



# **IP Maestro<sup>®</sup>**

## **Version 3.1.0**

**User Manual**  
**August 2025**

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IP Infusion Inc.  
3979 Freedom Circle  
Suite 900  
Santa Clara, California 95054  
<http://www.ipinfusion.com/>

For support, questions, or comments via E-mail, contact:  
[support@ipinfusion.com](mailto:support@ipinfusion.com)

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# Preface

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This guide describes the steps for logging in, navigating and utilizing the features in IP Maestro. It also provides insights to the multiple dashboards and its benefits.

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## Audience

The intended audience for this guide is the end-user with access/role/permission to IP Maestro with valid roles that include Network Administrators, Engineers, Operators, and Users.

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## Conventions

This table shows the conventions used in this guide.

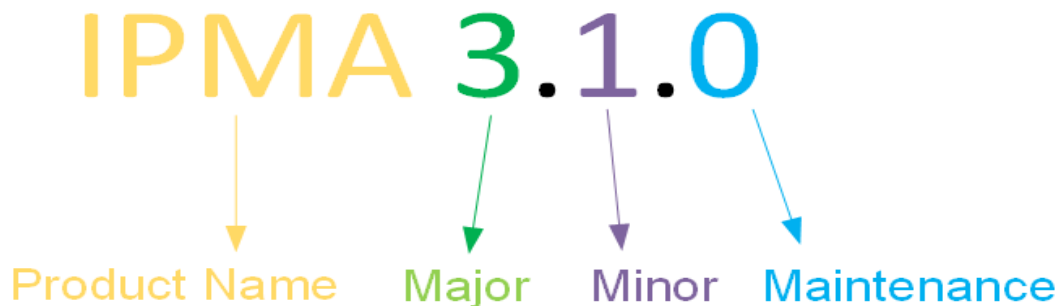
**Table 1: Conventions**

Convention	Description
Italics	Emphasized terms or titles of books
Note:	Special instructions, suggestions, or warnings
<code>monospaced type</code>	Code elements such as commands, parameters, files, and directories

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## Product Release Version

IP Maestro maintains a three-digit release version number. Each integer indicates Major, Minor, and Maintenance release versions. Build numbers are for internal tracking and verification of the software build process and are visible to customers as part of the software version number.



**Product Name:** IP Infusion Product Family.

**Major Version:** New customer-facing functionality that represents a significant change to the code base; in other words, a significant marketing change or direction in the product.

**Minor Version:** Enhancements to existing features to address external or internal requirements to satisfy the needs of new sales regions or to support marketing initiatives.

**Maintenance Version:** Product fixes that are released every 30 or 60 days, based on the number of issues being addressed.

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## Supported OcNOS Version

IP Maestro Release 3.1.0 software is designed to monitor devices running OcNOS-6.3.4-70 and above.

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## Technical Support

IP Infusion maintains an online technical support site that provides a variety of technical support programs for licensed IP Maestro customers and partners at <https://www.ipinfusion.com/support/>

The site allows customers and partners to open technical support calls, update open calls with new information, and review the status of open or closed calls. The password-protected site includes technical documentation, Release Notes, and descriptions of service offerings.

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## Technical Sales

Contact the IP Infusion sales representative for more information about the IP Maestro solution.

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## Technical Documentation

For the core User Guide and procedures, visit <https://documentation.ipinfusion.com/home/Content/LibraryPages/ip-maestro/IP-Maestro.htm>

### Comments

If you have comments, or need to report a problem with the content, contact [techpubs@ipinfusion.com](mailto:techpubs@ipinfusion.com).

# Introduction

IP Maestro is a Graphical User Interface (GUI)-based Element Management System (EMS) framework that allows operators to simplify device configuration, management, and automation operations. It is meticulously designed to streamline device management, enhance visibility, and fortify security. The system offers an intuitive view of the network topology, performance metrics, faults, and inventory.

IP Maestro supports the following features:

- **Topology:** Discover the network topology effortlessly with a visual map, enabling an intuitive understanding of network elements' physical connectivity. The Topology Toolbar ensures easy manipulation, providing a graphical overview of devices, both managed and unmanaged third-party, and connected links.
- **Inventory:** Gain a holistic view of physical and logical network resources, services, and topologies. The real-time network inventory, coupled with the filter functionality, allows users to navigate and select specific inventory types with ease.
- **Fault Management:** Capture and display alarms from network devices, links, and services. IP Maestro's Fault Management module efficiently processes NETCONF alarms and integrates with syslog for centralized management and alerts. IP Maestro also has the ability to send out email and Slack notifications to users on occurrences of critical alarms.
- **Performance Monitoring:** Monitor network performance effortlessly with metrics (KPI) and calculated/complex metrics (KQI). Define measurement points, groups, collection intervals, and aggregations intervals for precise and periodic data analysis.
- **Configuration Management:** Manage device configurations with IP Maestro seamlessly. Perform tasks such as downloading software images, creating and deleting configuration files, syncing configurations with the database, and executing configurations on specific devices. Ability to take device configuration backups and then do a *config diff* to see the difference between two configurations
- **Audit and Logs:** Ensure transparency and accountability through historical logs, including syslog records and command history logs. IP Maestro maintains a detailed account of device activities for comprehensive auditing and implements a role-based user management system with comprehensive auditing logs for accountability.

# Log in to IP Maestro

Logging in to IP Maestro involves accessing the system to perform network management, configuration, and monitoring tasks.

## Prerequisites

- A valid SSO account.
- Ensure to install any of the following browser versions on your computer:

Browser	Version
Google Chrome	102.0.5005.63 (64-bit) (or latest)
Mozilla Firefox	100.0.1 (64-bit) (or latest)
Microsoft Edge	13+ (64-bit) (or latest)
Safari	15.5 (or latest)
Opera	89.0.4447.51

## Procedure

To log in to the IP Maestro:

1. On any web browser, type the IP Maestro portal URL. For Example: `https://[HOST_IP]`.
2. On the login page, enter user credentials, including a username and password. You can choose the language of your preference using the drop-down at the top right of the login dialog box. The languages supported currently are English and Japanese.



3. Click **Sign In**.

**Note:** For security reasons, it is advisable to log out of IP Maestro when the session is no longer needed.

# Home Page

Upon successful login to IP Maestro, users are displayed with the IP Maestro home page, which serves as the central hub for accessing key information related to network management. The home page offers a high-level overview of the network status, presenting details about configured devices, network topologies, and device-specific information.

Key components:

- [Navigation Pane](#)
- [System Dashboards](#)

The IP Maestro Dashboard is the default home page displayed as below.

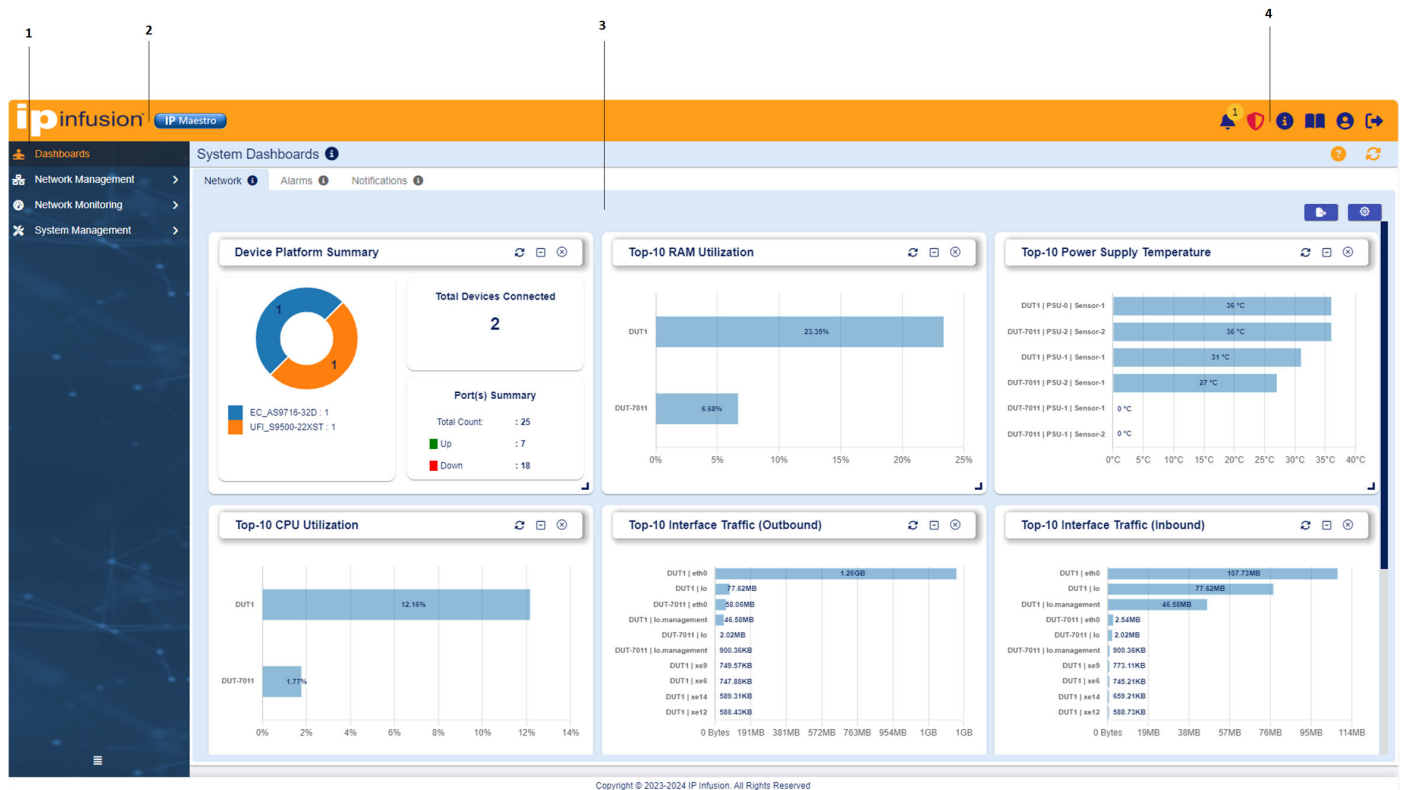


Figure 1: Home Page


Callouts	Description
1. Menu Bar	Facilitates navigation in the IP Maestro UI. This provides various informational panes to help users effectively monitor and manage network-related tasks.
2. Banner	Displays the global actions icon and redirects to IP Infusion web page for detailed information.
3. Home Page	Displays the system dashboard by default and provide an overview of the mounted devices.
4. Navigation Pane	Offers quick access to essential functions, information, and personalization options.



# Navigation Pane






The navigation pane menu on the top right corner of the screen enhances user interaction with IP Maestro, offering quick access to essential functions, information, and personalization options. Users can efficiently navigate the system, manage alarms, check software details, adjust preferences, and securely log out as required.

The following menus are available:

- **Unacknowledged Alarms:** The count and summary of the generated active alarms that are device-related. Click  menu to view the list of active alarms on the Alarms page under the **System Dashboards** menu. The following are the types of the severity of the active alarms:
  - Critical
  - Major
  - Minor
  - Warning

Click the alarm row in the table to render another Alarm details page.

Note: For more information on active alarms, refer to the [View Alarms Dashboard](#) section.

- **IP Maestro License:** Click the  icon to view the IP Maestro License information.
- **About IP Maestro:** Click the  icon to view the IP Maestro version details.
- **User Guide:** Click the  icon to view or download the IP Maestro User Manual.
- **User Preferences:** Click the  icon to view the user preferences and system settings like admin, theme, and dashboard color settings.
  - **Switch Theme:** Click to switch the entire application to dark mode or light mode.
  - **Dashboard Color Scheme:** Select a color scheme from a list of options for the dashboard.
- **Logout:** Click the  icon to log out.

# System Dashboards

The System Dashboards serve as visual interfaces that deliver a comprehensive status overview of the critical elements monitored by the IP Maestro domain controller. Upon a successful login, users are directed to the IP Maestro dashboard, which functions as the primary landing page. To access specific dashboards, click the designated tab.






- [View Network Dashboard](#)
- [View Alarms Dashboard](#)
- [View Notifications Dashboard](#)

---

## View Network Dashboard

The Network Dashboard comprises multiple network-related panels featuring key contributors to the network. These panels encompass a device-platform summary, CPU utilization, memory utilization, interface traffic (outbound and inbound), fan speed, power supply temperature, and sensor temperature. Each panel operates autonomously and supports data refreshment functionality.

The following list describes some of the key features and functionalities of the panels:

Field	Description
	Reloads the data in the widget.
	Collapses (minimizes) the details. Click again to show the details.
	Removes the widget from the dashboard.
	Exports the dashboard in PDF format.
	Allows to display data based on the following settings: <ul style="list-style-type: none"><li>• Dashboard color scheme - you can choose the color scheme to display the dashboard.</li><li>• Manage Widgets - you can choose widgets to show/hide on the dashboard.</li></ul>

### Prerequisites

The devices must be mounted as the dashboard displays data for the mounted devices only.

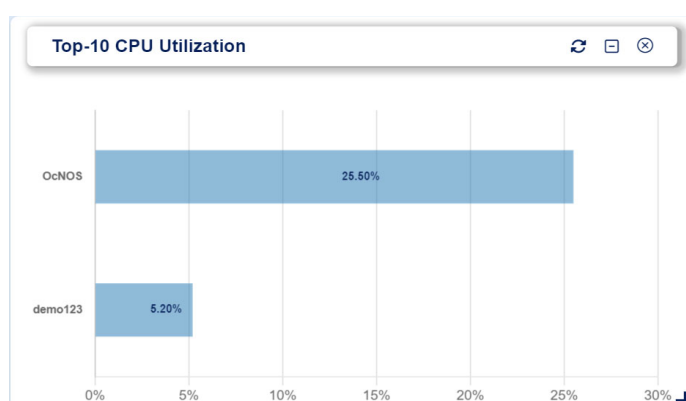
### Procedure

1. In the IP Maestro home page, click **Dashboards > Network**.
2. Click the appropriate widget to view the details as displayed:

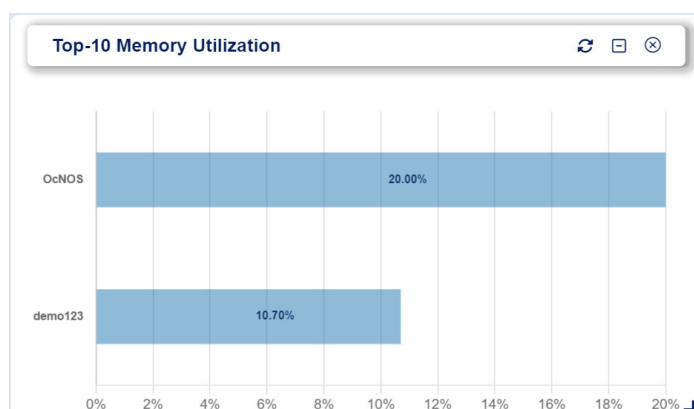
Field	Description
Device Platform Summary	Summarizes the platform type mounted on the system.
Top-10 CPU Utilization	Displays the top 10 CPU utilization across all devices.

Top-10 RAM Utilization	Displays the top 10 memory utilization across all devices.
Top-10 Interface Traffic (Inbound)	Displays the top 10 inbound traffic across all devices.
Top-10 Interface Traffic (Outbound)	Displays the top 10 outbound traffic across all devices.
Top-10 Fan Speed	Displays the top 10 fan speed traffic across all devices.
Top-10 Power Supply Temperature	Displays the top 10 power supply temperature traffic across all devices.
Top-10 Sensor Temperature	Displays the top 10 sensor temperature traffic across all devices.

The details of the network-related dashboards are displayed.



**Figure 1: Top-10 CPU Utilization**



**Figure 2: Top-10 Memory Utilization**

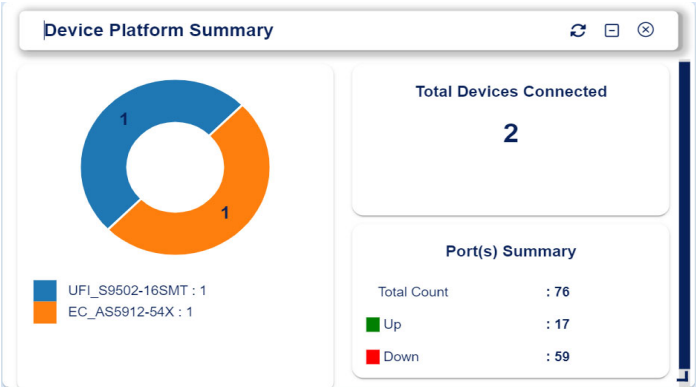


Figure 3: Device Platform Summary

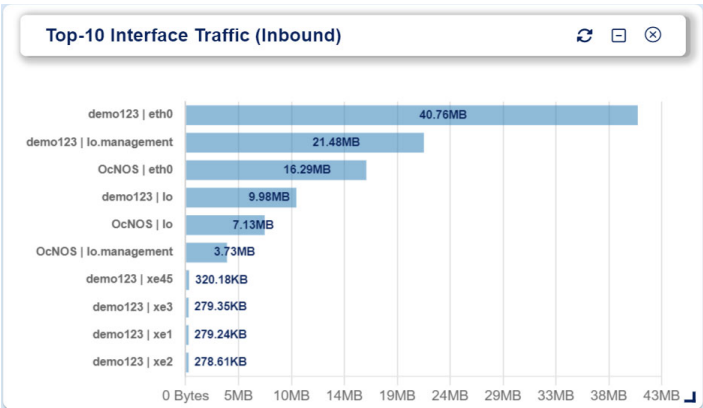


Figure 4: Top-10 Interface Traffic (Inbound)

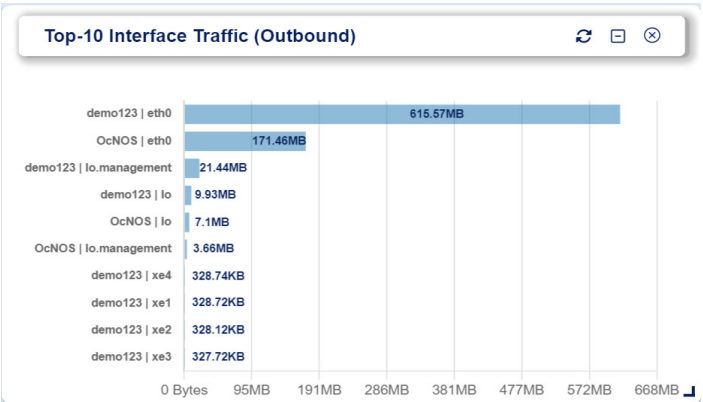
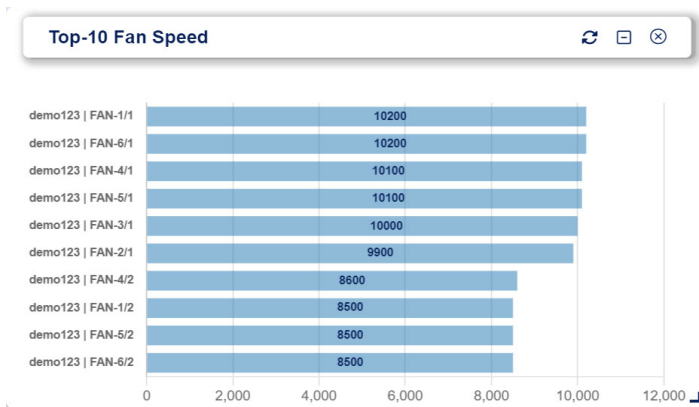
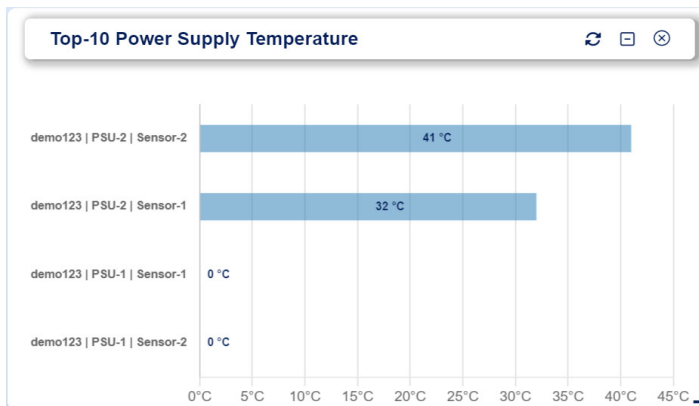
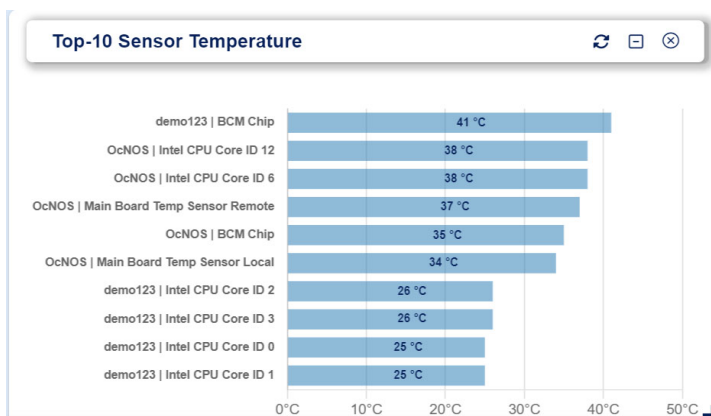


Figure 5: Top-10 Interface Traffic (Outbound)

**Figure 6: Top-10 Fan Speed****Figure 7: Top-10 Power Supply Temperature****Figure 8: Top-10 Sensor Temperature**

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## View Alarms Dashboard

The Alarms Dashboard facilitates the monitoring of active alarms associated with mounted devices. The count of alarms based on severity is displayed in color coded format, which can be clicked to filter the display.

Use the tabs at the right to customize the alarm display, as described in the table below.:

Field	Description
All Alarms	Displays all active alarms.
Acknowledged	Active alarms that are acknowledged by the current user.
Unacknowledged	Active alarms that are not acknowledged by the current user.

**Note:** By default, the unacknowledged alarms are displayed when the dashboard is opened.

The alarms table automatically updates as new alarms are raised. Click **Alarm History** icon at the end of each row to view the history (transitions) of the selected alarm.

### Prerequisites

The devices must be mounted as the dashboard displays data for the mounted devices only.

### Procedure

On the IP Maestro home page, click **Dashboards > Alarms**. The following details of the active alarms are displayed:

Field	Description
Ack	Check box to acknowledge the alarm.
Alarm	Alarm type.
Device	IPv4 address of the device.
Severity	Alarm severity levels that include Critical, Major, Minor, and Warning.
Resource	Origin or source of the alarm.
Description	Description of the alarm.
Timestamp	Date and time in IST format.
Action	Icon to view the alarm history.

---

## View Notifications Dashboard

The Notifications dashboard allows to monitor notifications (events) for the system. Use various filter options including clicking on the **Error**, **Warning**, and **Info** tabs to filter notifications that you are interested in.

**Note:** The notifications table automatically updates as new notifications are raised.

## Prerequisites

The devices must be mounted as the dashboard displays data for the mounted devices only.

## Procedure

On the IP Maestro home page, click **Dashboards > Notifications**. The following details of the notifications are displayed:

Field	Description
Timestamp	Date and time in Indian Standard Time (IST).
Source	Origin or source of the notification.
Severity	Notification severity level.
Description	Event description of the notification.

# Network Management

The Network Management menu allows to configure network devices and manage its performance. It shows data on network elements such as device information, image upgrade, license information, network configuration and so on.

This menu has the following sub-menus:

- [Manage Inventory](#)
- [View Topology](#)
- [Troubleshooting](#)

---

## Manage Inventory

The Inventory page provides options used to administer the network devices. It displays all the known network devices for this controller and helps with the mounting of the devices on the domain controller.

Icons located at the top-right of the table are primarily used to mount network devices, monitor operational progress, and for bulk execution.

This page shows the devices that are configured on the domain controller. You can mount/connect or unmount/disconnect the registered devices.

### Procedure


In the IP Maestro home page, click **Network Management > Inventory**.

The Inventory page is displayed with the following details:

Field	Description
Host Name	The assigned name or label generated by the system.
Device	Ipv4 address provided by the user.
Status	Operational connection status. The possible values are: <ul style="list-style-type: none"><li>• Connected</li><li>• Unable to connect</li><li>• Connecting</li><li>• Unknown</li><li>• Rebooting</li></ul>
Telemetry	Monitoring type configured for the device. The possible values are: <ul style="list-style-type: none"><li>• Restconf - Data is polled using RESTCONF</li><li>• gNMI - Data is streamed from the device</li><li>• Disabled - Monitoring is turned off for the device</li></ul> Hover over the Telemetry type to learn about the status.
Groups	Group in which the device is located.
Location	Physical location of the device.
Vendor	Hardware provider name.



Platform	Operating system or management software on the device.
License	License type.
Image	Installed image details.
Action	A set of actions that can be performed on each device, explained further in the chapter.

In case of an error, an icon  is displayed to the left of the device row. Click the icon to view the error description.


## Mount a device

You can mount one or many devices on the domain controller. Each network device is known as a mount point and each mount point must be configured and registered to the controller.

### Prerequisites

- Ensure that the device exists in the network.
- The Management IP must be reachable.

### Procedure

1. Click the  icon at the top right.
2. In the **Device Mount** dialog box, add the required details in the following fields:

Field	Description
Device	The registered device to be updated.
Username	The username used to gain access to the device.
Password	Password used to gain access to the device.
Port	Secure Shell (SSH) access port
Monitoring Type	The monitoring type to be enabled on the device. <ul style="list-style-type: none"> <li>• Restconf: To monitor using RESTCONF monitoring capabilities</li> <li>• Telemetry: To monitor using Streaming Telemetry capabilities</li> </ul>
Location	Physical location of the device. <ul style="list-style-type: none"> <li>• Site: The site where the device is located</li> <li>• Rack: The rack where the device is installed</li> </ul>

Note: When the IP Maestro server is upgraded using the steps mentioned in [Upgrade IP Maestro](#) section in the Installation guide, the monitoring is defaulted to RESTCONF.

3. In the **Device Mount** dialog box, click the  icon to define the device groups.
4. In the **Device Groups** dialog box, add the required details in the following fields:

Field	Description
Group name	A user-defined name or label used to group devices.
Owner (username)	Originator and/or owner of the group.
Notes	Description of the group purpose.

- Click **Save**.
- In the **Device Mount** dialog box, click **Mount** to confirm mounting of the device.  
The configuration of the new device is initialized and the status is displayed on the Inventory page.

You can click the   icon to check the current status of the mounted devices.



## Discover a Device

You can discover and mount several devices on the Inventory page by specifying the start range and the end range of the device IPs.

### Prerequisites

- The device exists in the network.
- The Management IP is reachable.

### Procedure

- On the Inventory page, click the   icon.
- In the **Device Discovery** dialog box, add the required details in the following fields:

Field	Description
<b>Device Range</b>	
Start	The IPv4 address to begin the search with.
End	The IPv4 address to conclude the search. Note: The ending address must be within the same subnet (network ID).
Username	The username to gain access to the device.
Password	The password to gain access to the device.
Port	The port number of the device.

- Click **Discover** to display the list of the devices within the specified range.
- In the list of devices that are displayed, select the ones to mount, and click **Mount** to add the devices to the Inventory page.

The selected devices are mounted on the Inventory page.

Note: You can also add and assign groups to individual discovered devices using row level actions before mounting devices.

---


## Unmount a Device

You can unmount one or many devices that are mounted.

### Prerequisites

The device(s) must be mounted.

### Procedure

1. Click the check-box on the device rows you want to unmount and click the  icon.
2. In the Confirmation dialog box, click **Yes**.

---


## Import Device Details

You can import the Comma Separated Value (CSV) files to the Inventory page. The **Import** and **Export** features allow you to save and restore your registered devices. This feature also allows offline customization through custom imports of CSV file.

### Prerequisites

- Ensure that the device already exists and is configured on the domain controller.
- All devices mentioned in the CSV files are reachable.

### Procedure

1. On the **Inventory** page, click the  icon icon.
2. In the Import Data dialog box, click **+Choose**.
3. Select the CSV files that you want to import to the **Inventory** page, and click **Mount**.

The selected CSV files are imported. This feature enables you to configure a large number of devices at once.

---

## Export Device Details

You can export the current device details in a CSV format. The **Import** and **Export** features allow you to save and restore your registered devices. This feature also allows offline customization via custom imports. The file is in comma-separated values (CSV) format.

### Prerequisite

Ensure that the device already exists and is configured on the domain controller.

### Procedure

1. On the **Inventory** page, select the devices that you want to export.

- Click the **Export selected devices data in CSV format** icon.

The devices' details are exported as CSV files in Excel format. You can open these CSV files on Notepad for better representation.

## Push Configuration for Devices

To ease the process of manual configuration on each single device, there is an option to push configuration on more than one device at a time. This provides accuracy and a reduced risk of encountering configuration errors.

Bulk configurations can be pushed to OcNOS devices in two ways, either in JSON format or CLI text based format.

### Procedure

To push configurations for the mounted devices, follow the steps mentioned below:

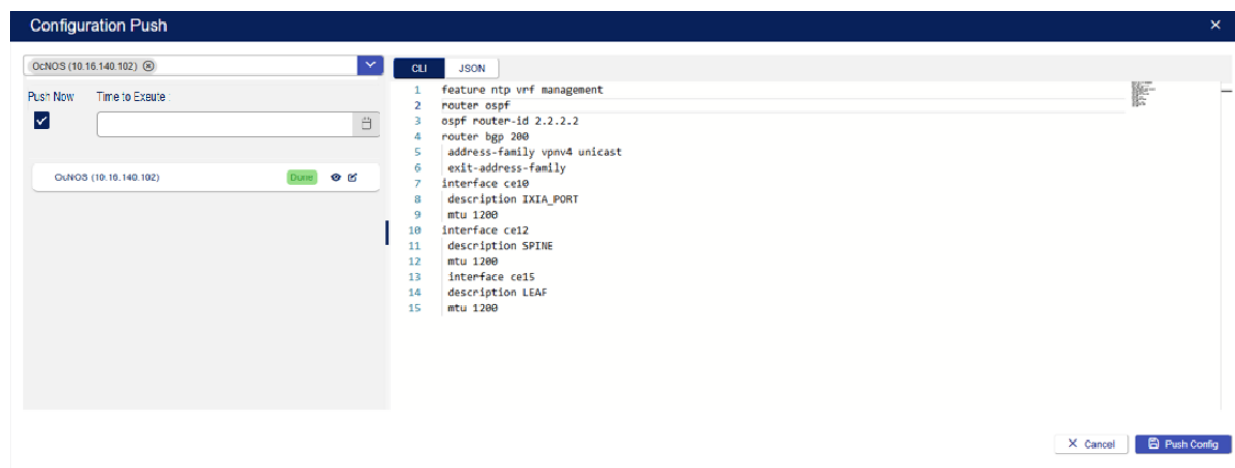
- On the **Inventory** page, select the devices to push JSON configurations.
- Click the **Device configuration push** icon. The **Configuration Push** screen is opened displaying the selected devices on the left. Using the drop-down, you can select more devices on which you want to push configuration.
 

Note: If no device is selected, a progress panel with the history of configuration push that are performed is displayed.
- In this screen, you can either select **CLI** based or **JSON** based configuration push by clicking the relevant tab on the right panel.
- Select the **Push Now** check-box to push the configurations real-time or schedule it for a later date and time using the **Time to Execute** field.

### CLI Text Based Configuration Push

Here is the procedure for text based configuration push:

- In the **Configuration Push** screen, click the **CLI** tab in the main window. The tab changes to blue when activated.
- In the main text editor window, add the CLI commands to be executed on the selected devices to push configuration. The selected devices are displayed on the left.



- Click the **Push Config** button at the bottom to execute the commands.

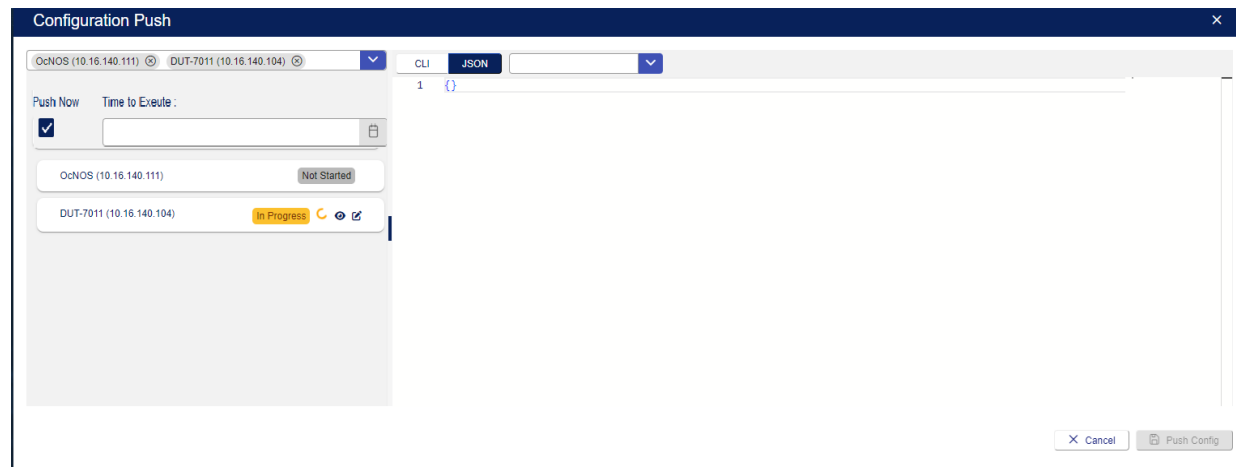
- Click **Yes** at the confirmation message that is displayed. The status of the operation is shown against the device on the screen.

## JSON Configuration Push

Here is the procedure for JSON configuration push:

- In the **Configuration Push** screen, click the **JSON** tab in the main window. The tab changes to blue when activated.

In JSON based format, the main window is a JSON formatted sensitive code editor. The initial editor contains an empty payload in the first line denoted by 1 {}.

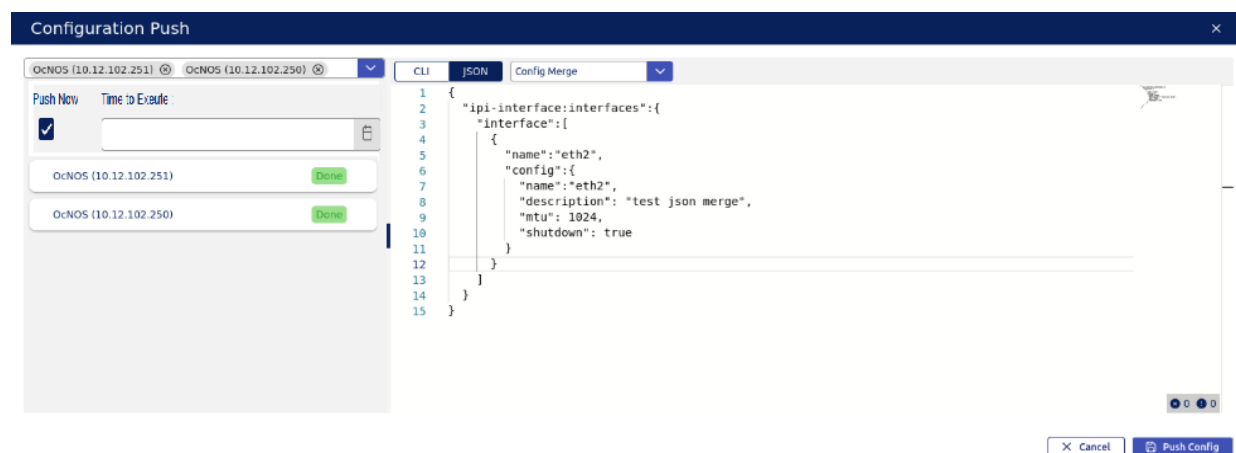


The code editor implements IntelliSense and validation including basic syntax checking and coloring and the intended payload consists of NETCONF YANG model segments in JSON format.

- In the drop-down, select any of the three push configuration methods - Merge, Replace, or Remove.

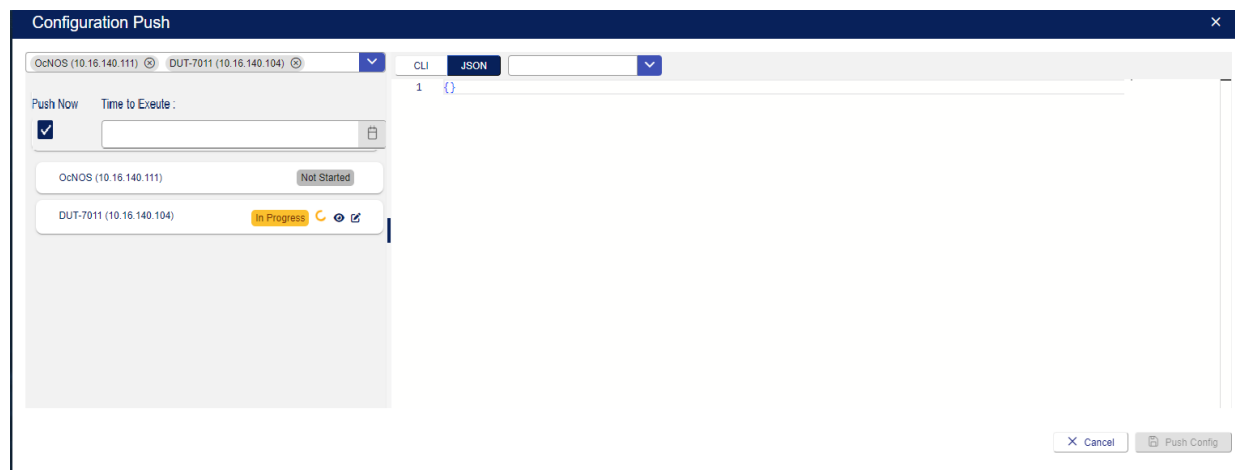
## Config-Merge

This operation is used to merge configurations by adding new configs or modifying the existing configuration values. It allows the addition or modification of attributes to existing objects. It is added in the JSON editor on selected devices as shown in the image below:



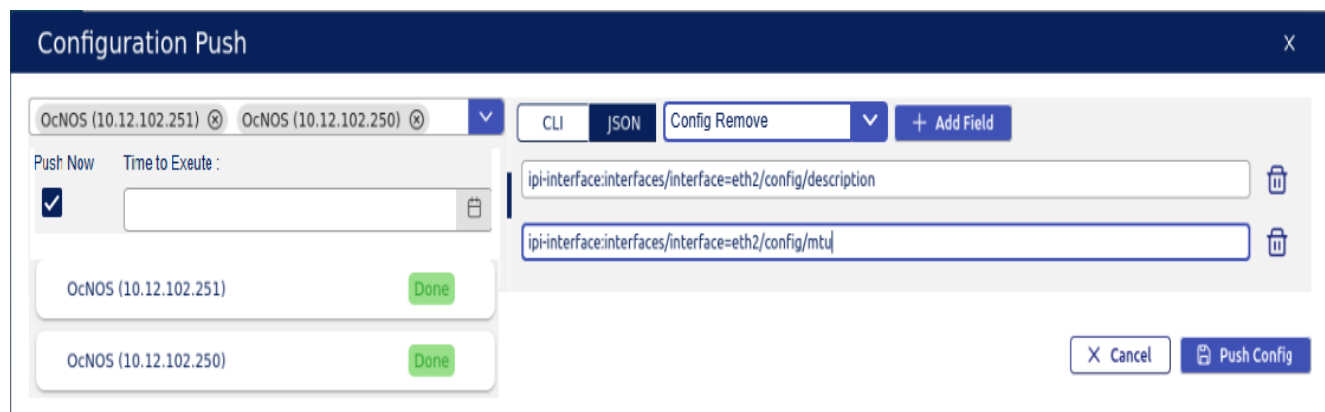
## Config-Replace

This operation adds the new configs by deleting the existing configs. You can set a container for which configuration must be replaced and added in JSON editor.



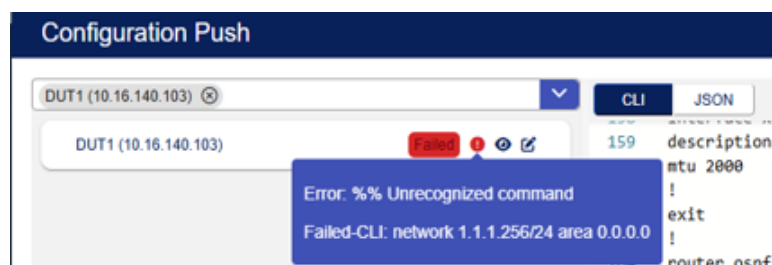
## Config-Remove

This operation supports deletion of configurations from selected devices. Enter the path for the Configuration deletion as shown in the image below:



1. Click the **Push Config** button at the bottom.
2. Click **Yes** at the confirmation message that is displayed. The status of the operation is shown against the device on the screen.



In case of an error, the progress is highlighted in red and the error message is shown by hovering on the status.



Note: **HINT:** You can use the CLI on a device to help you construct and format a payload using the `show json running-config` command.

---

## Monitor Operation Progress on Device

You can monitor the progress of various operations such as Image Upgrade, License Installation, Configuration Backup, and Configuration Restore on a device using the   icon at the top right of the table.

### Image Upgrade

Image Upgrade is a feature that supports the upgrade of OcNOS image on a device being managed by IP Maestro. It provides a feature that enables IP Maestro to download and upgrade the software on devices. The images are created and managed externally from IP Maestro and are made available via a published repository. The portal is then used to navigate through the public folder in search of the appropriate image. The user selects the image file for the targeted device. For more information, refer to the section [Upgrade New Image](#).

### Install License

Install License is a feature that enables IP Maestro to manage device node licenses. The binary license files are created and managed externally from IP Maestro and are made available via a published repository. The portal is then used to navigate through the public folder in search of the appropriate license. The user selects the license file based on its name, which is the serial number of the targeted device. On selecting the device and license, the portal is used to notify the device as to where the license is located. The device will then retrieve and activate the license. For more information, refer to the section [Install License](#).

### Configuration Backup

Configuration Backup is used to back up Device Configuration for a single device or the entire network. A customized data table is used to define and manage the targeted devices.

The managed network devices are configured using YANG modules and each device contains its own modules. The Configuration Backup feature is used to store these device configurations (which can be restored at a later date). When a device is backed up, all the configurations are grouped and assigned a label. The label is then used to restore a specifically labeled backup. For more information, refer to the section [Configuration Backup](#).

### Configuration Restore

Configuration Restore is used to back up and restore Device Configuration for a single device or the entire network. A customized data table is used to define and manage the targeted devices.

The managed network devices are configured using YANG modules and each device contains its own modules. This feature is used to replace device configurations that were previously backed up. For more information, refer to the section [Configuration Restore](#).

---


## Upgrade New Image

The image is a binary file that is installed on the OcNOS device. During the upgrade process, the image is first downloaded to the device. The actual installation however is performed according to the scheduled installation time. One or more registered devices can be selected for image upgrade at the same time. This two-step process is executed automatically.

## Prerequisite


Ensure that the device already exists and is configured on the domain controller.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Inventory**.
2. Click the **Monitor operation progress on device**  icon, and then click **Image Upgrade** to display the image upgrade status and configuration.

The following details are displayed for **Image Upgrade Progress**:

Field	Description
Host Name	The assigned name or label generated by the system.
Device	Ipv4 address provided by the user.
Status	<p>The status of download operation, such as:</p> <ul style="list-style-type: none"> <li>• Pending</li> <li>• Scheduled</li> <li>• In-Progress</li> <li>• Failed</li> <li>• Done</li> </ul> <p>The status of image operation:</p> <ul style="list-style-type: none"> <li>• Started</li> </ul>
Operation	<p>Status in response (or notification). It is the current sequence of the two-step process. The operation status can be:</p> <ul style="list-style-type: none"> <li>• Download</li> <li>• Installation</li> </ul>
Install Time (GMT)	The time scheduled to begin operation.
Current Version	Software version installed on the device.
Installed Version	The recently installed software version on the device.
Image Location	The fully qualified path name of the file.
Interface	The management interface used for file transfers.

1. Click the **Add a new entry to table**  icon.
2. In the **Image Upgrade** dialog box, add the required details in the following fields:

Field	Description
Device	Registered device to update selected by the user from the dropdown.
Source Interface	<p>Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface.</p> <p>Note: The source interface is used for all selected interfaces.</p>



Image Selection	
Published Images	The images that are available and hosted from an Image Repository. Note: The repository is defined in System Management > Preferences.
User Defined	Free- form field to enter a custom, fully-qualified path and image name.
Upgrade Now	Toggle to enable the input switch to execute the upgrade.
Save Configuration	Toggle to copy the configuration to startup-config before the image upgrade.
Installation Time	Calendar to schedule an update.

3. Click **Apply** to save and schedule the image upgrade for all selected devices.

The new image upgrade is configured.


## Edit the Image Upgrade Details

You can edit an image that is installed on the device.

### Prerequisite

Ensure that the device already exists and is configured on the domain controller.

### Procedure

- On the **Inventory** page, in the **Image Upgrade Progress** menu, click the  icon at the end of device row.
- In the **Image Upgrade** dialog box, add the required details in the following fields:

Field	Description
Device	Registered device to update from the dropdown.
Source Interface	Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface. Note: The source interface is used for all selected interfaces
Image Selection	
Published Images	The images that are available and hosted from an Image Repository. Note: The repository is defined in System Management > Preferences.
User Defined	Free- form field to enter a custom, fully-qualified path and image name.
Upgrade Now	Toggle to enable the input switch to execute the upgrade.
Save Configuration	Toggle this to copy the configuration to startup-config before the image upgrade.
Installation Time	Calendar to schedule an update.

3. Click **Apply** to save and schedule image upgrade for all selected devices.

The image upgrade is edited.

## Upgrade Image for all Selected Devices

You can perform bulk upgrade of images for selected devices.

### Prerequisite

Ensure that the device already exists and is configured on the domain controller.

### Procedure

1. In the IP Maestro home page, navigate to **Network Management > Inventory**.
2. Click the **Monitor operation progress on device** icon, and then click **Image Upgrade** to display the image upgrade status.
3. In the Image Upgrade Progress panel, select the devices and click the **Upgrade image for all selected devices.** icon.
4. In the **Image Upgrade** dialog box, add the required details in the following fields:

Field	Description
Device	Registered device to update selected by the user from the drop-down.
Source Interface	Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface. Note: The source interface is used for all selected interfaces.
<b>Image Selection</b>	
Published Images	The images that are available and hosted from an Image Repository. Note: The repository is defined in System Management > Preferences.
User Defined	Free- form field to enter a custom, fully-qualified path and image name.
Upgrade Now	Toggle to enable the input switch to execute the upgrade.
Save Configuration	Toggle to copy the configuration to startup-config before the image upgrade.
Installation Time	Calendar to schedule an update.

5. Click **Apply** to save and schedule the image upgrade for all selected devices.

The image upgrade is configured for the selected device(s)

## Import the Image Upgrade Details


You can import the CSV files to the Image Upgrade page. The **Import** and **Export** features allow you to save and restore your upgraded images. This feature also allows offline customization via custom imports. This file format is comma-separated values (CSV).

### Prerequisites

- The device already exists and is configured on the domain controller.
- All devices mentioned in the CSV files are reachable.

---

## Procedure

1. On the **Inventory > Image Upgrade** page, in the **Image Upgrade Progress** menu, click the **Import**  icon.
2. In the **Import Data** dialog box, click **+Choose** to select the CSV files that you want to import.
3. Click **Upgrade**.

The selected CSV files are imported on the **Image Upgrade Progress** menu. This enables you to configure a large number of images at once.

---


## Export the Image Upgrade Details

You can export the current device details in a CSV format. The **Import** and **Export** features allow you to save and restore your upgraded images. This feature also allows offline customization via custom imports. This file format is CSV.

### Prerequisite

Ensure that the device already exists and is configured on the domain controller.

### Procedure

1. On the **Inventory > Image Upgrade** page, in the **Image Upgrade Progress** menu, select the devices for which you want to export the images.
2. Click the **Export**  icon.

The devices' details are exported as CSV files in Excel format. You can open these CSV files in Notepad for a better representation.

---

## Delete the Image Upgrade Details

To cancel the scheduled image upgrade for all selected devices, you must delete the details from the **Image Upgrade** page.

### Prerequisite

The image upgrade details are applied on the mounted devices.

### Procedure

1. In the **Image Upgrade Progress** menu, select the device row(s) to delete the image.
2. Click **Delete** at the bottom right.

The scheduled image upgrade gets canceled for all the selected devices.

---

## Install License

To install license on a selected device, follow the steps mentioned below:

### Prerequisites

- The devices are already mounted and registered on the domain controller.

- Licenses are externally available via a public URL.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Inventory**.
2. Click the **Monitor operation progress on device** icon, and then click **Install License** to display the image upgrade status and configuration.

Alternatively, select the device row, click the **Action** icon, and click **Operations > Install License**. The **License Install** dialog box is displayed.

3. Enter the appropriate information as follows:

Field	Description
Device	Registered device to update.
Source Interface	Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface. Note: The source interface is used for all selected interfaces.
<b>License Selection</b>	
Published Licenses	Licenses available and hosted from a License Repository. The repository is defined in System Management > Preferences.
User Defined	Free-form field to enter a custom fully-qualified path and name of license.
Device ID	Registered device to update.

4. Click **Apply** to apply and save the changes.

Alternatively, to install license on bulk devices at a time, follow these steps:

1. Select the check boxes on the device rows for bulk install and click the **Monitor operation progress on device** icon.
2. Click **Install License** to display the **License Install** dialog box.
3. Enter the appropriate information as follows:

Field	Description
Device	Registered device to update.
Source Interface	Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface. Note: The source interface is used for all selected interfaces.
<b>License Selection</b>	
Published Licenses	Licenses available and hosted from a License Repository. The repository is defined in System Management > Preferences.
User Defined	Free-form field to enter a custom fully-qualified path and name of license.
Device ID	Registered device to update.


## Edit License

To edit an available license, follow the steps mentioned below:


### Prerequisites

- The devices are already mounted and registered on the domain controller.
- Licenses are externally available via a public URL.

### Procedure

1. In the IP Maestro home page, navigate to **Network Management > Inventory**.
2. Click the **Monitor operation progress on device**  icon and click **Install License** to display the license status and configuration.
3. The Inventory page is displayed with the following details under the **License Installation Progress** menu:

Field	Description
Host Name	Assigned name or label generated by the system.
Device	Ipv4 address provided by the user.
Status	Operational status of the device.
Device ID	Serial number of the device.
Device SKU	Software capabilities installed on the device.
Software Type	License type of the device.
License Validity	License status of the device.
Interface	Management interface used for file transfers.
License Path	Fully qualified path name of the file.

4. Click the **Install License**  icon at the end of the device row.
5. In the **License Install** dialog box, add the required details in the following fields:

Field	Description
Device	Registered device to update.
Source Interface	Select an interface on the device used for data transfers (within the management VRF). The default is "eth0" interface. Note: The source interface is used for all selected interfaces.
<b>License Selection</b>	
Published Licenses	Licenses available and hosted from a License Repository. The repository is defined in System Management > Preferences.

User Defined	Free-form field to enter a custom fully-qualified path and name of license.
Device ID	Registered device to update.

6. Click **Apply** to copy and save the license on the device.

## Configuration Backup

**Configuration Backup** can be used to back up Device Configuration for a single device or the entire network. It is used to store the device configurations to be restored at a later date. When a device is backed up, all the configurations are grouped and assigned a label. The label is then used to restore a specifically labeled backup.

To define an immediate backup, click the **Action** icon to the right of the device row and click **Operations > Configuration Backup**. The **Configuration Backup** dialog box is displayed. Enter the appropriate information as follows:

Field	Description
Device	The device to backup.
Backup Label	A user-defined label to identify the configuration.

### Prerequisites


Ensure that the devices are already mounted and registered on the domain controller.

### Procedure

1. In the IP Maestro home page, navigate to **Network Management > Inventory**.
2. Click the **Monitor operation progress on device**  icon and click **Configuration Backup** to display the backup status and configuration.

The **Configuration Backup Progress** menu is displayed with the following information:

Field	Description
Host Name	The Host name or Label.
Device	The device to backup.
Status	Displays the status of the operation. The possible values are: <ul style="list-style-type: none"> <li>• Pending</li> <li>• Scheduled</li> <li>• In-Progress</li> <li>• Failed</li> <li>• Done</li> </ul>
Start Time	Date and time provided by the date-time picker.
Label	The name assigned to the host. The label is N/A if the type is network.

1. Click the  icon.
2. In the **New Configuration Backup** dialog box, add the required details in the following fields:

Field	Description
Device	The device to back up.
Backup Label	A user-defined label to identify the configuration.

3. Click **Apply** to apply and save the changes on the device.

The new backup is configured.

---


## Create/Update Schedule for Backup of Registered Devices

You can schedule a backup of the registered devices.



### Prerequisites

- The devices are already mounted and registered on the domain controller.

### Procedure

1. In the **Configuration Backup Progress** menu, click the **Create/Update schedule for backup of registered devices**  icon.
2. The **Save Backup Schedule** dialog box is displayed. Add the required details in the following fields:

Field	Description
Start Time	Use the calendar to schedule a backup.
Recurring	The frequency to schedule a backup. The possible values are: <ul style="list-style-type: none"><li>• Daily</li><li>• Weekly</li><li>• Monthly</li></ul>

3. Toggle the **Active**  icon to schedule the backup. The  icon changes to green color indicating the “Active” status

Note: If there is an active schedule for any of the devices, the status line will display a green status **Status: Active** icon.

4. Click **Save**.  
The new schedule is updated.

---

## View Backup History and Formatted Configuration

You can view the backup history and the formatted configuration of the already configured and created backup and backup schedules.

## Prerequisites

- The devices are already mounted and registered on the controller.



## Procedure

- In the **Configuration Backup Progress** menu, click the icon under the **Action** menu.  
The **Backup History** page is displayed showing the **Label**, **Backup Time** and **Backup Size** of the already configured backup schedules.
- Click the icon to view the configuration details of the specific module.

## Compare Configuration

The comparing configuration process allows you to compare the configurations of the backup labels of selected modules.

## Prerequisites

- The devices are already mounted and registered on the domain controller.



## Procedure

- Under the **Configuration Backup Progress** menu, click the icon under the **Action** menu.  
The **Compare Configuration** page is displayed.
- Select the backup labels from the drop-down to compare their configurations.

## Configuration Restore

**Configuration Restore** can be used to back up and restore images for a single device or the entire network.

**Note:** When a device is restored, the previous configuration is removed and replaced with the new set of configurations.

To define a restore, in the **Inventory** screen, click the **Action** icon to the right of the device row and click **Operations > Configuration Restore**. In the **Configuration Restore** dialog box that is displayed, enter the appropriate information as follows:

Field	Description
Device	Registered device to update selected by the user from the drop-down.
Archive	The available labels to restore.

Click **Apply** to apply the changes.


## Prerequisites

- The devices are mounted and registered on the domain controller.

## Procedure

- In the IP Maestro home page, navigate to **Network Management > Inventory**.



2. Click the  icon, and then click **Configuration Restore** to display the restore status and configuration.

The Inventory page is displayed with the following details under the **Configuration Restore Progress** menu:

Field	Description
Host Name	The assigned name or label generated by the system.
Device	The host IP address.
Status	Displays the status of the operation. The possible values are: <ul style="list-style-type: none"> <li>Pending</li> <li>Scheduled</li> <li>In-Progress</li> <li>Failed</li> <li>Done</li> </ul>
Start Time	Date and time provided by the date-time picker.
Label	The name assigned to the host. The label is N/A if the type is network.

3. Click the  icon.


4. In the **New Configuration Restore** dialog, add the required details in the following fields:

Field	Description
Device	Registered device to update.
Archive	The available labels to restore.

5. Click **Apply** to apply and save the changes.

The new restore is configured.

## Device Level Actions

In the **Inventory** home page, every device row contains the  icon to the right which enables the following actions, if appropriate:

Field	Description
Device information	Contains the basic information about the device such as operational status, port speed, fan, temperature, power, transceiver details etc.
Interfaces	Interface details of the device. It contains details on the assigned name, unique identifier, state of the interface, L2 VLAN members, error descriptions, and so on.

<b>Operations</b> <ul style="list-style-type: none"> <li>• Unmount Device</li> <li>• Image Upgrade</li> <li>• Install License</li> <li>• Configuration Backup</li> <li>• Configuration Restore</li> <li>• Configuration Push</li> <li>• Device Groups</li> <li>• Device Location</li> <li>• Switch Telemetry</li> </ul>	<ul style="list-style-type: none"> <li>• To unmount the device</li> <li>• To add a published or user defined image</li> <li>• To install published or user defined license</li> <li>• To apply backup for the device</li> <li>• To apply configuration restore using the available labels on the device</li> <li>• To push bulk configurations to OcNOS devices</li> <li>• To assign the device to a group</li> <li>• To specify the physical location of the device</li> <li>• To switch the monitoring type from Restconf to gNMI or vice-versa. You can also turn off monitoring for the device using the Disable option.</li> </ul>
<b>Monitoring</b> <ul style="list-style-type: none"> <li>• Device Metric</li> <li>• Chassis Monitoring</li> <li>• Interface Statistics</li> <li>• Device Logs</li> </ul>	<ul style="list-style-type: none"> <li>• Allows to monitor the resources for the device</li> <li>• Visualization of the hardware metrics for the device</li> <li>• Visualization of the interface for the device</li> <li>• Displays the device log details.</li> </ul>
<b>Troubleshooting</b> <ul style="list-style-type: none"> <li>• Device Terminal Access</li> <li>• Generate Tech Support</li> </ul>	<ul style="list-style-type: none"> <li>• Allows to manage Device Terminal Access</li> <li>• Allows to generate Tech Support files</li> </ul>

## View Topology

This menu is used to represent a topology view of the network based on the Link Layer Discovery Protocol (LLDP). The map consists of nodes and edges, where each node represents a managed or unmanaged network device and shows connections between each node using bidirectional links.

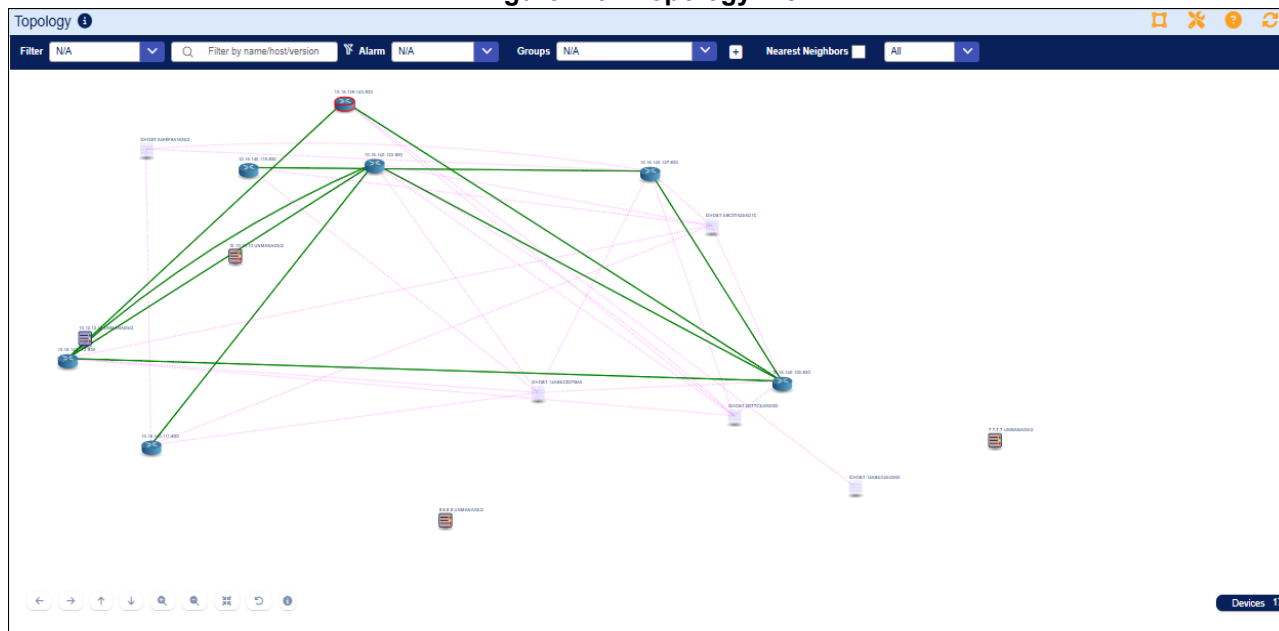
The devices that are configured can be viewed in the topology. LLDP is a vendor-neutral link layer protocol used by network devices. It is used for advertising their identity, capabilities, and neighbors on a local area network based on IEEE 802 technology, principally, wired Ethernet. The LLDP topology is configured on the domain controller.

The User Interface enables the display of the following types of devices in the topology view:









- **Managed** - The OcNOS devices that are configured and registered to the controller.
- **Unmanaged** - Third-party devices that are external and not managed directly by IP Maestro. However, these devices and their connections can be established on the topology view using various nodes.
- **Tracked** - A combination of managed and unmanaged devices included in the topology.
- **All** - Displays all managed, unmanaged, and [Ghost Devices](#) that are discovered by LLDP but are not managed.











The topology depicts the actual physical network to a large extent. In the topology, various nodes are used to represent managed OcNOS devices and third party devices.

**Figure P-9: Topology View**



The following list describes some of the key features and functionalities:

Field	Description
<b>Toolbar at the top right</b>	
	Displays device link details on an information panel.
	Provides options to customize the graph.
	Provides access to User Manual.
	Manual topology refresh.
<b>Toolbar at the bottom</b>	
	Moves the topology view to the left.
	Moves the topology view to the right.
	Moves the topology view up.
	Moves the topology view down.

	Zoom in.
	Zoom out.
	Zoom in or zoom out to fit the view.
	Returns the view to original.
	Shows information on controls and link legend.
	Shows device summary on clicking the icon.
<b>Node mouse events</b>	
	Shift-click to show device details.
	Right-click to show the sub-menu containing device links.
<b>Node legend</b>	
	Normal operation.
	Fault detected.

## View Devices on the Topology Menu


The configured devices are shown on the Topology page based on the following inputs:

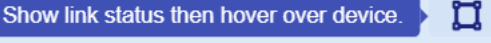
### Prerequisite

Ensure that the configured devices are available and connected.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Topology**. The Topology page is displayed with the following options:

Field	Description
Filter	<p>Filter the topology view based on any the following options:</p> <ul style="list-style-type: none"> <li>• Host Name</li> <li>• Node ID</li> <li>• Device IP</li> <li>• Software Version</li> </ul> <p>Or type the option in the <b>Filter by name/host/version</b> field.</p>
Clear all filters	Click the icon to clear all the selected filters.
Alarm	<p>Choose the Alarm type from the following options:</p> <ul style="list-style-type: none"> <li>• Has alarms</li> <li>• Has no alarms</li> <li>• CRITICAL</li> <li>• MAJOR</li> <li>• MINOR</li> <li>• WARNING</li> </ul>
Groups	<p>Choose if the node belongs to a group or not</p> <ul style="list-style-type: none"> <li>• In a Group</li> <li>• Not in Group</li> </ul> <p>Any group specified in the <b>Device Groups Management</b> is listed here.</p>
Device Groups Management	Click the  icon to specify the group in which the device is located.
Nearest Neighbors	Click the check-box to view the neighboring nodes
	<p>Choose from the following options to view the specific topology:</p> <ul style="list-style-type: none"> <li>• Managed</li> <li>• Unmanaged</li> <li>• Tracked</li> <li>• All</li> </ul>


2. Select any node and click the  icon to view the device details.  
Alternatively, you can hover over the node for a quick look at the device details.  
The following details of the selected device are displayed:


Field	Description
Details	

Host Name	Network node name defined for the topology.
Node ID	Unique identifier for the node.
Software Version	OcNOS version installed on the device.
Software Build	Build details of software installed on the device.
Boot Time	Device boot time.
Time Zone	Time zone for the device boot time.
License Type	License type.
License Status	License status.
<b>Links</b>	Link Source and Destination details. Double click on the Link Source to view the Interface Statistics.
<b>Groups</b>	
Groups	Shows the group for the selected node, if any.

## Create Third-Party Devices

To include a node for a third-party device in the topology, follow the steps mentioned below:

1. In the IP Maestro home page, navigate to **Network Management > Topology**.
2. Right click on the topology area and select the  **New Device (Unmanaged)** option.
3. In the **Create User Defined Device** dialog box, add the required details in the following fields:

Field	Description
Device Icon	Select an icon for the user defined device.
Host Name	Enter the name to be used for the device.
Device IP	Enter a unique IP address for the device.
Chassis MAC	Enter a unique chassis MAC for the device.
Ping Enabled	Select the check-box if the device needs to be pinged periodically to determine if it is reachable.
Description	Enter a description for the device.
Groups	Select the group for this device. You can also create a new group using the <a href="#">Device Groups Management</a>  icon.

4. Click **Save** to save the changes. The user defined device is displayed as a node in the topology.

## Ghost Devices

The devices on LLDP advertise on the local link frequently and any other unknown devices in the same neighborhood are identified. These ghost devices that are discovered by LLDP are not managed directly by IP Maestro. However, they can be converted to an unmanaged device and included as a node in the topology.

Ghost devices are visible in the topology when **All** is selected.

To convert ghost devices to unmanaged devices, press Shift and click the device icon. In the dialog that is opened, enter the details as shown in the table in the [Create Third-Party Devices](#) section.

## Create User-Defined Link

To create a link between any two devices, use Ctrl+Shift and click the source device, drag it to the target device, and release the click. This opens the **Create User Defined Link** dialog box with the following details:



Field	Description
Source Device	The device that is selected as the source
Source Port	The port on the source device
Target Device	The device that is linked to the source
Target Port	The port on the target device
Status	Status of the new link to be created

Click **Save** to save the changes.

## Customize Nodes and Links of Configured Devices

You can customize nodes and links of the configured devices as follows:

### Procedure

- In the IP Maestro home page, navigate to **Network Management > Topology**. The Topology page is displayed.
- Click the  icon, which allows you to customize the **Nodes** and **Links** of the configured devices.   

- Navigate and customize the following details:
  - Nodes:**
    - Show Node Labels:** The names of the nodes in the configured devices. The node labels are shown by default.
    - Node Label:** Sets the node label in topology to Host Name or Node ID.
  - Links:**
    - Link Thickness (px):** Drag to set the stroke-width property to define the thickness of the links or edges.
    - Curved Lines:** Select the checkbox to display links as curved lines.
    - Link Curve Size:** Drag to adjust the shape of the curved lines.
    - Bidirectional links:** Select the checkbox to display the bidirectional links.
    - Arrow Size:** Drag to adjust the size of the arrows.
    - Arrow Position:** Drag to adjust the position of arrows in the links.

- Click **Reset** to restore the changes back to default or click **Close** to apply the changes.

---

## View the Device-level Dashboards

You can view the dashboards from a device level by right-clicking the configured device in the Topology menu.

### Procedure

- In the IP Maestro home page, navigate to **Network Management > Topology**. The Topology page is displayed.
- Right-click the configured device, for which you want to see the device-level information. The following details of the device are displayed:

Field	Description
Network Management <ul style="list-style-type: none"><li>Inventory</li><li>Troubleshooting</li></ul>	<ul style="list-style-type: none"><li>Redirects to the Inventory page for information on the devices' mount transaction.</li><li>Device Terminal Access Redirects to the Device Terminal Access page to gain direct access to a shell on any device on the network using a secure connection.</li><li>Device Tech Support Redirects to the Device Tech Support dashboard to generate and download Tech Support file from mounted devices.</li></ul>
Field	Description
Network Monitoring <ul style="list-style-type: none"><li>Device Metrics</li><li>Chassis Monitoring</li><li>Active Alarms</li><li>Interface Statistics</li><li>Device Logs</li></ul>	<ul style="list-style-type: none"><li>Allows to monitor the resources for the device</li><li>Visualization of the hardware metrics for the device</li><li>Displays the active alarms for the device.</li><li>Visualization of the interface for the device</li><li>Displays the device log details.</li></ul>

You can also double click the node to view the **Device Information** dashboard.

---

## Troubleshooting

The Troubleshooting menu allows you to gain direct access to the Device Terminal to view the running configuration and also to generate the Tech Support files.

This menu has the following sub-menus:

- [Manage Device Terminal Access](#)
- [Generate Tech Support Files](#)

---

## Manage Device Terminal Access

Terminals are web-based command-line applications to access the devices from which you can directly connect to the OcNOS device over Secure Shell Protocol (SSH). This is a fully-featured terminal emulator that can be used to gain direct access to a shell on any device on the network using an SSH connection.





## Prerequisite

Ensure that the configured devices (through the device registration process) are available.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Troubleshooting > Device Terminal Access**.

The Device Terminal Access page is displayed. Alternatively, you can click the  icon at the end of the device row on the Inventory page, and click **Troubleshooting > Device Terminal Access**.

2. Click the  icon. This allows you to manage the **New Connection** and **Registered Devices** as follows:

- **New Connection:**
  - Host: IP Address/hostname for connecting to the terminal over SSH.
  - Username: Username for connecting the terminal to a host/device over SSH.
- **Registered Devices:** Select a host from the drop-down menu.

3. Click **Connect** to view the running configuration.

The OcNOS device is connected. To terminate a session, type exit in the **terminal>\_** or just click the **Close** icon on the terminal tab.

## Generate Tech Support Files


You can generate and download tech support files for the selected devices that are mounted.



## Prerequisite

Ensure that the devices are mounted and available.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Troubleshooting > Device Tech Support**.

The **Device Tech Support** page is displayed. Alternatively, you can click the  icon at the end of the device row on the Inventory page, and click **Troubleshooting > Device Tech Support**.

2. In the **Device(s)** drop-down, select the required devices from the list of mounted devices.
3. Choose the module(s) by clicking the appropriate module filters, as required.
4. Click **Query Current Files** button to check if there are existing tech support files. The existing files, if any, are listed along with a  icon at the right to download the file.
5. Click the **Generate** button if you wish to generate the files newly or if there are no existing files for the device. Once generated, the file can be downloaded using the  icon.

Note: Select the **Remove old Tech Support files** check-box, if you do not wish to retain the previously generated file(s).

# Network Monitoring

The Network Monitoring menu contains submenus that display system-configured dashboards. These dashboards are tailored to provide comprehensive visual representations of network data and performance metrics. Users can access detailed insights into devices configured for distinct time periods, including 15 minutes, 30 minutes, 1 hour, 12 hours, 24 hours, 7 days, 30 days, 90 days or 1 year. Users can utilize these submenus to track historical trends, analyze patterns, and assess the performance of network devices across different durations.







This chapter describes the following sections:

- [View Device Metrics](#)
- [View Interface Statistics](#)
- [View Chassis Monitoring](#)
- [Manage Device Logs](#)
- [Manage System Audit Logs](#)

## View Device Metrics

The Device Metrics dashboard allows you to monitor resources for the mounted devices. Using RESTCONF monitoring capabilities, the dashboard presents comprehensive information encompassing CPU, disk, memory, and host-related metrics.

The following list provides details on key features of device metrics:

Field	Description
	Reloads the data in the widget.
	Collapses (minimizes) the widget. Click again to show the details.
	Removes the widget from the dashboard.
	Exports the Dashboard in PDF format. You can choose the panels to include/exclude from the file.
 Last 12 Hours(s)	Displays data according to the date range.
	Allows to display data based on the following settings: <ul style="list-style-type: none"> <li>• Quick Selection - displays data according to the selected input.</li> <li>• Date Time Picker - displays data according to the specified date range.</li> <li>• Auto refresh - if enabled, data is refreshed as per the specified time interval.</li> <li>• Dashboard color scheme - you can choose the color scheme to display the dashboard.</li> <li>• Manage Widgets - you can choose the widgets to be displayed on the dashboard.</li> </ul>

Note: This dashboard currently shows data from polling the device using RESTCONF. The data is not real-time, causing a 3-minute delay in fetching information based on the polling interval. To instantly update the page, click the reload icon in the toolbar.

## Prerequisites

Ensure that the configured devices (through the device registration process) are available.

## Procedure

1. In the IP Maestro home page, navigate to **Network Monitoring > Device Metrics**.
2. Click the **Device** drop-down to select a device from the available list of registered devices.

The following list provides details on the key features of device metrics:

Field	Description
<b>CPU Information</b>	
CPU Usage	Percentage of CPU usage.
1 min Load	Percentage of load to the CPU over 1 minute for the selected device.
5 min Load	Percentage of load to the CPU over 5 minutes for the selected device.
15 min Load	Percentage of load to the CPU over 15 minutes for the selected device.
<b>RAM Information</b>	
RAM Usage	Percentage of RAM usage.
RAM Details	Details of Total, Used and Available RAM in megabytes.
Other Details	Details about Shared memory, Buffers and number of processes running currently.
Swap Memory	The total, used and available swap space in megabytes.
High Memory	The total, used and available high memory in the RAM in megabytes.
<b>CPU Usage Chart - Historical</b>	Chart showing the percentage of CPU utilization, and load details for different time intervals.
<b>RAM Usage Chart - Historical</b>	Chart showing the Total, Used and Available memory with respect to RAM usage.
<b>Hard Disk Information</b>	Detailed information about the hard disk and disk activity.

---







## View Interface Statistics

The Interface Statistics dashboard gives a visual representation of the interface specific to the selected device.

The dashboard displays a data table containing a comprehensive list of all interfaces, displaying the administrative and operational statuses, alongside additional miscellaneous statistics (such as Speed, MAC, and so on.). It also includes the timestamp of the last change made to each interface.

In conjunction with the data table, the dashboard provides aggregated metrics reflecting inbound and outbound traffic for these interfaces. These metrics offer a summarized view of traffic flow and activity on the selected device's interfaces.

The following list describes some of the key features and functionalities of the interface statistics details:

Field	Description
	Reloads the data in the widget.
	Collapses (minimizes) the widget. Click again to show the details.
	Removes the widget from the dashboard.
	Exports the Dashboard in PDF format. You can choose the panels to include or exclude from the file.
 Last 12 Hours(s)	Displays data according to the date range.
	Allows to display data based on the following settings: <ul style="list-style-type: none"> <li>Quick Selection - displays data according to the selected input.</li> <li>Date Time Picker - displays data according to the specified date range.</li> <li>Dashboard color scheme - you can choose the color scheme to display the dashboard.</li> <li>Manage Widgets - you can choose the widgets to be displayed on the dashboard.</li> </ul>

**Note:** This dashboard currently shows data from polling the device using RESTCONF. The data is not real-time, causing a 3-minute delay in fetching information based on the polling interval. To instantly update the page, click the reload icon in the toolbar.

## Prerequisites

Ensure that the configured devices are available through the device registration process.

## Procedure

1. In the IP Maestro home page, navigate to **Network Management > Interface Statistics**.
2. Click the **Device** drop-down to select a device from the available list of registered devices.
3. Click the **Interface(s)** drop-down to select a particular interface. This is an optional step.
  - Click **Transceiver Details** checkbox to get the Transceiver Overview on the dashboard. This checkbox is only visible once you select the interface and works on a single interface at a time.

The **Interface Statistics** details are displayed as follows:

Field	Description
Interface Statistics	Represents the data in tabular view and provides the following information for the selected interface: <ul style="list-style-type: none"><li>• Interface</li><li>• Admin Status</li><li>• Oper Status</li><li>• LastChange-Flapped</li><li>• Speed</li><li>• Rx Bytes</li><li>• Tx Bytes</li><li>• Rx Packets</li><li>• Tx Packets</li><li>• Index</li><li>• MAC</li><li>• Action</li></ul>
Transceiver Overview	Displays the transceiver overview and operational data as detailed in the following section.
Network Traffic Bandwidth	Displays the network traffic bandwidth in bytes per second.
Network Traffic (Bytes)	Displays the network traffic in bytes.
Network Traffic (Packets)	Displays the network traffic in packets.
Errors and Discards	Displays the errors and discards in packets.

Note: The traffic data represented indicates the total aggregate traffic through the port.

### Transceiver Overview

The transceiver overview displays data in two parts - Overview and Operational Data.

## Overview

This section provides the following details:



Field	Description
Transceiver	The status of the transceiver
Vendor	Name of the vendor Hover on the  icon for the vendor details.
Part Number	Part number of the transceiver
Serial Number	Serial number of the transceiver
Identifier	Identifier for the transceiver
Connector Type	The type of connector for the transceiver
Nominal BR	The nominal bit rate (BR) of the interface Hover on the  icon for more details.
DDM Support	The support for Digital Diagnostic Monitoring (DDM)
Channel Count	The number of channels
Other Details	Displays the following details: <ul style="list-style-type: none"><li>• Encoding Algorithm</li><li>• Removable - true or false</li><li>• Check Code</li><li>• Ethernet Compliance Code</li><li>• Extended Check Code</li><li>• Length SMF</li><li>• Length OM1</li><li>• Length OM2</li><li>• Length OM3</li></ul>

Figure P-10: Transceiver Overview

Transceiver Overview	
Overview	
Transceiver	: Present
Vendor	: Optech 
Part Number	: OPQS28-T-03-PCD
Serial Number	: M9AL1302
Identifier	: qsfp28-or-later
Connector Type	: copper-pigtail
Nominal BR	: 255 
DDM Support	: no
Other Details	
Encoding Algorithm	: enc-64b-or-66b
Removable	: true
Check Code	: 0x9b
Ethernet Compliance Code	: N/A
Extended Check Code	: 0xbe
Length SMF	: 0 (Kilometers)
Length OM1	: 0 (Meters)
Length OM2	: 0 (Meters)
Length OM3	: 0 (X 2 Meters)
Length OM4	: 3 (X 1 Meters (For Copper or AOC) / X 2 Meters (for OM4))

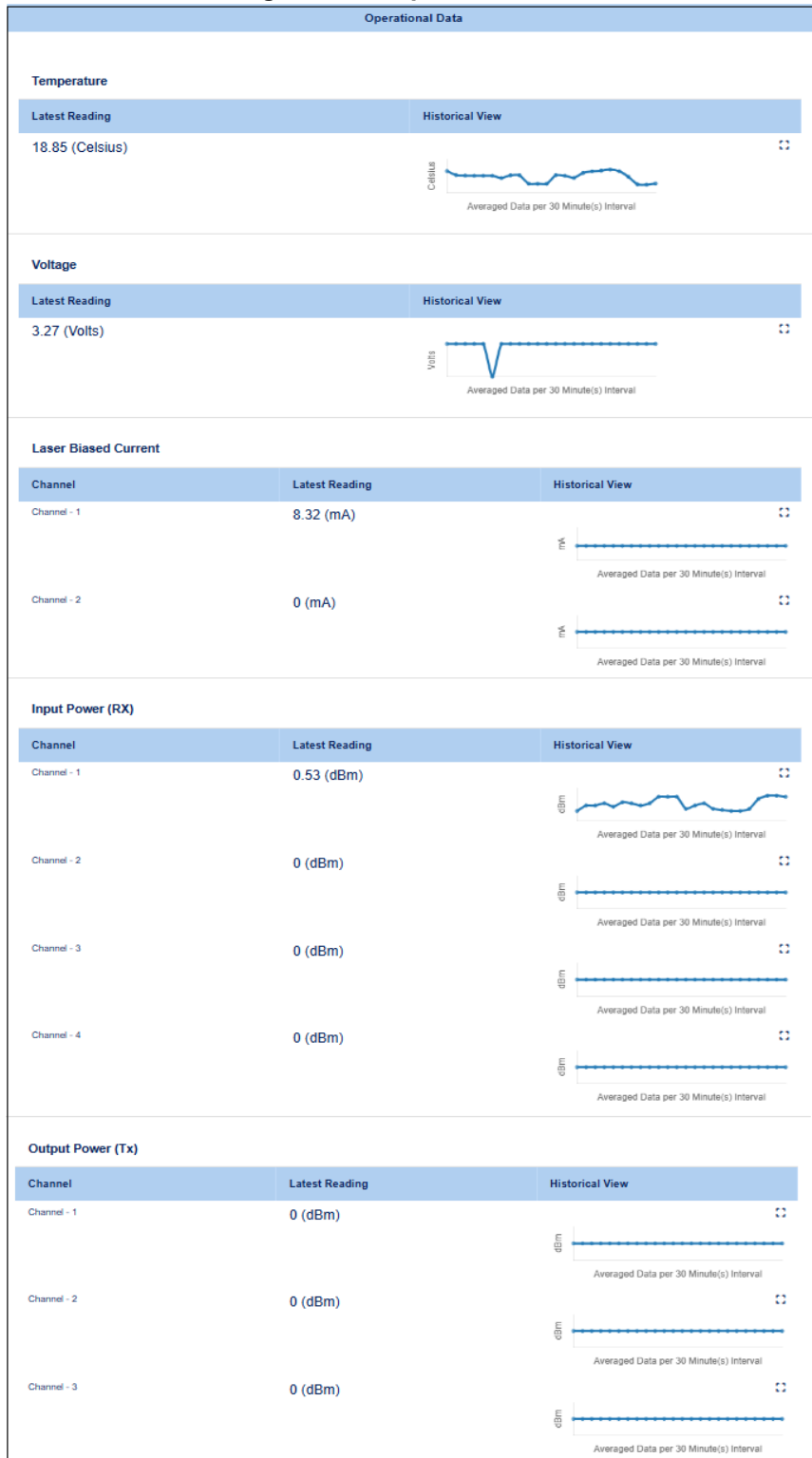
## Operational Data

This section provides the averaged operational data per 30 minutes interval. Along with the latest reading, it also displays a Historical View, which is a graphical representation of the data.

It provides the following details:

Field	Description
Temperature	The latest temperature reading in Celsius.
Voltage	The latest voltage reading in Volts.
Laser Biased Current	The Laser biased current reading for each of the channels in milliampere (mA).
Input Power (RX)	The latest input power reading in decibel-milliwatts (dBm).
Output Power (Tx)	The latest output power reading decibel-milliwatts (dBm).

Figure P-11: Operational Data




The Historical View can be expanded for an enlarged representation of data.



## Clear Interface Counters

The Interface Statistics table provides a wide range of information on the traffic and inbound/outbound packets for the selected interface. There is an option to clear the information and reset the values for one or more interfaces.

### Procedure

1. In the IP Maestro home page, navigate to **Network Management > Interface Statistics**.
2. Click the **Device** drop-down to select a device from the available list of registered devices.
3. In the Interface Statistics table, click the **Clear Interface Counters**  icon at the end of the interface row for which you want to clear the counter.
4. At the confirmation dialog, click **Yes** to confirm.

The counters are cleared and all the values are reset to zero.

Alternatively, you can follow the below steps to clear the counters for more than one interface at a time:

1. Select the check-box at the start of the required interface rows.
2. Click the **Bulk Clear Interface Counters** icon that is enabled above the statistics table.
3. Click **Yes** at the confirmation dialog that is displayed.

---

## View Chassis Monitoring

Chassis Monitoring dashboard allows you to retrieve the device-specific information concerning device type, power supply, fan, and sensors for the selected device. This dashboard offers a visual representation of the hardware metrics associated with mounted devices.


There are two sections of the dashboard.






- **Top Section:** It presents a summary and detailed information for the selected device. When a physical device is selected, this section displays the following information:
  - **Summary Fieldset:** Displays fundamental parameters pertinent to the device.
  - **Details Fieldset:** Provides miscellaneous values retrieved from the device.

However, if a Virtual Machine is selected, only its summary is visible.

- **Bottom Section:** It offers an aggregate perspective on hardware-specific metrics, focusing on the hardware chassis. It includes details concerning:
  - Power Supplies
  - System Sensors
  - Fans

The following list provides details on key features of chassis monitoring:

Field	Description
	Reloads the data in the widget.

Field	Description
	Collapses (minimizes) the widget. Click again to show the details.
	Removes the widget from the dashboard.
	Exports the Dashboard in PDF format. You can choose the panels to include/exclude from the file.
 Last 12 Hours(s)	Displays data according to the date range,
	Allows to display data based on the following settings: <ul style="list-style-type: none"> <li>• Quick Selection - displays data according to the selected input.</li> <li>• Date Time Picker - displays data according to the specified date range.</li> <li>• Dashboard color scheme - you can choose the color scheme to display the dashboard.</li> <li>• Manage Widgets - you can choose the widgets to be displayed on the dashboard.</li> </ul>

Note: This dashboard currently shows data from polling the device using RESTCONF. The data is not real-time, causing a 3-minute delay in fetching information based on the polling interval. To instantly update the page, click the reload icon in the toolbar.

## Prerequisites

Ensure that the configured devices (through the device registration process) are available.

## Procedure

1. In the IP Maestro home page, navigate to **Network Monitoring > Chassis Monitoring**.
2. Click the **Device** drop-down to select a device from the available list of registered devices:

Field	Description
Device Details	Displays the following data of the OcNOS device: <ul style="list-style-type: none"> <li>• Host Name</li> <li>• IP Address</li> <li>• Software Version</li> <li>• Software Build</li> <li>• Boot Time</li> <li>• Device Model</li> </ul>
Device Summary	Displays a device summary for the OcNOS device, with details on the power supply, the total number of installed fans, fan cards, and system sensors on the devices.
Power Supply Summary	Displays the summary of the power supply units.
Power Supply Temperature Chart	Displays the temperature of the individual sensors installed on the devices.
Sensor(s) Summary	Displays the summary of the sensors installed on the hardware devices.

Field	Description
Sensor(s) Temperature Chart	Displays data on the temperature of all the installed sensors.
Fan Summary	Displays the fan summary in Rotation Per Minute (RPM).
Fan Speed Chart	Displays the data of the all the fans represented in the chart.
Fan Card Summary	Displays data of the fan cards.






## Manage Device Logs

The Device Logs page helps you view logs, such as application logs, for the selected host. When a device is mounted, a remote syslog configuration is pushed into OcNOS to set up IP Maestro remote syslog server that will receive OcNOS device logs.

This dashboard provides a visualization of the logs for the selected devices. The logs can be filtered by Log Level and Protocol.

**Note:** This dashboard currently shows data from polling the device using RESTCONF. The data is not real-time, causing a 3-minute delay in fetching information based on the polling interval. To instantly update the page, click the reload icon in the toolbar.

The following list describes some of the key features and functionalities:

Field	Description
	Reloads the data.
	Opens the User Guide in a separate panel.
 Last 12 Hours(s)	Displays data according to the date range.
 10 s	Auto refresh every 10 seconds.
	<p>Allows to display data based on the following settings:</p> <ul style="list-style-type: none"> <li>Quick Selection - Displays data according to the selected input.</li> <li>Date Time Picker - displays data according to the specified date range.</li> <li>Auto refresh - If enabled, data is refreshed as per the specified time interval.</li> </ul> <p>Click <b>Reset to Defaults</b> to reset the values to back to default.</p>

This page contains two tabs:

- [View Device Logs](#)
- [Upload Device Logs](#)

---

## View Device Logs

### Prerequisite

Ensure that the configured devices are available.

### Procedure

1. In the IP Maestro home page, click **Network Monitoring > Device Logs**.
2. In the **Monitored** tab, select a device from the available list of registered devices.

Field	Description
Device(s) <ul style="list-style-type: none"><li>• Device IP</li><li>• Host name</li></ul>	Select a device from the available list of registered devices. <ul style="list-style-type: none"><li>• IPv4 address of the device</li><li>• Assigned name or label</li></ul>
Severity	Select the severity of the log.
Module	Select the protocol module name.
Message Type	Choose from the list of message types.

The device logs for the selected device are displayed with the following details:

Field	Description
Host Name	Host name of the originating device.
Device	IP address of the originating device.
Timestamp	Date and time in Indian Standard Time (IST) format.
Severity	Severity level of the log.
Module	Protocol module name.
Message Type	Log message type with embedded severity.
Description	Detailed description of the log message.

---

## Upload Device Logs

You can import or load a previously saved device log file. The content is added to the database to provide persistent storage and retrieval capabilities.

### Prerequisite

- Ensure that the configured devices (through the device registration process) are available.
- The device log file must be available for upload.

### Procedure

1. In the IP Maestro home page, click **Network Monitoring > Device Logs**.

2. In the **Uploaded** tab, click **Upload Log File(s)** button at the right.
3. Click **+Choose** to select the file or drag and drop files to upload.
4. Enter the host IP address to associate with the logs from the uploaded file(s).
5. Click the **Upload** button.

## Manage System Audit Logs

The System Audit Logs page provides audit logging of configuration changes to all the registered devices. It is a read-only menu where no write or delete capabilities are provided. It provides the ability to expand and view payload contents in a user-friendly format.


This page provides a group of tabbed panels used to display and filter various logs throughout IP Maestro and the network.

The following tabs can be used to display, filter, and inspect the information as listed below:

- **Configuration Logs:** Configuration history for all the devices and modifications applied to the network devices.
- **Administrative Logs:** History of all non-device configurations or operations .
- **Monitoring Logs:** History of all the monitoring logs.
- **User Management Logs:** Logs of all the user management actions.

## Configuration Logs

This table provides a configuration history for all the devices in the network. Each log shows the device and its associated operation.

In addition to providing the details for each operation, most operations contain a configuration (or payload). When a payload is available for inspection, click the  icon within the desired row under the **Action** column.

### Prerequisite


The device already exists and is configured on the domain controller.

### Procedure

1. In the IP Maestro page, click **Network Monitoring > System Audit Logs**.
2. Click the **Configuration Logs** tab to display the log status and configuration as follows:

Field	Device IP
Device IP	Ipv4 address.
Status	Command execution status. The possible values are: <ul style="list-style-type: none"> <li>• Success</li> <li>• Failed</li> </ul>
Operation	The execution type to configure the device.
Timestamp	The execution date and time logged by the system in IST.

Field	Device IP
User	The user that applied the configuration.
Browser	The originating address of the client.
Origin	The servicing component responsible for command execution.
Payload	The payload identifier in JSON format.

- Click the **Action** expansion icon  to show the entire payload of the existing entries in a JSON-friendly format. The **JSON Formatted Payload** window is displayed showing the details of the existing entries.

JSON Formatted Payload

copy

```

{
  ipi-sys-update:sys-update-get: {
    input: {
      source-interface: "eth0",
      url: "http://artifactory.ipinfusion.com/artifactory/ocnos-build-bins/com/ocnos/sp/6.5.0/125/ONIE/OCNOS_MPLS_Q1/OcNOS-SP-MPLS-Q1-6.5.0-125-Alpha-installer"
    }
  }
}

```

Close

- Click **Close** to close the **JSON Formatted Payload** window.

## Administrative Logs

This table provides a configuration history for all other non-device configurations or operations.

### Prerequisite

The device already exists and is configured on the domain controller.

### Procedure

- In the IP Maestro home page, click **Network Monitoring > System Audit Logs**.
- Click the **Administrative Logs** tab to display all the non-device configurations and operations with the following details:

Field	Device IP
Device IP	Ipv4 address.

Field	Device IP
Status	Command execution status. The possible values are: <ul style="list-style-type: none"> <li>Success</li> <li>Failed</li> </ul>
Operation	The execution type to configure the device.
Timestamp	The execution date and time logged by the system in IST.
User	The user that applied the configuration.
Browser	The originating address of the client.
Origin	The servicing component responsible for command execution.

## Monitoring Logs

This table provides a history of all the monitoring logs.

### Prerequisite

The device already exists and is configured on the domain controller.

### Procedure

1. In the IP Maestro home page, click **Network Monitoring > System Audit Logs**.
2. Click the **Monitoring Logs** tab to display the logs with the following details:

Field	Device IP
Device IP	IPv4 address.
Status	Operational status. The possible values are: <ul style="list-style-type: none"> <li>Success</li> <li>Failed</li> </ul>
Type	The execution type to configure the device.
Action	Enable or Disable
Timestamp	The execution date and time logged by the system in IST.
User	The user that applied the configuration.

## User Management Logs

This table provides logs of all the user management actions that are performed.

### Procedure

1. In the IP Maestro home page, click **Network Monitoring > System Audit Logs**.
2. Click the **User Management Logs** tab to display the logs with the following details:

---

Field	Device IP
Operation	The user management operation.
Operation executed by	The system that executed the operation.
Origin	The origin server of execution.
Timestamp	The execution date and time logged by the system in IST.
Details	The details of the user management operation.



# System Management

The System Management menu in the IP Maestro banner serves as a comprehensive tool for overseeing various aspects of the system. It facilitates the management of key components, including the IP Maestro portal, user activity, user accounts, sessions, user preferences, and DHCP & SMTP configuration.

This chapter describes the following sections:

- [User Management](#)
- [Manage Preferences](#)
- [View IP Maestro Health](#)

---

## User Management

The User Management page allows you to manage users, sessions, and email preferences relating to user notifications.

This page contains the following tabs:

- [IP Maestro Accounts](#)
- [Sessions](#)
- [Subscriptions](#)
- [User Federation](#)

---

## IP Maestro Accounts

The Accounts dashboard allows you to create, read, delete, and update user accounts. You will be able to access the Accounts screen and create multiple users with similar access. You can also create, delete, and update all user profiles. The data of all the users are shown in table format. Multiple users can be created, updated, and deleted by selecting table rows.


### Add a New User

The addition process allows you to add new users to the Accounts page.

### Prerequisite

You have the permissions/roles to add a new user.

### Procedure

1. In the IP Maestro home page, click **System Management > User Management**.
2. In the **IP Maestro Accounts** tab, click the  icon.
3. In the **Create new user** dialog box, add the following field details:

Field	Description
Username	The username to authenticate provided by the user.

First Name	First name of the user.
Last Name	Last name of the user.
Password	Provide the credentials for the user to access.
Role	<p>The user role. The following are the user roles:</p> <ul style="list-style-type: none"> <li>• IP Maestro Administrator - Complete read and write access to entire system.</li> <li>• IP Maestro Engineer - Read access to entire system. Read and write access to fabric interconnect infrastructure and network security operations.</li> <li>• IP Maestro Operator - Read access to entire system. Read and write access to all the logs.</li> <li>• IP Maestro User - Read only access to the entire system.</li> </ul>
Email	Email address of the user.
Slack Notification URL	URL to be used for the Slack notification.

4. Click **Create** to add the new user.

The new user is added in the **IP Maestro Accounts** tab.

## Edit an Existing User

The editing process allows you to edit existing users on this page.


## Prerequisites

- The user is already added to the user accounts.
- You have the permissions/roles to edit an existing user.

## Procedure

1. In the IP Maestro home page, click **System Management > User Management**.
2. In the **IP Maestro Accounts** tab, select the check-box of the user accounts row to edit the selected users.
3. Click the Edit icon in **Action > Edit User** for the user that you want to edit or update.
4. Edit the required fields in the dialog box that is displayed:

Field	Description
Username	The username to authenticate provided by the user.
First Name	First name of the user.
Last Name	Last name of the user.
Password	Provide the credentials for the user to access.
Role	<p>The user role. The following are the user roles:</p> <ul style="list-style-type: none"> <li>• IP Maestro Administrator - Complete read and write access to entire system.</li> <li>• IP Maestro Engineer - Read access to entire system. Read and write access to fabric interconnect infrastructure and network security operations.</li> <li>• IP Maestro Operator - Read access to entire system. Read and write access to all the logs.</li> <li>• IP Maestro User - Read only access to the entire system.</li> </ul>

Email	Email address of the user.
Slack Notification URL	URL to be used for Slack notifications. Optionally, send a test Slack notification using the  icon. Note: Slack notification URL is specifically a Slack app-based Webhook URL.

5. Click **Update** to incorporate your changes.

The existing user is updated.

## Delete an Existing User

When you want to remove the user from its physical location, you must delete the user details from the Accounts page.

### Prerequisites

- The user is already added to the user accounts.
- You have the permissions/roles to delete an existing user.

### Procedure

1. Select the row containing the user account to delete the selected users.
2. In the **Action** tab, click the **Delete** icon for the user that you want to delete.
3. In the **User Deletion Confirmation** dialog box, click **Delete** to confirm.

The selected users are deleted from the Accounts page.

Note: The default admin user cannot be deleted. This default admin user can be used to create other admin users.

## Sessions

The sessions page allows the user to view and manage all the active sessions.

### View Sessions

Allows you to view which users are active and when they are logged in.

### Prerequisite

The users must be active to be viewed.

### Procedure

In the IP Maestro home page, click **System Management > User Management > Sessions**. The Sessions page is displayed with the details related to the **Username**, IP address (**From IP**), **Session Start**, and **Last Access** details.

Note: To log out a user from the session, select the user and click the **Logout** icon.

## Subscriptions

This tab allows you to subscribe to email or slack notification, and select the alert type as alarm or notification.

As an Admin, you can choose an user from the list of registered users in the drop-down, and select the type of alarm or notification that you want to enable for that user. You can also define an URL based destination for the user as a notification type.

This tab contains the following operations:


- [Email Subscription](#)
- [Slack Subscription](#)

## Email Subscription

### Procedure

1. In the IP Maestro home page, click **System Management > User Management > Email Notifications**. The page is displayed with the list of registered users along with the following details:

Field	Description
Username	Username of the registered user.
Email	Email address of the user.
Subscriptions	Type of email alerts and IP Maestro notification subscribed to.
Action	Option to Edit or Delete the subscription.

1. To add a new subscription, click the  icon.
2. Select the email address for the user that you want to subscribe to email alerts.
3. Click the check-box for the desired **Alarm** type - Critical, Major, Warning, Minor.
4. Click the check-box for the **IP Maestro Notification** type.
5. Click **Save** to save the changes. A pop-up message is displayed to confirm the preferences are saved successfully.

You can edit or delete the subscription using the icons in the **Action** tab

Note: As a non-admin user, you can go to the **Email Notifications** tab and check if your email ID is correct. You can select the severity type check-box for which you want to be notified on email.


## Slack Subscription

Slack is a cloud based communication platform that has the capability to integrate with many other applications.

### Procedure

1. In the IP Maestro home page, click **System Management > User Management > Slack Subscription**. The page is displayed with the list of registered users when the user has an assigned Slack URL. The following details are shown:

Field	Description
Username	Name of the registered user.
Slack URL	URL used for Slack notifications.
Subscriptions	Type of alert and Slack notification subscribed to.
Action	Option to Edit or Delete the subscription.

2. To add a new subscription, click the  icon.
  3. Select the user from the drop-down to subscribe.  
 Note: The Slack URL must be previously assigned to the user in the **User Management > IP Maestro Accounts** tab in order to show in the drop-down list.
  4. Click the check-box for the desired **Alarm** type - Critical, Major, Warning, Minor.
  5. Click the check-box for the **IP Maestro Notification** type.
  6. Click **Save** to save the changes. A pop-up message is displayed to confirm the preferences are saved successfully.
- You can edit or delete the subscription using the icons in the **Action** tab.

## User Federation

This tab provides support for role-based access control using Lightweight Directory Access Protocol (LDAP) Authentication and Active Directory (AD). IP Maestro user interface leverages the User Federation capabilities of authentication manager to integrate LDAP and AD.

For detailed information on configuration, refer to Appendix section in the *IP Maestro Installation Guide*.

### Create and Manage Providers

The **User Federation** tab on IP Maestro interface enables administrators to create and manage providers.

To add a new provider, follow the steps mentioned below:

1. In the IP Maestro home page, click **System Management > User Management > User Federation**.
2. In the User Federation page, click the **Add Provider** button.

In the **Provider Details** page that is displayed, enter the details as follows:

Field	Description	Mock LDAP server settings	Comments
<b>General Options</b>			
Provider Name	Enter a display name for the provider	Test LDAP server	Any name to identify the provider.
Vendor	Type of the LDAP vendor	Other	Mock LDAP server is not a part of AD, hence use "Other".
<b>Connection and Authentication Settings</b>			
Connection URL	URL to connect to the LDAP server	ldap://<ip-of-server>:port	For example: ldap://1.1.1.1:10381
Enable StartTLS	Encrypts the connection to LDAP using StartTLS	Off	Mock LDAP server does not support TLS.

Connection Pooling	Check box to determine if IP Maestro must use connection pooling for accessing LDAP server.	Off	Connection pooling is not required to access mock LDAP server.
Connection Timeout	LDAP connection timeout in milliseconds	Off	No connection timeout is specified.
Test Connection	Button to test the connection		
Bind Type	Type of authentication method used during LDAP bind operation.	Simple	If the LDAP server allows anonymous requests, select 'none'. The mock LDAP server will not accept anonymous requests hence select 'simple' and pass authentication details.
Bind DN	Distinguished name of the LDAP admin for IP Maestro to access LDAP server.	uid=jbrown123,ou=People,dc=keycloak,dc=org	Complete DN of the admin user
Bind Credentials	Password of LDAP admin.	password123	Password is encrypted and only used to check authentication with LDAP server.
Test Authentication	Button to test the authentication		
<b>LDAP Searching and Updating</b>			
Edit Mode	READ_ONLY - Read-only LDAP store. UNSYNCED - Imports User data without syncing back to LDAP.	UNSYNCED	Recommended to select edit mode as UNSYNCED so that the basic information of users will be imported to IP Maestro and cached.
Users DN	Parent distinguished name of LDAP users. It is the name of the LDAP tree where the users are stored.	ou=People,dc=keycloak,dc=org	Name of the LDAP tree where users are present.
Username LDAP Attribute	LDAP attribute that is stored as IP Maestro user name	uid	The attribute in the mock LDAP server which defines the username of the users.
RDN LDAP Attribute	Name of LDAP attribute used as Relative Distinguished Name (RDN) of typical user	uid	Same as user name attribute.
UUID LDAP Attribute	LDAP attribute used as unique object identifier for objects in LDAP.	uid	Same as user name attribute.
User Object Classes	LDAP object class attribute values for users, separated by commas	top, person, organizationalPerson, inetOrgPerson	Object classes defined for users in the mock server.
Read Timeout	LDAP read timeout in milliseconds that apply to read operations		Read timeout values not configured.

Pagination	Check-box to determine if LDAP server supports pagination	Off	The mock server does not support pagination.
<b>Group Mapper Settings</b>			
Create Group Mapper	Check-box to create LDAP mapper	On	Group-mapper will be created
LDAP Groups DN	Distinguished name of LDAP where the groups of the tree are saved.	ou=RealmRoles,dc=keycloak,dc=org	Tree where groups are defined in the mock server.
Group Name LDAP Attribute	Name of LDAP attribute in group objects and Relative Distinguished Name (RDN) of group	cn	This defines the name of the group in the mock LDAP server.
Group Object Classes	LDAP object class of the group object, separated by commas	top,groupOfNames	These are the 2 object classes defined in the server.
Membership LDAP Attribute	Name of LDAP attribute on group used for membership mappings	member	
Membership Attribute Type	<ul style="list-style-type: none"> <li>• DN - The LDAP group has members declared in the form of full distinguished name.</li> <li>• UID - The LDAP group has members declared in the form of user ID.</li> </ul>	DN	
Membership User LDAP Attribute	Enter if the membership attribute type is UID	uid	
User Groups Retrieve Strategy	Specifies how to retrieve groups of users: <ul style="list-style-type: none"> <li>• LOAD_Groups_BY_MEMBER_ATTRIBUTE - Roles of users are retrieved by sending LDAP query for all groups where 'member' is our user.</li> <li>• GET_GROUPS_FROM_USER_MEMBEROF_ATTRIBUTE - Groups of users are retrieved from 'memberOf' attribute of our user.</li> </ul>	LOAD_Groups_BY_MEMBER_ATTRIBUTE	
Member-of LDAP Attribute	Used only when the User Roles Retrieve Strategy is GET_GROUPS_FROM_USER_MEMBEROF_ATTRIBUTE. The default value is 'memberOf'.	memberOf	This is default value as it is not needed for mock LDAP server since retrieve strategy is LOAD_Groups_BY_MEMBER_ATTRIBUTE

The configurations that are provided enable IP Maestro to connect to the LDAP server, allowing users from the LDAP server to log in to Maestro upon successful authentication.

Here are a few images of the mock LDAP server configurations that have been added in the IP Maestro user interface.

**General Options**

Provider Name \* ?

Vendor \* ?

**Connection and Authentication Settings**

Connection URL \* ?

Enable StartTLS ? ☐ Off

Connection Pooling ? ☐ Off

Connection Timeout ?

Bind Type \* ?

Bind DN \* ?

Bind Credentials \* ?

**LDAP Searching and Updating**

Edit Mode \* ?

Users DN \* ?

Username LDAP Attribute \* ?

RDN LDAP Attribute \* ?

UUID LDAP Attribute \* ?

User Object Classes \* ?

Read Timeout ?

Pagination ? ☐ Off



### Group Mapper Settings

- If group mapper configured, Groups from this provider will be imported to IP Maestro and can be used to map imported groups to the IP Maestro Roles.
- If group mapper not configured, Users from this provider will be assigned with the IP Maestro's default 'ip-maestro-user' role with minimum privileges.

Create Group Mapper ?	<input checked="" type="checkbox"/> On
LDAP Groups DN * ?	<input type="text" value="ou=RealmRoles,dc=keycloak,dc=org"/>
Group Name LDAP Attribute * ?	<input type="text" value="cn"/>
Group Object Classes * ?	<input type="text" value="top,groupOfNames"/>
Membership LDAP Attribute * ?	<input type="text" value="member"/>
Membership Attribute Type * ?	<input type="text" value="DN"/>
Membership User LDAP Attribute * ?	<input type="text" value="uid"/>
User Groups Retrieve Strategy ?	<input type="text" value="LOAD_GROUPS_BY_MEMBER_ATTRIBUTE"/>
Member-Of LDAP Attribute * ?	<input type="text" value="memberOf"/>

It is recommended to retain the Synchronization and Advanced Settings as provided below:

### Synchronization and Advanced Settings

#### Synchronization Settings

Import Users ?	<input checked="" type="checkbox"/> On
Batch Size ?	<input type="text" value="500 users"/>
Periodic Full Sync ?	<input checked="" type="checkbox"/> On
Full Sync Period ?	<input type="text" value="604,800 seconds"/>
Periodic Changed Users Sync ?	<input checked="" type="checkbox"/> On
Changed Users Sync Period ?	<input type="text" value="86,400 seconds"/>

#### Cache Settings

Cache Policy * ?	<input type="text" value="DEFAULT"/>
------------------	--------------------------------------

#### Advanced Settings

Enable the LDAPv3 password modify extended operation ?	<input type="checkbox"/> Off
Validate Password Policy ?	<input type="checkbox"/> Off
Trust Email ?	<input type="checkbox"/> Off

## Map Roles

To map LDAP group/user role to a relevant role in IP Maestro, follow the procedure mentioned below:

- In the IP Maestro home page, click **System Management > User Management > User Federation**.
- In the User Federation page, click the **Map Role(s)** button.
- In the **Role Mapping** page that is displayed, follow the steps shown below:

**Note:** If group mapper is created, the groups/roles from the LDAP server will be imported to IP Maestro as per configurations and will be available to map.

- In the **LDAP Synced Role/Group** drop-down menu, select the groups/roles that are needed to be mapped to IP Maestro role.

User Management ⓘ

Accounts ⓘ Sessions ⓘ Email Notifications ⓘ User Federation ⓘ

### Role Mapping - LDAP Group(s) to IP Maestro Role

Map New LDAP Group(s)

LDAP Synced Role/Group ⓘ

Select...

- ldap-admin
- ldap-user

Mapped Group(s)/Role(s)

Global Search

LDAP Role ↑↓	IP Maestro Role ↑↓	Mapped By ↑↓
⚠ No Data Available		

- From the **IP Maestro Role** drop-down menu, select IP Maestro role.

User Management ⓘ

Accounts ⓘ Sessions ⓘ Email Notifications ⓘ User Federation ⓘ

### Role Mapping - LDAP Group(s) to IP Maestro Role

Map New LDAP Group(s)

LDAP Synced Role/Group ⓘ

ldap-admin ⓘ Select...

IP Maestro Role ⓘ

Select...

- IP Maestro Administrator
- IP Maestro Engineer
- IP Maestro Operator
- IP Maestro User

Mapped Group(s)/Role(s)

Global Search

LDAP Role ↑↓	IP Maestro Role ↑↓	Mapped By ↑↓	Action
⚠ No Data Available			

- After selecting the appropriate roles, the mapping details are displayed.

- Click the **Map Role(s)** button to confirm the mapping.

The mapped roles are displayed in the **Mapped Group(s)/Role(s)** table and can be modified or deleted using the **Action** button.

After successful authentication, users from the configured provider will be granted access to IP Maestro and their roles will be assigned based on the role mappings. The user roles can also be validated under **System Management > User Management > Accounts** tab.

**Note:** If no mappings are done, the LDAP users are allowed to login with the default IP Maestro User role assigned to them.

## Manage Preferences

The Preferences page helps you to define system-wide parameters like license repository and image repository. These global parameters are initially configured during the deployment of IP Maestro.

Note:

- The image and license repository path names can be modified to accommodate field requirements.
- The Configuration Push Parameters are defined during initial installation and cannot be modified using the portal.

This page allows the following operations:

- [Configure System Preferences](#)
- [Configure DHCP](#)
- [Configure SMTP](#)
- [Configure Dashboard Level Preferences](#)

---

## Configure System Preferences

The configuration process allows you to specify the IP address of the license server, or to define the location of the repository of the licenses and images for managing the system in the **Licenses** and **Image Upgrade** sections under the **Device Management** menu.

Note:

For more information on licenses and images, refer to the [Edit the License Installation Progress](#) and [Upgrade New Image](#) sections.

### Procedure

1. In the IP Maestro home page, click **System Management > Preferences > System**.
2. Under **IP Maestro Licensing** field, enter the following details:

Field	Description
License Server	IP address of the License Server to obtain license to IP Maestro.
Acquire License	Button to acquire the license.

The status of the license, with device numbers is displayed at the right.

The **Release License** button is used to release the previously acquired license. Note that the devices must be unmounted before releasing the license.

1. Under **Device Repositories**, specify the URL details as follows:

Field	Description
License Repository	Path name used to access the device licenses repository provided by the user.
Image Repository	Path name used to access the device images repository provided by the user.

2. Click **Save** to save your changes.

## Configuration Push Parameters

The Configuration Push Parameters that are defined during initial installation are displayed. Note that the parameters cannot be modified here.

Field	Description
Push Configuration for LLDP	Allows IP Maestro to push the LLDP configuration.
Push Configuration for Alarms	Allows IP Maestro to enable Fault Management Services on a device.
Push Configuration for Syslog	Allows IP Maestro to push the Syslog configuration.

## Database Management

The Backup Database feature allows to export the backup of the entire IP Maestro database. It provides a solution to restore the Maestro network configuration in the event of hardware failure or corrupted database.

To download the backup zip file, follow the steps mentioned below:

1. In the IP Maestro home page, click **System Management > Preferences > System**.
2. In **Database Management** section, click the **Backup** button.  
This opens the **Database Archive File** dialog box which displays the newly backed up zip file that is ready to be downloaded.
3. Click **Submit** to download the files. The archive is generated with the date-time stamp and then downloaded into the Downloads folder.

## Restoration

Restoration is a script based feature with a set of steps to be followed by an admin user with Linux privileges.

**WARNING:** Perform the Restore operation only when absolutely necessary.

**Note:** These instructions require that you essentially 'down/stop' IP Maestro for a short period of time.

1. Log in to the Maestro controller via Linux shell into the NSMO directory. You can reinstall Maestro, if necessary.
2. Copy the associated archive file (from the Downloads folder) to the local NSMO directory.
3. In the script file `postgresRestoreFromZip.sh` (located in `./bin dir`) enter the command:  

```
sudo bash ./postgresRestoreFromZip.sh <path_to_zip_file> to repopulate the Maestro database.
```

The Restore script takes the archive file name as an input parameter and populates the Maestro database from its contents.

**Note:** While performing a restore, to prevent database locking you must ensure all docker containers are stopped except the postgres server (ipi-postgres). This is to ensure no database contention is caused by other docker containers.

## Configure DHCP

Dynamic Host Configuration Protocol (DHCP) is a client/server protocol. It automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information. For example, it provides the subnet mask and default gateway.

### Procedure

1. In the IP Maestro home page, click **System Management > Preferences > DHCP**.
2. In the DHCP tab, enter the following details:

Field	Description
<ul style="list-style-type: none"> <li>Form View</li> <li>File Editor</li> </ul>	<ul style="list-style-type: none"> <li>Displays the form view with the options mentioned below.</li> <li>Displays the file editor.</li> </ul>
Interface	The physical interface of the server on which the DHCP server needs to listen when serving DHCP requests.
<b>DHCP Configuration</b>	
Default Lease Time	Specifies the duration in seconds for which DHCP clients will retain the assigned IP address (e.g., default-lease-time 86400 sets the lease time for 24 hours).
Maximum Lease Time	Specifies the maximum duration in seconds for which DHCP clients can retain the assigned IP address before they must renew the lease or request a new IP address (e.g., max-lease-time 7200 sets the maximum lease time to 7200 seconds or 2 hours).
Subnet	Defines a subnet with its network address pool.
Subnet Mask (or netmask)	Specifies the subnet mask, which determines the network portion and host portion of an IP address within the subnet.
Range Start	Start IP for the IP address range within the subnet that can be assigned to DHCP clients.
Range End	End IP for the IP address range within the subnet that can be assigned to DHCP clients.
Routers	Specifies the IP address of the default gateway (router) that DHCP clients must use for internet access.
Domain Name Server	Sets the IP address of the Domain Name System (DNS) server that DHCP clients must use for domain name resolution.
License Server	Specifies the URL to obtain a valid software license file for the device.
License Folder	Specifies the URL of the software license folder to obtain a valid software license file for the device.
Image Location	Specifies the URL to obtain a valid OcNOS image to be loaded to the device.
Day Zero Configuration	Specifies the URL to obtain a valid day-0 configuration file to be applied to the device.

3. Click **Save** to save your changes.

You can click **Stop** to stop the server or **Restart** to restart the server.

---

## Configure SMTP

Simple Mail Transfer Protocol (SMTP) is an Internet standard communication protocol for e-mail transmission. In order to have email notifications enabled on IP Maestro, the SMTP server must be configured.

### Procedure

To configure SMTP server, follow the steps below:

1. In the IP Maestro home page, click **System Management > Preferences > SMTP**.

In the SMTP tab, enter the following details:

Field	Description
From	From address email ID
From Display Name	A user-friendly name for the 'From' address
Reply to Display Name	A user-friendly name for the 'Reply to' address
Host	SMTP Mail server host IP
Port	SMTP Mail server port

2. Click the **Test Connection** button to test the SMTP connection. A pop-up message is displayed to show if the connection is successful or not. This also triggers a test mail to the e-mail address of the logged-in admin user.
3. Click **Save** to save the SMTP configuration.

This configuration is necessary for enabling e-mail alerts to users. As an admin, you can configure subscription to e-mail alerts, notifications and alarms for other users. For more details, refer the section [Subscriptions](#).

---

## Configure Dashboard Level Preferences

The user persistence feature in IP Maestro provides the ability to render the dashboards and other settings, based on the assigned preferences data. This feature also detects the changes to the dashboards or other preferences and these changes are persisted in the database.

The **Dashboards** tab allows you to configure dashboard level preferences for different types of roles.

### Configure Preferences

As an administrator, you can assign default preferences to user accounts based on particular roles in IP Maestro as follows:

1. In the IP Maestro home page, click **System Management > Preferences > Dashboards**.
2. In the **Role** drop-down field, select the role for which you want to assign the preferences.
3. Select the check-boxes for the desired features you want to be displayed for each dashboard.
4. Click **Update** to save the preferences.

System Preferences

SystemDHCPSMTPDashboards

Dashboard Preferences

Role : IP Maestro Administrator

Network Dashboard

☒ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

IP Maestro Helath Dashboard

☒ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

Device Metrics Dashboard

☐ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

Interface Statistics Dashboard

☒ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

Chassis Monitoring Dashboard

☒ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

Monitored Device Logs Dashboard

☐ Widgets Removable  
☒ Widgets Reloadable  
☐ Widgets Collapsible

Service Dashboard

☒ Export Dashboard Feature  
☒ Widgets Removable  
☒ Widgets Reloadable  
☒ Widgets Collapsible

Device Information Dashboard

☐ Widgets Removable  
☐ Widgets Reloadable  
☒ Widgets Collapsible

Update

Note: Whenever an user account is deleted from IP Maestro, the preferences are also removed.

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## View IP Maestro Health

The IP Maestro Health page allows you to monitor the system health of the overall IP Maestro domain controller.

The following list provides details on key features of IP Maestro Health:

Field	Description
	Reloads the data in the Health tab.
	Collapses (minimizes) the details. Click again to show the details.
	Removes the widget from the screen.
	Exports the data in PDF format.
 Last 12 Hours(s)	Displays data according to the date range.
	<p>Allows to display data based on the following settings:</p> <ul style="list-style-type: none"> <li>• Quick Selection - displays data according to the selected input.</li> <li>• Date Time Picker - displays data according to the specified date range.</li> <li>• Auto refresh - if enabled, data is refreshed as per the specified time interval.</li> <li>• Dashboard color scheme - you can choose the color scheme to display the dashboard.</li> <li>• Manage Widgets - you can choose the widgets to be displayed on the dashboard.</li> </ul>

## Prerequisites

Ensure that the configured devices (through the device registration process) are available.

## Procedure

In the IP Maestro home page, navigate to **System Management > IP Maestro Health**.

The Health dashboard is displayed with the following information:

Field	Description
Status Summary	Provides an overview of the internal IP Maestro applications as a container. It shows the container name, image specification, and its running time.
Containers	Shows the containers information such as name, status, and image name.

Field	Description
Statistics	<p>Lists the internal IP Maestro applications as containers along with the statistics for each container. It displays the following information:</p> <ul style="list-style-type: none"><li>• Container Name</li><li>• CPU Usage (%)</li><li>• Memory Usage (%)</li><li>• Memory Usage</li><li>• Memory Limit</li><li>• Total Net Inbound</li><li>• Total Net Outbound</li></ul>
Memory Usage	Displays the overall Memory usage for the IP Maestro system.
CPU Usage	Displays the overall CPU usage for the IP Maestro system.