Cisco Converged EdgeQAM Manager User Guide

First Published: 2016-04-21

Last Modified: 2018-04-27

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CONTENTS

CHAPTER 1 **Information About Cisco Converged EdgeQAM Manager** 1

VOD Privacy Mode Encryption System Introduction 2

Platform Requirements 2

CHAPTER 2 **How to Launch Cisco Converged EdgeQAM Manager** 5

Windows 5

Linux 5

CHAPTER 3 **How to Use Cisco Converged EdgeQAM Manager** 7

User Authentication 8

Local Authentication 8

TACACS+ Authentication 12

Common Login Settings 13

Communication with the ERS 14

Establishing a Connection with the ERS 14

Status of the Connection with the ERS 15

Global Resynchronization 15

Communication with Cisco Edge QAM device 16

Starting the Server Socket 16

Adding Cisco Edge QAM device 17

Status of the Connection with the Cisco Edge QAM device 19

Removing Cisco Edge QAM device 19

General Operation 19

Viewing Logs 19

Application Settings 20

Configuring SNMP Traps 20

Adding SNMP Notification Host 21

Modify or Delete SNMP Configuration 22

Feature Information for Converged EdgeQAM Manager 23

CHAPTER 1

Information About Cisco Converged EdgeQAM Manager

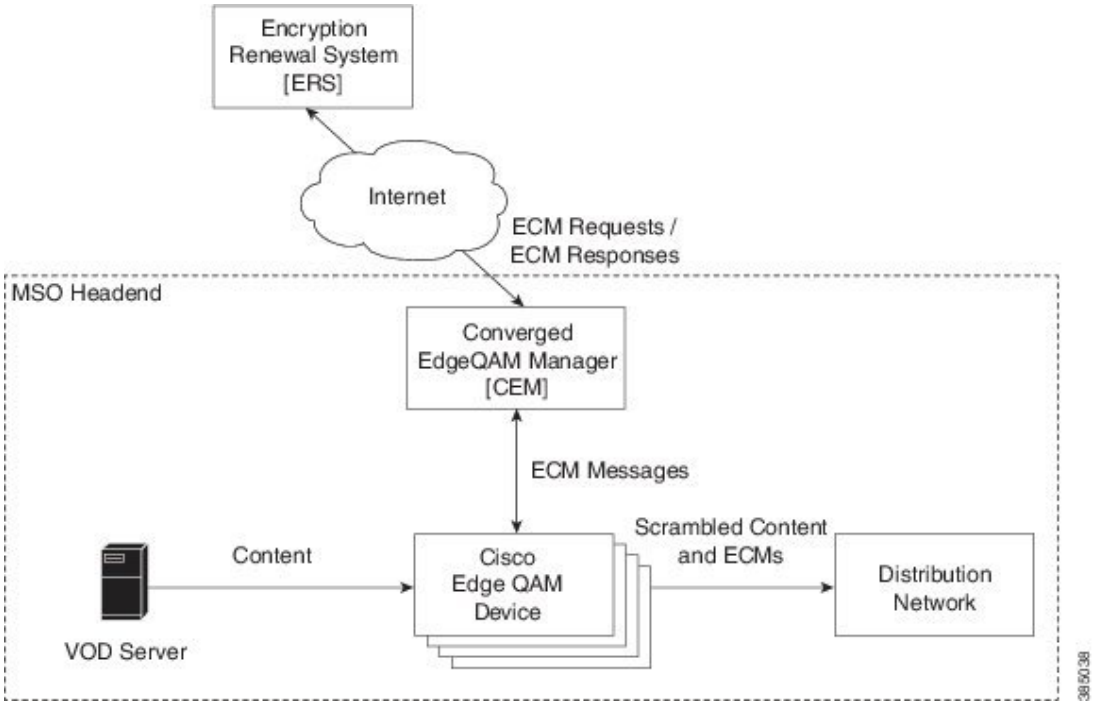
The Cisco Converged EdgeQAM Manager (CEM) is a Java application that runs on Windows/Linux Systems. It communicates with the Encryption Renewal System (ERS) over the Internet and obtains the ECM messages, then forwards the ECM messages to Cisco Edge QAM devices in the site.

- VOD Privacy Mode Encryption System Introduction, page 2
- Platform Requirements, page 2

VOD Privacy Mode Encryption System Introduction

The VOD Privacy Mode Encryption (VPME) system integrates encrypted VOD content within an ARRIS (Motorola) digital cable headend.

Figure 1: VPME System



Platform Requirements

The table below shows the hardware requirements of CEM.

Table 1: CEM Hardware Requirements

Component	Minimum Requirements
Processor	Intel Core 2 Duo or equivalent with the clock speed of 2.4 GHz
RAM	4 GB
Hard Drive	40 GB
CD/DVD-ROM Drive	CD ROM or DVD ROM
Video Adapter	PCI or on-board VGA, resolution: 1024x768

Component	Minimum Requirements
Video Display	Resolution: 1024x768
Network Adapter	1 port, 10/100 Base-T

The table below shows the software requirements of CEM.

Table 2: CEM Software Requirements

Component	Details
Operating System	Windows 7 64-bit (or) Windows Server 2008 64-bit (or) Linux
Java Runtime Environment	Java Runtime Environment v1.8.0_151

Other requirements include:

- The CEM application must connect to Cisco Edge QAM device as well as the ERS (via the Internet). If a firewall is used, the standard HTTPS port (443) and the port that is set for listening to the connections from Cisco Edge QAM device must be unblocked for accessing the ERS and Cisco Edge QAM device respectively.
- The Java Runtime environment (JRE version 1.8.0_151 or newer) must be installed on the machine before running the CEM application.
- The **CcadTrustStore** file containing the ERS server's Public Key Certificates must be in the same folder as the CEM application.
- The system time on the PC must be synchronized with UTC, preferably by connecting to an NTP (Network Time Protocol) server to keep it accurate.
- It is recommended to refer the following informative guides to harden the system/virtual machine and reduce the attack surface:
  - Red Hat: https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/pdf/Security_Guide/Red_Hat_Enterprise_Linux-6-Security_Guide-en-US.pdf
  - Microsoft Windows: http://technet.microsoft.com, search for "hardening"
  - NSA hardening guide collection: https://www.nsa.gov/ia/mitigation_guidance/security_configuration_guides/operating_systems.shtml
- It is also recommended to ensure that all the non-commonly used ports are closed. The listening port that is configured on the CEM application must be controlled by the administrator and it must be unblocked so that each of the Cisco Edge QAM device that are configured on the CEM can establish connection with the CEM.

CHAPTER 2

How to Launch Cisco Converged EdgeQAM Manager

Cisco CEM application is available in a deployment disk and on the Cisco website.

- Windows, page 5
- Linux, page 5

Windows

Complete these steps to launch the Cisco CEM application in Windows:

Step 1 Copy the **\PmeCemApp** directory to a local directory on the hard drive disk. For example, C:\Program Files\PME CEM\.

Step 2 The Java Runtime Environment v1.8.0 revision 151 or later is required for running the Cisco CEM application. The installer for the JRE v1.8.0_151 is in the \Java Runtime Environment\Windows\ directory of the deployment disk. Please install this version of JRE if it is not installed in your system or if you have an earlier version of JRE installed in your system.

Step 3 JAR files are usually associated with the Java(TM) Platform SE binary application. If so, open the directory that contains the Cisco CEM application and click on the **PME_CEM.jar** file to start the CEM application. If not, please right click on the **PME_CEM.jar** file. Click **Open With..** and choose **Java(TM) Platform SE binary** in the list. If Java(TM) Platform SE binary is not listed, then click on **Browse** and navigate to the directory in which the JRE is installed and choose the **javaw.exe** in the bin directory. Usually, the JRE is installed in the C:\Program Files\Java\jre1.8.0_151 directory.

Linux

Complete these steps to launch the Cisco CEM application in Linux.

Note These steps must be performed on RedHat Linux. For other flavours of Linux, please perform the equivalent operations.

Step 1 Copy the **/PmeCemApp** directory to a local directory on the hard drive disk. For example, /usr/PME CEM/.

Step 2 The Java Runtime Environment v1.8.0 revision 151 or later is required for running the Cisco CEM application. The installer for the JRE v1.8.0_151 for Linux is in the /Java Runtime Environment/Linux/ directory of the deployment disk. Please install this version of JRE if it is not installed in your system or if you have an earlier version of JRE installed in your system.

Step 3 JAR files are usually associated with the Java(TM) Platform SE binary. Open the directory that contains the Cisco CEM application and click on the **PME_CEM.jar** file to start the CEM application. If the application is not launched, please perform the following operations:

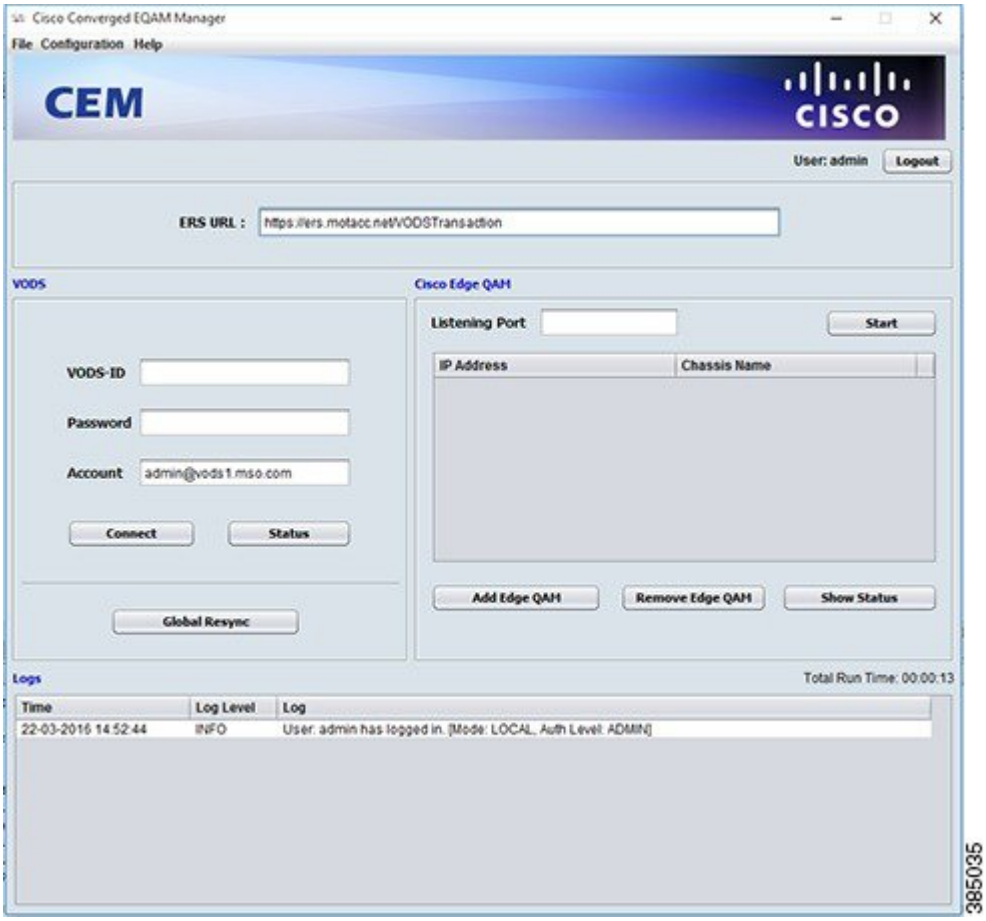
a) Right click on the JAR file, and then click **Open with other application..** and **Use Custom Command** button.
b) Click **Browse** and navigate to the directory in which the JRE is installed and choose the **java** file in the /bin directory. Usually, the JRE is installed in the /usr/Java/jre1.8.0_151 directory.
c) Append **-jar** in the Custom Command text box. For example, '/usr/java/jre1.8.0_151/bin/java' - jar
d) Click the **Open..** Button.
e) Right click on the **PME_CEM.jar** file and click **Open with java** to launch the Cisco CEM application.

CHAPTER 3

How to Use Cisco Converged EdgeQAM Manager

This is the main interface of the Cisco CEM application.

Figure 2: CEM Interface



- User Authentication, page 8
- Communication with the ERS, page 14

- Communication with Cisco Edge QAM device, page 16
- General Operation, page 19
- Configuring SNMP Traps, page 20
- Feature Information for Converged EdgeQAM Manager, page 23

User Authentication

The CEM application supports user authentication in two modes: local and TACACS+.

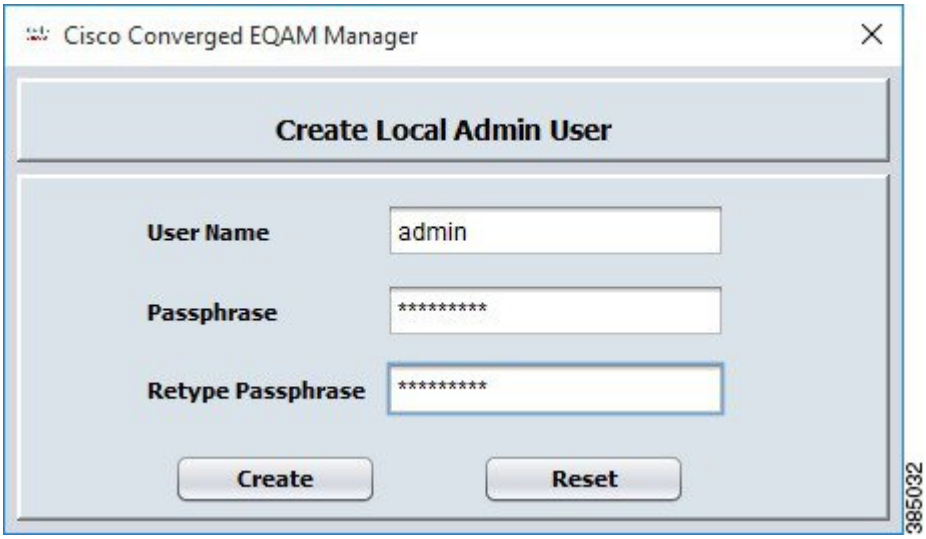
The user authorization level that are supported by the CEM application are:

- **Monitor**: The user can only view the status of the connection with the ERS and Cisco Edge QAM device. The user will not be allowed to close the CEM application.
- **Admin**: The user can access and configure all the settings in the CEM, establish connection with the ERS and Cisco Edge QAM device.

Local Authentication

When the CEM application is launched for the first time, a local administrator user has to be created. This admin user can then proceed and configure the CEM to connect with the ERS and Cisco Edge QAM device.

Figure 3: Create Local Admin User



The validation rules for the passphrase are:

- It must be 6-127 characters in length.
- It must not contain any whitespace.
- Character rules (any 3 of the following 4 rules):

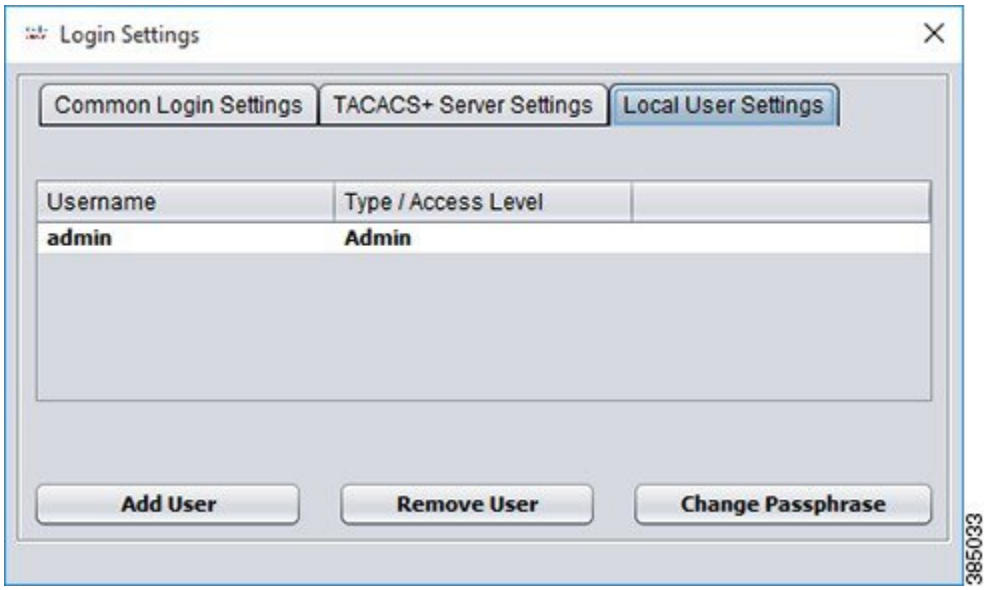
- It must contain at least 1 digit.
- It must contain at least 1 non alphanumeric character.
- It must contain at least 1 upper case character.
- It must contain at least 1 lower case character.

• It must not contain character sequences similar to **qwerty**.

An example of a passphrase that satisfies the aforementioned rules is: V#g0K$7q.

The admin user can create several other users with the Admin/Monitor privilege. The dialog to manage the users can be viewed using the **Configuration > Login Settings** menu item and then choosing the **Local User Settings** tab.

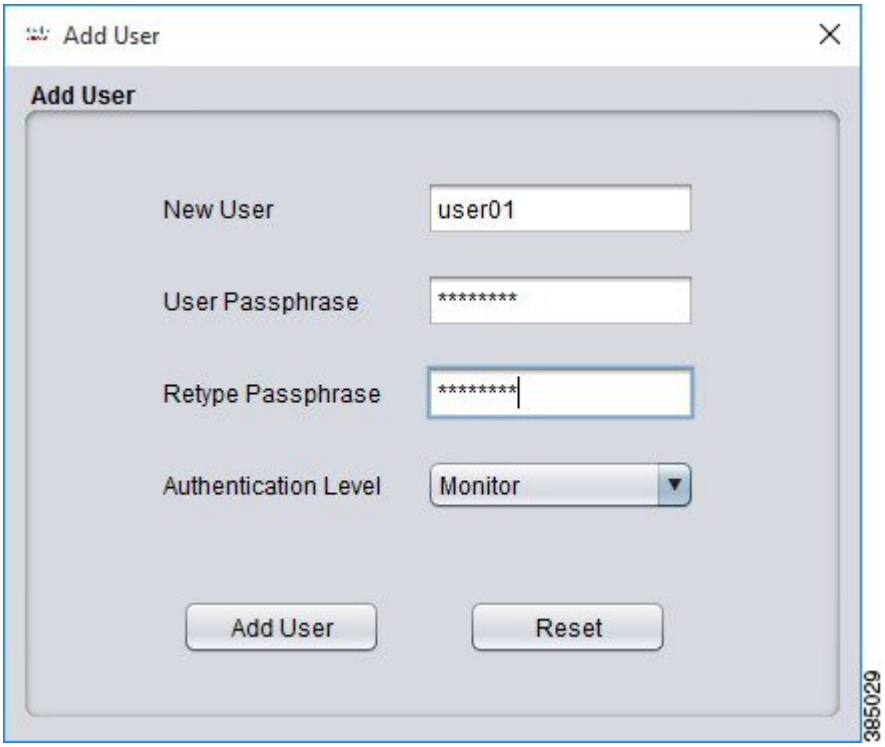
Figure 4: Local User Setting



Note If the user forgets the passphrase, it cannot be retrieved by the user. Hence, it is important to know the passphrase of at least one local admin user.

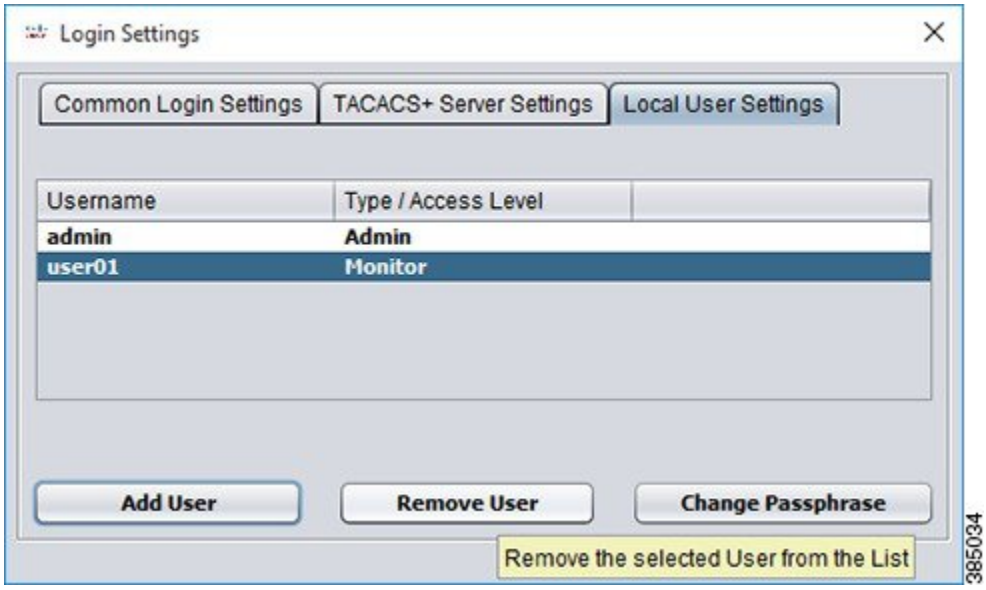
Only a user with the Admin privilege can add/remove users. A new user can be added by clicking the **Add User** button.

Figure 5: Add User



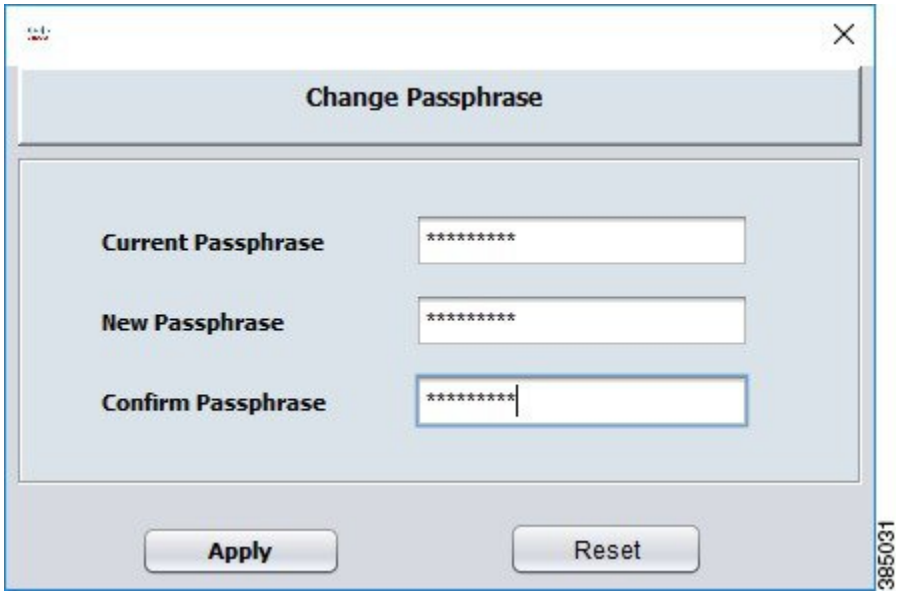
A user can be removed by selecting the user and then clicking the **Remove User** button.

Figure 6: Remove User



The passphrase can be updated by clicking the **Change Passphrase** button, and the passphrase rules that mentioned earlier are applicable in this dialog window too.

Figure 7: Change Passphrase

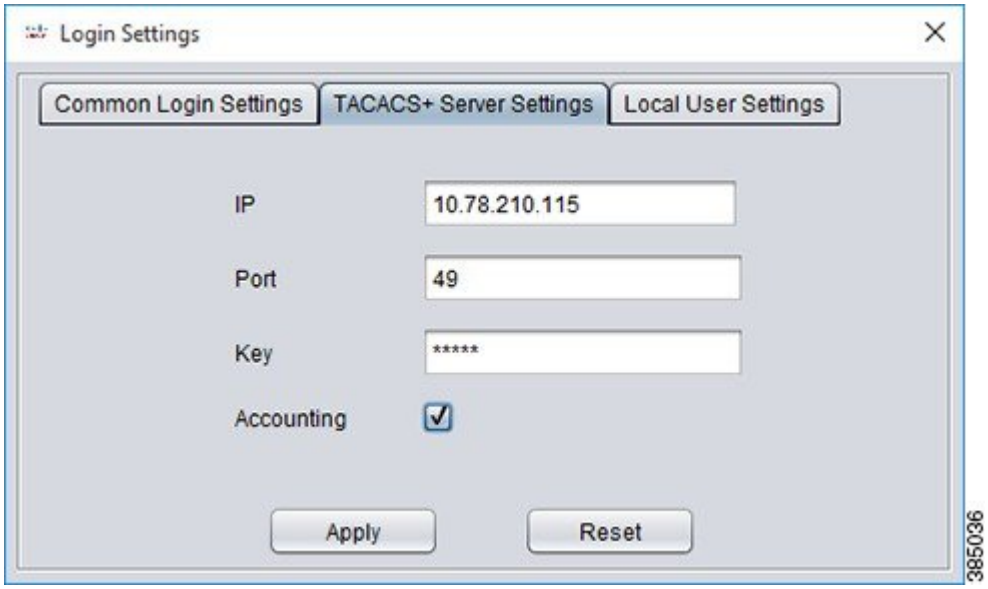


TACACS+ Authentication

The information regarding the TACACS+ server must be specified after logging in the CEM application as the local Admin user.

The dialog to specify the TACACS+ server information can be opened using the **Configuration > Login Settings** menu item then choosing the **TACACS+ Server Settings** tab.

Figure 8: TACACS+ Server Settings



The Shared Secret that is configured on the TACACS+ server as a part of the TACACS+ Authentication Options must be set in the **Key** field of the **Login Settings** Dialog.

If the user intends to enable TACACS+ Accounting, then the checkbox must be selected as shown in the above screenshot.

Please close the **Login Settings** dialog box after clicking the **Apply** button.

Then the user can use the TACACS+ user credentials to login to the CEM application.

Figure 9: User Login

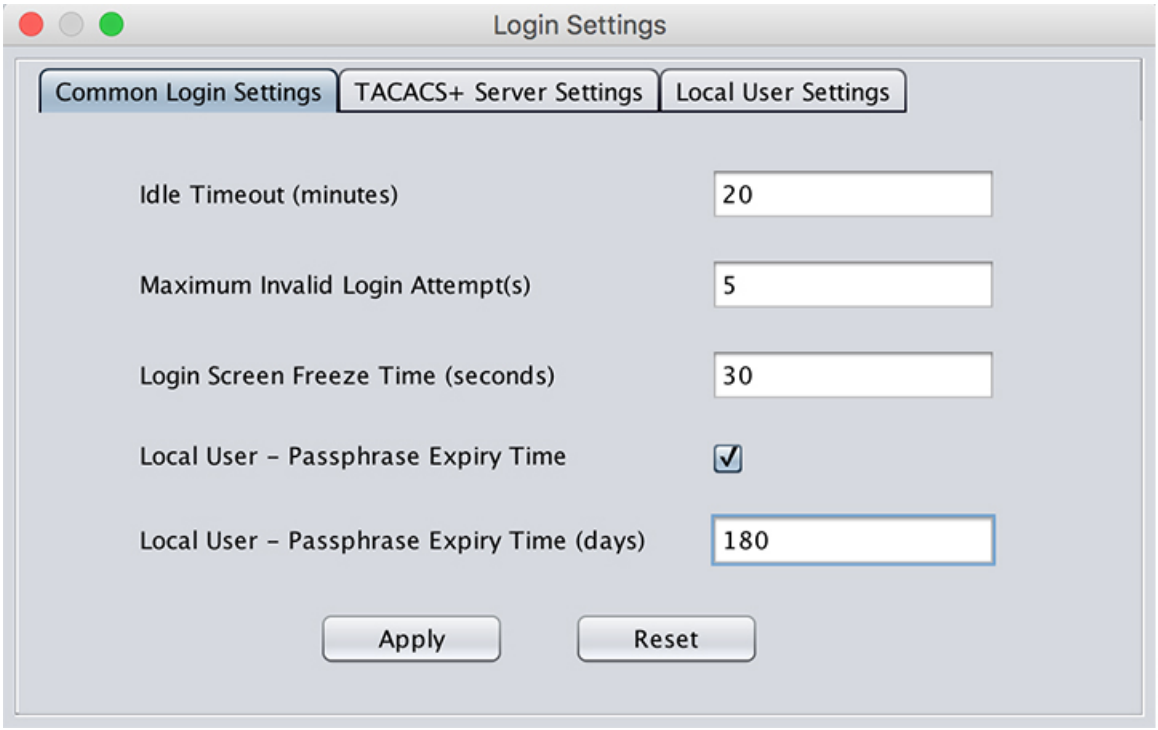
Common Login Settings

The settings that control the user session can be viewed/modified by clicking the **Configuration > Login Settings** menu item then choosing the **Common Login Settings** tab, including:

- **Idle Timeout (minutes)—**Idle session timeout.
- **Maximum Invalid Login Attempt(s)—**Maximum number of attempts a user can try to login with incorrect login credentials.
- **Login Screen Freeze Time (seconds)—**Duration for which the login screen can be frozen after the user has entered invalid credentials for maximum admissible attempts.
- **Local User – Passphrase Expiry Time—**Select the checkbox if you want to configure an expiry time for the passphrase (for the local user).

- **Local User – Passphrase Expiry Time (days)—**Passphrase expiry time in days.

Figure 10: Common Login Settings



Passphrase Expiry

You can set the passphrase to expire after a period of a maximum of 180 days. By default, the passphrase expiry time is disabled.

Click the **Local User – Passphrase Expiry Time** checkbox to enable and configure the expiry time in the **Common Login Settings** tab. The **Local User – Passphrase Expiry Time (days)** field for specifying the time is enabled only when you select the **Local User – Passphrase Expiry Time** checkbox.

Communication with the ERS

Establishing a Connection with the ERS

Complete these steps to establish a connection with the ERS:

Step 1 Specify the ERS URL and the VODS parameters.

- **ERS URL** - URL of the ERS server.

- **VODS-ID** - Assigned to the MSO by ARRIS.
- **Password** - Assigned to the MSO by ARRIS.
- **Account** - E-mail address of the contact person at the MSO site.

The URL of the licensing ERS is the default URL that is displayed on the GUI. The MSO must use the URL of the production ERS that is provided by ARRIS to establish the connection and get the ECM messages.

The new URL is saved automatically and will be displayed when the application is started the next time.

Step 2 Click the **Connect** button to establish a connection with the ERS.
After the SSL handshake is complete between the CEM application and the ERS, the CEM will send the ERS sync request to the ERS. If ERS server responds without any error, the CEM will send the ECM request to the ERS to obtain the ECM message.

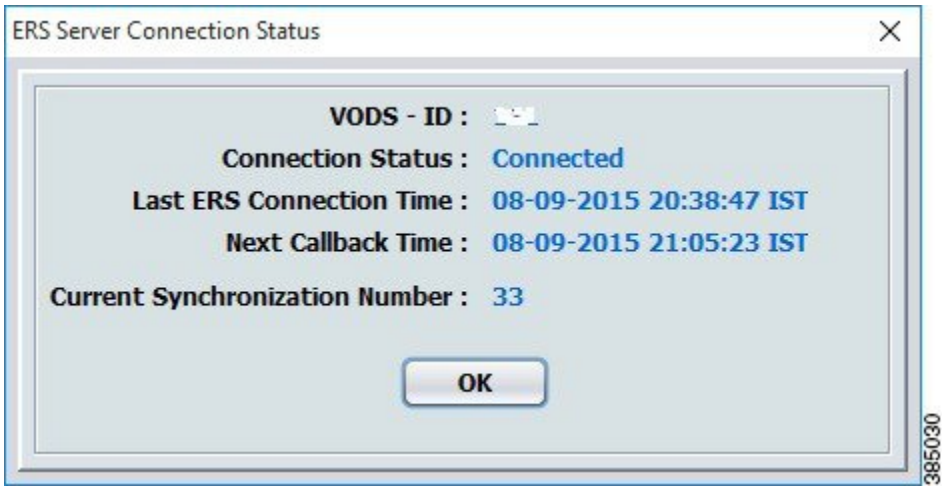
After the connection is established with the ERS, the text boxes corresponding to the ERS server URL and the VODS parameters will be disabled.

The CEM application will send the ERS sync request automatically after the callback time expires and send the ECM request if a new sync number is received from the ERS server.

Status of the Connection with the ERS

The status of the connection with the ERS server can be ascertained by clicking the **Status** button.

Figure 11: ERS Connection Status



Global Resynchronization

The **Global Resynchronization** Button is used to send the ECM request to the ERS and obtain the new set of ECM messages.

Note Global Resynchronization can only be done when ARRIS/CCAD instructs the MSO to request and obtain the new set of ECM messages.

Communication with Cisco Edge QAM device

Starting the Server Socket

Complete these steps to start the server socket:

Step 1 Specify the listening port.

- **Listening port** - The port number on which the CEM will listen for connections from Cisco Edge QAM device. It must be in the range of 1024-65534.

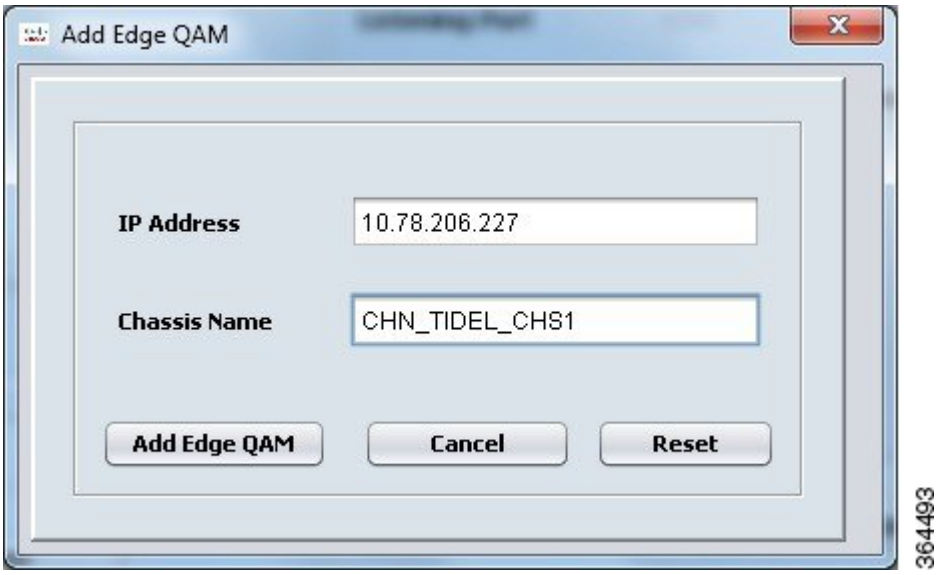
Step 2 Click the **Start** button to start the server socket and listen for connections from Cisco Edge QAM device.

Adding Cisco Edge QAM device

Complete these steps to add Cisco Edge QAM device:

Step 1 Click the **Add Edge QAM** button to open the **Add Edge QAM** window.

Figure 12: Add Edge QAM



Step 2 Specify the IP address and chassis name of Cisco Edge QAM device to which the CEM application will connect in the above window.

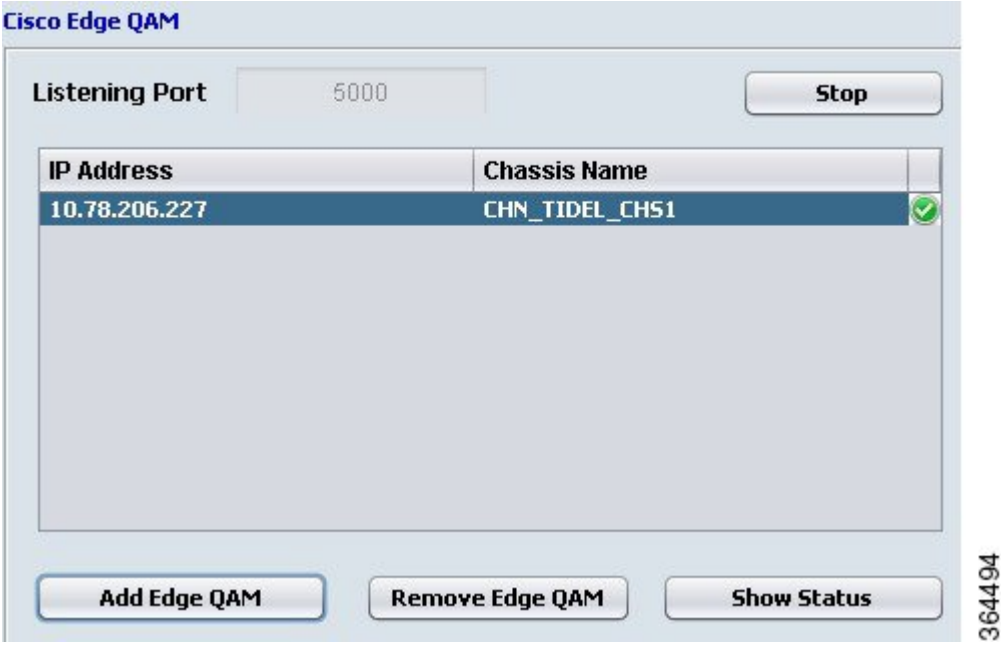
- **IP Address** - The IP address of Cisco Edge QAM device interface from which the connection is established with the CEM.
- **Chassis Name** - The chassis name of Cisco Edge QAM device.

Step 3 Click the **Add Edge QAM** button in the above window to add Cisco Edge QAM device.

The connection will be established between the CEM application and Cisco Edge QAM device if PME is enabled on Cisco Edge QAM device.

Note The hostname of Cisco Edge QAM device must match the one that is specified on the GUI of the CEM application.

Figure 13: Connection Established



The tick symbol in the right-most column of the table indicates that the connection with Cisco Edge QAM device is established. If the cell is blank, it indicates that the connection has not established yet.

The CEM application will close the connection with Cisco Edge QAM device if:

- no messages are exchanged between the CEM application and Cisco Edge QAM device for 6 minutes.
- Cisco Edge QAM device does not acknowledge the ECM provision message after 3 retries.

Status of the Connection with the Cisco Edge QAM device

The status of the connection between the CEM application and Cisco Edge QAM device can be ascertained by selecting Cisco Edge QAM device in the Edge QAM List and then clicking the **Show Status** Button.

Figure 14: Edge QAM Status

Removing Cisco Edge QAM device

The connection with Cisco Edge QAM device can be closed and the corresponding entry in the Edge QAM List can be removed by selecting Cisco Edge QAM device in the Edge QAM list and then clicking the **Remove Edge QAM** button.

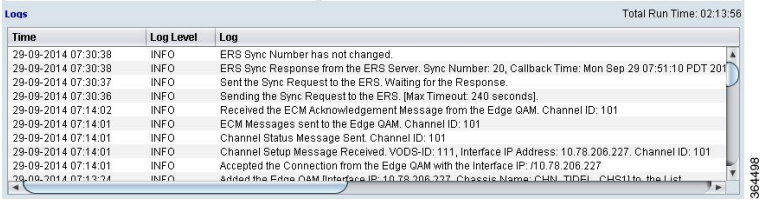
General Operation

Viewing Logs

The logs that are written when the current instance of the CEM application is active will be displayed on the GUI.

Select the **File > View Logs** menu or the **Ctrl+L** shortcut key to view the complete set of logs. The log file will be opened in the default text editor of the operating system.

Figure 15: Logs



Application Settings

The settings that control the communication between the CEM application, the ERS and Cisco Edge QAM device can be viewed/modified using the **File > Application Settings** menu.

The following are the ERS connection settings that can be modified in the application settings dialog:

- timeout for the initial handshake with the ERS server
- timeout for receiving the data from the ERS server
- the time after which the next message should be sent to the ERS server after the server returned an error

Cisco Edge QAM device connection settings including:

- time for which the CEM will wait to receive the acknowledgment message for the ECM provision message from Cisco Edge QAM device before re-sending the ECM provision message
- idle connection timeout

The application settings can be saved by clicking the **File > Save Settings** menu.

Configuring SNMP Traps

You can configure the CEM application to send SNMP trap messages to the remote SNMP Notification Host/Manager for any connection related errors.

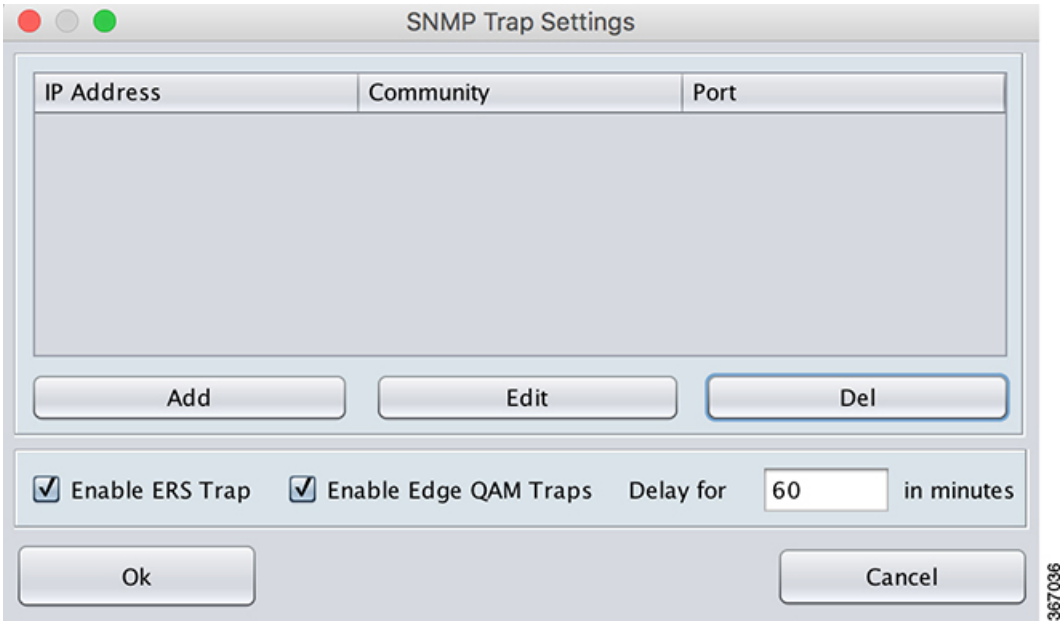
The CEM application sends trap messages only if the connection is not restored before the timeout that is specified on the GUI. By default, trap messages are sent for both ERS connection related errors and Edge QAM connection errors.

Adding SNMP Notification Host

You can add more than one remote SNMP notification host/manager. Complete these steps to add Cisco Edge QAM device:

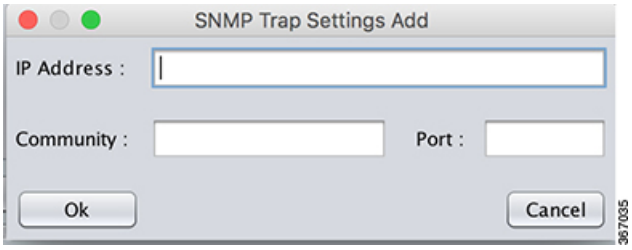
Step 1 Choose **Configuration** > **SNMP Trap Settings** menu to open the **SNMP Trap Settings** window.

Figure 16: SNMP Trap Settings



Step 2 Click the **Add** button to open the **SNMP Trap Settings Add** dialog box.

Figure 17: SNMP Trap Settings Add



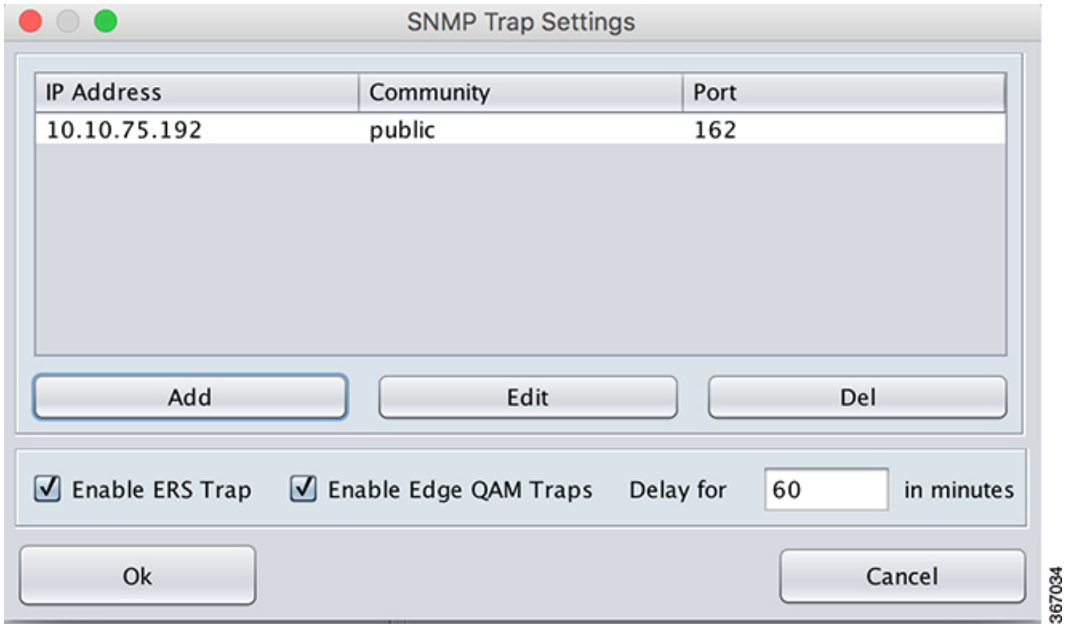
Step 3 Enter the following details in the **SNMP Trap Settings Add** window:

- IP Address—IP address of the remote SNMP notification host
- Community—SNMP community string

- Port—Port number of the remote SNMP notification host

Step 4 Click **Ok** to add the host to the list.

Figure 18: SNMP Trap Settings—Host-list



Step 5 Choose the required checkboxes to enable the following:

- **Enable ERS Trap—**ERS connection-related traps
- **Enable Edge QAM Traps—**Cisco Edge QAM connection-related traps

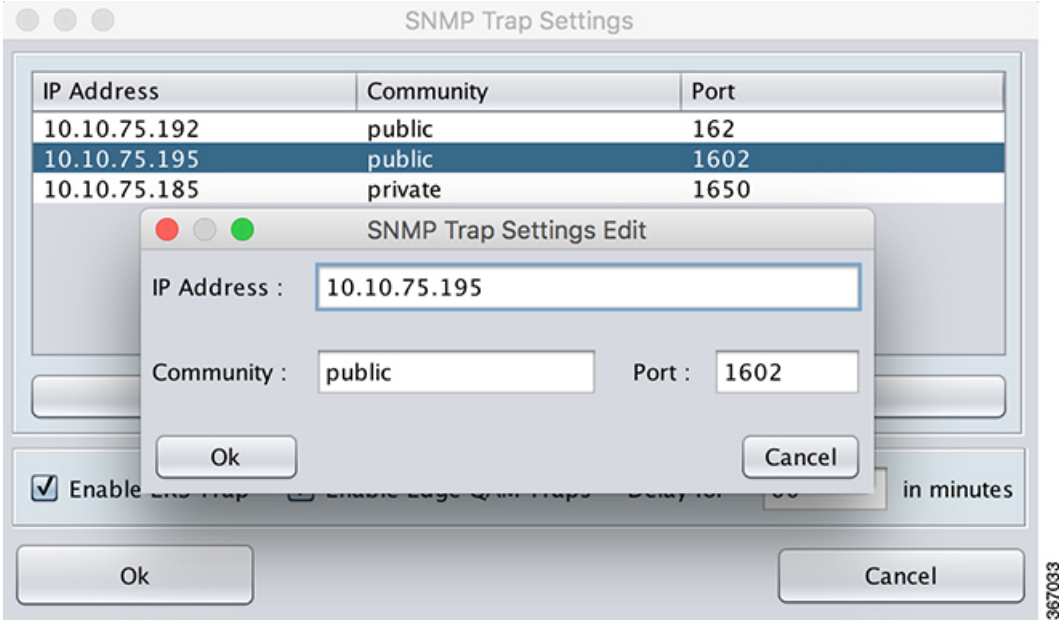
Step 6 In the **Delay** for text box, specify the time after which the traps should be sent to the configured remote SNMP notification hosts.
The traps are sent to the hosts only if the connection is not restored before the timeout that is specified in the UI. By default, the delay is 60 minutes.

Modify or Delete SNMP Configuration

You can modify the details of the remote SNMP notification hosts already added in the CEM application.

To edit the details, in the **SNMP Trap Settings** window, select the **IP address** and click the **Edit** button. You can edit the **IP Address**, **Community** (SNMP community string), and the **Port** fields.

Figure 19: SNMP Trap Settings Edit



To delete a host configuration, in the **SNMP Trap Settings** window, select the **IP address** and click the **Del** button.

Feature Information for Converged EdgeQAM Manager

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note The table below 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.

Table 3: Feature Information for Converged EdgeQAM Manager

Feature Name	Releases	Feature Information
SNMP Trap Configuration	Converged EdgeQAM Manager 2.1	Cisco cBR-8 router is supported in this release.

Feature Name	Releases	Feature Information
Converged EdgeQAM Manager	Version 2.0	Cisco cBR-8 router is supported in this release.
Converged EdgeQAM Manager	Version 1.0	Cisco cBR-8 router is not supported in this release.