object contains the number of occurrences of unsupported
        options being specified in received Proxy-Require headers.
        Such occurrences result in a 420 Bad Extension status code
        being returned.

        Discontinuities in the value of this counter can occur at
        re-initialization of the SIP entity or service.  A Management
        Station can detect discontinuities in this counter by
```

```

        monitoring the sipServerProxyStatsDisconTime object in the same
        row."
 ::= { sipServerProxyStatsEntry 1 }

sipServerProxyStatsDisconTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the sysUpTime object when the counters for the server
        statistics objects in this row last experienced a discontinuity."
 ::= { sipServerProxyStatsEntry 2 }

--
-- This group contains MIB objects related to SIP Registrars.
--
sipServerRegCfg          OBJECT IDENTIFIER ::= { sipServerMIBObjects 5 }
sipServerRegStats       OBJECT IDENTIFIER ::= { sipServerMIBObjects 6 }

--
-- Registrar Configuration
--
sipServerRegCfgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipServerRegCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains configuration objects applicable to SIP
        Registrars."
 ::= { sipServerRegCfg 1 }

sipServerRegCfgEntry OBJECT-TYPE
    SYNTAX      SipServerRegCfgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A row of common Registrar configuration.

        Each row represents those objects for a particular SIP server
        present in this system.  applIndex is used to uniquely identify
        these instances of SIP servers and correlate them through the
        common framework of the NETWORK-SERVICES-MIB (RFC 2788).  The
        same value of applIndex used in the corresponding
        SIP-COMMON-MIB is used here."
    INDEX { applIndex }
 ::= { sipServerRegCfgTable 1 }

SipServerRegCfgEntry ::=

```

```
SEQUENCE {
    sipServerRegMaxContactExpiryDuration  Unsigned32,
    sipServerRegMaxUsers                  Unsigned32,
    sipServerRegCurrentUsers              Gauge32,
    sipServerRegDfltRegActiveInterval     Unsigned32
}
```

sipServerRegMaxContactExpiryDuration OBJECT-TYPE

SYNTAX Unsigned32 (0..4294967295)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the maximum expiry that may be requested by a User Agent for a particular Contact. User Agents can specify expiry using either an Expiry header in a REGISTER request, or using an Expires parameter in a Contact header in a REGISTER request. If the value requested by the User Agent is greater than the value of this object, then the contact information is given the duration specified by this object, and that duration is indicated to the User Agent in the response."

::= { sipServerRegCfgEntry 1 }

sipServerRegMaxUsers OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the maximum number of users that the Registrar supports. The current number of users is reflected by sipServerRegCurrentUsers."

::= { sipServerRegCfgEntry 2 }

sipServerRegCurrentUsers OBJECT-TYPE

SYNTAX Gauge32 (0..4294967295)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the number of users currently registered with the Registrar."

::= { sipServerRegCfgEntry 3 }

sipServerRegDfltRegActiveInterval OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object reflects the default time interval the Registrar considers registrations to be active. The value is used to compute the Expires header in the REGISTER response. If a user agent requests a time interval shorter than specified by this object, the Registrar SHOULD honor that request. If a Contact entry does not have an 'expires' parameter, the value of the Expires header field is used instead. If a Contact entry has no 'expires' parameter and no Expires header field is present, the value of this object is used as the default value."

## REFERENCE

"RFC 3261, Section 10.2"

::= { sipServerRegCfgEntry 4 }

--

-- Per User Information

--

sipServerRegUserTable OBJECT-TYPE

SYNTAX SEQUENCE OF SipServerRegUserEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains information on all users registered to each Registrar in this system."

::= { sipServerRegCfg 2 }

sipServerRegUserEntry OBJECT-TYPE

SYNTAX SipServerRegUserEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This entry contains information for a single user registered to this Registrar."

Each row represents those objects for a particular SIP server present in this system. applIndex is used to uniquely identify these instances of SIP servers and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788). The same value of applIndex used in the corresponding SIP-COMMON-MIB is used here."

INDEX { applIndex, sipServerRegUserIndex }

::= { sipServerRegUserTable 1 }

SipServerRegUserEntry ::=

SEQUENCE {

sipServerRegUserIndex

Unsigned32,

sipServerRegUserUri

SnmpAdminString,

sipServerRegUserAuthenticationFailures

Counter32,

sipServerRegUserDisconTime

TimeStamp

}

```
sipServerRegUserIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This object uniquely identifies a conceptual row in the table."
    ::= { sipServerRegUserEntry 1 }

sipServerRegUserUri OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object contains the user's address-of-record. It is the
        main form by which the Registrar knows the user. The format is
        typically 'user@domain'. It is contained in the To header for
        all REGISTER requests."
    ::= { sipServerRegUserEntry 2 }

sipServerRegUserAuthenticationFailures OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object contains a count of the number of times the user
        has failed authentication.

        Discontinuities in the value of this counter can occur due to
        successful user authentications and at re-initialization of
        the SIP entity or service. A Management Station can detect
        discontinuities in this counter by monitoring the
        sipServerRegUserDisconTime object in the same row."
    ::= { sipServerRegUserEntry 3 }

sipServerRegUserDisconTime OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the sysUpTime object when the counters for the
        user registration statistics objects in this row last
        experienced a discontinuity."
    ::= { sipServerRegUserEntry 4 }
--
-- Per Contact Information
--
sipServerRegContactTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF SipServerRegContactEntry
```

MAX-ACCESS not-accessible  
 STATUS current  
 DESCRIPTION

"This table contains information on every location where a registered user (specified by sipServerRegUserIndex) wishes to be found (i.e., the user has provided contact information to each SIP Registrar in this system)."

::= { sipServerRegCfg 3 }

sipServerRegContactEntry OBJECT-TYPE

SYNTAX SipsServerRegContactEntry  
 MAX-ACCESS not-accessible  
 STATUS current  
 DESCRIPTION

"This entry contains information for a single Contact. Multiple contacts may exist for a single user.

Each row represents those objects for a particular SIP server present in this system. applIndex is used to uniquely identify these instances of SIP servers and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788). The same value of applIndex used in the corresponding SIP-COMMON-MIB is used here."

INDEX { applIndex,  
         sipServerRegUserIndex,  
         sipServerRegContactIndex  
       }

::= { sipServerRegContactTable 1 }

SipsServerRegContactEntry ::=

SEQUENCE {  
     sipServerRegContactIndex Unsigned32,  
     sipServerRegContactDisplayName SnmpAdminString,  
     sipServerRegContactURI SnmpAdminString,  
     sipServerRegContactLastUpdated TimeStamp,  
     sipServerRegContactExpiry DateAndTime,  
     sipServerRegContactPreference SnmpAdminString  
 }

sipServerRegContactIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..4294967295)  
 MAX-ACCESS not-accessible  
 STATUS current  
 DESCRIPTION

"Along with the sipServerRegUserIndex, this object uniquely identifies a conceptual row in the table."

::= { sipServerRegContactEntry 1 }

## sipServerRegContactDisplayName OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object contains the display name for the Contact. For example, 'Santa at Home', or 'Santa on his Sled', corresponding to contact URIs of sip:BigGuy@example.com or sip:sclaus817@example.com, respectively."

::= { sipServerRegContactEntry 2 }

## sipServerRegContactURI OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object contains either a SIP URI where the user can be contacted. This URI is normally returned to a client from a Redirect Server, or is used as the RequestURI in a SIP request line for requests forwarded by a proxy."

::= { sipServerRegContactEntry 3 }

## sipServerRegContactLastUpdated OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object indicates the time when this contact information was accepted. If the contact information is updated via a subsequent REGISTER of the same information, this object is also updated."

::= { sipServerRegContactEntry 4 }

## sipServerRegContactExpiry OBJECT-TYPE

SYNTAX DateAndTime

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object contains the date and time when the contact information will no longer be valid. Such times may be specified by the user at registration (i.e., Expires header or expiry parameter in the Contact information), or a system default can be applied."

::= { sipServerRegContactEntry 5 }

## sipServerRegContactPreference OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-only



STATUS current

DESCRIPTION

"This object indicates a relative preference for the particular Contact header field value compared to other bindings for this address-of-record. A registering user may provide this preference as a 'qvalue' parameter in the Contact header.

The format of this item is a decimal number between 0 and 1 (for example 0.9). Higher values indicate locations preferred by the user."

REFERENCE

"RFC 3261, Section 10.2.1.2, 16.6, and 20.10"

::= { sipServerRegContactEntry 6 }

--

-- Registrar Statistics

--

sipServerRegStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF SipServerRegStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains the summary statistics objects applicable to all SIP Registrars in this system."

::= { sipServerRegStats 1 }

sipServerRegStatsEntry OBJECT-TYPE

SYNTAX SipServerRegStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A row of summary statistics.

Each row represents those objects for a particular SIP server present in this system. applIndex is used to uniquely identify these instances of SIP servers and correlate them through the common framework of the NETWORK-SERVICES-MIB (RFC 2788). The same value of applIndex used in the corresponding SIP-COMMON-MIB is used here."

INDEX { applIndex }

::= { sipServerRegStatsTable 1 }

SipServerRegStatsEntry ::=

SEQUENCE {

sipServerRegStatsAcceptedRegs Counter32,

sipServerRegStatsRejectedRegs Counter32,

sipServerRegStatsDisconTime TimeStamp

}

## sipServerRegStatsAcceptedRegs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object contains a count of the number of REGISTER requests that have been accepted (status code 200) by the Registrar. This includes additions of new contact information, refreshing contact information, as well as requests for deletion of contact information.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipServerRegStatsDisconTime object in the same row."

::= { sipServerRegStatsEntry 1 }

## sipServerRegStatsRejectedRegs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object contains a count of the number REGISTER requests that have been rejected by the Registrar.

Discontinuities in the value of this counter can occur at re-initialization of the SIP entity or service. A Management Station can detect discontinuities in this counter by monitoring the sipServerRegStatsDisconTime object in the same row."

::= { sipServerRegStatsEntry 2 }

## sipServerRegStatsDisconTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The value of the sysUpTime object when the counters for the registrar statistics objects in this row last experienced a discontinuity."

::= { sipServerRegStatsEntry 3 }

--

-- Conformance

--

## sipServerMIBCompliances

OBJECT IDENTIFIER ::= { sipServerMIBConformance 1 }

```
sipServerMIBGroups
    OBJECT IDENTIFIER ::= { sipServerMIBConformance 2 }

--
-- Compliance Statements
--
sipServerProxyServerCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for SIP entities acting as Proxy
        Servers."
    MODULE -- this module
        MANDATORY-GROUPS { sipServerConfigGroup,
                            sipServerProxyConfigGroup,
                            sipServerProxyStatsGroup
                            }
    ::= { sipServerMIBCompliances 1 }

sipRedirectServerCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for SIP entities acting as Redirect
        Servers."
    MODULE -- this module
        MANDATORY-GROUPS { sipServerConfigGroup }
    ::= { sipServerMIBCompliances 2 }

sipServerRegistrarServerCompliance MODULE-COMPLIANCE
    STATUS          current
    DESCRIPTION
        "The compliance statement for SIP entities acting as
        Registrars."
    MODULE -- this module
        MANDATORY-GROUPS { sipServerConfigGroup,
                            sipServerRegistrarConfigGroup,
                            sipServerRegistrarStatsGroup }
    GROUP sipServerRegistrarUsersGroup
    DESCRIPTION
        "This is an optional group."
    ::= { sipServerMIBCompliances 3 }

--
-- Units of Conformance
--
sipServerConfigGroup OBJECT-GROUP
    OBJECTS {
        sipServerCfgHostAddressType,
        sipServerCfgHostAddress
    }
```

```
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing configuration common to SIP
        Proxy and Redirect servers."
    ::= { sipServerMIBGroups 1 }

sipServerProxyConfigGroup OBJECT-GROUP
    OBJECTS {
        sipServerCfgProxyStatefulness,
        sipServerCfgProxyRecursion,
        sipServerCfgProxyRecordRoute,
        sipServerCfgProxyAuthMethod,
        sipServerCfgProxyAuthDefaultRealm
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing configuration for SIP Proxy
        servers."
    ::= { sipServerMIBGroups 2 }

sipServerProxyStatsGroup OBJECT-GROUP
    OBJECTS {
        sipServerProxyStatProxyReqFailures,
        sipServerProxyStatsDisconTime
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing statistics for SIP Proxy
        servers."
    ::= { sipServerMIBGroups 3 }

sipServerRegistrarConfigGroup OBJECT-GROUP
    OBJECTS {
        sipServerRegMaxContactExpiryDuration,
        sipServerRegMaxUsers,
        sipServerRegCurrentUsers,
        sipServerRegDfltRegActiveInterval
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects providing configuration for SIP
        Registrars."
    ::= { sipServerMIBGroups 4 }

sipServerRegistrarStatsGroup OBJECT-GROUP
    OBJECTS {
        sipServerRegStatsAcceptedRegs,
```

```

        sipServerRegStatsRejectedRegs,
        sipServerRegStatsDisconTime
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects providing statistics for SIP
        Registrars."
    ::= { sipServerMIBGroups 5 }

sipServerRegistrarUsersGroup OBJECT-GROUP
    OBJECTS {
        sipServerRegUserUri,
        sipServerRegUserAuthenticationFailures,
        sipServerRegUserDisconTime,
        sipServerRegContactDisplayName,
        sipServerRegContactURI,
        sipServerRegContactLastUpdated,
        sipServerRegContactExpiry,
        sipServerRegContactPreference
    }
    STATUS          current
    DESCRIPTION
        "A collection of objects related to registered users."
    ::= { sipServerMIBGroups 6 }

END

```

## 8. IANA Considerations

The MIB modules defined in this document use the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor	OBJECT IDENTIFIER value
sipTC	{ mib-2 148 }
sipCommonMIB	{ mib-2 149 }
sipUAMIB	{ mib-2 150 }
sipServerMIB	{ mib-2 151 }

## 9. Security Considerations

There are a number of management objects defined in the SIP-COMMON-MIB MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

The following read-create object in SIP-COMMON-MIB is used to configure the status code statistics that will be monitored by the SIP entity:

`sipCommonStatusCodeRowStatus:`

If this object is SET maliciously, it may result in an over-allocation of resources in a system for the purpose of accumulating and maintaining statistics.

The following read-write objects in SIP-COMMON-MIB are used to configure the behavior of certain SNMP notifications potentially generated by a SIP entity:

`sipCommonStatusCodeNotifSend, sipCommonStatusCodeNotifEmitMode,  
sipCommonStatusCodeNotifThresh, sipCommonStatusCodeNotifInterval,  
sipCommonCfgServiceNotifEnable:`

If these objects are SET maliciously, it may result in a system and/or network performance impact due to the generation of SNMP notifications.

Some of the readable objects in the MIB modules (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP.

The following object values may contain private or confidential customer information like first name, last name, customer identification, location, company affiliation, the time the information was updated, etc.

`sipServerRegContactDisplayName, sipServerRegContactURI,  
sipServerRegContactLastUpdated and sipCommonCfgOrganization.`

The sipCommonCfgTable table contains some objects that may help attackers gain knowledge about the status and operations of the SIP service. In particular, the object value of sipCommonCfgServiceOperStatus may indicate that the SIP entity is in congested state and may lead attackers to build additional service attacks to overload the system.

The sipCommonCfgEntityType object indicates the type of SIP entity, and the sipCommonMethodSupportedTable table contains in the SIP-COMMON-MIB MIB module list of SIP methods supported by each entity in the system. Gaining access to this information may allow attackers to build method-specific attacks or use unsupported methods to create denial-of-service attack scenarios.

In the SIP-UA-MIB MIB module, the sipUACfgServerTable contains the address of the SIP servers providing services to the UA, and obtaining this information may disclose some private or sensitive information about the SIP service usage.

In the SIP-SERVER-MIB MIB module, the sipServerCfgProxyAuthMethod object defines the authentication methods supported by the server and may be used to build specific denial-of-service attackers targeted at the security mechanisms employed by the SIP entity.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPsec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this set of MIB modules.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see RFC 3410 [RFC3410]), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## 10. Contributor Acknowledgments

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