



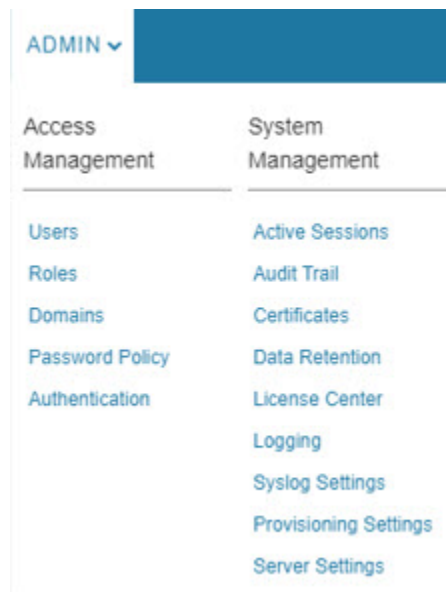
# Managing System Settings

This section describes how to manage system settings.



**Note** To manage system settings, you must be logged in either as root or as a user with Administrative Operations permissions.

System settings are managed from the **ADMIN > System Management** menu.



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# Managing Active Sessions

IoT FND tracks active user sessions and lets you log out users.

## Viewing Active Sessions

To view active user sessions:

Choose **ADMIN > System Management > Active Sessions**.

IoT FND displays the Active Sessions page.

| <input type="checkbox"/> | User Name | IP             | Login Time       | Last Access Time |
|--------------------------|-----------|----------------|------------------|------------------|
| <input type="checkbox"/> | root      | 10.65.50.154   | 2021-11-11 12:57 | 2021-11-11 14:23 |
| <input type="checkbox"/> | root      | 10.65.40.200   | 2021-11-10 16:45 | 2021-11-11 14:23 |
| <input type="checkbox"/> | root      | 10.65.79.9     | 2021-11-11 10:47 | 2021-11-11 14:23 |
| <input type="checkbox"/> | root      | 10.65.231.232  | 2021-11-11 11:01 | 2021-11-11 12:20 |
| <input type="checkbox"/> | root      | 10.65.35.187   | 2021-11-10 13:24 | 2021-11-11 08:55 |
| <input type="checkbox"/> | root      | 10.227.243.226 | 2021-11-10 10:19 | 2021-11-10 18:45 |

The table describes the Active Session fields:

| Field            | Description  |
|------------------|--|
| User Name        | The user name in the session record. To view user settings, click the user name. |
| IP               | The IP address of the system the user employs to access IoT FND.                 |
| Login Time       | The log in date and time for the user.   |
| Last Access Time | The last time the user accessed the system.                                      |

**Tip** Click the **Reload** button (upper-left hand corner) to update the users list.

## Logging Out Users

To log out an IoT FND user:

**Step 1** Choose **ADMIN > System Management > Active Sessions**.

**Step 2** Select the check boxes for those users you want to log out.

**Step 3** Click **Logout Users**.

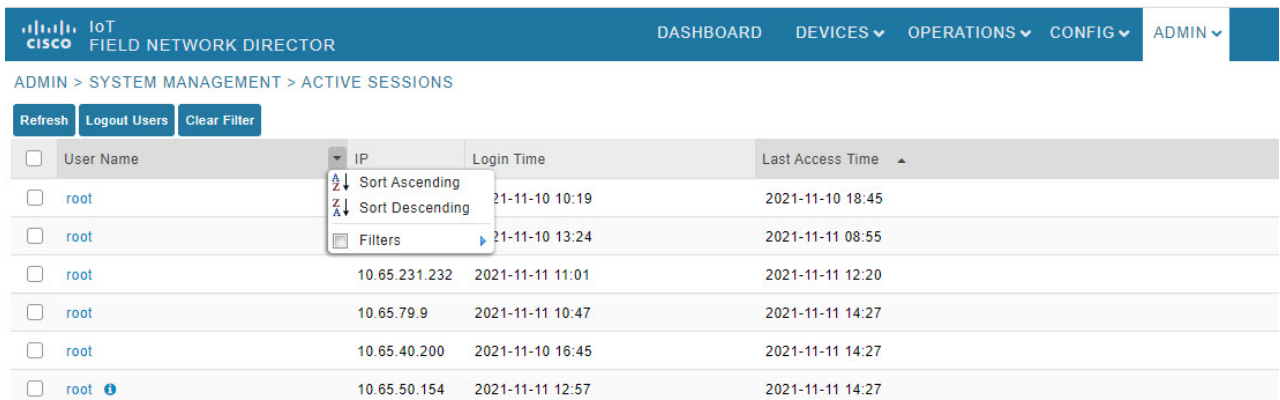
**Step 4** Click **Yes** to confirm logout of the users.

## Filtering the Active Sessions List

To filter the Active Sessions list using column filtering:

**Step 1** Choose **ADMIN > System Management > Active Sessions**.

**Step 2** Hover the mouse over the User Name column heading to expose the filter icon (triangle). Enter the user name or the first characters of the user name to filter the list.



The screenshot shows the Cisco IoT Field Network Director interface. The breadcrumb navigation is ADMIN > SYSTEM MANAGEMENT > ACTIVE SESSIONS. There are buttons for Refresh, Logout Users, and Clear Filter. The table has columns for User Name, IP, Login Time, and Last Access Time. The User Name column is filtered with 'root'. A dropdown menu is open over the User Name header, showing options for sorting and filtering.

| <input type="checkbox"/> | User Name | IP            | Login Time       | Last Access Time |
|--------------------------|-----------|---------------|------------------|------------------|
| <input type="checkbox"/> | root      |               | 21-11-10 10:19   | 2021-11-10 18:45 |
| <input type="checkbox"/> | root      |               | 21-11-10 13:24   | 2021-11-11 08:55 |
| <input type="checkbox"/> | root      | 10.65.231.232 | 2021-11-11 11:01 | 2021-11-11 12:20 |
| <input type="checkbox"/> | root      | 10.65.79.9    | 2021-11-11 10:47 | 2021-11-11 14:27 |
| <input type="checkbox"/> | root      | 10.65.40.200  | 2021-11-10 16:45 | 2021-11-11 14:27 |
| <input type="checkbox"/> | root      | 10.65.50.154  | 2021-11-11 12:57 | 2021-11-11 14:27 |

For example, to list the active sessions for the root user, enter **root**.

**Tip** To remove the filter, from the User Name drop-down menu, clear the **Filters** check box or click **Clear Filter**.

## Displaying the Audit Trail

Use the audit trail to track IoT Field Network Director user activity.

To display the Audit Trail:

Choose **ADMIN > System Management > Audit Trail**.

| Date/Time           | Domain | User Name | IP            | Operation                            | Status  | Details   |
|---------------------|--------|-----------|---------------|--------------------------------------|---------|---|
| 2023-10-12 08:31:30 | root   | root      | 10.142.92.80  | runner provisioning template updated | Success | Device type: cgl root                           |
| 2023-10-12 08:26:15 | root   | root      | 10.142.92.80  | Login                                | Success | N/A   |
| 2023-10-12 06:44:29 | root   | root      | 10.232.4.123  | Login                                | Success | N/A   |
| 2023-10-11 08:59:16 | root   | root      | 10.196.134.90 | Devices removed                      | Success | N/A   |
| 2023-10-11 08:52:08 | root   | root      | 10.196.134.90 | Login                                | Success | N/A   |
| 2023-10-11 06:57:09 | root   | root      | 10.196.134.90 | IPAM Ipv6 address generation         | Success | Excluded Ipv6 [13], Usable Ipv6 generated [243] |
| 2023-10-11 06:57:09 | root   | root      | 10.196.134.90 | Tunnel provisioning settings changed | Success | N/A   |
| 2023-10-11 06:52:50 | root   | root      | 10.196.134.90 | Login                                | Success | N/A   |

The table below describes the Audit Trail Fields:

| Field     | Description  |
|-----------|--|
| Date/Time | Date and time of the operation.  |
| Domain    | Specifies domains with root or non-root access. <ul style="list-style-type: none"> <li>• Root - The Admin user who defines root access for other users while creating a domain.</li> <li>• Non-root - Admin creates the domain without root access.</li> </ul> |
| User Name | The user who performed the operation. To view user settings, click the user name.  |
| IP        | IP address of the system that the user employs to access IoT FND.  |
| Operation | Type of operation performed.   |
| Status    | Status of the operation.   |
| Details   | Operation details.   |

**Tip** Click the **Refresh** icon (far right) to update the list.

## Filtering the Audit Trail List

To filter the Audit Trail list using column filtering:

**Step 1** Choose **ADMIN > System Management > Audit Trail**.

**Step 2** From the User Name drop-down menu, pass over Filters option and in the field that appears enter the user name or the first characters of the user name to filter the list.

For example, to list the Audit Trail entries for the user jane, enter **jane**.

**Tip** To remove the filter, from the User Name drop-down menu, uncheck the **Filters** check box or click **Clear Filter (left of the screen)**.

## Managing Certificates

The Certificates page displays the certificates for CSMP (CoAP Simple Management Protocol), and Web certificates used by IoT FND and lets you download these certificates.

To display the CSMP, and Web certificates:

**Step 1** Choose **ADMIN > System Management > Certificates**.

**Step 2** To view a certificate, click its corresponding heading (such as Certificate for Routers).

```

Certificate:
Data:
  Version: 3
  Serial Number: 191174027
  Signature Algorithm: SHA256withECDSA
  Issuer: CN=SSM_CSMP, OU=CENBU, O=Cisco, L=San Jose, ST=CA, C=US
  Validity
    Not Before: Tue Jul 22 23:32:52 UTC 2014
    Not After : Thu Jul 21 23:32:52 UTC 2044
  Subject: CN=SSM_CSMP, OU=CENBU, O=Cisco, L=San Jose, ST=CA, C=US
  Fingerprints:
    MD5: 2E:AC:06:1F:3E:AB:A6:BE:33:1F:1E:EF:33:D9:80:29
    SHA1: 48:A2:EC:63:2F:6F:54:25:23:5D:E7:6F:4E:E9:8E:2D:93:50:A0:FF
    SHA256: C4:10:BB:56:16:52:CC:A8:40:8C:E8:46:50:71:01:EE:D1:BB:15:7F:0E:1B:32:9E:93:20:36:72:62:47:1C:49
  Subject Public Key Info:
    Public Key Algorithm: EC
      30:59:30:13:06:07:2A:86:48:CE:3D:02:01:06:08:
      2A:86:48:CE:3D:03:01:07:03:42:00:04:23:D2:83:
      45:E8:D5:DF:96:9D:6E:E7:58:0D:C1:8F:35:9D:57:
      B1:3D:50:4A:16:01:15:C4:81:19:B0:E6:60:B8:64:
      14:01:5D:56:83:BE:E1:85:98:CB:90:E1:F7:9B:F4:
      33:5A:4B:29:AD:35:69:9B:4F:DC:42:7F:EB:C2:99:
      A5
  X509v2 extensions:
    
```

Binary  Base64 **Download**

**Step 3** To download a certificate, select encoding type (**Binary** or **Base64**) radio button, and then click **Download**.

For more information about certificates, see [Generating and Installing Certificates](#) in the Cisco IoT Field Network Director Installation Guide.

## Configuring CA Certification to verify the App Signature

Allows you to import and add a trust anchor to the default profile for a Cisco IOx device that is being managed by IoT FND such as IC3000 or IR800. (The default profile is not visible to the user). You can enable this capability on the Application Security tab of the Certificate page.

The Application Security tab only appears when both of the following conditions are met:

- The user should have application management permission.

- At least one IOx device is being managed such as IC3000 or IR800.

To import and add a trust anchor to a default profile for a Cisco IOx device:

**Step 1** Choose **ADMIN > System Management > Certificates**.

**Step 2** Select the Application Security tab. The page that appears displays any existing trust anchors.

**Note** By default, no information will display for new installations or updates and the fields for Checksum and Trust Anchor will display a value of 'None'.)

**Step 3** To import a new a new trust anchor, check the boxes next to App Signature and Import New Trust Anchor and then enter a path to the file. Click the disk icon to Save your entries. File will also be pushed to Fog Director.

**Note** After you save and reload the Certificates page, the Checksum and Trust Anchor File name appear on the page replacing the previous values of None.

The screenshot shows the Cisco Field Network Director interface. The breadcrumb navigation is **ADMIN > SYSTEM MANAGEMENT > CERTIFICATES**. The **Application Security** tab is selected. The page displays a table for 'Existing trust Anchor' with columns for 'Checksum' and 'Trust Anchor filename', both showing 'None'. Below the table are two checkboxes: 'App Signature' and 'Import new Trust Anchor', both of which are unchecked. A 'File' input field contains the text 'Select a file from local directory.' and a blue 'Save' button with a disk icon is positioned below it.

## Configuring Data Retention

The Data Retention page lets you determine the number of days to keep event, issue, and metric data in the IoT FND database.



**Note** Data retention prunes events even if they have associated open issues.

To set IoT FND data retention:

**Step 1** Choose **ADMIN > System Management > Data Retention**.

**Step 2** For each of the retention categories, specify the number of days to retain the data as specified in the table.

Table 1: Data Retention Field Allowable Maximum Values

| Field                                       | Minimum Values in Days | Maximum Values in Days | Default Values in Days |
|---|------------------------|------------------------|------------------------|
| Keep Event data for                         | 1                      | 90                     | 31                     |
| Keep Endpoint Firmware Operation data for   | 7                      | 180                    | 7                      |
| Keep Historical Dashboard data for          | 1                      | 90                     | 62                     |
| Keep Dashboard data for                     | 1                      | 7                      | 7                      |
| Keep Historical Endpoint Metrics for        | 1                      | 7                      | 7                      |
| Keep Closed Issues data for                 | 1                      | 90                     | 30                     |
| Keep JobEngine data for                     | 1                      | 30                     | 30                     |
| Keep Historical Router Statistics data for  | 1                      | 90                     | 30                     |
| Keep Device Network Statistics data for     | 1                      | 7                      | 7                      |
| Keep Service Provider down routers data for | 1                      | 31                     | 31                     |

**Step 3** To save the maximum values, click the disk icon.

**Step 4** To revert to default settings, click **Reset**.

## Managing Licenses

The License Center page, **ADMIN > System Management > License Center**, lets you view and manage license files.



**Note** IoT FND performs license enforcement when importing devices. If you add licenses, IoT FND only allows the permitted number of devices to be imported, as defined in the licenses.

Without licenses, IoT FND allows only 3 routers and 100 mesh endpoints.

## Adding License Files

To add a license file:

## Viewing License Summary

**Step 1** Choose **ADMIN > System Management > License Center**.

**Step 2** Click **Classic Licenses**.

**Step 3** Click **Add**. An **Upload License File** window appears.

**Step 4** Click **Browse** to locate the license file and then click **Open**.

**Step 5** Click **Upload**.

**Note** The license is consumed only by devices in the Managed device category. The devices in OOS device category do not consume license.

**Step 6** Click **Reset** to cancel the selected file and search for another file.

**Note** If you import more devices that your Classic License allows, the import process will not fail. Any devices imported beyond the license limit will be marked as 'Unmanaged' and listed under Status in the Browse Devices panel. No other license types other than Classic Licenses support this capability.

DEVICES > FIELD DEVICES

Browse Devices Quick Views Show Filters

All FAN Devices

Inventory

| Name  | Meter ID | Status                               | Last Heard     | Category | Type    | Function | PANID | Firmware          |
|---|----------|--------------------------------------|----------------|----------|---------|----------|-------|-------------------|
| <input type="checkbox"/> 2ED02DFFF6E8EEB      |          | <span style="color: green;">✔</span> | 4 days ago     | ENDPOINT | IR500   | GATEWAY  | 11    | 6.1weekly(6.1.18) |
| <input type="checkbox"/> 00173B050322038      |          | <span style="color: green;">✔</span> | 55 minutes ago | ENDPOINT | IR500   | EXTENDER | 164   | 6.4.18            |
| <input type="checkbox"/> 2ED02DFFF6E8EF1      |          | <span style="color: green;">✔</span> | 20 days ago    | ENDPOINT | IR500   | GATEWAY  | 13    | 6.4.17            |
| <input type="checkbox"/> 00173B1704450024     |          | <span style="color: green;">✔</span> | 1 month ago    | ENDPOINT | IR500   | EXTENDER | 13    | 6.4weekly(6.4.9)  |
| <input type="checkbox"/> 00173B0600420051     |          | <span style="color: green;">✔</span> | 10 days ago    | ENDPOINT | IR500   | GATEWAY  | 13    | 6.4weekly(6.4.9)  |
| <input type="checkbox"/> 00173B05002E0048     |          | <span style="color: green;">✔</span> | 3 minutes ago  | ENDPOINT | IR500   | GATEWAY  | 164   | 6.4(6.4.18)       |
| <input type="checkbox"/> 00173B05001E0049     |          | <span style="color: green;">✔</span> | 3 minutes ago  | ENDPOINT | IR500   | GATEWAY  | 149   | 6.3(6.3.20)       |
| <input type="checkbox"/> COR1240K9+FX2518D0AL |          | <span style="color: green;">✔</span> | 12 minutes ago | ROUTER   | COR1000 |          | 164   | 15.9(3.0M4)       |
| <input type="checkbox"/> COR1240K9+FX2518D00L |          | <span style="color: green;">✔</span> | 3 minutes ago  | ROUTER   | COR1000 |          | 163   | 15.9(3.0M4)       |

## Viewing License Summary

To view IoT FND license summary:

**Step 1** Choose **ADMIN > System Management > License Center**.

**Step 2** Click **License Summary**. A list of devices with their license information is displayed.

**Note** The License Summary page displays the license information for devices in the Managed status only. The OOS devices are not displayed on this page, as they do not consume the license.

ADMIN > SYSTEM MANAGEMENT > LICENSE CENTER

License Summary Classic Licenses

| Package Name     | CGR1K Licenses Consumed / Total | C800 Licenses Consumed / Total | IR500 Licenses Consumed / Total | LORAWAN Licenses Consumed / Total | IR500 Licenses Consumed / Total | ENDPOINT Licenses Consumed / Total | CELL_ENDPOINT Licenses Consumed / Total | IR5100 Licenses Consumed / Total | Days Until Expiry              |
|------------------|---------------------------------|--------------------------------|---------------------------------|-----------------------------------|---------------------------------|------------------------------------|---|----------------------------------|--------------------------------|
| DEVICE_LICENSE   | 2 / 1000000                     | 0 / 1000000                    | 0 / 1000000                     | 0 / 1000000                       | 4 / 1000000                     | 2 / 10000000                       | 0 / 1000000                             | 0 / 10                           | Min: 31 day(s), Max: Permanent |
| SOFTWARE_LICENSE | NA                              | NA                             | NA                              | NA                                | NA                              | NA                                 | NA                                      | NA                               | Min: 31 day(s), Max: Permanent |

For every license, IoT FND displays the information as described in the table.

**Note** IR500s use mesh endpoint licenses and require no special license.



Table 2: Device License Summary Information

| Field                                   | Description  |
|---|--|
| Package Name                            | Name of license package.   |
| CGR1K Licenses Consumed / Total         | Lists the number of CGR1K devices currently active in the network and the maximum number of CGR1000s supported by the license.   |
| IR800 Licenses Consumed / Total         | Lists the number of IR800 (IR809 and IR829) devices currently active in the network and the maximum number of IR800 devices supported by the license.  |
| LORAWAN Licenses Consumed / Total       | Lists the number of Cisco interface modules for LoRaWAN devices currently active in the network and the maximum number of Cisco interface modules for LoRaWAN devices that are supported by the license. |
| IR500 Licenses Consumed / Total         | Lists the number of IR509 devices currently active in the network and the maximum number of IR509 devices supported by the license.  |
| ENDPOINT Licenses Consumed / Total      | Lists the number of endpoint devices currently active in the network and the maximum number of endpoint devices supported by the license.  |
| CELL_ENDPOINT Licenses Consumed / Total | Lists the number of cell_endpoint devices currently active in the network and the maximum number of cell_endpoint devices supported by the license.  |
| IR8100 Licenses Consumed / Total        | Lists the number of IR8100 devices currently active in the network and the maximum number of IR8100 devices supported by the license.  |
| Days Until Expiry                       | Number of days remaining until the license expires.  |

Table 3: Feature History

| Feature Name          | Release Information | Description   |
|-----------------------|---------------------|---|
| Enable 8140 Licensing | IoT FND 4.8         | <p>The licensing for device type IR8100 is now supported in FND. The license PID for IR8100 devices is IOTFND-IR8140. After adding the license, go to <b>ADMIN &gt; System Management &gt; License Center &gt; License Summary</b> page to view the licenses consumed and total license count for IR8100 devices.</p> <p>It is also possible to allocate licenses for each domain. Go to <b>ADMIN &gt; Access Management &gt; Domains</b>. In the Edit Domain page, you can allocate licenses for the IR8100 devices.</p> |

## Viewing License Files

To view IoT FND license files:

**Step 1** Choose **ADMIN > System Management > License Center**.

**Step 2** Click **Classic Licenses** to display details on all active licenses.

| ID                | PAK | Added At         | License Filename                   |
|-------------------|-----|------------------|------------------------------------|
| 20210804032409030 | N/A | 2021-09-30 07:37 | CGNMSTERMFEAT20210804032409030.lic |
| 20170112035309068 | N/A | 2021-08-11 23:24 | Ultimate_Lic1.lic                  |

For every file, IoT FND displays the fields as described in the table:

**Table 4: License File Fields**

| Field            | Description  |
|------------------|--|
| ID               | License ID.  |
| PAK              | Number for issuing license fulfillment. Displays as N/A. |
| Added At         | Date and time the license was added to IoT FND.          |
| License Filename | Filename of the license.                                 |

## Deleting the License Files



**Note** Ensure that you have access to license files before deleting existing license files. Without licenses, IoT FND only allows registration of 3 routers and 100 mesh endpoints.

To delete a single license or multiple license files:

**Step 1** Choose **ADMIN > System Management > License Center**.

**Step 2** Click **Classic Licenses**.

**Step 3** Check the license file ID check box that you want to delete.

**Step 4** Click **Delete**.

**Note** On deleting the license file, devices in Out of Service (OOS) status move to Unmanaged status. If license is added again, the devices move back to OOS status.

**Step 5** Click **Yes** to confirm deletion or click **No** to cancel the action.

# Managing Logs

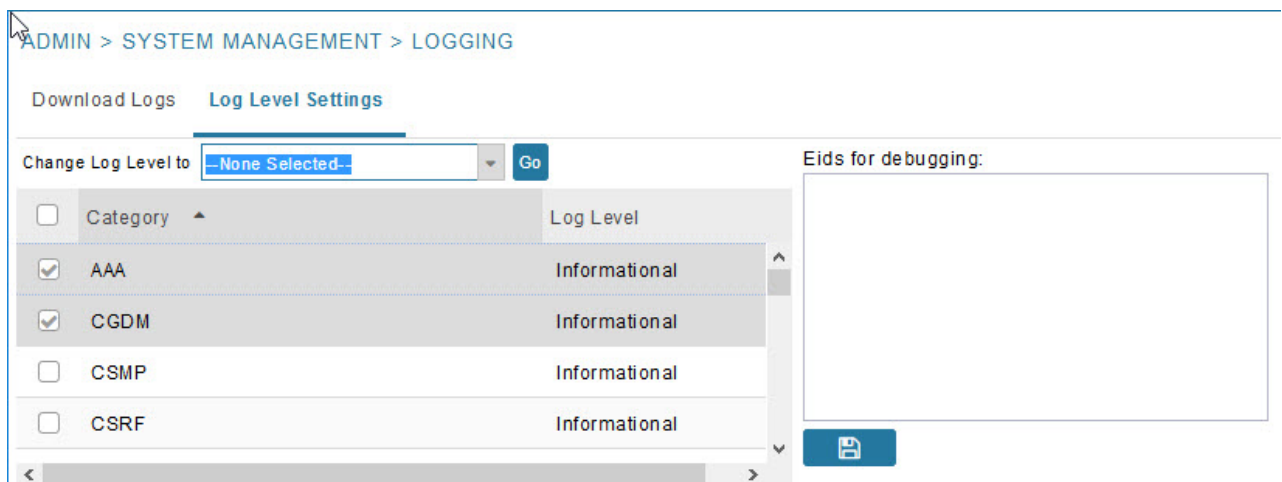
This section explains about configuring and downloading logs.

## Configuring Log Settings

IoT FND lets you change the logging level for the various log categories and download the logs. Logs incur a certain amount of disk space. For example, for 5 million meters at an 8-hour reporting interval and 5000 routers at a 60-minute periodic inventory notification, disk consumption is approximately 7MB/sec. Ensure that your server has enough disk space to contain your logs.

To configure the logging level:

- Step 1** Choose **ADMIN > System Management > Logging**.
- Step 2** Select **Log Level Settings**.
- Step 3** Check the check boxes of all logging categories to configure.



- Step 4** From the **Change Log Level** drop-down menu, choose the logging level setting (**Debug or Informational**).

- To generate all possible logging messages, use the **Debug** level.

**Note** Running the **Debug** logging category can impact performance.

- To generate a subset of these messages, use the **Informational** logging level.

**Note** The **Informational** logging level is the default for all categories when IoT FND opens. Custom logging level settings are retained between log-in sessions, but not after IoT FND restarts.

- Step 5** To apply the configuration, click **Go**.

**Note** The server.log file is rotated based on size.

**Step 6** Click the disk icon to save the configuration.

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## Downloading Logs

To download logs:

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**Step 1** Choose **ADMIN > System Management > Logging**.

**Step 2** Click the **Download Logs** tab.

**Step 3** Click the **Download Logs** button.

- When you click this button in a single-server deployment, IoT FND compresses the log files into a single zip file and adds an entry to the Download Logs pane with a link to the zip file.
- In IoT FND cluster deployments, when you click this button, the IoT FND server to which you are connected:
  - Compresses the log files on the server into a single zip file and adds an entry to the Download Logs pane with a link to the zip file.
  - Initiates the transfer of the log files in .zip format from the other servers to this server. As files become available, the server adds entries for these files to the Download Logs pane.

**Step 4** To download a zip file locally, click its file name.

**Tip** In a cluster environment, if you need to send log files to Cisco Support, ensure that you send the log files of all cluster servers.

---

## Configuring Provisioning Settings

The Provisioning Settings page (**ADMIN > System Management > Provisioning Settings**) lets you configure the IoT FND URL, DHCPv4 Proxy Client, and DHCPv6 Proxy Client settings required for IoT FND to create tunnels between routers and ASRs/C8000 ([Provisioning Settings page](#)). For an example of tunnels as used in the IoT FND, see [Tunnel Provisioning Configuration Process](#) topic in the Managing Tunnel Provisioning chapter.

During Zero Touch Deployment (ZTD), you can add DHCP calls to the device configuration template for leased IP addresses.



**Note** For Red Hat Linux 7.x server installations, you must configure specific IPv4 and IPv6 addresses from the IoT FND Linux host server to which to bind DHCP IPv4 and IPv6 clients by setting the following values in IoT FND:

---

|   |  |
|---|--|
| <b>ADMIN &gt; Provisioning Settings &gt; DHCPv6 Proxy Client &gt; Client Listen Address</b> | Set the value to the IPv6 address of the interface to use to obtain IPv6 DHCP leases from the DHCP server. The default value is “::”. Change the default setting to an actual IPv6 address on the Linux host machine.      |
| <b>ADMIN &gt; Provisioning Settings &gt; DHCPv4 Proxy Client &gt; Client Listen Address</b> | Set the value to the IPv4 address of the interface to use to obtain IPv4 DHCP leases from the DHCP server. The default value is “0.0.0.0”. Change the default setting to an actual IPv4 address on the Linux host machine. |




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**Note** To configure tunnel and proxy settings, you must be logged in either as root or as a user with Administrative Operations permissions.

---

Under **ADMIN > System Management > Provisioning Setting** page, the CSMP optimization settings help to configure the timeout to acquire lock when processing the csmg messages. By default, the timeout value is 5 seconds which can be configured between 1 to 30 seconds.




---

**Note** This csmg setting is applicable only for Oracle deployments.

---

If the timeout happens, then during registration, the following message is displayed in the server.log file.

```
"Failed to acquire lock for <Endpoint Eid> during registration.
Another Operation seems to be in progress."
```

During csmg notification, the following log message is displayed in the server.log file when handing csmg messages.

```
"Failed to acquire lock to update Endpoint Status. Another Operation seems to be in progress."
```

**Provisioning Settings Page**

## Provisioning Process

IoT-FND URL: 

Field Area Router uses this URL to register with IoT-FND after the tunnel is configured

Periodic Metrics URL: 

Field Area Router uses this URL for reporting periodic metrics with IoT-FND

## DHCPv6 Proxy Client

Server Address: 

IPv6 address to send (or multicast) DHCPv6 messages to (can be multiple addresses, separated by commas)

Server Port: 

Port to send (or multicast) DHCPv6 messages to

Client Listen Address: 

IPv6 address to bind to, for sending and receiving DHCPv6 messages (for cluster deployment use cgms.properties file)

## DHCPv4 Proxy Client

Server Address: 

IPv4 address to send (or broadcast) DHCPv4 messages to (can be multiple addresses, separated by commas)

Server Port: 

Port to send (or broadcast) DHCPv4 messages to

Client Listen Address: 

IPv4 address to bind to, for sending and receiving DHCPv4 messages (for cluster deployment use cgms.properties file)

## -ZTD Properties

Select CA Type:  PnP Install TrustPool  Cisco Cloud Redirection  Custom CASCEP URL: 

URL of the CA server. The URL could point to a RA instead

CA Fingerprint: 

Fingerprint of the issuing CA Server

Proxy Bootstrap Address: 

TPS IPv4 address or Hostname

PNP Continue on Error:  True  FalsePNP State Max Retries  
On Error: 

PNP State Max Retries On Error - Enter a value between 1 and 5

\*ZTD Settings in UI will take precedence over the same in cgms properties

## -CSMP Optimization Settings

CSMP Optimization  
Settings Enabled:  True  FalseTime to wait for acquiring  
lock: 

Min value is 1 sec and Max value is 30 secs

## Configuring the IoT FND Server URL

The IoT FND URL is the URL that routers use to access with IoT FND after the tunnel is established. This URL is also accessed during periodic inventories. During ZTD, routers transition from accessing IoT FND through the TPS proxy to using this URL, which must be appropriate for use through the tunnel.

To configure the IoT FND URL:

---

**Step 1** Choose **ADMIN > System Management > Provisioning Settings**.

**Step 2** In the **IoT FND URL** field, enter the URL of the IoT FND server.

The URL must use the HTTPS protocol and include the port number designated to receive registration requests. By default, the port number is 9121. For example:

```
https://nms.sgbu.example.com:9121
```

**Step 3** Click **Save**.

---

## Configuring DHCP Option 43 on Cisco IOS DHCP Server

To configure for IPv4, enter:

```
ip dhcp pool fnd-pool
network 192.0.2.0 255.255.255.0
default-router 192.0.2.1
option 43 ascii "5A;K4;B2;I192.0.2.215;J9125"

5 - DHCP type code 5
A - Active feature operation code
K4 - HTTP transport protocol
B2 - PnP/FND server IP address type is IPv4
I - 192.0.2.215 - PnP/FND server IP address
J9125 - Port number 9125
```

## Configuring DHCPv4 Proxy Client

To configure DHCPv4 Proxy client settings:

---

**Step 1** Choose **ADMIN > System Management > Provisioning Settings**.

**Step 2** Configure the DHCPv4 Proxy Client settings:

a) In the **Server Address** field, enter the address of the DHCPv4 server that provides tunnel IP addresses.

**Note** You can enter multiple addresses separated by commas. However, in most cases, you only need one server. IoT FND tries to get the tunnel IP addresses from the first server in the list. If it cannot, it moves to the next server in the list, and so on.

b) In the **Server Port** field, enter the port address on the DHCP server to send DHCPv4 requests to.

**Note** Do not change the default port number (67) unless you have configured your DHCP server to operate on a non-standard port.

- c) In the **Client Listen Address** field, enter the address to bind to for send and receive DHCPv4 messages.

**Note** This is the address of the interface that the DHCP server uses to communicate with IoT FND. You can enter multiple backup addresses separated by commas.

**Step 3** Click **Save**.

---

## Configuring DHCPv6 Proxy Client

To configure DHCPv6 Proxy client settings:

---

**Step 1** Choose **ADMIN > System Management > Provisioning Settings**.

**Step 2** Configure the DHCPv6 Proxy client settings:

- a) In the **Server Address** field, enter the address of the DHCPv6 server that provides tunnel IP addresses.  
You can enter multiple addresses separated by commas. However, in most cases, you only need one server. IoT FND tries to get the tunnel IP addresses using DHCP protocols. If it cannot, it goes to the next server in the list and so on.
- b) In the **Server Port** field, enter the port address on the DHCP server to send DHCPv6 requests.
- Note** Do not change the default port number (547) unless you have configured your DHCP server to operate on a non-standard port.
- c) In the **Client Listen Address** field, enter the address to bind to for DHCPv6 send and receive messages.

This is the address of the interface that the DHCP server uses to communicate with IoT FND. You can enter multiple backup addresses separated by commas.

**Tip** For IoT FND installations where the host has multiple interfaces, the client sends requests using each listed source address. The default values, “0.0.0.0” (IPv4) and “::” (IPv6), cause the client to send requests out each interface. Usually, one interface faces the DHCP server(s). In these installations, setting the **Client Listen Address** field to the IP address of the facing interface sends all client requests out that interface.

**Step 3** Click **Save**.

---

## Configuring Server Settings

The Server Settings page (**ADMIN > System Management > Server Settings**) lets you view and manage server settings.

## Configuring Download Log Settings



**Note** Configuring download log settings is only required for IoT FND cluster setup.

---

The Download Logs page lets you configure the Keystore settings.



To configure download log settings:

- 
- Step 1** Choose **ADMIN > System Management > Server Settings**.
  - Step 2** Click the **Download Logs** tab.
  - Step 3** Configure these settings:

*Table 5: Keystore Settings*

| Field                     | Description   |
|---------------------------|---|
| Keystore Filename         | Click <b>Upload Keystore File</b> to upload a Keystore file with the public key of the X.509 certificate that IoT FND uses. You can reuse the same Keystore file. |
| Keystore Password         | Enter the password that IoT FND uses to access the Keystore file on start up.   |
| Confirm Keystore Password |   |
| FTP Password              | Enter the FTP password.   |
| Confirm FTP Password      |   |

- Step 4** To save the configuration, click the disk icon.
- 

## Configuring Web Sessions

The Web Sessions page lets you specify the number of timeout seconds after which IoT FND terminates web sessions and logs users out.

To configure web session timeout:

- 
- Step 1** Choose **ADMIN > System Management > Server Settings**.
  - Step 2** Click the **Web Session** tab.
  - Step 3** Enter the number of timeout seconds.  
The valid values are 0–86400 (24 hours).  
**Note** If a web session is idle for the specified amount of time, IoT FND terminates the session and logs the user out.
  - Step 4** To save the configuration, click the disk icon.
- 

## Configuring Device Down Timeouts

The **Server Settings** page allows you to configure the device down timeout globally for head-end routers (ASR, C8000) and other devices that are managed by IoT FND such as routers (CGR1000, IR800, IR8100, ESR), endpoints, and gateways. On reaching the specified device down timeout interval, the devices move to *Down* state in the IoT FND GUI based on the last heard value from the device (must be greater than the down timeout value) and the tunnel interface state. If the tunnel interface that is associated with the device is *Down*

as well, then devices are marked *Down* in IoT FND GUI. Otherwise, IoT FND must wait until the tunnel interface goes *Down* to mark the device as *Down* in IoT FND GUI.

From the Device Configuration page (**CONFIG > DEVICE CONFIGURATION**), you can configure the device downtime for a specific router or endpoint configuration group. For more information, refer to [Configuring Mark-Down Timer](#)



**Note** For HER, you can set the device down timeout only in the Server Settings page.

Device status changes to *Up* when IoT FND detects any of the following:

- Periodic inventory notifications
- Events
- Manual metric refreshes
- Device registrations

To configure device down timeout settings:

**Step 1** Choose **ADMIN > System Management > Server Settings**.

**Step 2** Click the **Device Down Timeouts** tab.

ADMIN > SYSTEM MANAGEMENT > SERVER SETTINGS

Download Logs Web Session **Device Down Timeouts** Asset Property Settings Billing Period Settings RPL Tree Settings Issue Settings Map Settings

**Note:** Markdown time should be more than polling interval.

|  |                                    |
|--|------------------------------------|
| Mark Routers Down After (secs):            | <input type="text" value="1800"/>  |
| Mark ACT Endpoints Down After (secs):      | <input type="text" value="57600"/> |
| Mark CAM Endpoints Down After (secs):      | <input type="text" value="57600"/> |
| Mark Cellular Endpoints Down After (secs): | <input type="text" value="57600"/> |
| Mark IR500 Endpoints Down After (secs):    | <input type="text" value="57600"/> |
| Mark Meter Endpoints Down After (secs):    | <input type="text" value="57600"/> |
| Mark Gateway Down After (secs):            | <input type="text" value="1800"/>  |

**Note** The device down timeout value must be greater than the corresponding polling intervals. For example, if the polling interval for routers is 30 minutes (1800 seconds), then the value in the Mark Routers Down After (secs) field must be 1801 or greater.

**Step 3** Click the disk icon to save the configuration.

## Configuring Billing Period Settings

IoT FND lets you configure the start day of the monthly billing periods for cellular and Ethernet (satellite) services.

To configure the billing period settings:

- Step 1** Choose **ADMIN > System Management > Server Settings**.
- Step 2** Click the **Billing Period Settings** tab.
- Step 3** Enter the starting days for the cellular and Ethernet billing periods.
- Step 4** From the drop-down menu, choose the time zone for the billing period.
- Step 5** To save the configuration, click the disk icon.

## RPL Tree Settings

The RPL tree routing table is generated using the CSMP messages from the Mesh nodes. The data that is obtained from the Mesh nodes is often outdated. The proposed solution is to use the RPL tree routing data from FAR which is more up to date.

IoT FND uses the command below to fetch the RPL tree data:

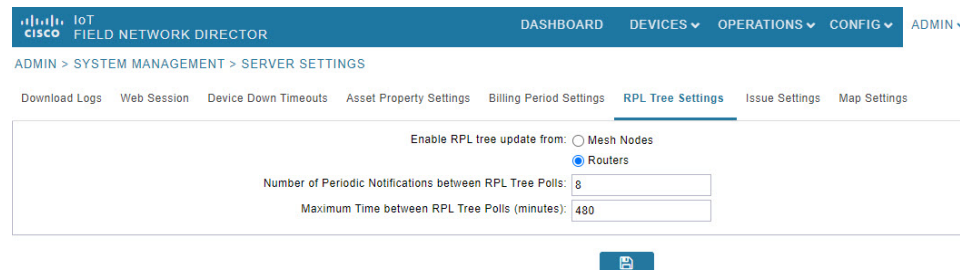
```
show rpl dag 1 itable | xml
```

- [RPL Tree Update from Mesh Nodes](#)
- [RPL Tree Update from Routers](#)

### RPL Tree Update from Mesh Nodes

The default RPL tree update is always set to 'Mesh Nodes'. This is a global setting for the entire FND. Traditionally, the RPL data has been reported to the FND by the mesh nodes as part of `IPRoute` and `IPRouteRPLMetrics` during the periodic inventory reporting.

### Global RPL Tree Settings for Entire FND



**Table 6: Global RPL Tree Settings for Entire FND**

| Field   | Description  |
|---|--|
| Enable RPL tree update from                             | Select Routers.<br><b>Note</b> By default, Mesh Nodes is selected. |
| Number of Periodic Notifications between RPL Tree Polls | Number of periodic notification from CGR between each RPL pull.    |

| Field   | Description   |
|---|---|
| Maximum Time between RPL Tree Polls (minutes) | Maximum time FND waits to pull RPL from a CGR for the associated PAN. |

### RPL Tree Update from Routers

As the Mesh nodes data is often outdated, the proposed solution is to use the RPL tree routing from FAR, which is more up to date. The RPL tree is not pushed from the FAR with the periodic notification. Therefore, the FND explicitly needs to pull the RPL tree at regularly configured intervals based on the Device Configuration Group properties. The FND depends on the periodic notification to determine when to poll next for the RPL tree. The FND is configured to poll the FAR for RPL tree update after every "N" periodic notifications. At times, some periodic notifications are missed. If that happens, after an absolute maximum time value, the RPL tree is fetched from the FAR.

The FAR pulls at a much higher frequency than the mesh nodes. Therefore, the RPL data is more accurate and provides a snapshot of entire PAN at any given point in time. The FND invokes **show rpl dag 1 itable** command on the CGR to obtain the RPL tree for the associated PAN.

### Device Configuration Group Properties

The screenshot shows the configuration interface for a Device Configuration Group named 'default-cgr1000'. Under the 'GROUP WISE SETTINGS' tab, the following settings are visible:

- Mark Routers Down After (secs): 1800
- Number of Periodic Notifications between RPL Tree Polls: 8
- Maximum Time between RPL Tree Polls (minutes): 480
- LRR Image: (dropdown menu)
- LRR Public Key: (dropdown menu)

The 'Number of Periodic Notifications between RPL Tree Polls' and 'Maximum Time between RPL Tree Polls (minutes)' fields are highlighted with a red box in the image.

**Table 7: Device Configuration Group Properties**

| Field                        | Description  |
|------------------------------|--|
| <b>RplTreePullingCycle</b>   | The number of periodic notification intervals.<br><b>Note</b> The default maximum number of <b>RplTreePullingCycle</b> is 8.           |
| <b>RplTreePullingMaxTime</b> | The maximum time interval between the pulls in minutes.<br><b>Note</b> The default maximum time between pulls is 480 minutes (8 * 60). |

When processing a periodic notification event, if either of these [Table 7: Device Configuration Group Properties](#) have passed, then the FND starts RPL tree retrieval from FAR.

The RPL pull times can be configured to each CGR configuration group as shown in the [Device Configuration Group Properties](#). For the settings to take effect, the Global Settings must be set to 'Routers', refer to [Global RPLTree Settings for Entire FND](#).

## RPL Tree Retrieval

The FND currently collects the following information from CGR as part of the RPL tree data:

- Node IP address
- Next hop IP address
- Number of parents
- Number of hops from root node
- ETX for path
- ETX for link
- Forward RSSI
- Reverse RSSI



**Note** No changes are required on FAR configuration when RPL updates setting is changed to routers or vice versa. When changed, the FND automatically schedules for gathering the RPL updates from FARs.

## Configuring RPL Tree Polling

RPL tree polls are derived from router periodic notification events. Since the RPL tree is not pushed from the router with the periodic notification event, IoT FND must explicitly poll for the RPL tree at the configured intervals. IoT FND lets you configure the RPL tree polling cycle (that is, how many periodic notification events occur between RPL tree polls), and set the maximum amount of time between tree polls.

To configure RPL tree polling settings:

**Step 1** Choose **ADMIN > System Management > Server Settings**.

**Step 2** Choose the **RPL Tree Settings** tab.

**Step 3** Choose the **Enable RPL tree update from** radio button for **Mesh Nodes** or **Routers** to receive the RPL tree update from those devices at the specified intervals.

**Note** By default, **Mesh Nodes** radio button is selected.

**Note** To make the L+G endpoints graph functionality work, ensure to select the **Mesh Nodes** option in the **RPL Tree Settings**.

**Step 4** For Router polling, enter the number of events that pass between RPL tree polling intervals in the **Number of Periodic Notifications between RPL Tree Polls** field.

**Note** The default value is 8. If thresholds are exceeded during periodic notification events, IoT FND performs a RPL tree poll.

**Step 5** In the **Maximum Time between RPL Tree (minutes)** field, enter the maximum amount of time between tree polls in minutes.

**Note** The default value is 480 minutes (8 hours).

**Step 6** To save the configuration, click the disk icon.

## Configuring the Issue Status Bar

The Issue Status bar displays issues by device type (as set in user preferences) and severity level in the lower-left browser frame.

To enable the Issue Status bar and configure the refresh interval:

**Step 1** Choose **ADMIN > System Management > Server Settings > Issue Settings**.

**Step 2** To display the Issue status bar in the browser frame, check the **Enable/Disable Status Bar** > check box.

**Step 3** In the **Issue Status Bar Refresh Interval (seconds)** field, enter a refresh value in seconds.

The valid values are 30 secs (default) to 300 secs (5 minutes).

**Step 4** In the **Certificate Expiry Threshold (days)** field for all supported routers or an IoT FND application server, enter a value in days.

The valid value is 180 days (default) to 365 days.

**Note** When the configured Certificate Expiry Threshold default date is met, a Major event, certificateExpiration, is created. When the Certificate has expired (>180 days), a Critical event, certificateExpired, is created.

## Managing the Syslog

When IoT FND receives device events, it stores them in its database and sends syslog messages to a syslog server that allows third-party application integration.



**Note** The syslog server receives only the IoT FND device events (listed on **Operations > Events** page) and not the other IoT FND application logs in the server.log.

To configure Syslog forwarding:

**Step 1** Choose **ADMIN > System Management > Syslog Settings**.

**Step 2** In the **Syslog Server IP Address** field, enter the IP address of the Syslog server.

**Step 3** In the **Syslog Server Port Number** field, enter the port number (default is 514) over which to receive device events.

- Click **Enable Syslog Sending Events** to enable message forwarding to the Syslog server.
- Click **Disable Syslog Sending Events** to disable message forwarding to the Syslog server.

For IoT FND cluster solutions, each server in the cluster sends events to the same Syslog server.

---

