



AES and 3-DES Encryption Support for SNMP Version 3

The AES and 3-DES Encryption Support for SNMP Version 3 feature enhances the encryption capabilities of SNMP version 3. This support for Simple Network Management Protocol (SNMP) version 3 User-Based Security Model (USM) is compliant with RFC 3414, which defines DES as the only required method of message encryption for SNMP version 3 authPriv mode.

The AES and 3-DES Encryption Support for SNMP Version 3 feature adds Advanced Encryption Standard (AES) 128-bit encryption in compliance with RFC 3826. RFC 3826 extensions have been included in the SNMP-USM-AES-MIB. In addition, Cisco-specific extensions to support Triple-Data Encryption Algorithm (3-DES) and AES 192-bit and 256-bit encryption have been added to the CISCO-SNMP-USM-MIB. Additional information can be found in the Internet-Draft titled *Extension to the User-Based Security Model (USM) to Support Triple-DES EDE in "Outside" CBC Mode*, which can be found at the following URL: <http://www.snmp.com/eso/draft-reeder-snmpv3-usm-3desede-00.txt>.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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

Prerequisites for AES and 3-DES Encryption Support for SNMP Version 3

- The network management station (NMS) must support SNMP version 3 to use this feature of the SNMP agent.
- This feature is available in Cisco IOS XE software images where encryption algorithms are supported.

Information About AES and 3-DES Encryption Support for SNMP Version 3

SNMP Architecture

The architecture for describing Internet Management Frameworks contained in RFC 3411 describes the SNMP engine as composed of the following components:

- Dispatcher
- Message Processing Subsystem
- Security Subsystem
- Access Control Subsystem

Applications make use of the services of these subsystems. It is important to understand the SNMP architecture and the terminology of the architecture to understand where the Security Model fits into the architecture and interacts with the other subsystems within the architecture. The information is contained in RFC 3411 and you are encouraged to review this RFC to obtain an understanding of the SNMP architecture and subsystem interactions.

Encryption Key Support

In the AES and 3-DES Encryption Support for SNMP Version 3 feature the Cipher Block Chaining/Data Encryption Standard (CBC-DES) is the privacy protocol. Originally only DES was supported (as per RFC 3414). This feature adds support for AES-128 (as per RFC 3826) and AES-192, AES-256 and 3-DES (as per CISCO-SNMP-USM-oids-MIB).

- AES encryption uses the Cipher Feedback (CFB) mode with encryption key sizes of 128, 192, or 256 bits.
- 3DES encryption uses the 168-bit key size for encryption.

The AES Cipher Algorithm in the SNMP User-based Security Model draft describes the use of AES with 128-bit key size. However, the other options are also implemented with the extension to use the USM. There is currently no standard for generating localized keys for 192- or 256-bit size keys for AES or for 168-bit size key for 3-DES. There is no authentication protocol available with longer keys.

Management Information Base Support

The AES and 3-DES Encryption Support for SNMP Version 3 AES and 3-DES Encryption Support for SNMP Version 3 feature supports the selection of privacy protocols through the CLI and the Management Information Base (MIB). A new standard MIB, SNMP-USM-AES-MIB, provides support for the 128-bit key in AES. The extended options of AES with 192- or 256-bit keys and 3-DES are supported as extensions to the SNMP-USM-MIB, in the Cisco-specific MIB, CISCO-SNMP-USM-OIDS-MIB.

How to Configure AES and 3-DES Encryption Support for SNMP Version 3

Adding a New User to an SNMP Group

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **snmp-server user** *username group-name* [**remote host** [**udp-port port**]] {**v1** | **v2c** | **v3** [**encrypted**] [**auth** {**md5** | **sha**} *auth-password*]} [**priv** {**des** | **3des** | **aes** {**128** | **192** | **256**}} *privpassword*] [**access** [**ipv6 nacl**] {*acl-number* | *acl-name*}]

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enters privileged EXEC mode. • Enter your password when prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	snmp-server user <i>username group-name</i> [remote host [udp-port port]] { v1 v2c v3 [encrypted] [auth { md5 sha } <i>auth-password</i>]} [priv { des 3des aes { 128 192 256 }} <i>privpassword</i>] [access [ipv6 nacl] { <i>acl-number</i> <i>acl-name</i> }]	Adds an SNMP user, specifies a group to which the user belongs, specifies the authorization algorithm to be used (MD5 or SHA), specifies the privacy algorithm to be used (DES, 3-DES, AES, AES-192, or AES-256), and specifies the password to be associated with this privacy protocol.

	Command or Action	Purpose
	Example: <pre>Device(config)# snmp-server user new-user new-group v3 auth md5 secureone priv aes 128 privatetwo access 2</pre>	

Verifying SNMP User Configuration

To display information about the configured characteristics of Simple Network Management Protocol (SNMP) users, use the **show snmp user** command in privileged EXEC mode.



Note

The **show snmp user** command displays all the users configured on the router. However, unlike other SNMP configurations, the **snmp-server user** command will not appear on the “show running” output.

SUMMARY STEPS

1. **enable**
2. **show snmp user** *[username]*

DETAILED STEPS

- Step 1** **enable**
Enters privileged EXEC mode. Enter your password when prompted.
- Step 2** **show snmp user** *[username]*
The following example specifies the username as abcd, the engine ID string as 00000009020000000C025808, and the storage type as nonvolatile:

Example:

```
Device# show snmp user
abcd
User name: abcd
Engine ID: 00000009020000000C025808
storage-type: nonvolatile      active access-list: 10
Rowstatus: active
Authentication Protocol: MD5
Privacy protocol: 3DES
Group name: VacmGroupName
Group name: VacmGroupName
```

Additional References

Related Documents

Related Topic	Document Title
Cisco software commands	Cisco IOS Master Command List, All Releases
Cisco Network Management commands	<i>Cisco IOS Network Management Command Reference</i>
SNMP configuration	“Configuring SNMP Support” chapter in the <i>Cisco Network Management Configuration Guide</i>
SNMP Support for VPNs	SNMP Notification Support for VPNs

Standards

Standard	Title
None	--

MIBs

MIB	MIBs Link
• CISCO-PING-MIB • IP-FORWARD-MIB • SNMP-VACM-MIB, <i>The View-based Access Control Model (ACM) MIB for SNMP</i>	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 1441	<i>Introduction to version 2 of the Internet-standard Network Management Framework</i>
RFC 1442	<i>Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1443	<i>Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2)</i>

RFC	Title
RFC 1444	<i>Conformance Statements for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1445	<i>Administrative Model for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1446	<i>Security Protocols for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1447	<i>Party MIB for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1448	<i>Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1449	<i>Transport Mappings for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 1450	<i>Management Information Base for version 2 of the Simple Network Management Protocol (SNMPv2)</i>
RFC 2571	<i>An Architecture for Describing SNMP Management Frameworks</i>
RFC 2576	<i>Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework</i>

Technical Assistance

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

Feature Information for AES and 3-DES Encryption Support for SNMP Version 3

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [http://www.cisco.com/cisco/featurenavigator](#). An account on Cisco.com is not required.

Table 1: Feature Information for AES and 3-DES Encryption Support for SNMP Version 3

Feature Name	Releases	Feature Information
AES and 3-DES Encryption Support for SNMP Version 3		The AES and 3-DES Encryption Support for SNMP Version 3 feature enhances the encryption capabilities of SNMP version 3. This support for SNMP version 3 USM is compliant with RFC 3414, which defines DES as the only required method of message encryption for SNMP version 3 authPriv mode. The AES and 3-DES Encryption Support for SNMP Version 3 feature adds AES 128-bit encryption in compliance with RFC 3826.

