



# Centralized License Manager

Release 18.6

## User Guide

3HE-14322-AAAA-TQZZA

Issue 1

June 2018

---

**Legal notice**

Nokia is a registered trademark of Nokia Corporation. Other products and company names mentioned herein may be trademarks or tradenames of their respective owners.

The information presented is subject to change without notice. No responsibility is assumed for inaccuracies contained herein.

© 2018 Nokia.

---

# Contents

<b>1</b>	<b>Getting Started</b> .....	<b>5</b>
1.1	List of abbreviations .....	5
1.2	Overview .....	5
1.3	Architecture .....	6
1.4	Workflow for typical CLM operator configuration.....	6
<b>2</b>	<b>Network Pool Keys</b> .....	<b>9</b>
2.1	To obtain a network pool key.....	9
2.2	To upload a network pool key.....	10
2.3	To remove a network pool key .....	10
2.4	To view details of a network pool key .....	11
2.5	To view allocated entitlements for a selected network pool key .....	11
2.6	Network pool key upload errors .....	12
<b>3</b>	<b>License Repository</b> .....	<b>13</b>
3.1	To configure a license repository.....	13
3.2	To edit a license repository.....	14
3.3	To delete a license repository.....	14
<b>4</b>	<b>Network Functions</b> .....	<b>17</b>
4.1	To define a network function .....	17
4.2	VSR function business rules .....	18
4.3	To view network functions .....	20
4.4	To edit a network function .....	20
4.5	To delete a network function .....	22
4.6	To generate and deploy a license key.....	22
4.7	To revoke license keys .....	23
4.8	To generate and download license keys .....	24
<b>5</b>	<b>Notifications and Events</b> .....	<b>25</b>
5.1	To view notifications .....	25
5.2	To configure notification thresholds.....	25
5.3	To view events history .....	26



---

# 1 Getting Started

## 1.1 List of abbreviations

### 1.1.1

Abbreviation	Definition
CLM	Centralized License Manager
CSR	Certificate Signing Request
UID	Unique ID
UUID	Universally Unique Identifier
VM	Virtual Machine
VSR	Virtualized Service Router

## 1.2 Overview

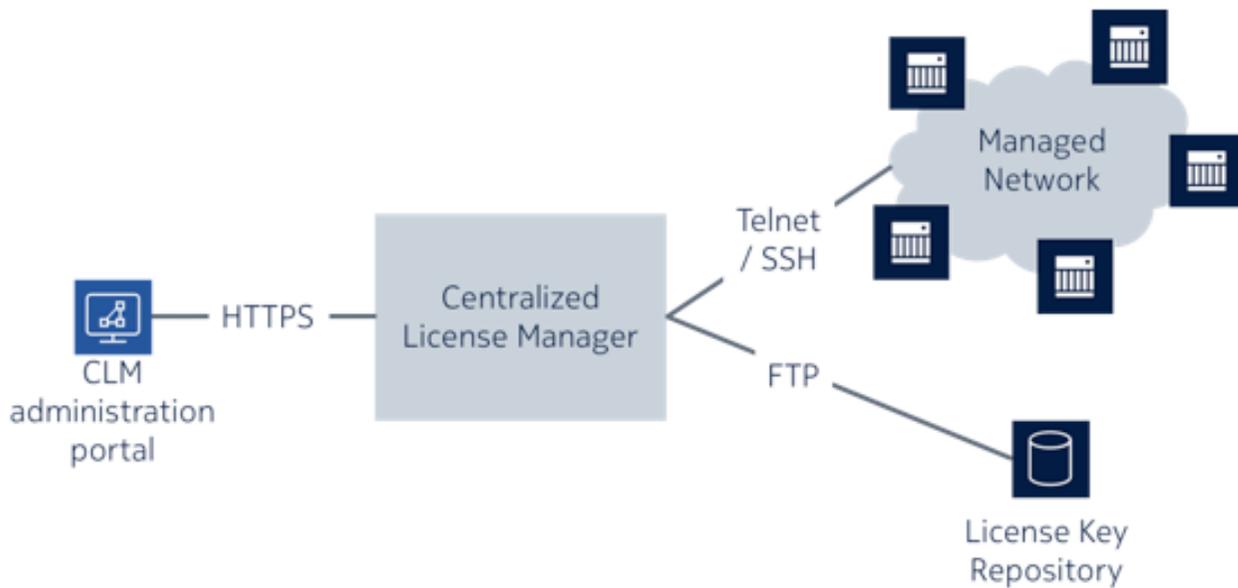
### 1.2.1

The Centralized License Manager (CLM) provides simplification of network function license management. Using the CLM, operators can flexibly control license entitlement and monitor license usage for their managed network functions.

**i** **Note:** Only an administrator user can perform the majority of the operations listed. An administrator of the CLM application is a user who belongs to the “admin” group. The group name needs to be exactly “admin”. Non-administrator users can only view information.

## 1.3 Architecture

### 1.3.1



The CLM resides on a single server/virtual machine (VM) for a standalone installation, or on a pair of servers/VMs for a redundant installation. The CLM server communicates with the managed network function as well as the license key repository that is used to store the license keys used by the network functions. The CLM application allows an operator to configure, manage, and monitor the license key deployment.

## 1.4 Workflow for typical CLM operator configuration

### 1.4.1

- 1 \_\_\_\_\_  
Obtain your network pool key(s) from the Nokia Supply Chain; see “To obtain a network pool key” on the NETWORK POOL KEYS panel.
- 2 \_\_\_\_\_  
Upload your network pool key(s); see “To upload a network pool key” on the NETWORK POOL KEYS panel.

---

**3** \_\_\_\_\_  
Configure your customer license repositories; see “To configure a license repository” on the LICENSE REPOSITORY panel.

**4** \_\_\_\_\_  
Define your network functions; see “To define a network function” on the NETWORK FUNCTIONS panel.

**5** \_\_\_\_\_  
Generate and deploy license keys; see “To generate and deploy a license key” on the NETWORK FUNCTIONS panel.

**END OF STEPS** \_\_\_\_\_



---

## 2 Network Pool Keys

### 2.1 To obtain a network pool key

#### 2.1.1

Before you can define and assign entitlements to network functions you need to first obtain a network pool key from Nokia. A network pool key is a file that contains details about the quantities and entitlements that you can assign to a specific product and version of a network function; for example, VSR version 16.0. A network pool key contains an expiry date, after which time the ability to generate license keys for network functions is unavailable. The CLM provides notifications fifteen days prior to the expiry date of any network pool key. Network pool keys are digitally signed and the CLM rejects keys that have been tampered with.



**Note:** A network pool key is locked to a specific CLM installation.

1 \_\_\_\_\_

Sign in as an administrator user and launch the CLM application.

2 \_\_\_\_\_

Click Configuration and then click System Information.

3 \_\_\_\_\_

Click on the Download button next to the System Certificate Signing Request (CSR) label.

4 \_\_\_\_\_

Send the downloaded file (zip archive) to your Nokia representative.

5 \_\_\_\_\_

If you are running CLM in a redundant configuration, you must also:

1. Manually perform a switch-over to the redundant site.
2. Sign in as an administrator user and launch the CLM application.
3. Click Configuration and then click System Information.
4. Copy the text under the label System Universally Unique Identifier (UUID).
5. Include this UUID with the email you send to your Nokia representative.

---

#### END OF STEPS

When Nokia receives the zip file containing the downloaded CSR and UUID information (and the secondary UUID if required), the request is referenced against the purchased licenses in the system, and a network pool key is provided back to you for you to upload to the CLM.

---

## 2.2 To upload a network pool key

### 2.2.1

To generate license keys for network functions, you must first upload your network pool key(s) into the CLM. Your network pool key may come to you as a zip archive file from Nokia. You can upload the network pool keys you have received from Nokia, there is no need to unzip the file.

If you have already uploaded a network pool key for the same product and license type, you will replace the currently uploaded network pool key with the new one.

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
- 2 \_\_\_\_\_  
Click Network Pool Keys and then click Add Pool Key.
- 3 \_\_\_\_\_  
Choose a file and click Upload. A message appears confirming the upload was successful and a network pool key tile appears as a visual representation.  
If an error message appears instead, see “Network pool key upload errors” on the NETWORK POOL KEYS panel.

END OF STEPS \_\_\_\_\_

## 2.3 To remove a network pool key

### 2.3.1

After a pool key is no longer required, for example it has expired, you can remove the pool key from the CLM.

**i** **Note:** You receive an error message if you attempt to remove a network pool key that has associated network functions. You must delete all network functions that reference the network pool key first.

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
- 2 \_\_\_\_\_  
Click Network Pool Keys.
- 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose Remove. A confirmation pop-up opens.

---

4

Click Continue. The network pool key is removed from the CLM.

END OF STEPS

---

## 2.4 To view details of a network pool key

### 2.4.1

Uploaded network pool keys are displayed as tiles on the Network Pool Keys page. The tile provides the product, version, license type, and expiry date of the network pool key. The network pool key tile displays a warning icon if the network pool key is nearing its expiry date, or if the amount of allocated entitlements has exceeded one of the thresholds.

You can view more information about your network pool keys, such as common properties (for example, product, license type, and activation date), as well as the entitlements that the product-specific network pool key provides.

1

Sign in and launch the CLM application.

2

Click Network Pool Keys.

3

Click on the More button on the network pool key tile and choose View Information.

END OF STEPS

---

## 2.5 To view allocated entitlements for a selected network pool key

### 2.5.1

1

Sign in and launch the CLM application.

2

Click Network Pool Keys.

3

Click on a network pool key tile. A list of entitlements displays.

The Allocated column displays how much of the entitlement has been allocated to your various network functions. The Allocatable column displays a count of the total amount of the entitlement that is provided by the network pool key. The Available column shows how much of the entitlement remains for future use.

---

A notification icon appears when an entitlement has approached or exceeded the set thresholds.

END OF STEPS

---

## 2.6 Network pool key upload errors

### 2.6.1

When you upload a network pool key, there are a number of errors that can occur. Contact Nokia to resolve any problems.

Common errors are:

Error	Cause
Invalid UUID	The UUID specified in the network pool key does not match the UUID of your CLM.
Invalid field: expiry date	The network pool key has expired and cannot be used.
Zip archive processing error	The zip file is corrupt.
Invalid signature	The network pool key has an invalid signature and might have been tampered with.
Parsing error	There was a problem parsing the network pool key.

---

## 3 License Repository

### 3.1 To configure a license repository

#### 3.1.1

A license repository is a secure server in the customer premise where license files are stored. A license repository contains information about the FTP server that is used by your network functions (for example, VSRs) to obtain their license key files. This information is used by the CLM to connect, log in, and manage license key files that the CLM generates and are referenced by the network functions. Once a license repository has been created in CLM, it can be assigned to network functions. When you generate and deploy a license key for a specific network function, the information defined in the license repository assigned to the network function is used for license key management.

**i** **Note:** Create one license repository for each unique location that you want to store license keys. A location is unique if its server IP address and Full Directory Path are different than another license repository.

1 \_\_\_\_\_

Sign in as an administrator user and launch the CLM application.

2 \_\_\_\_\_

Click Configuration and then click License Repository.

3 \_\_\_\_\_

Click Add. The Add License Repository form opens.

4 \_\_\_\_\_

Configure the required parameters, ensuring that:

- The Name is unique.
- The login credentials are correct.
- The directory specified by Full Directory Path exists and the user specified in the connection properties has read/write permissions to the directory.
- The directory is specified relative to root of the file system.

5 \_\_\_\_\_

Save the form.

**i** **Note:** After you create a license repository, wait for approximately five minutes to allow the CLM to automatically check that it can connect to the license repository without errors.

END OF STEPS \_\_\_\_\_

---

## 3.2 To edit a license repository

### 3.2.1

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
  - 2 \_\_\_\_\_  
Click Configuration and then click License Repository.
  - 3 \_\_\_\_\_  
Click on the Edit/pencil icon for the License Repository you want to edit. The Edit License Repository form opens.
  - 4 \_\_\_\_\_  
Edit the parameters.
    - The Name must be unique.
    - You cannot change the Full Directory Path after you have associated network functions to the license repository.
  - 5 \_\_\_\_\_  
Save the form.
-  **Note:** After you edit a license repository, wait for approximately five minutes to allow the CLM to automatically check that it can connect to the license repository without errors.

END OF STEPS \_\_\_\_\_

## 3.3 To delete a license repository

### 3.3.1

-  **Note:** You will receive an error message if you attempt to delete a license repository that has been assigned to one or more network functions.
- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
  - 2 \_\_\_\_\_  
Un-assign the license repository from any network functions that are referencing it. Do this by editing a network function and selecting 'none' for the referenced license repository.

---

**3** \_\_\_\_\_  
Click Configuration and then click License Repository.

**4** \_\_\_\_\_  
Click on the Delete/trash can icon for the License Repository you want to delete. A delete confirmation pop-up opens.

**5** \_\_\_\_\_  
Click Continue.

**END OF STEPS** \_\_\_\_\_



---

## 4 Network Functions

### 4.1 To define a network function

#### 4.1.1

The CLM application allows you to assign entitlements to your network functions to enable specific features of the network function. An entitlement is a definition of the application specific licenses for a specific network function.

- For a VSR, the UID must be the IP address of the network function.
- A network function must have a unique name.
- A network function for a given product type must have a unique UID within that product type.

**i** **Note:** You will receive an error message if you attempt to delete a license repository that has been assigned to one more network functions.

1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.

2 \_\_\_\_\_  
Click Network Pool Keys.

3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose Define Network Function. The Define Network Function form opens.

4 \_\_\_\_\_  
Configure the required parameters. The panel on the left side of the form lists the Properties of the network function as well as the groups of entitlements that can be assigned to the network function. The panel indicates which groups contain mandatory fields with a yellow dot icon next to the label.

5 \_\_\_\_\_  
Select the various entitlements that you want to allocate to the network function. The Create button becomes active when all mandatory fields have been populated.

**i** **Note:** Creating the network function may result in an over-allocation of one or more entitlements. If the over-allocation of any single entitlement exceeds 110%, you will receive an error message and the network function is not created. You must either free up the listed entitlements from another network function, or order additional resources from Nokia.

---

6

Click Create.

END OF STEPS

---

## 4.2 VSR function business rules

### 4.2.1

The following table provides a list of entitlements required to configure a VSR to perform a specific function. To use the table, pick your VSR function (e.g. VSR-NAT) and then when you are creating or editing a network function, choose the entitlements that have an 'X' in the column.

- AA (Application Assurance)
- BNG (Broadband Network Gateway)
- LNS (L2TP Network Server)
- NAT (Network Address Translation)
- NGE (Network Group Encryption)
- PE (Provider Edge)
- RR (Route Reflector)
- SeGW (Security Gateway)
- vRGW (virtual Residential Gateway)
- WLGW (Wireless LAN Gateway)

VSR Function	VSR-AA	VSR-BNG	VSR-LNS	VSR-NAT	VSR-NGE	VSR-PE	VSR-RR	VSR-SeGW	VSR-vRGW	VSR-WLGW	All
<b>All Functions</b>											
VSR Standard QoS Bandwidth	X			X	X	X		X		X	X
VSR Advanced QoS Bandwidth	X	X	X	X	X	X		X	X	X	X
VSR VPN Service Instances	X	X	X	X	X	X		X	X	X	X
VSR IP-Tunnels	X					X		X			X
VSR Lawful Intercept		X	X			X			X	X	X
VSR ADV DC GW and Service Chain		X				X			X		X
VSR Hybrid OpenFlow Switch						X					X
<b>VSR-BNG</b>											
VSR-BNG Hosts		X									X
<b>VSR-LNS</b>											
VSR-LNS L2TP Tunnels			X								X
VSR-LNS Hosts			X								X
<b>VSR-NGE</b>											
VSR-NGE Network Group Encryption Bandwidth					X						X
<b>VSR-RR</b>											
VSR-RR BGP Route Reflector							X				X
<b>VSR-vRGW</b>											
VSR-vRGW Hosts									X		X
<b>VSR-WLGW</b>											
VSR-WLGW Hosts										X	X
VSR-WLGW Multiple SSID										X	X
VSR-WLGW Mobility										X	X
VSR-WLGW Geo Redundancy										X	X
<b>Value Add Services - AA for BNG, vRGW, and AA</b>											
VSR-AA ID and Control Residential Subscribers	X	X	X						X		X
VSR-AA IBN Residential Subscribers	X	X	X						X		X
VSR-AA ICAP Control Residential Subscribers	X	X	X						X		X
VSR-AA URL Filter Residential Subscribers	X	X	X						X		X
VSR-AA RTP Performance Measurement Residential Subscribers	X	X	X						X		X
<b>Value Add Services - AA for WLGW</b>											
VSR-AA ID and CTL Wifi Subscribers										X	X
VSR-AA IBN Wifi Subscribers										X	X
VSR-AA ICAP Control Wifi Subscribers										X	X
VSR-AA URL Filter Wifi Subscribers										X	X
VSR-AA DEM Gateway Wifi Subscribers										X	X
<b>Value Add Services - AA for PE and SeGW</b>											
VSR-AA ID and CTL VPN Bandwidth					X	X					X
VSR-AA Stateful Firewall VPN Bandwidth					X	X		X			X
VSR-AA RTP Performance Measurement Bandwidth					X	X					X
<b>Value Add Services - NAT for PE, BNG, and LNS</b>											
VSR-NAT Subscribers		X	X	X		X					X
VSR-NAT Bandwidth		X	X	X		X					X
VSR-NAT Geo Redundancy		X	X	X							X
VSR-NAT UPnP				X					X		X
VSR L2Aware-NAT		X		X					X		X
VSR MAP-T Bandwidth		X	X	X		X					X
<b>Value Add Services - IPSec for PE and SeGW</b>											
VSR-IPsec Tunnels						X		X			X
VSR-IPsec Bandwidth						X		X			X
VSR-IPsec Geo Redundancy								X			X

---

## 4.3 To view network functions

### 4.3.1

- 1 \_\_\_\_\_  
Sign in and launch the CLM application.
- 2 \_\_\_\_\_  
Click Network Pool Keys.
- 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.  
Use the column headings to sort the network functions, or the column fields to search for a specific network function.  
The Deployed Status column identifies if network functions have deployed license keys on their referenced license repository.  
The Highest Severity column denotes the highest severity notification associated with the network function.  
Notifications can be raised on network functions if:
  - CLM cannot connect to the network function
  - CLM fails to deploy a license key for a network function
- 4 \_\_\_\_\_  
To view the entitlements that have been associated with the network function, click on a network function from the list and then click the View Entitlements icon.

END OF STEPS \_\_\_\_\_

## 4.4 To edit a network function

### 4.4.1

-  **Note:** Editing a network function may result in an over-allocation of one or more entitlements. If the over-allocation of any single entitlement exceeds 110%, you receive an error message and the network function is not created. You must either free up the listed entitlements from another network function, or order additional resources from Nokia.
-  **Note:** You cannot edit a network function while a license key is being deployed or revoked. You will receive an error message stating that the object is busy and that you should re-try the operation.

- 
- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
  - 2 \_\_\_\_\_  
Click Network Pool Keys.
  - 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.
  - 4 \_\_\_\_\_  
Click on a network function from the list that you want to modify and click the Edit icon. The Edit Network Function form opens.
  - 5 \_\_\_\_\_  
Modify the parameters, as required.  
  
 **Note:** If a network function has a deployed license key, one of the following occurs:
    - If you changed the UUID of the network function, the existing license key is revoked.
    - If you changed which license repository the network function references, the license key is removed from the original license repository and a new license key is deployed to the new license repository.
    - If you set the referenced license repository to 'none' the CLM revokes the license key from the original license repository.
  - 6 \_\_\_\_\_  
Edit or assign new entitlements to the network function. If you remove an existing entitlement from a network function, you will receive a warning next to the entitlement stating that you are removing functionality from the network function. Certain network functions require that you apply configuration changes to them before deploying a new license key that reduces functionality. Consult the network functions operator guide. The edit form panel displays a warning icon next to the group label to indicate which entitlement groups contain entitlements that you have removed.
  - 7 \_\_\_\_\_  
Click Save to save your changes to the network function, or cancel the operation by clicking the X in the upper right-hand corner of the edit form.  
  
Changing the functionality of a network function requires a network function reboot for the new functionality to become active.

END OF STEPS

---

---

## 4.5 To delete a network function

### 4.5.1

You can delete a network function when it is no longer needed. Deleting a network function releases any entitlements assigned to it back to the pool of available entitlements.

If the network function you are deleting has a deployed license key, the CLM attempts to remove the key from the license repository referenced by the network function.

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
- 2 \_\_\_\_\_  
Click Network Pool Keys.
- 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.
- 4 \_\_\_\_\_  
Click on a network function from the list and click the Delete icon. A confirmation pop-up opens.
- 5 \_\_\_\_\_  
Click Continue.

END OF STEPS \_\_\_\_\_

## 4.6 To generate and deploy a license key

### 4.6.1

Deploying a license key is the process of:

- Generating a unique license key file for the selected network function.
- Placing the license key file onto the license repository referenced by the network function.
- Setting the network function to reference the license key file. For example, for a VSR, the VSRs BOF is set to reference the location of the license key file on the license repository.

**i** **Note:** Changing the functionality of a network function requires a network function reboot for the new functionality to become active. The CLM does not automatically reboot the network function.

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.

- 
- 2 \_\_\_\_\_  
Click Network Pool Keys.
  - 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.
  - 4 \_\_\_\_\_  
Click on a network function for which you want to deploy a license key and choose Deploy License Key.  
The deploy license key operation is asynchronous and may take a few minutes depending on your network performance. Pressing the refresh button updates the data in the network function grid.  
The Deployed Status column of the network function grid indicates that the license key file has been deployed to the license repository. After deploying a license key:
    - If the network function is not marked as Deployed, there will be notifications raised about problems communicating with the referenced license repository.
    - If the network function is marked as Deployed, but there are notifications raised against it, the network function is not configured to use the new license key.You must address the problem indicated in the notification, and then choose the deploy license key operation again.  
If errors are encountered during the deployment, notifications are raised.

END OF STEPS

---

## 4.7 To revoke license keys

### 4.7.1

Revoking license keys is the process of removing the current license key for the network function from the license repository.

 **Note:** When a license key is revoked, the network function is still referencing the now-removed license key file. If the network function is rebooted, it will fail to find a license key.

- 1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.
- 2 \_\_\_\_\_  
Click Network Pool Keys.
- 3 \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.

---

**4** \_\_\_\_\_  
Click on a network function for which you want to revoke a license key and choose Revoke License Key.

**5** \_\_\_\_\_  
Click Continue.

**END OF STEPS** \_\_\_\_\_

## **4.8 To generate and download license keys**

### **4.8.1**

The pool key associated with the network function may have permission to enable you to generate and download a license key file for a network function. If these permissions are present, you will see a Generate and Download License Pool Key button on the grid row.

**1** \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.

**2** \_\_\_\_\_  
Click Network Pool Keys.

**3** \_\_\_\_\_  
Click on the More button on the network pool key tile and choose View Network Functions. A list of network functions displays.

**4** \_\_\_\_\_  
Click on a network function for which you want to generate and download a license key and choose Generate and Download License Pool Key.  
Your browser downloads the license key file, or an error dialog appears.

**END OF STEPS** \_\_\_\_\_

---

## 5 Notifications and Events

### 5.1 To view notifications

#### 5.1.1

Notifications alert an operator of misconfiguration of license repository, failed license deployment, or expiration of the pool key.

Notifications are generated automatically by the CLM, and they are cleared when the condition has cleared.

1 \_\_\_\_\_  
Sign in and launch the CLM application.

2 \_\_\_\_\_  
Click Notifications. A list of notifications displays.  
Use the column headings to sort the notifications, or use the Type field to search for a specific type of notification.

3 \_\_\_\_\_  
You can also see notification icons on the Network Functions list when thresholds are close to, or exceeding, thresholds.

END OF STEPS \_\_\_\_\_

### 5.2 To configure notification thresholds

#### 5.2.1

Perform this procedure to set thresholds for the percentage usage of an entitlement. For example, if you set the Warning Threshold to 75, the CLM raises a warning when an entitlement is 75% used.

1 \_\_\_\_\_  
Sign in as an administrator user and launch the CLM application.

2 \_\_\_\_\_  
Click Configuration and then click Notification Threshold.

3 \_\_\_\_\_  
Configure the parameters and save the form.

END OF STEPS \_\_\_\_\_

---

## 5.3 To view events history

### 5.3.1

Events provide a log of operations on CLM, listing all significant operator-initiated actions. It could be used for a an audit log.

1 \_\_\_\_\_

Sign in and launch the CLM application.

2 \_\_\_\_\_

Click Events. A list of events displays.

3 \_\_\_\_\_

To view more details for an event, hover over the event and click on the Log Detail button. The Event Info pop-up opens.

**END OF STEPS** \_\_\_\_\_