

Cisco ACI Sensor Pack by AutoMonX

Date	Change	Author
21.03.2022	Initial Release	AutoMonX
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10.12.2023	Configuration wizard changes, support for EPGs	AutoMonX

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1 Purpose

The purpose of this document is to provide a detailed explanation of the AutoMonX Sensor Pack for Cisco ACI and how to deploy it.

2 Cisco ACI Sensor Pack Overview

AutoMonX has developed the Cisco ACI Sensor Pack for monitoring Cisco Application Centric Infrastructure (ACI) networks. The Cisco ACI Sensor Pack can discover and monitor the Cisco ACI physical and logical components managed by multiple APIC servers. The Cisco ACI Sensor Pack natively integrates with Grafana and InfluxDB as well as with the PRTG Network Monitor. The Cisco ACI Sensor Pack currently supports auto-discovery and monitoring of 32 Cisco ACI component types as seen below:

Cisco APIC:

- Disks
- Processes
- Fans
- Memory
- CPU
- Network Interfaces
- Temperature

Fabric:

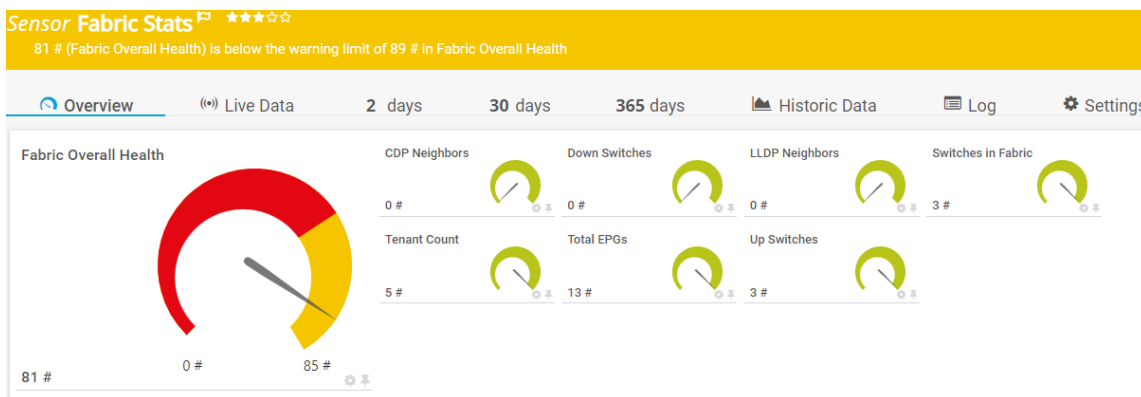
- Health Score
- Tenants
- Latency between Cisco ACI devices
- Top Ports by Traffic
- Top Talkers
- EPGs

Cisco Switches:

- Health Score
- CPU utilization
- Memory utilization
- Network Interface statistics
- Power Supplies
- Fans
- Temperature
- CDP Neighbors
- LLDP Neighbors
- Line Cards
- FEX Cards
- Latency between switches
- Top Ports by Traffic
- Top Talkers
- EPGs
- Contracts
- OSPF Statistics
- Policy CAM

3 How does it work?

The AutoMonX Cisco ACI Sensor Pack connects via REST API to the APIC server and collects metrics, statuses and additional information. This data is pushed into InfluxDB or can be used by the PRTG server via the custom sensor integration. The monitoring data can be displayed via pre-built dashboards in Grafana, that displays the gathered information in a readable and clear way as seen in the picture below:



3.1 The Cisco ACI Sensor Pack Architecture

The AutoMonX Cisco ACI Sensor Pack sends multiple requests to the APIC web service and therefore needs a managing service to efficiently handle the requests while minimizing the server load. The managing service harnesses the advantages of threading technology to efficiently queue the sensor requests to the APIC web service to provide reliable, swift, and lightweight performance.

4 Getting Started with Cisco ACI Sensor Pack

4.1 Supported Software versions

The Cisco ACI Sensor Pack has been tested to support the following software:

Software Type	Versions	Comments
Windows OS	2016, 2019	Standard and Enterprise editions
Virtual Infrastructure	VMWare Cloud or on-prem VM	
Cisco APIC server	4.x,5.x,6.x	
PRTG Core and Probe deployments	17.x,18.x,19.x, 20.x, 21.x, 22.x	All On-Prem PRTG license types supported
PRTG Cloud	Supported	

4.2 Cisco ACI Sensor Pack - Machine requirements

Software Type	Versions	Comments
CPU cores	2	
RAM	16 GB	
Disk space	100 GB	

4.3 Cisco ACI Sensor Pack - Port requirements

The AutoMonX Cisco ACI Sensor Pack requires the following ports to be open for it to function correctly. Please make sure that the local firewall / anti-virus and the external firewalls are configured correctly to allow the Sensor Pack to function correctly.

Port / URL	Purpose	Direction
HTTPS to all your APIC servers	APIC API connection	From the monitoring server to APIC
TCP 3000	Connect to Grafana servers. Can be adjusted on install process.	From Cisco ACI administrator workstations to the monitoring server

TCP 8086 TCP 8090 TCP 8099 TCP 8193	Internal service ports. Make sure these ports are not occupied by other programs on the server.	No need to open FW rules.
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4.4 Cisco ACI Sensor Pack – Anti-Virus requirements

The AutoMonX Cisco ACI Sensor Pack initiates many processes and threads during its normal execution. Configure your anti-virus and/or anti-malware software to exclude the AutoMonX directory in <drive>:\Program Files (x86)\AutoMonX from on-access scanning. This would greatly improve the general performance of the Cisco ACI Sensor Pack.

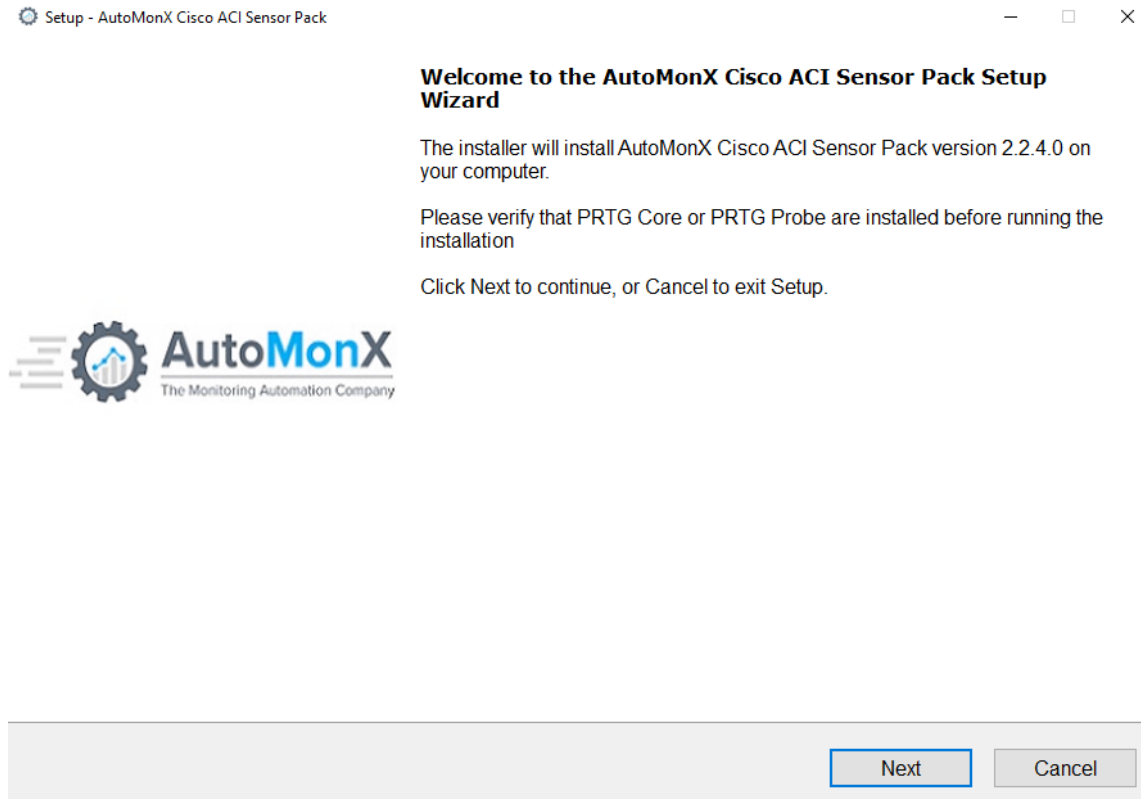
4.5 Downloading the Cisco ACI Sensor Pack

Obtain the installer by downloading it from the AutoMonX web site at <https://www.automonx.com/downloads>

5 Installing the ACI Sensor Pack using the Installer

Run the installer file, typically named

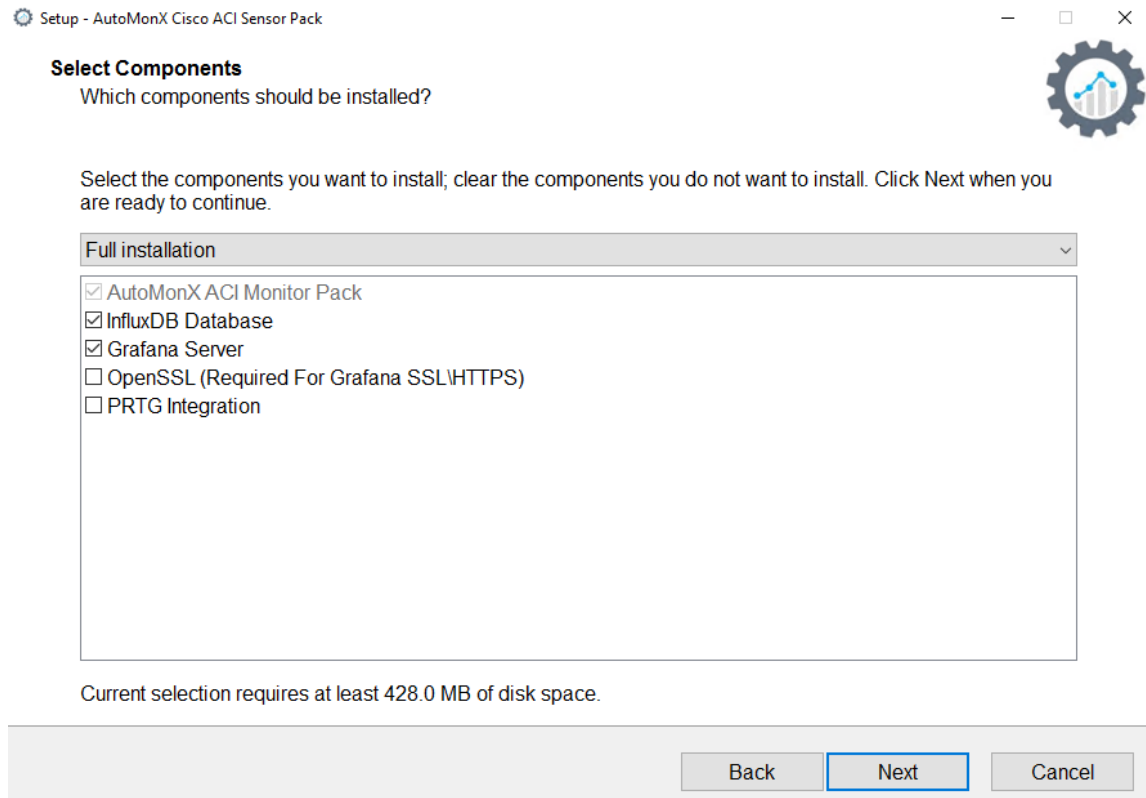
AutoMonX_ACI_Sensor_Pack_Installer_x.x.x.x.exe, as administrator.



Select the programs to install. If you do not already have InfluxDB and Grafana installed, use the default choices as seen below.

Select to install OpenSSL to enable HTTPs access to Grafana.

Select “PRTG Integration” for integrating the ACI Monitor Pack with your existing PRTG deployment.



Follow the installation wizard as described.

Select the path where the software would be installed

Setup - AutoMonX Cisco ACI Sensor Pack

— □ ×

Select Destination Location

Select the destination of the InfluxDB installation



Path to Install InfluxDB:

Browse...

Path to InfluxDB Database Storage:

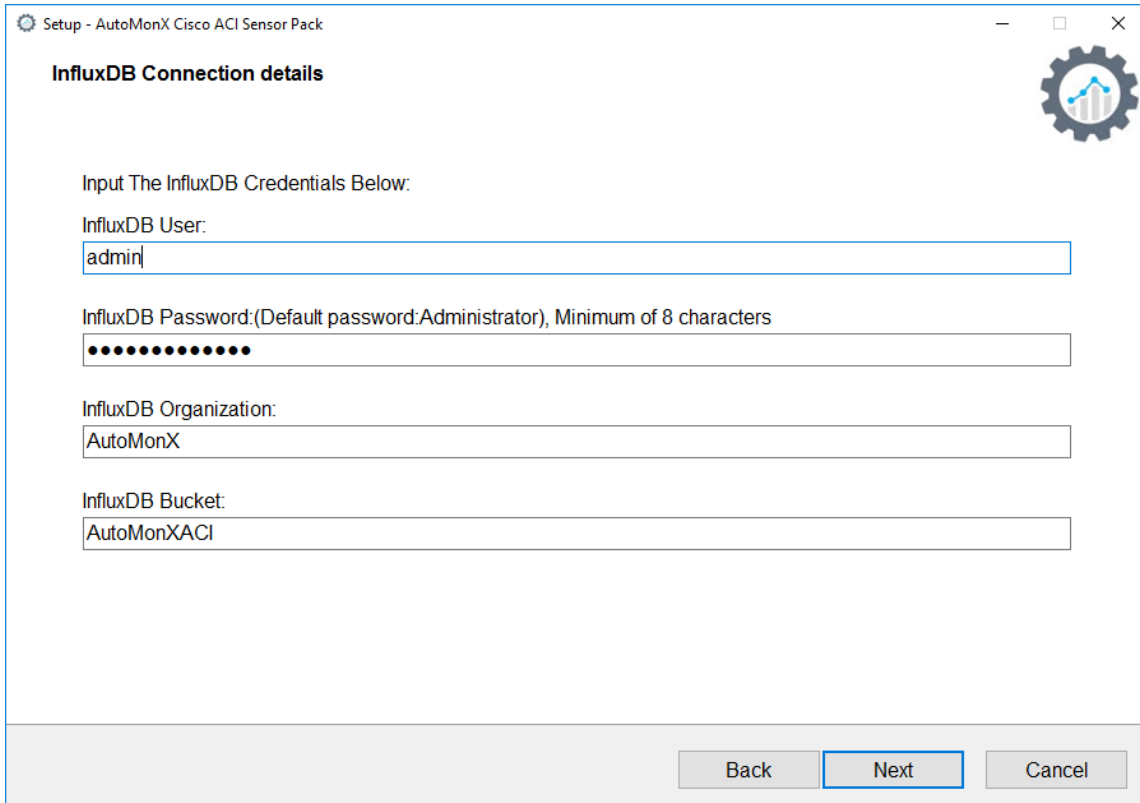
Browse...

Back

Next

Cancel

Fill-in the credentials for InfluxDB. It is suggested to leave the Organization and Bucket in their default settings as seen below.



The screenshot shows a window titled "Setup - AutoMonX Cisco ACI Sensor Pack" with a gear icon in the top right corner. The main heading is "InfluxDB Connection details". Below this, the text "Input The InfluxDB Credentials Below:" is displayed. There are four input fields: "InfluxDB User:" with the value "admin"; "InfluxDB Password:(Default password:Administrator), Minimum of 8 characters" with a masked password of 10 dots; "InfluxDB Organization:" with the value "AutoMonX"; and "InfluxDB Bucket:" with the value "AutoMonXACI". At the bottom right, there are three buttons: "Back", "Next" (which is highlighted with a blue border), and "Cancel".

Select Additional Tasks

Which additional tasks should be performed?



Select the additional tasks you would like Setup to perform while installing AutoMonX Cisco ACI Sensor Pack, then click Next.

Additional shortcuts:

- Create desktop icon to the UI for AutoMonX Cisco ACI Sensor Pack

Back

Next

Cancel

Ready to Install

Setup is now ready to begin installing AutoMonX Cisco ACI Sensor Pack on your computer.



Click Install to continue with the installation, or click Back if you want to review or change any settings.

Setup type:
Full installation

Selected components:
AutoMonX ACI Monitor Pack
InfluxDB Database
Grafana Server

Additional tasks:
Additional shortcuts:
Create desktop icon to the UI for AutoMonX Cisco ACI Sensor Pack

Back

Install

Cancel

Setup - AutoMonX Cisco ACI Sensor Pack

— □ ×

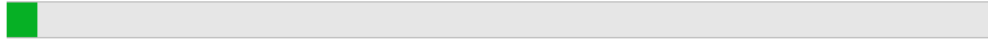
Installing

Please wait while Setup installs AutoMonX Cisco ACI Sensor Pack on your computer.



Extracting files...

C:\Program Files (x86)\AutoMonX\Backend\Automonx_Backend_Service.ini



Cancel

Setup - AutoMonX Cisco ACI Sensor Pack

— □ ×

AutoMonX Cisco ACI Sensor Pack installation conclusion



Thank you for installing the AutoMonX Cisco ACI Sensor Pack

Sensor pack files copied



Service installation



Reload Lookup Files in PRTG



Details required for evaluation license request:

The host name for the machine is: '3ifWN3aTFq'.

The IP address for the machine is: '5.100.253.53'

The MAC address for this machine is: '00-50-56-11-06-65'.

Contact us to get the evaluation license via
automonx.com Or mail sales@automonx.com.

Next

Proceed to request an evaluation license.

5.1 Requesting an Evaluation License

The initial license file used by the Cisco ACI Sensor Pack, part of the downloaded zip file, is empty and functions as a place holder. You must activate the sensor by obtaining a license.

To successfully activate the Cisco ACI Sensor Pack, you must contact AutoMonX Ltd either by filling the license evaluation request form at <https://www.automonx.com/aci>

Or by sending an email to sales@automonx.com and provide the following information:

- Your first and last name
- Your contact details (email, phone)
- Your business addresses.
- The hostname of the machine where the Sensor pack would be installed
- The IP address of the machine where the Sensor pack would be installed

Important: The hostname is case sensitive. Please use the LicDetailsLocator.exe utility to obtain the hostname and IP address

AutoMonX would provide you with a fully functional software evaluation license (two strings) valid for 30 days.

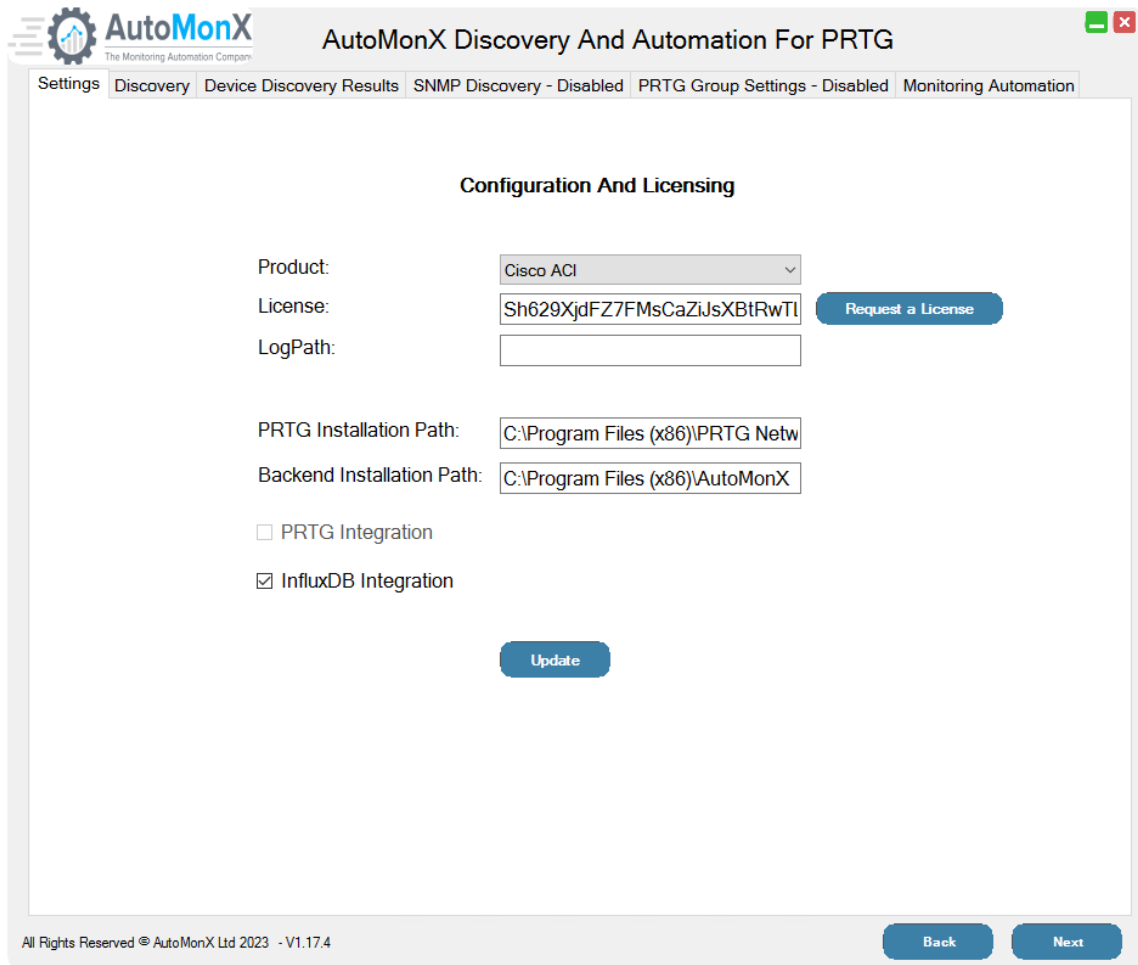
At the end of the evaluation period, you would need to purchase a license to continue monitoring your Cisco ACI infrastructure.

5.2 Activating the Cisco ACI Sensor Pack License

You can activate the Cisco ACI Sensor Pack by editing the following file via Notepad, pasting the relevant license string you have received via email and saving the file.

Automonx_ACIlicense.dat – For Cisco ACI Sensor Pack activation.

Or adding the license in the “Settings” tab in the AutoMonX UI and pressing “Update”:



The screenshot shows the 'Configuration And Licensing' interface within the AutoMonX application. The window title is 'AutoMonX Discovery And Automation For PRTG'. The navigation bar includes 'Settings', 'Discovery', 'Device Discovery Results', 'SNMP Discovery - Disabled', 'PRTG Group Settings - Disabled', and 'Monitoring Automation'. The main content area contains the following fields and options:

- Product:** A dropdown menu currently set to 'Cisco ACI'.
- License:** A text input field containing the license key 'Sh629XjdFZ7FMsCaZiJsXBtRwTl'. To its right is a blue button labeled 'Request a License'.
- LogPath:** An empty text input field.
- PRTG Installation Path:** A text input field containing 'C:\Program Files (x86)\PRTG Netw'.
- Backend Installation Path:** A text input field containing 'C:\Program Files (x86)\AutoMonX'.
- Integration Options:**
 - PRTG Integration
 - InfluxDB Integration

At the bottom center of the configuration area is a blue 'Update' button. The footer of the window displays 'All Rights Reserved © AutoMonX Ltd 2023 - V1.17.4' on the left and 'Back' and 'Next' buttons on the right.

6 Cisco ACI Sensor Pack Configuration

6.1 Preparing for Configuring the AutoMonX Cisco ACI Sensor Pack

The AutoMonX Cisco ACI Sensor Pack connects to the APIC server via API, that must at least have read permissions. You need to obtain the following information for the AutoMonX Cisco ACI Sensor Pack to properly function:

- APIC IP(s)
- APIC username
- APIC password
- A name identifying the APIC cluster(s) you want to monitor

Make sure there is a working connection between the monitoring server and the APIC. Update the IPs, the name of the cluster and the username in the file APIC_info.json. The password will be safely stored in an encrypted credentials file.

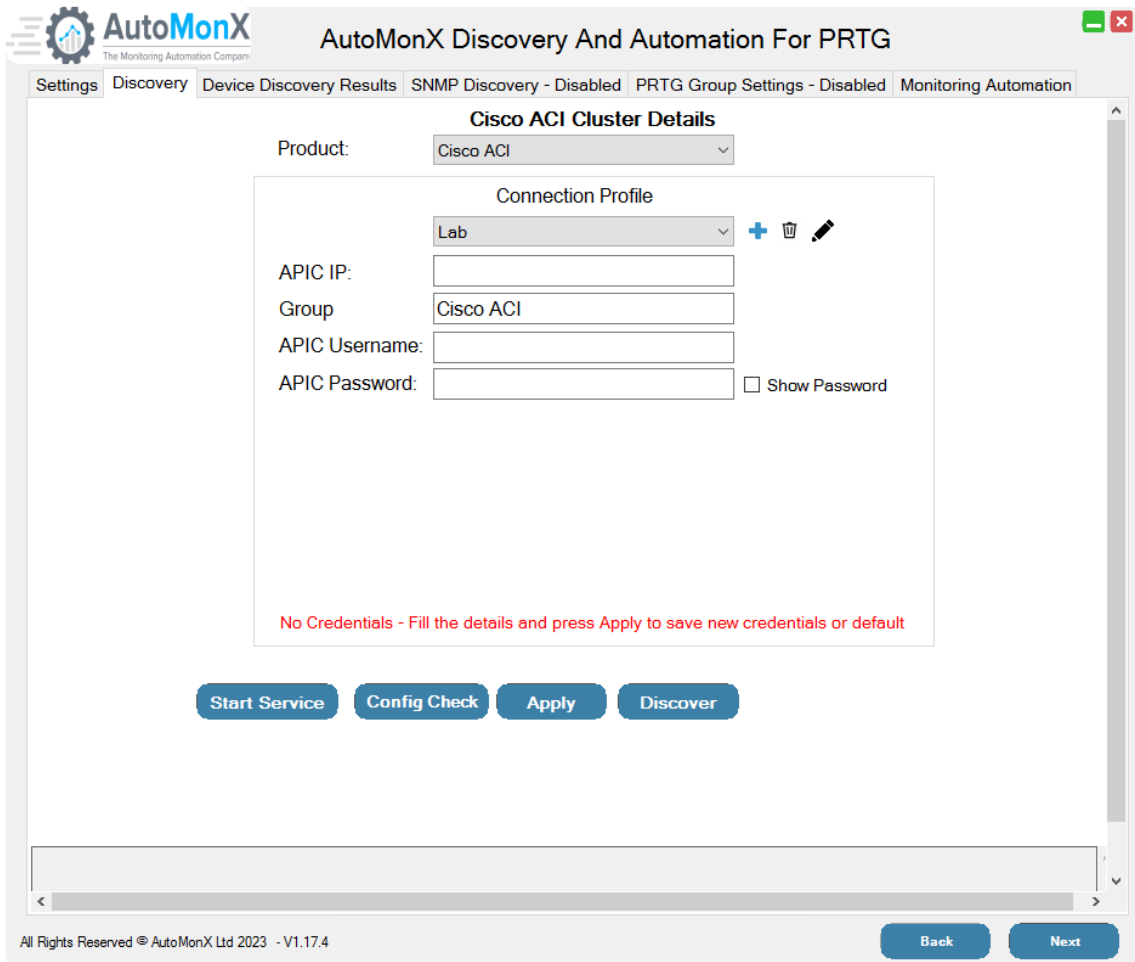
Right click the file “Update credentials.cmd” and select Run as Administrator. Enter the same cluster name, username, and password. This will create a credentials file in the Creds folder for each cluster. If successful, you will see: “Login to APIC status: successful.”

Note: The Cisco ACI Sensor Pack is backward compatible and will be able to read the Cisco ACI connection details from their previous location.

You need to configure the APIC infrastructure to collect flows and latency statistics as explained in [section 11](#) in order to see Flows and Latency information in the Grafana dashboards of the Cisco ACI Sensor Pack

6.2 Configuring APIC server connection

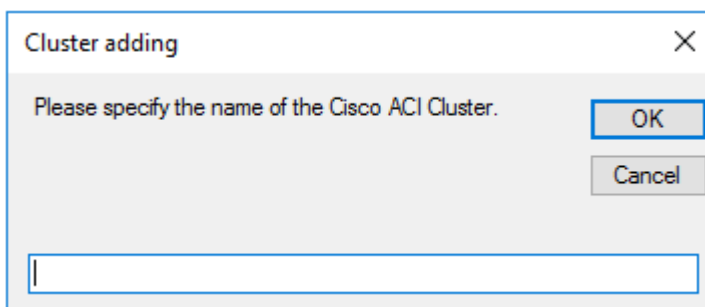
Here you will configure the connection to the APIC server. Press the + button to create your first Cluster. Give it a unique name.



The screenshot shows the 'Cisco ACI Cluster Details' configuration window. At the top, there are navigation tabs: Settings, Discovery, Device Discovery Results, SNMP Discovery - Disabled, PRTG Group Settings - Disabled, and Monitoring Automation. The main content area is titled 'Cisco ACI Cluster Details' and contains the following fields:

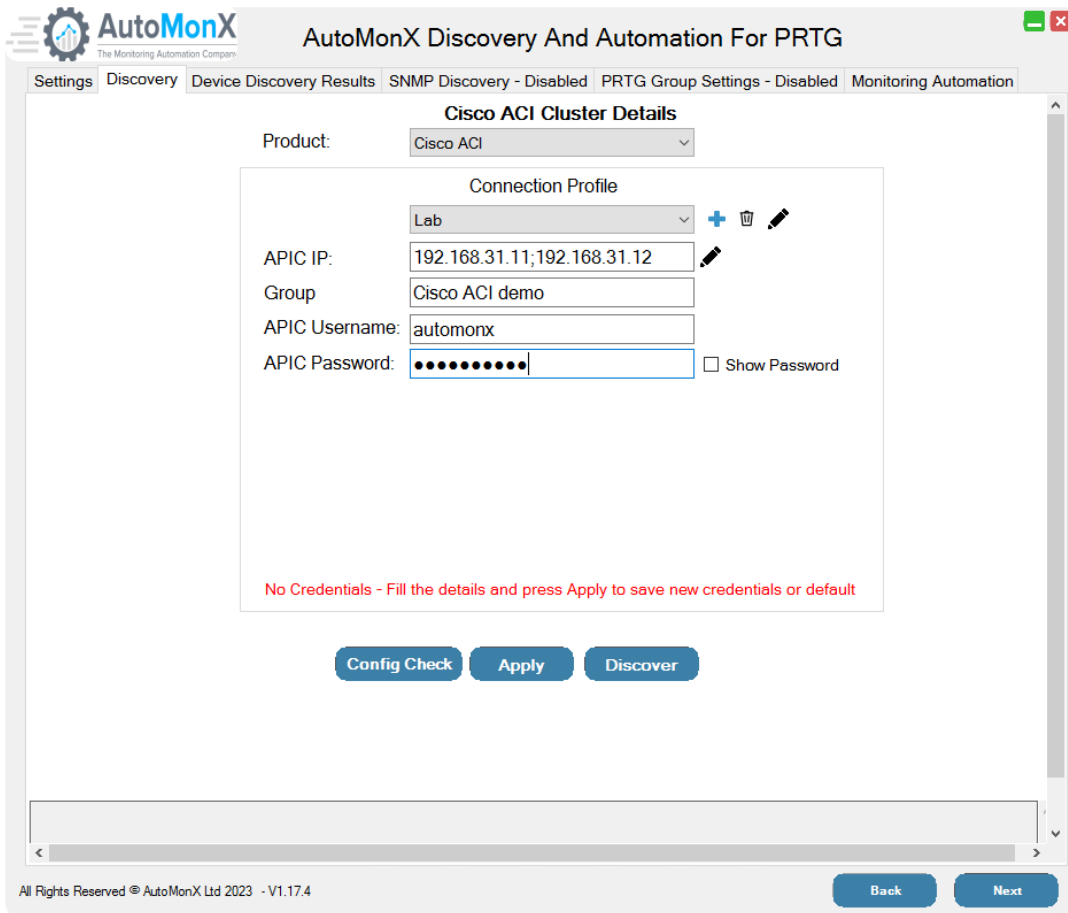
- Product:** A dropdown menu set to 'Cisco ACI'.
- Connection Profile:** A section containing:
 - A dropdown menu set to 'Lab' with a '+' button to add a new profile, a trash icon to delete, and an edit icon.
 - APIC IP:** An empty text input field.
 - Group:** A text input field containing 'Cisco ACI'.
 - APIC Username:** An empty text input field.
 - APIC Password:** An empty text input field with a 'Show Password' checkbox to its right.

Below the fields, a red message reads: 'No Credentials - Fill the details and press Apply to save new credentials or default'. At the bottom of the main area are four buttons: 'Start Service', 'Config Check', 'Apply', and 'Discover'. The footer of the window shows 'All Rights Reserved © AutoMonX Ltd 2023 - V1.17.4' and 'Back' and 'Next' buttons.



The 'Cluster adding' dialog box has a title bar with a close button (X). The main text reads: 'Please specify the name of the Cisco ACI Cluster.' Below this text is an empty text input field. To the right of the input field are two buttons: 'OK' and 'Cancel'.

Then enter the IP of each APIC server in this Cluster, separated by ; and the username and password for the APIC server. A read only user is enough.

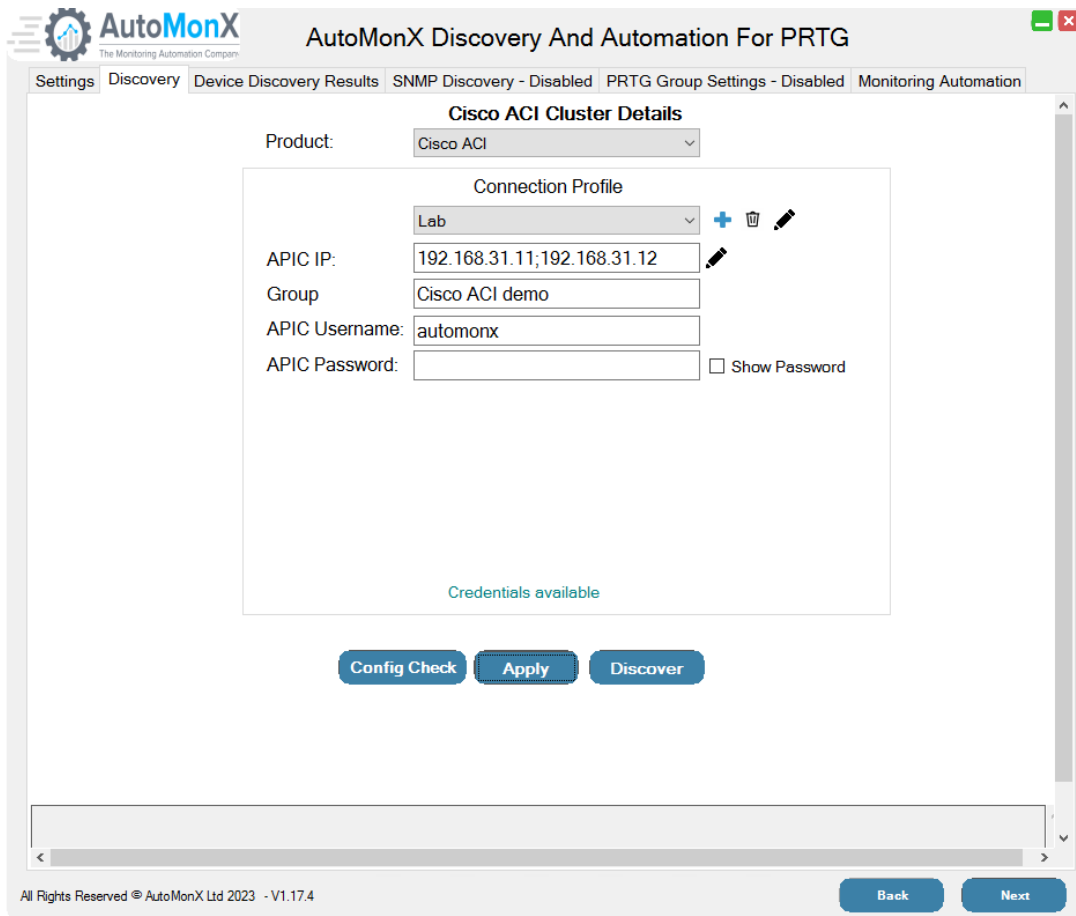


The screenshot shows the 'Cisco ACI Cluster Details' configuration window in the AutoMonX software. The window title is 'AutoMonX Discovery And Automation For PRTG'. The main content area is titled 'Cisco ACI Cluster Details' and contains the following fields:

- Product: Cisco ACI (dropdown menu)
- Connection Profile: Lab (dropdown menu with +, trash, and edit icons)
- APIC IP: 192.168.31.11;192.168.31.12 (text input with edit icon)
- Group: Cisco ACI demo (text input)
- APIC Username: automonx (text input)
- APIC Password: [masked with dots] (password input with 'Show Password' checkbox)

Below the fields, there is a red error message: "No Credentials - Fill the details and press Apply to save new credentials or default". At the bottom of the form, there are three buttons: 'Config Check', 'Apply', and 'Discover'. The footer of the window contains the text 'All Rights Reserved © AutoMonX Ltd 2023 - V1.17.4' and two buttons: 'Back' and 'Next'.

Press Apply



AutoMonX Discovery And Automation For PRTG

Settings | Discovery | Device Discovery Results | SNMP Discovery - Disabled | PRTG Group Settings - Disabled | Monitoring Automation

Cisco ACI Cluster Details

Product: Cisco ACI

Connection Profile: Lab

APIC IP: 192.168.31.11;192.168.31.12

Group: Cisco ACI demo

APIC Username: automonx

APIC Password: Show Password


Credentials available

Config Check **Apply** **Discover**

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Back **Next**

Now press “Config Check” to make sure the information is correct.



AutoMonX
The Monitoring Automation Company

Configuration Check Results

Sensor directories structure - OK
 Sensor files exist - OK
 Running Result: OK
 Version: 2.2.7
 Automonx Service status: running
 Connection to InfluxDB status: successful.

Connecting to server: 192.168.31.11.
 Login to APIC status: successful.

Service Status: Service OK

Wrote report to file: //C:\Program Files (x86)\AutoMonX\Common
 \Report.html

Copy to ClipBoard **OK**

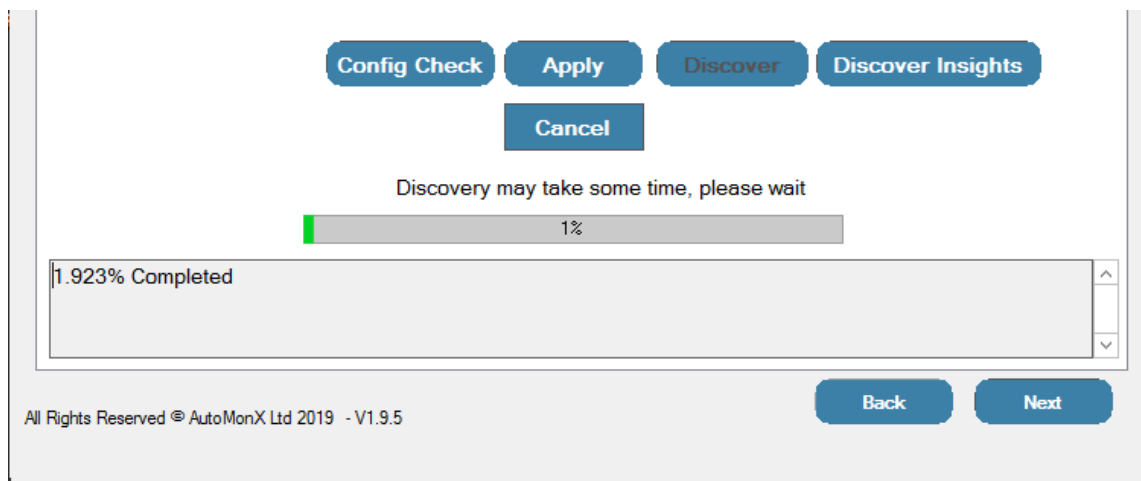
7 Discovering Cisco ACI Components

The AutoMonX Cisco ACI Sensor Pack needs to scan the Cisco ACI environment for any devices that it can monitor. In auto-discovery mode, the Sensor Pack will generate a list of all the Cisco ACI physical and logical components in your environment that it can monitor. Our monitoring automation would also provide you with the required configuration to fully monitor these components.

7.1 Starting Discovery with UI

Press the “Discover” button to start the Cisco ACI switches and metrics discovery. At this stage, the auto discovery will take place.

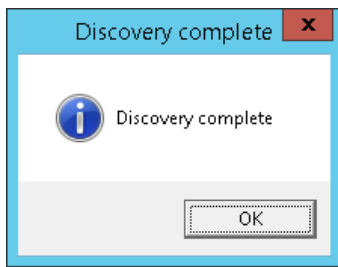
Note: Depending on the network connection, the APIC API response time and taking into account the size of your Cisco ACI environment, it will take a few minutes to complete.



You can cancel the discovery process while it is running by pressing the “Cancel” button.

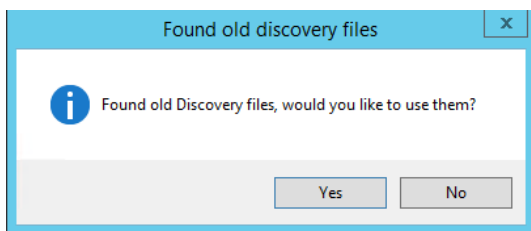
The discovery process can take some time, follow-up the progress by checking the message area at the bottom of the screen.

When auto-discovery has completed, the following window will pop-up. Now you can move to the next tab and examine the discovery results.

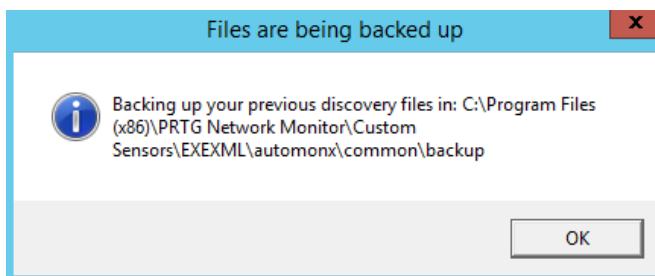


7.2 Previous Discovery Results handling

In cases there are previous auto-discovery results, the UI will offer to use them instead of re-discovering again the Cisco ACI environment, which can be time consuming.

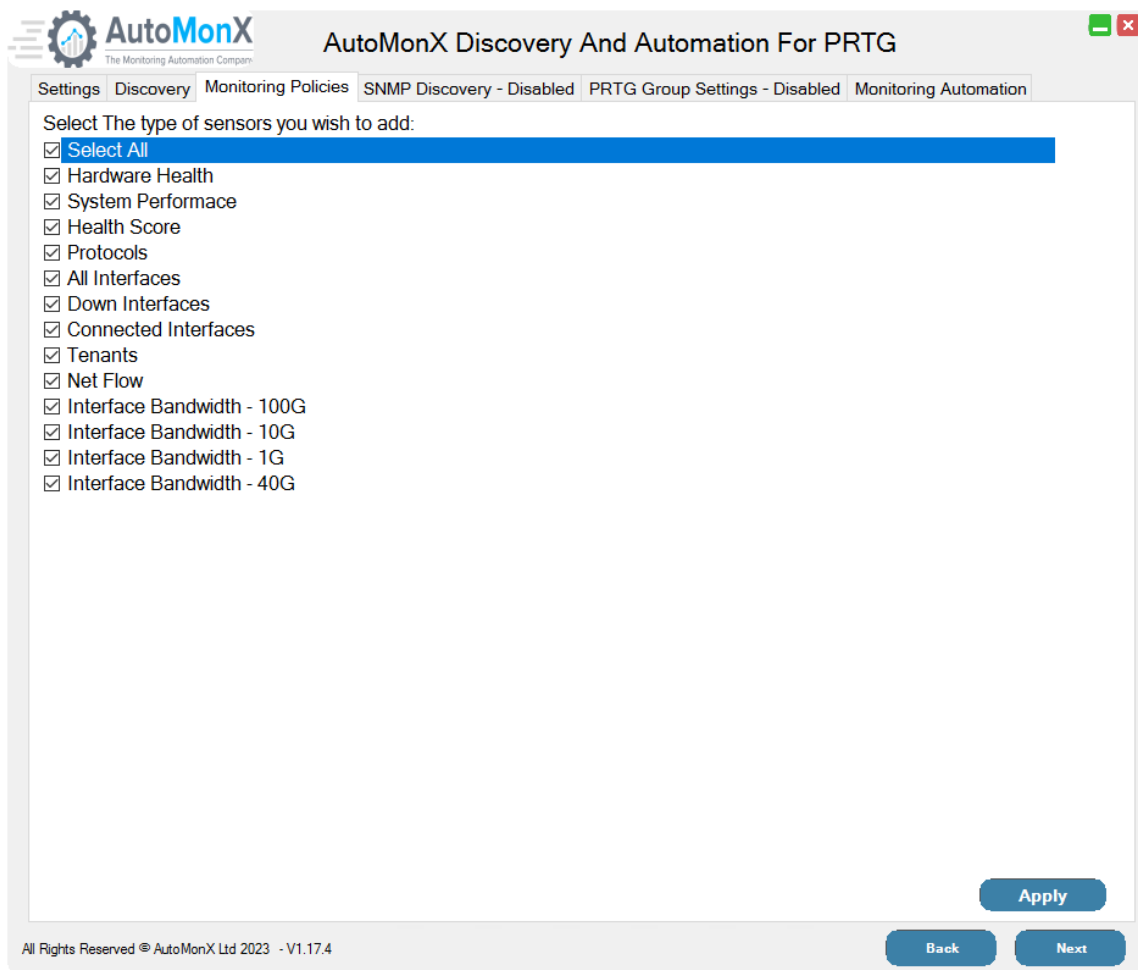


Before starting auto-discovery, the UI will backup any previous discovery results and pop-up the following window:



7.3 Selecting the monitoring policies

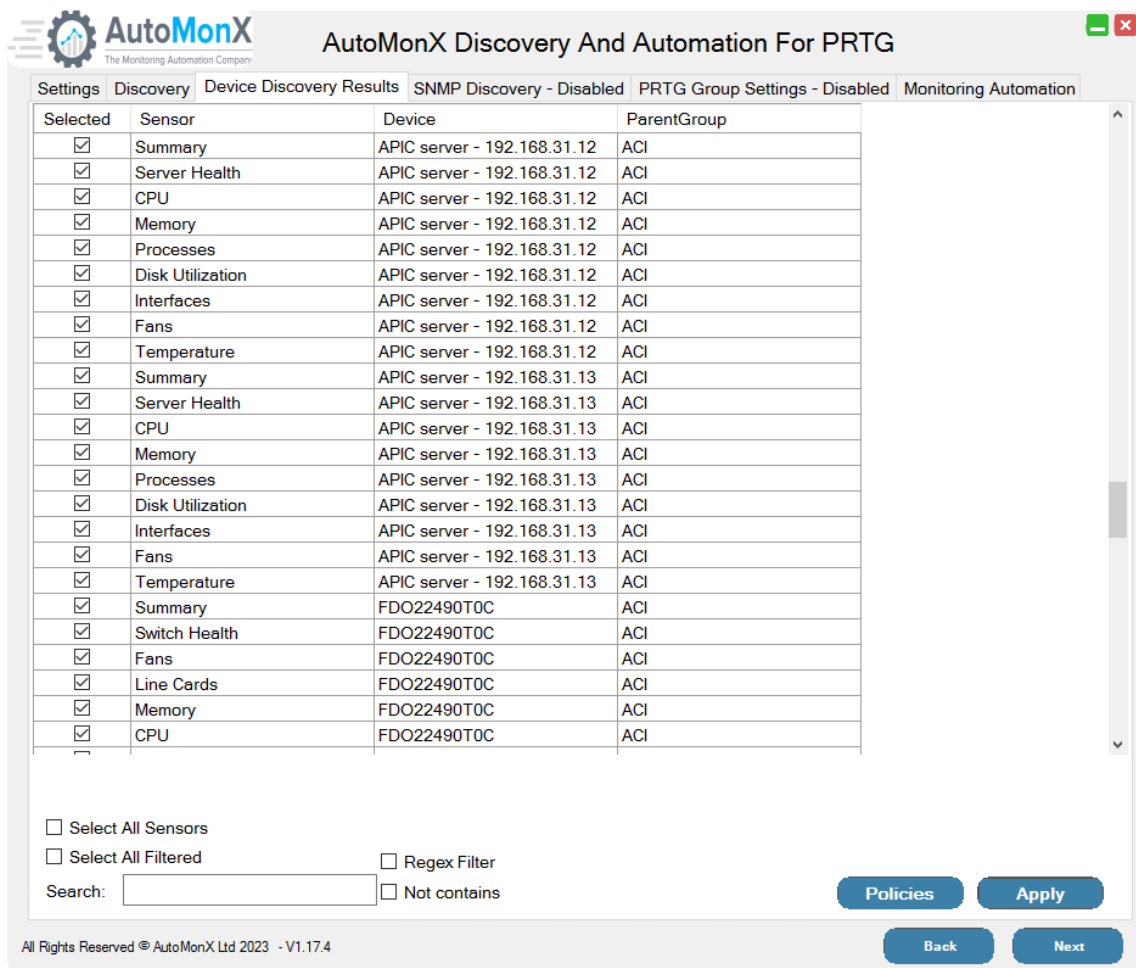
After the discovery is complete, the following page will show. Choose the relevant sensors you wish to monitor for them to be automatically marked for you. You can also perform it in the next step.



Press Apply once you are done.

7.4 Selecting Cisco ACI Sensors for Monitoring

Press “Next” to move to the next tab. All the discovered Cisco ACI sensors would be presented:

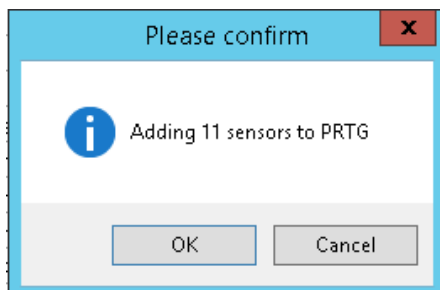


The screenshot shows the 'AutoMonX Discovery And Automation For PRTG' window. It features a table with columns for 'Selected', 'Sensor', 'Device', and 'ParentGroup'. The table lists various sensors for three different devices: two APIC servers (192.168.31.12 and 192.168.31.13) and one FDO22490T0C switch. All sensors in the table have their 'Selected' checkboxes checked. Below the table, there are options to 'Select All Sensors', 'Select All Filtered', and a 'Search' input field. There are also checkboxes for 'Regex Filter' and 'Not contains'. At the bottom right, there are 'Policies', 'Apply', 'Back', and 'Next' buttons.

Selected	Sensor	Device	ParentGroup
<input checked="" type="checkbox"/>	Summary	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Server Health	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	CPU	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Memory	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Processes	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Disk Utilization	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Interfaces	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Fans	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Temperature	APIC server - 192.168.31.12	ACI
<input checked="" type="checkbox"/>	Summary	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Server Health	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	CPU	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Memory	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Processes	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Disk Utilization	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Interfaces	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Fans	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Temperature	APIC server - 192.168.31.13	ACI
<input checked="" type="checkbox"/>	Summary	FDO22490T0C	ACI
<input checked="" type="checkbox"/>	Switch Health	FDO22490T0C	ACI
<input checked="" type="checkbox"/>	Fans	FDO22490T0C	ACI
<input checked="" type="checkbox"/>	Line Cards	FDO22490T0C	ACI
<input checked="" type="checkbox"/>	Memory	FDO22490T0C	ACI
<input checked="" type="checkbox"/>	CPU	FDO22490T0C	ACI

Select the sensors you want to add to monitoring by clicking on the relevant checkbox on the left side of the table. You can also click on “Select All” to mark all the sensors. There is also an option to filter only certain sensors by using the Search window.

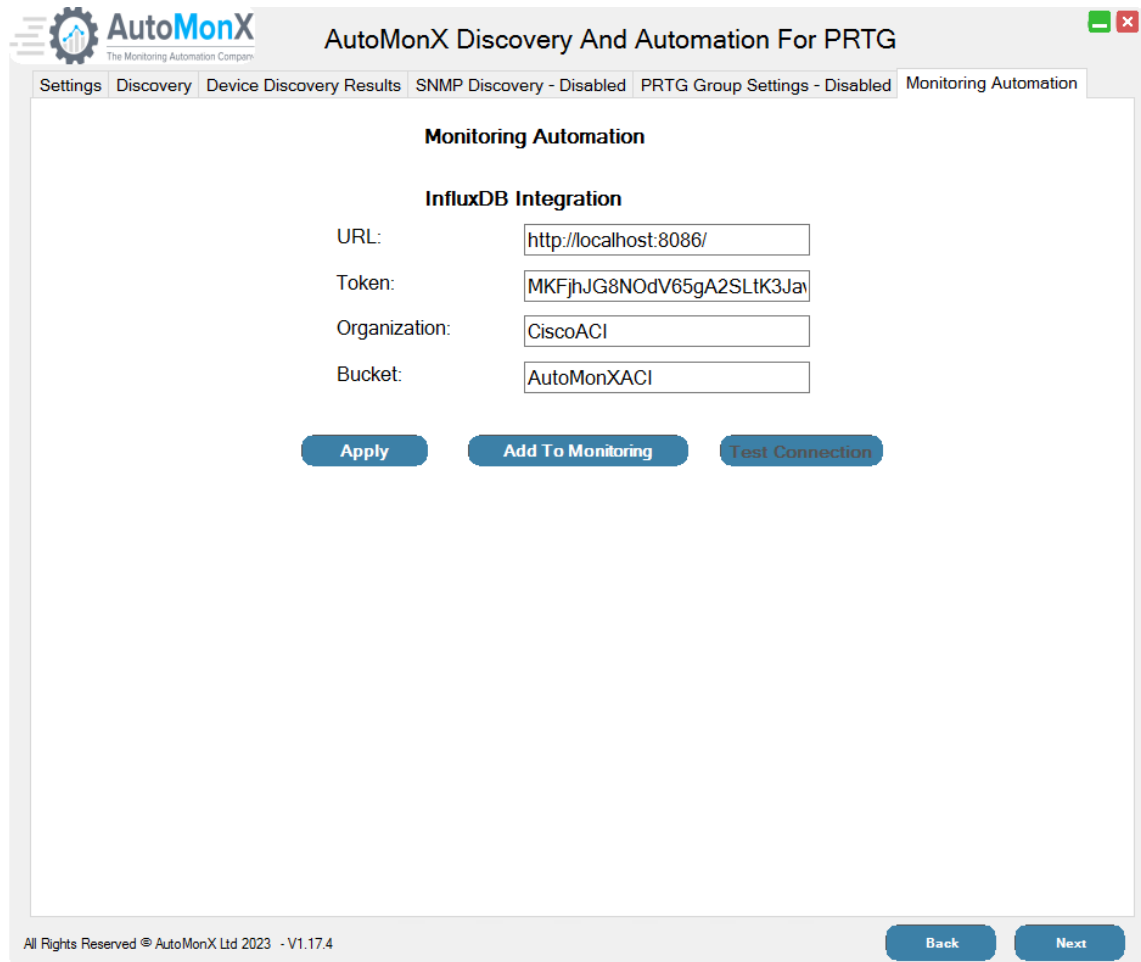
Click “Apply” to save your settings. A confirmation window will pop-up. Click “OK” to confirm or “Cancel”.



Press “Next” to proceed.

7.5 Setting the Influx connection Settings

This tab shows your InfluxDB server information, as configured during the installation process. Make sure it is correct and check it by pressing “Test Connection”.



The screenshot shows the AutoMonX web interface for PRTG. The main content area is titled "Monitoring Automation" and contains an "InfluxDB Integration" section. This section has four input fields: "URL" (http://localhost:8086/), "Token" (MKFjhJG8NOdV65gA2SLtK3Ja), "Organization" (CiscoACI), and "Bucket" (AutoMonXACI). Below the fields are three buttons: "Apply", "Add To Monitoring", and "Test Connection". At the bottom of the interface, there are "Back" and "Next" buttons and a copyright notice: "All Rights Reserved © AutoMonX Ltd 2023 - V1.17.4".

7.6 Cisco ACI Discovery Results


Running the discovery command generates files in the folder AutoMonX/Backend/QueueScheduler. Every file represents a resource to monitor in each device. You can delete a file to stop monitoring a specific resource, and later re-add it by running the discovery process. It is important not to delete any files that contain “Summary”.

8 Upgrade Instructions

If you are required to upgrade an existing installation of the AutoMonX Cisco ACI Sensor Pack, please follow the steps below.

Using the Azure sensor pack Installer is highly recommended. The installer automatically upgrades all the Sensor pack files. Automatic upgrade to the latest version is supported starting from version 4.0.17 of the Azure Sensor pack.

- Download the latest Azure Sensor Installer from <https://www.automonx.com/downloads>
- For PRTG integration only - Make sure to pause the Azure root group in PRTG.
- For PRTG integration only - Add the PRTG passhash to the configuration file (To smoothly update the lookup files. You may delete this later). For example:

 AutoMonX_PRTG_Automation.ini - Notepad

File Edit Format View Help

```
FIRST_CHECK_TIMEOUT=15  
SECOND_CHECK_TIMEOUT=5
```

```
[Connections]  
PRTG_USER=prtgadmin  
PRTG_SERVER=127.0.0.1  
PRTG_PORT=443  
HTTPS_CONNECTION=1  
PRTG_PASSHASH=4224444444
```

- Make a backup of the entire AutoMonX folder.
- Start the installer and follow the instructions.

Welcome to the AutoMonX Cisco ACI Sensor Pack Setup Wizard

The installer will install AutoMonX Cisco ACI Sensor Pack version 2.2.4.0 on your computer.

Please verify that PRTG Core or PRTG Probe are installed before running the installation

Click Next to continue, or Cancel to exit Setup.



Select the programs to install. If you already have InfluxDB and Grafana installed, they will not appear on the installation page.

Select Components

Which components should be installed?



Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.

Full installation

- AutoMonX ACI Monitor Pack
- OpenSSL (Required For Grafana SSLHTTPS)
- PRTG Integration

Current selection requires at least 428.0 MB of disk space.

Back

Next

Cancel

Select Additional Tasks

Which additional tasks should be performed?



Select the additional tasks you would like Setup to perform while installing AutoMonX Cisco ACI Sensor Pack, then click Next.

Additional shortcuts:

- Create desktop icon to the UI for AutoMonX Cisco ACI Sensor Pack

Back

Next

Cancel

Setup - AutoMonX Cisco ACI Sensor Pack

— □ ×

Ready to Install

Setup is now ready to begin installing AutoMonX Cisco ACI Sensor Pack on your computer.



Click Install to continue with the installation, or click Back if you want to review or change any settings.

Setup type:
Full installation

Selected components:
AutoMonX ACI Monitor Pack

Additional tasks:
Additional shortcuts:
Create desktop icon to the UI for AutoMonX Cisco ACI Sensor Pack

Back

Install

Cancel

Setup - AutoMonX Cisco ACI Sensor Pack

— □ ×

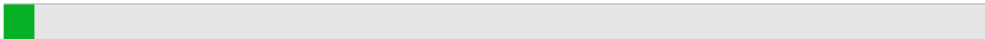
Installing

Please wait while Setup installs AutoMonX Cisco ACI Sensor Pack on your computer.



Extracting files...

C:\Program Files (x86)\AutoMonX\Backend\Automonx_Backend_Service.ini



Cancel

AutoMonX Cisco ACI Sensor Pack installation conclusion



Thank you for installing the AutoMonX Cisco ACI Sensor Pack

Sensor pack files copied	<input type="checkbox"/>
Service installation	<input type="checkbox"/>
Reload Lookup Files in PRTG	<input type="checkbox"/>

Details required for evaluation license request:

The host name for the machine is: '3ifWN3aTFq'.
The IP address for the machine is: '5.100.253.53'
The MAC address for this machine is: '00-50-56-11-06-65'.

Contact us to get the evaluation license via
automonx.com Or mail sales@automonx.com.

Next

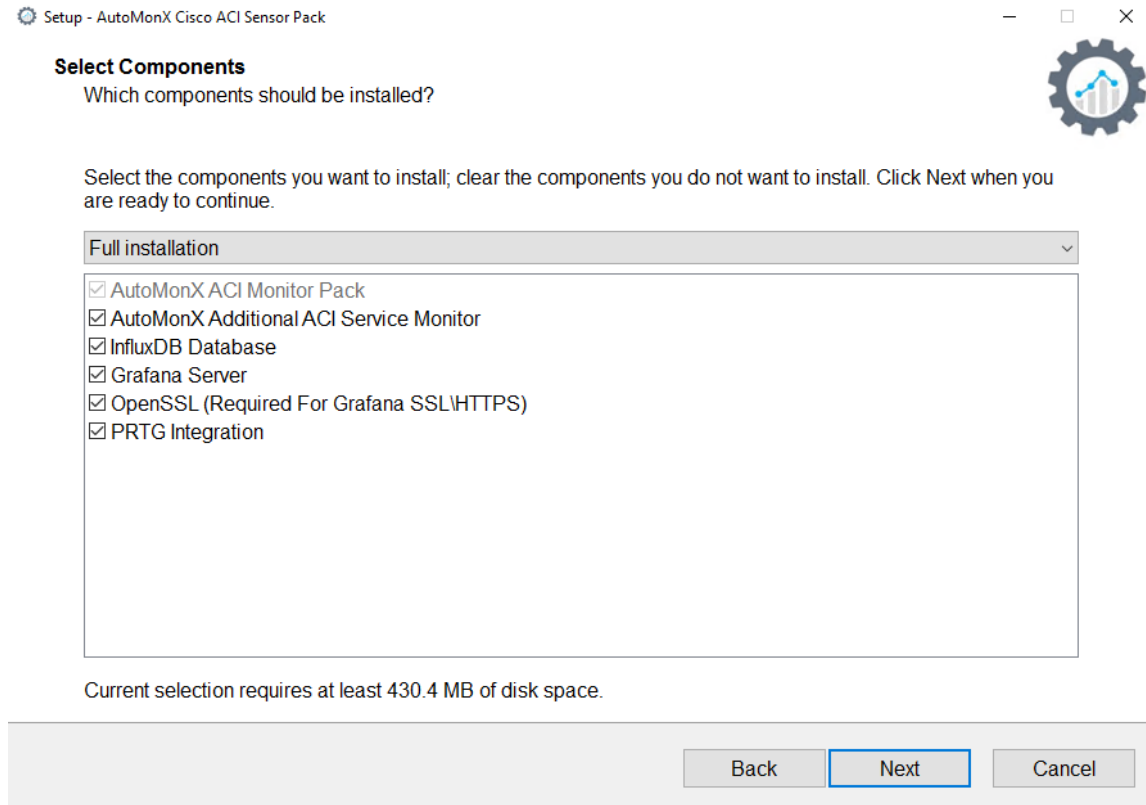
- For PRTG integration only - Resume the sensors in PRTG.

9 PRTG Integration

Skip this chapter if you do not have PRTG installed.

9.1 Installation

Make sure to check the PRTG Integration option during installation.



Setup - AutoMonX Cisco ACI Sensor Pack

Select Components
Which components should be installed?

Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.

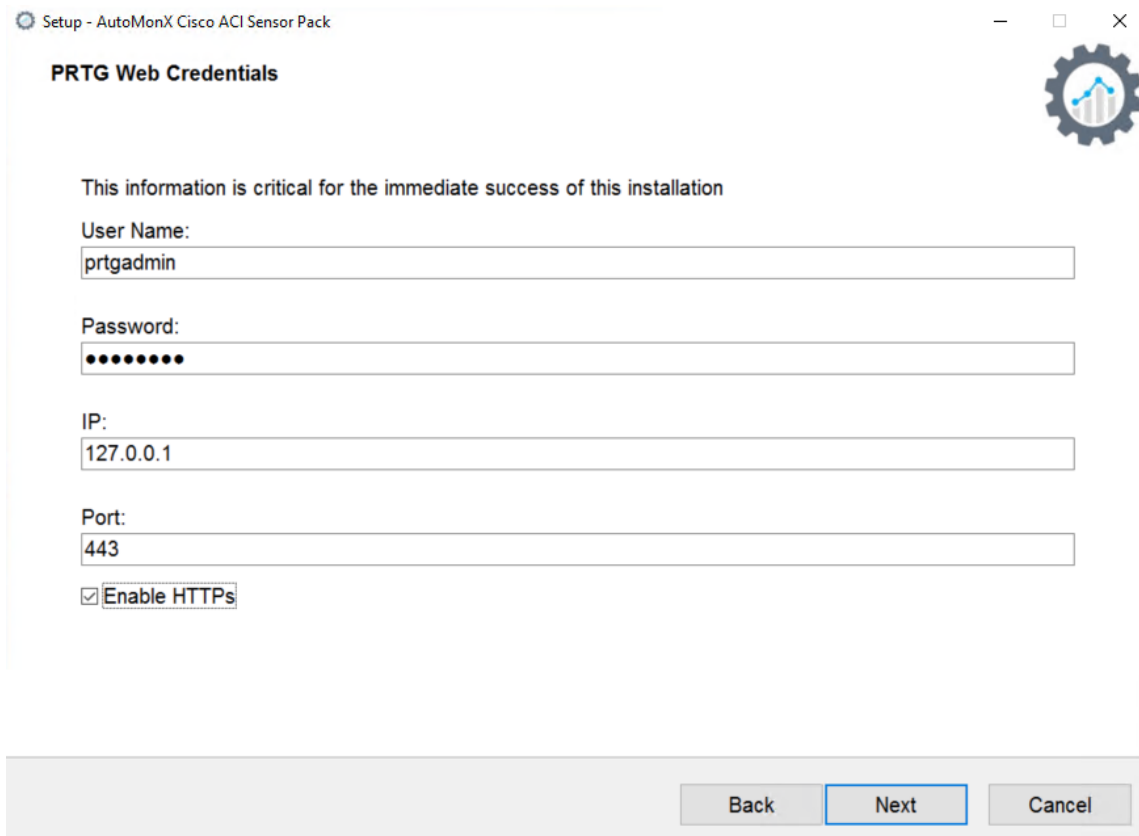
Full installation

- AutoMonX ACI Monitor Pack
- AutoMonX Additional ACI Service Monitor
- InfluxDB Database
- Grafana Server
- OpenSSL (Required For Grafana SSLHTTPS)
- PRTG Integration

Current selection requires at least 430.4 MB of disk space.

Back Next Cancel

Update the connection information to your PRTG Server.



Setup - AutoMonX Cisco ACI Sensor Pack

PRTG Web Credentials

This information is critical for the immediate success of this installation

User Name:
prtgadmin

Password:
●●●●●●

IP:
127.0.0.1

Port:
443

Enable HTTPs

Back Next Cancel

Rest of the installation process is the same as described in [section 5](#).


9.2 Auto Discovery

The AutoMonX Cisco ACI Sensor Pack needs to scan the Cisco ACI environment for any devices that it can monitor. In discovery mode, the Sensor Pack will generate a list of all the Cisco ACI devices in your environment that it can monitor, and then add them to your PRTG server.

The discovery with PRTG integration is very similar to the discovery described in [section 7](#), except for an additional section.

The PRTG Group Settings window provides you with the option to change the scanning intervals of the sensors under the Azure PRTG group. By default, the sensors are added with a 300 second interval (5 minutes). You can tick on the “inherit” checkbox to add the sensors in the Cisco ACI groups with the PRTG interval inherit system. More information can be seen at the bottom of the window.


This is an optional setting. Use the “Next” button to move to the next tab



AutoMonX Discovery And Automation For PRTG

Settings | Discovery | PRTG Group Settings | PRTG Group Settings | Add sensors to PRTG

Name	Subscription	Inherit	Scanning Interval
Default	test - Sub	<input type="checkbox"/>	300

 Here you can define the scanning interval of PRTG devices that are part of a certain group. Choose "Inherit" if you want the group to take the scanning settings from an upper-level group. All the values are in Seconds. Values must be one of the following: 30, 60, 300, 600, 1800, 3600, 21600, 86400.

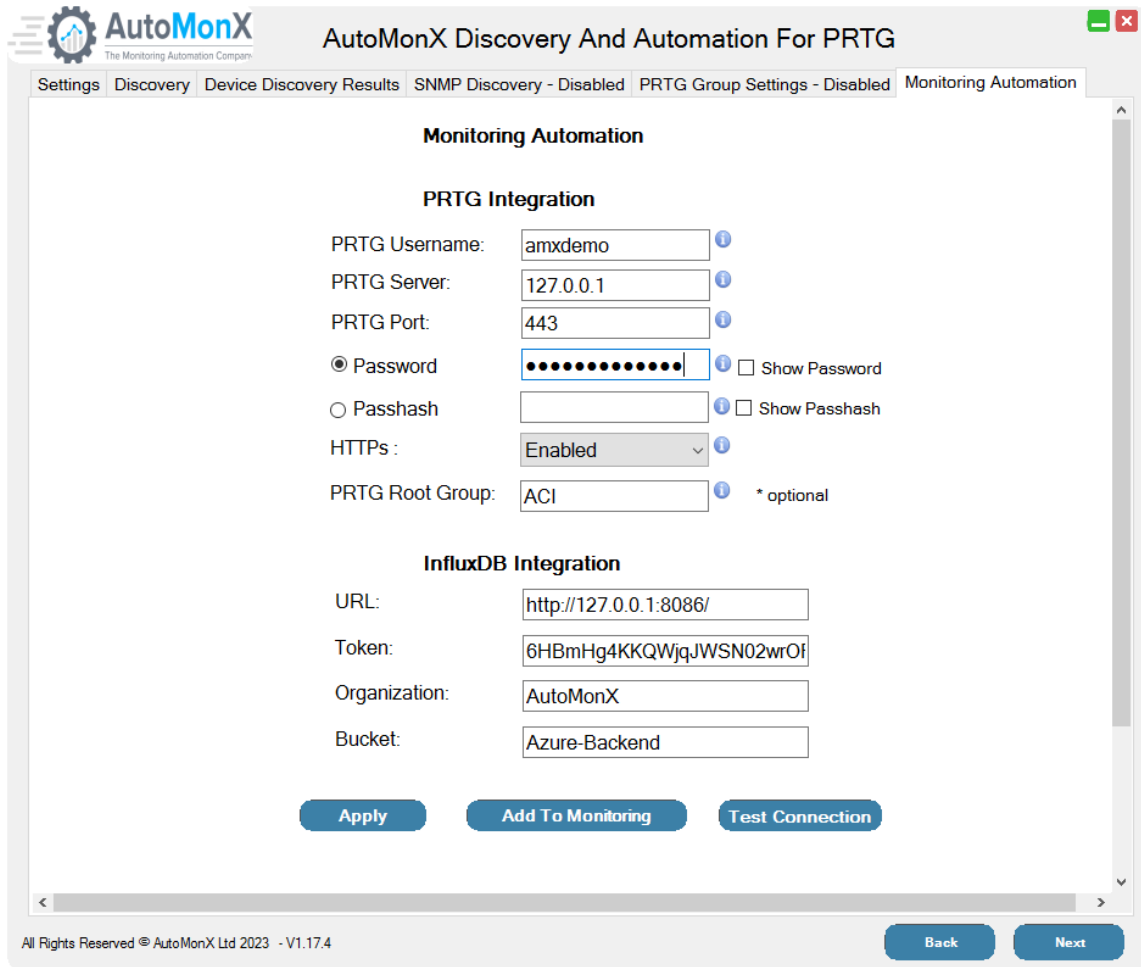
Apply

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Back Next

9.3 Adding the Sensors to PRTG

When all desired sensors have been chosen, the last tab will show the PRTG information. Make sure again that everything is correct and update the password or passhash. You can also “Test Connection” to both PRTG and InfluxDB. Press “Add to Monitoring” to start pushing the sensors to PRTG.



The screenshot shows the 'AutoMonX Discovery And Automation For PRTG' configuration window. It features a breadcrumb trail: Settings > Discovery > Device Discovery Results > SNMP Discovery - Disabled > PRTG Group Settings - Disabled > Monitoring Automation. The main content is titled 'Monitoring Automation' and is divided into two sections: 'PRTG Integration' and 'InfluxDB Integration'. The PRTG section includes fields for Username (amxdemo), Server (127.0.0.1), Port (443), Password (masked with dots), Passhash (empty), HTTPs (Enabled), and Root Group (ACI). The InfluxDB section includes fields for URL (http://127.0.0.1:8086/), Token (6HBmHg4KKQWjqJWSN02wrOf), Organization (AutoMonX), and Bucket (Azure-Backend). At the bottom of the form are three buttons: 'Apply', 'Add To Monitoring', and 'Test Connection'. A footer contains the text 'All Rights Reserved © AutoMonX Ltd 2023 - V1.17.4' and 'Back' and 'Next' buttons.

Monitoring Automation

PRTG Integration

PRTG Username:

PRTG Server:

PRTG Port:

Password Show Password

Passhash Show Passhash

HTTPs :

PRTG Root Group: * optional

InfluxDB Integration

URL:

Token:

Organization:

Bucket:

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10 Grafana Dashboards Overview

The AutoMonX Cisco ACI Monitor Pack has multiple pre-built dashboards that provide various useful information that can be used to troubleshoot your Cisco ACI deployment.

- Cisco ACI Fabric by AutoMonX
- Fabric Overview
- Cisco ACI Device Perf
- Cisco ACI APIC Perf
- Cisco ACI Fex Perf
- Fabric Troubleshooting
- TCAM and EPG Utilization
- Top Interfaces
- APIC Logs
- Self-Monitoring Dashboard - AutoMonX

10.1 Cisco ACI Fabric by AutoMonX

This dashboard displays an overview of the Cisco ACI Cluster / Fabric with all the essential statistics and indicators. Clicking on one of the top 10 devices will take you to the individual device page.

- Fabric Overall Health – Average & History
- Average CPU Used (%)
- Average Memory Used (%)
- TCAM Used (%)
- EPGs Used (%)
- Total EPGs in Fabric
- Down Switches
- Up Switches
- Total Switches
- Top 10 Switches by Health Score
- Worst 10 Switches by Health Score
- Worst 20 Tenants
- Total Tenants in Fabric
- CDP Neighbors
- LLDP Neighbors



10.2 Fabric Overview

This dashboard provides a general view for all Clusters in your system. It is useful when multiple clusters are monitored by the Cisco ACI Monitor Pack

- Cluster Health – Average & History



10.3 Cisco ACI Device Performance

This dashboard shows deep dive device performance metrics for Cisco Leaf and Spine switches.

- Health Score – Average & History
- Average CPU Used (%) – Average & History
- Average Memory Used (%) – Average & History
- Interface Status – Proportion & List
- Top Interfaces Utilization (%) – List & History
- EPGs – Count, Usage & History
- TCAM – Count, Usage & History
- Temperature (C) – Average & History
- Average Fan Speen (rpm) – Average & History
- Physical Components Status (Fans, PSUs, and Line Cards)
- CDP Neighbors
- LLDP Neighbors
- OSPF Neighbors
- OSPF Routes
- Rule Count
- Top Talkers (%)
- Average Latency (ms)
- Top Protocols (%)





10.4 Cisco ACI APIC Performance

APIC server complete performance.

- Health Score – Average & History
- Average CPU Used (%) – Average & History
- Average Memory Used (%) – Average & History
- Interface Status – Proportion & List
- Storage Utilization (%) – List & History
- Processes Status – List
- Temperature (C) – Average & History
- Physical Components Status (Fans, PSUs)
- Average Fan Speed (rpm) – Average & History



10.5 Cisco ACI Fex Performance

For environments with external chassis, this dashboard provides a separate look into Fex performance.

- Health Score – Average & History
- Interface Status – Proportion & List
- Top Interfaces Utilization (%) – List & History
- Power Supplies Status
- Fans Status
- Temperature (C) – Average & History



10.6 Fabric Troubleshooting

Monitor the top talkers and protocols in your environment and the latency between Cisco ACI switches.

- Top Talkers (%)
- Top Protocols (%)
- Worst 10 Leaf Pairs by Latency (ms)



10.7 TCAM and EPG Utilization

Fabric view of EPG and TCAM utilization, EPG bandwidth utilization and hits by Contract.

- Top 10 Switches by EPGs number – List & History
- Top 10 Switches by TCAM Policy Rules – List & History
- EPGs Ingress Bandwidth consumption (Packets per sec) – List & History
- EPGs Egress Bandwidth consumption (Packets per sec) – List & History
- Top 10 Contracts by Hits – List & History
- Total EPGs in Fabric History



10.8 Top Interfaces

Top 10 interfaces with errors and high utilization with easy link to device dashboard.

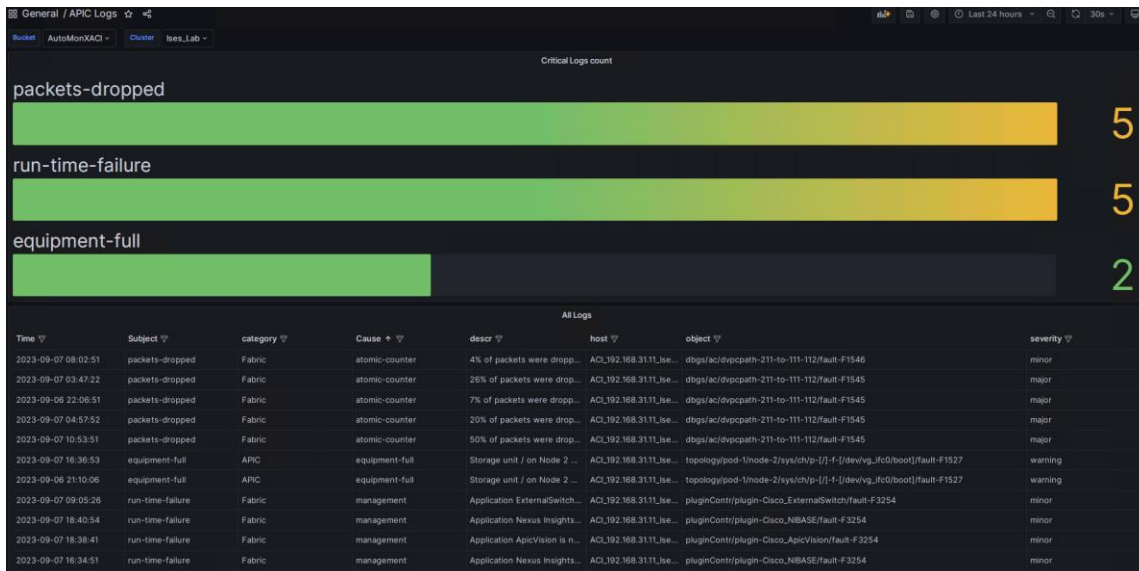
- Worst 10 Interfaces by Receive Utilization – List & History
- Worst 10 Interfaces by Transmit Utilization – List & History
- Worst 10 Interfaces by Drops – List & History
- Worst 10 Interfaces by Faults – List & History



10.9 APIC Logs

Complete list of the APIC logs, easily filtered by different fields.

- Critical Logs count
- All Logs



10.10 Self-Monitoring Dashboard - AutoMonX

This dashboard shows various health metrics of the AutoMonX Cisco ACI Sensor pack such as:

- License Days Left
- Maintenance Days Left
- Service Status
- InfluxDB Health
- APIC Health
- Metrics Sent to PRTG
- Metrics Sent to InfluxDB



11 The Cisco ACI Sensor Pack Command Line Options

Option	Details
-install	Installs the AutoMonX Backend Service. The service manages all Sensor Packs active in the server and handles the connection to the InfluxDB server.
-service	Activates the service
-cluster <Cluster_name>	Identifies the cluster to run other commands on. Must be used with most options
-config_check -username <user> -password <pass>	Checks the service communication to the Configured Cisco APIC server.
-discovery -all -discovery -tenant <Tenant1,Tenant2...>	Discovers all the physical and logical components of a Cisco ACI environment and creates a report in an HTML format. The report is AutoMonX_ACI_Report-<Sub Name>.html in the AutoMonX folder.
-discovery -up_int	Discovers only interfaces that are currently connected (up)
-username <user> -password <pass>	Updates the credentials for the specified cluster.
-version	Displays the program's version.
-help	Displays the command option list.

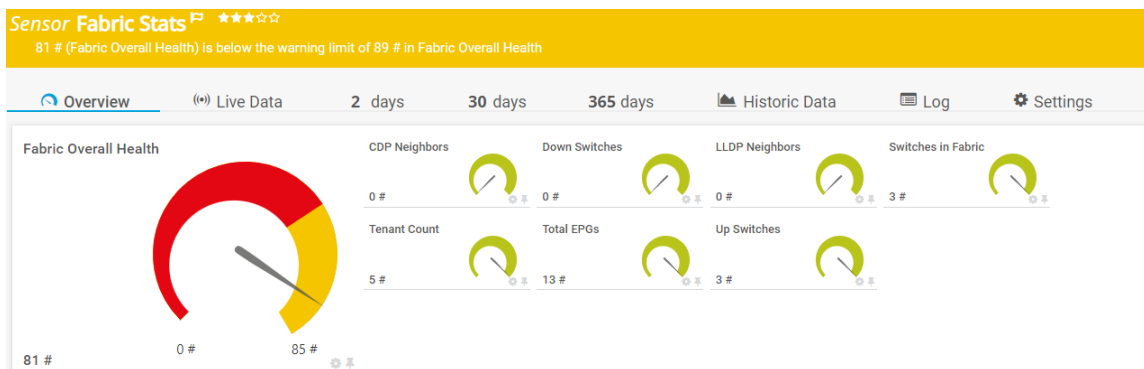
12 Supported Cisco ACI Components

The AutoMonX Cisco ACI Sensor Pack supports multiple resource types of the Cisco ACI infrastructure. Below is a detailed description of each resource and its context (APIC, Fabric or Device). Some of the monitored components are available in Grafana, PRTG or in both.

12.1 Fabric Statistics

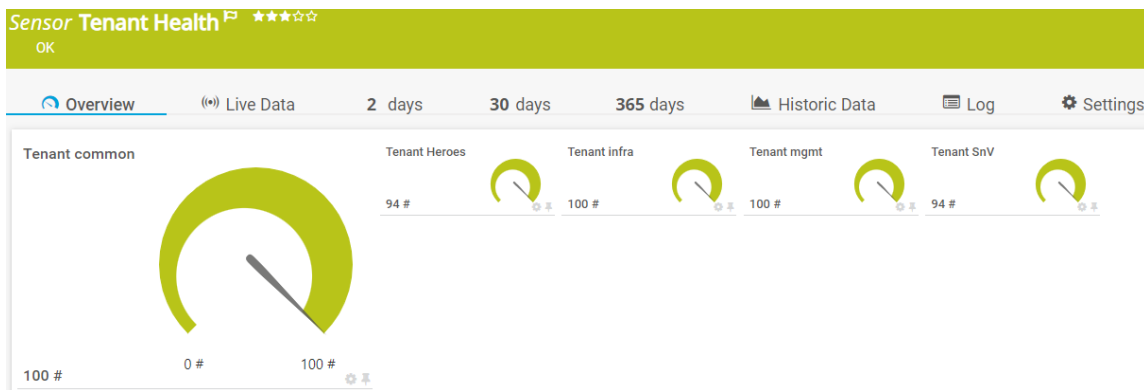
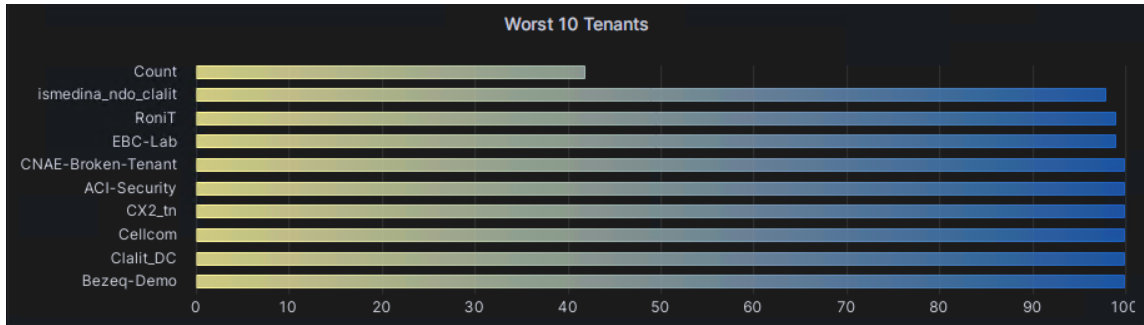
Supported in: Grafana, PRTG. Context: Entire Fabric.

The Cisco ACI Fabric Statistics resource collects data for the entire Cisco ACI fabric such as: Fabric general health score as calculated in the APIC server, Average CPU and Memory consumption, EPG and TCAM consumption, worst tenants, count of total CDP and LLDP neighbors in all devices, count of switches and tenants in fabric.



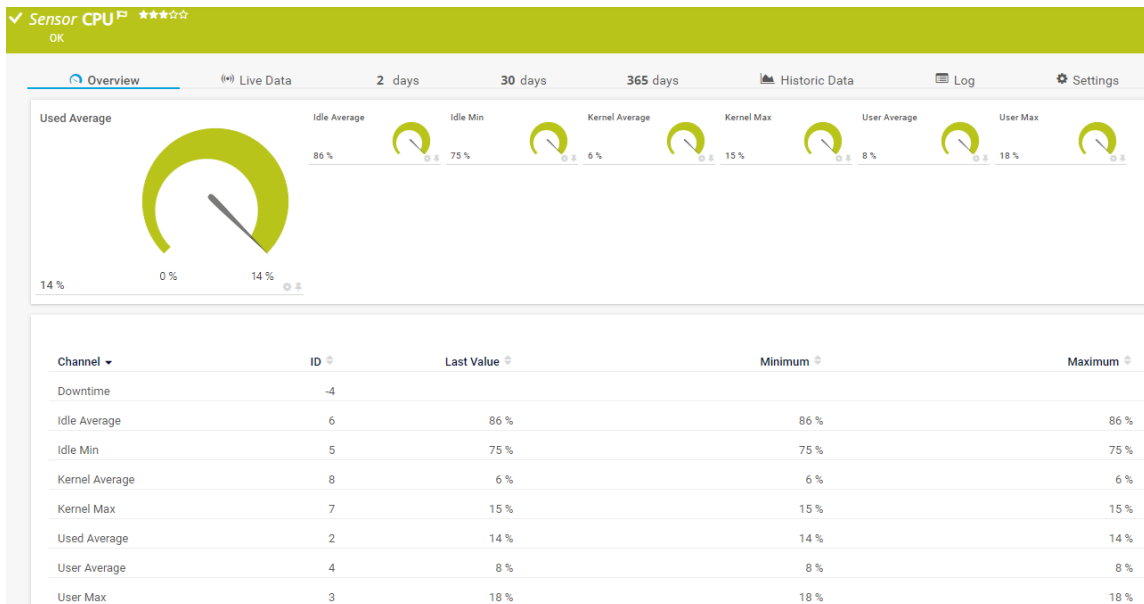
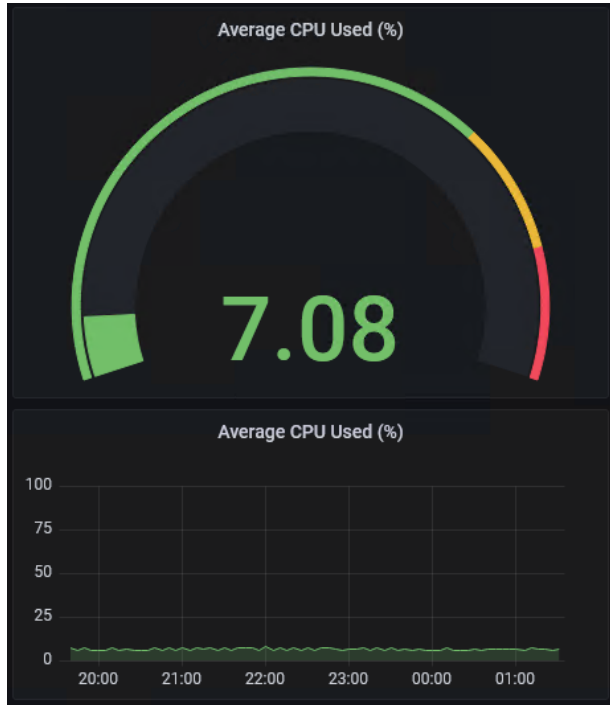
12.2 Tenants

Supported in: Grafana, PRTG. Context: Entire Fabric.
Tenant health score as calculated in the APIC server.



12.3 CPU

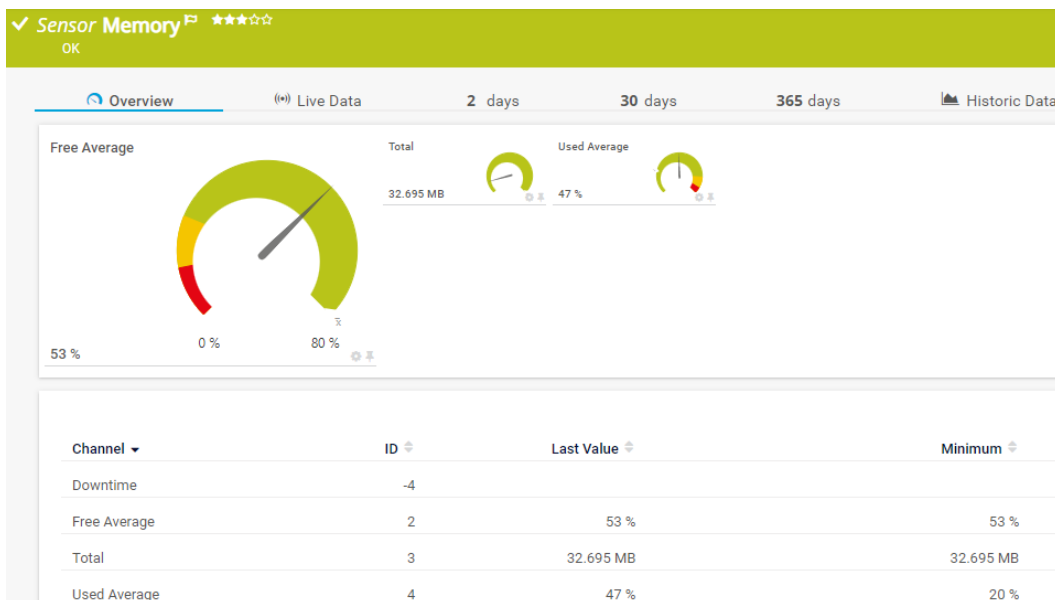
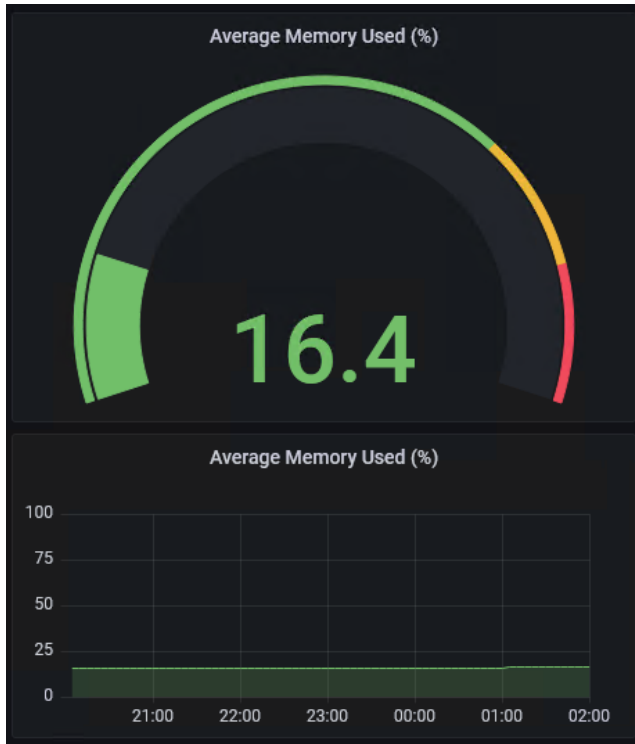
Supported in: Grafana, PRTG. Context: Device, APIC.
CPU stats for the device.



12.4 Memory

Supported in: Grafana, PRTG. Context: Device, APIC.

Shows the total memory in the device and how much is used.



12.5 Processes

Supported in: Grafana, PRTG. Context: APIC.

Operational status of each process present on the APIC server.

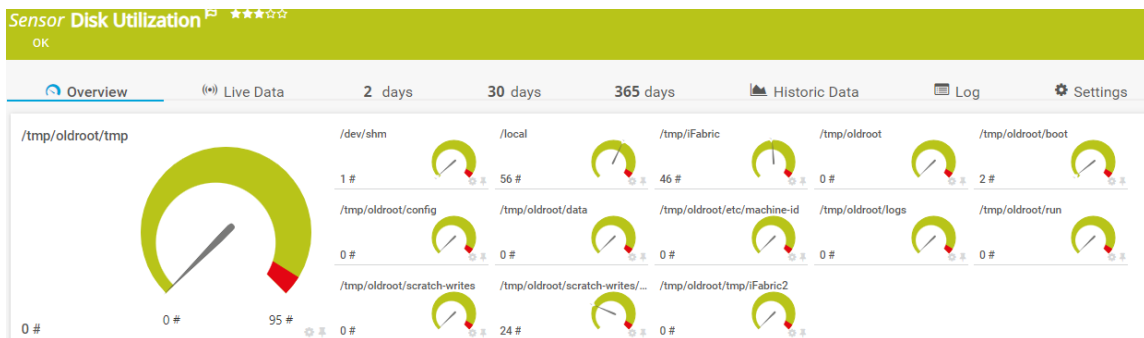
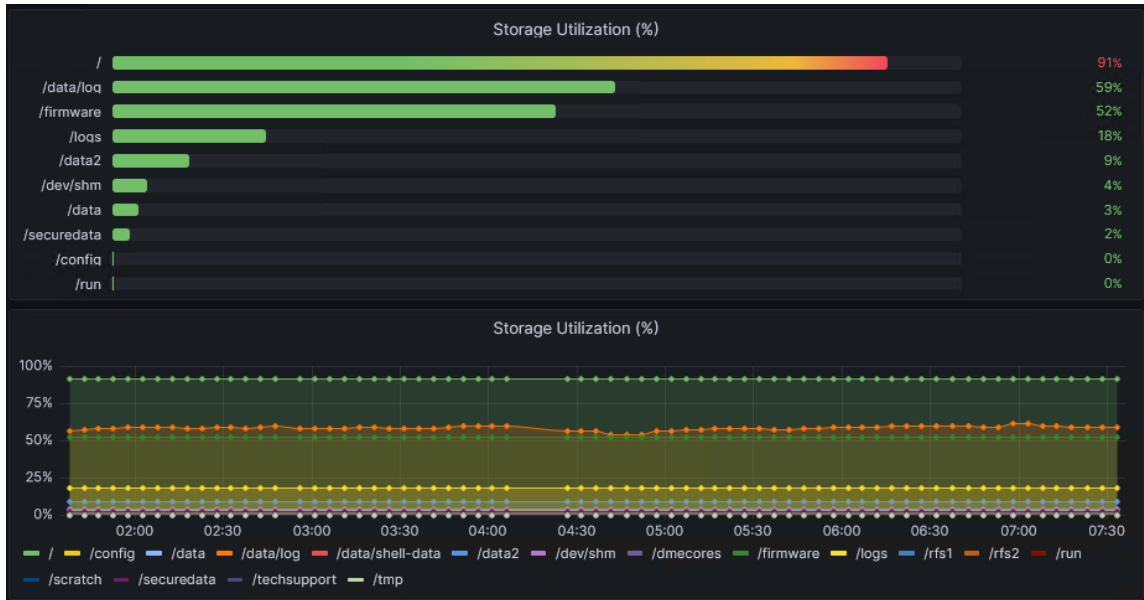
Status ↓	Process
Unknown	Techsupport
UP	nomad_client
UP	node_exporter
UP	nginxproxy
UP	kron
UP	consul
UP	Web_Server_and_Security_Management_Process



12.6 Storage

Supported in: Grafana, PRTG. Context: APIC.

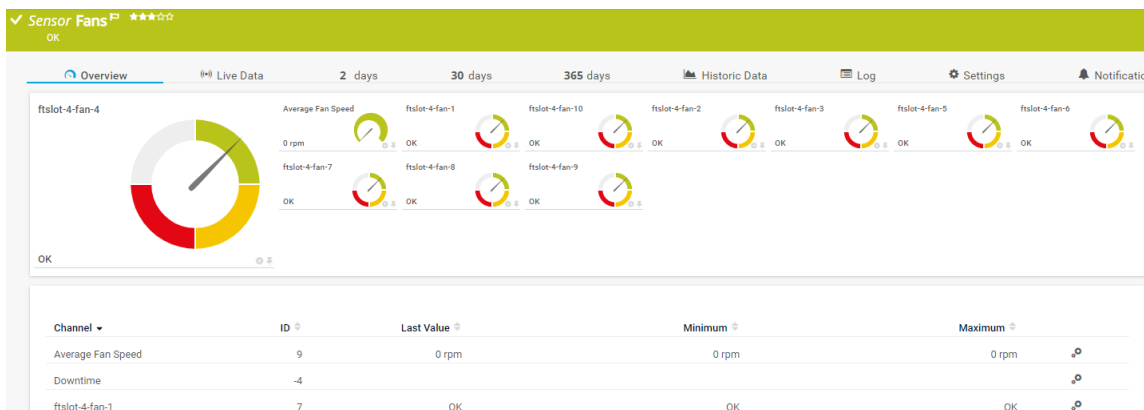
Basic operational status for each disk on the APIC server.



12.7 Fans

Supported in: Grafana, PRTG. Context: Device, APIC.

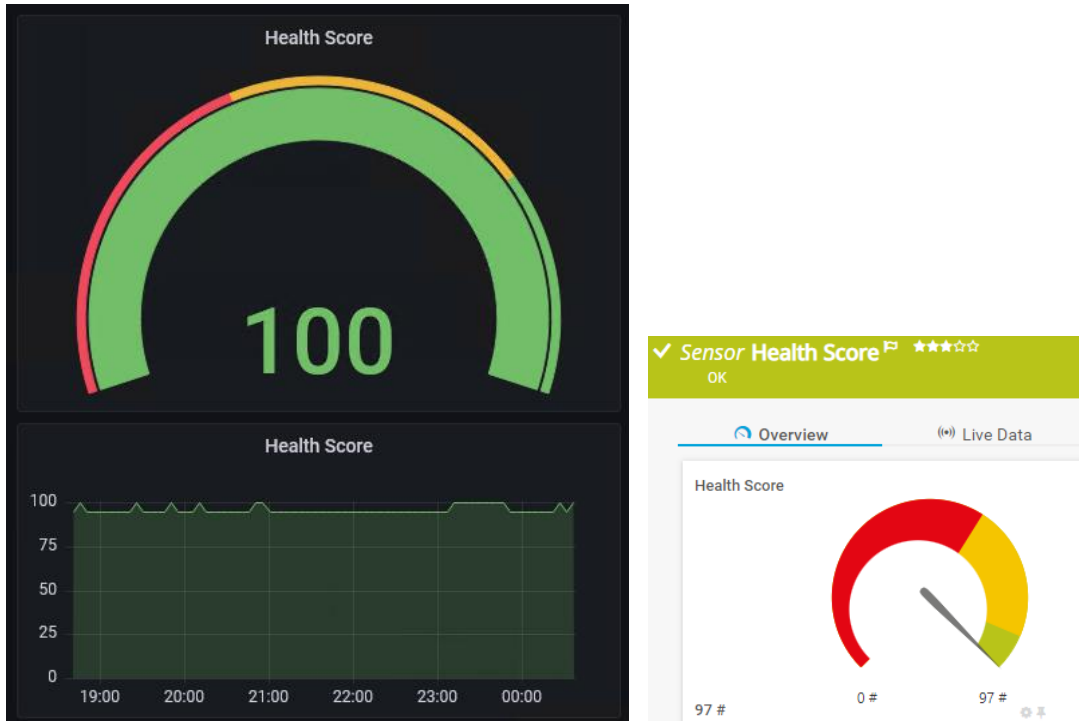
Operational status for every fan when the device is a leaf, and every fan-slot when the device is a spine, and the average fan speed for all fans.



12.8 Health Score

Supported in: Grafana, PRTG. Context: Device, APIC.

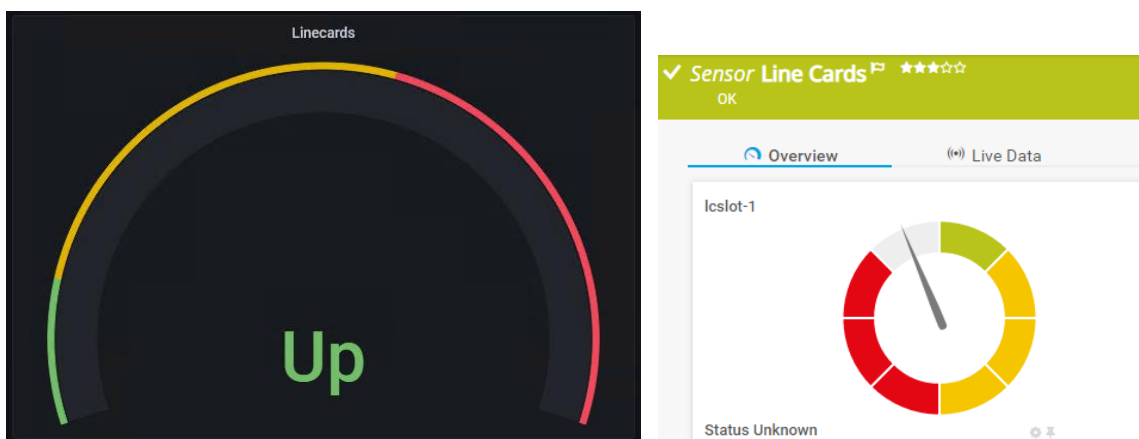
Shows the device health score as calculated by the APIC server.



12.9 Line Cards

Supported in: Grafana, PRTG. Context: Device.

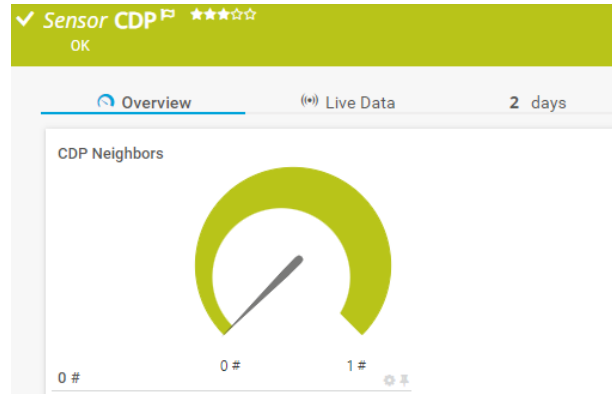
Operational status for every line card in the device



12.10 CDP Neighbors

Supported in: Grafana, PRTG. Context: Device.

Shows the number of CDP neighbors on current device.



12.11 LLDP Neighbors

Supported in: Grafana, PRTG. Context: Device.

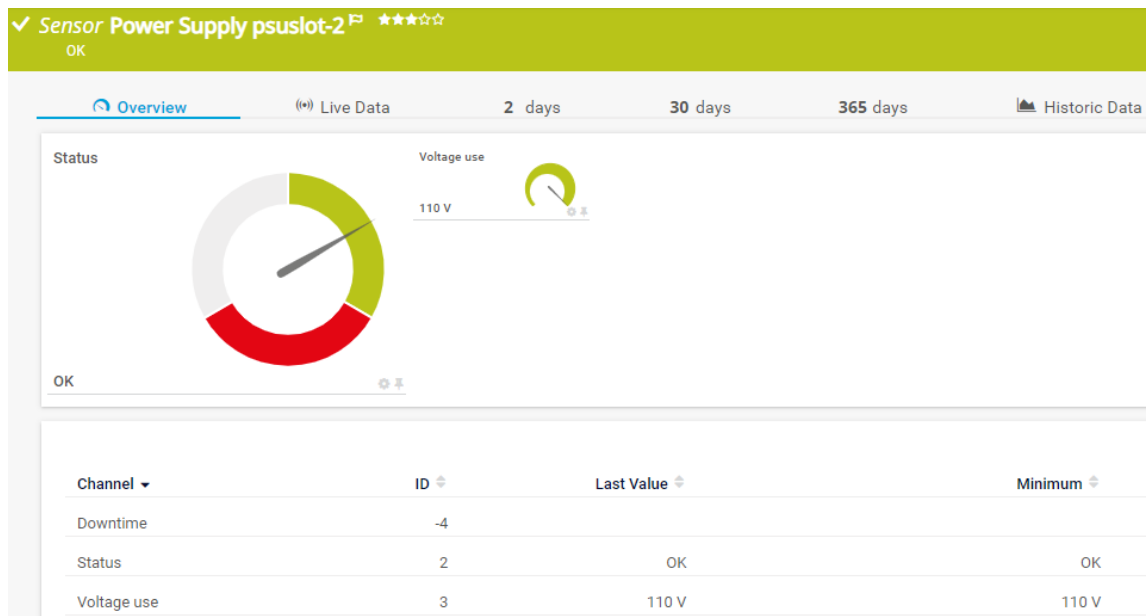
Shows the number of LLDP neighbors on current device



12.12 Power Supply

Supported in: Grafana, PRTG. Context: Device.

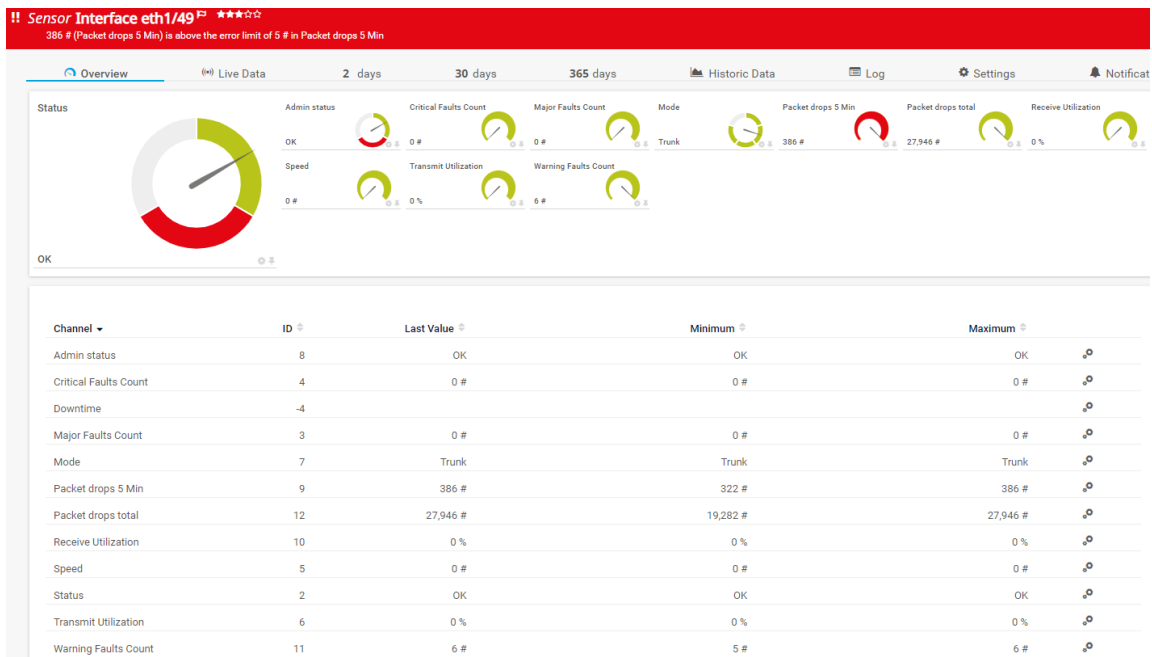
Every Power Supply sensor shows the operational status and the voltage usage of the PSU.



12.13 Interfaces

Supported in: Grafana, PRTG. Context: Device.

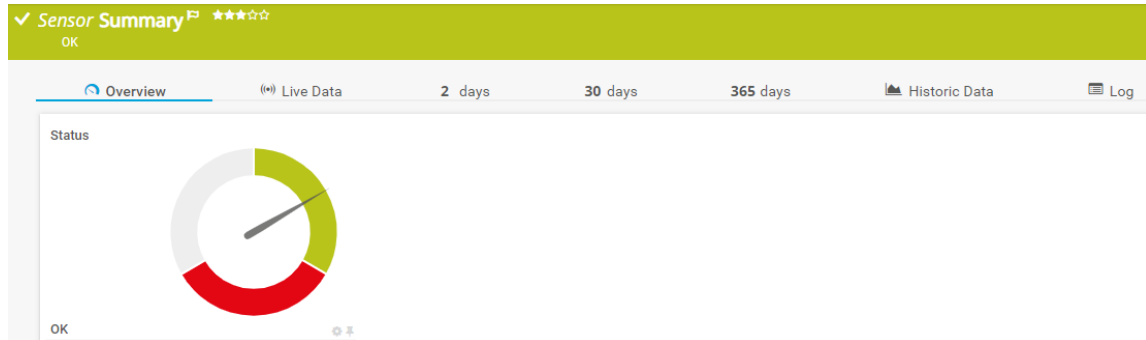
Contains Admin status and link status, port mode, port speed, warning, major and critical fault counts, packet drop counts, transmit and receive utilization.



12.14 Summary

Supported in: PRTG. Context: Device.

This sensor is responsible for retrieving and parsing data from the APIC. Each device has its own Summary sensor. An error will be shown if there was a problem retrieving any metrics.

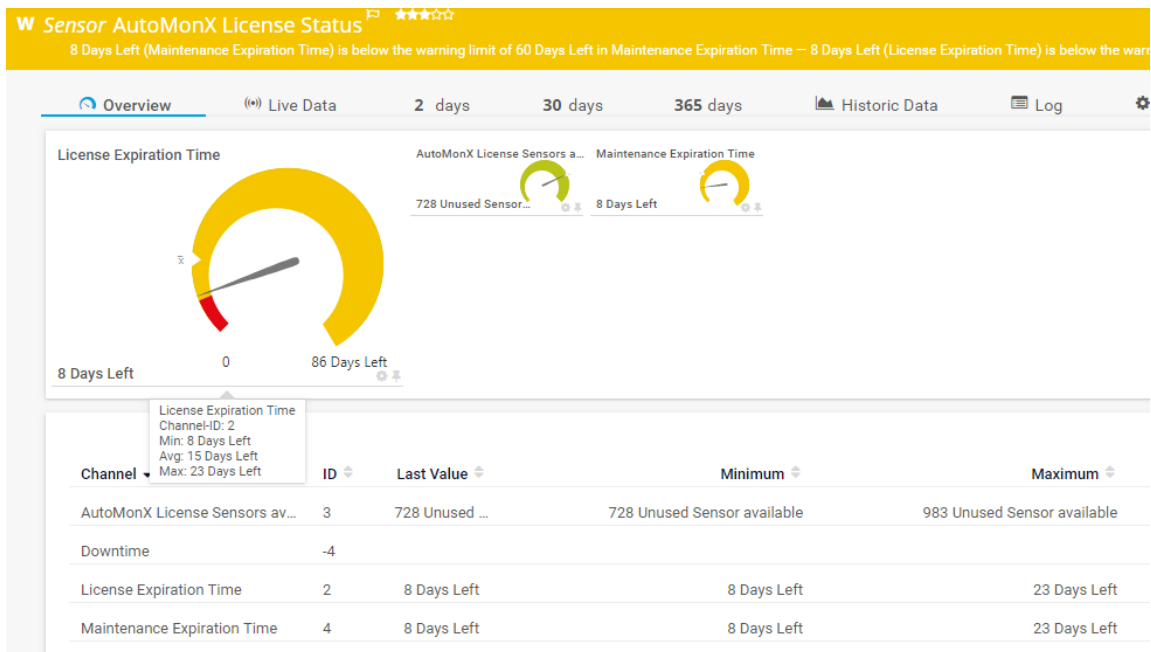


12.15 AutoMonX

12.16 License Sensor

Supported in: Grafana, PRTG. Context: Entire Product.

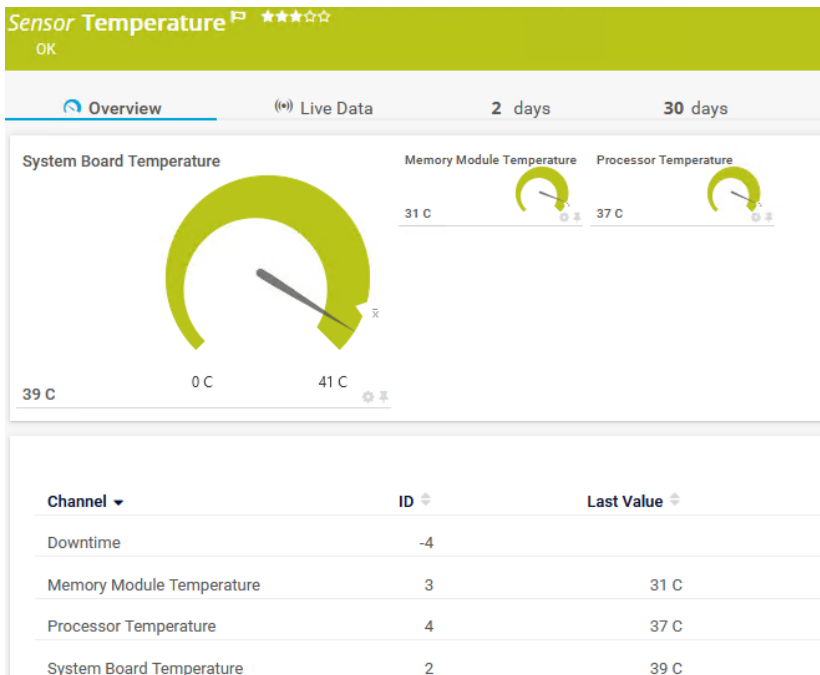
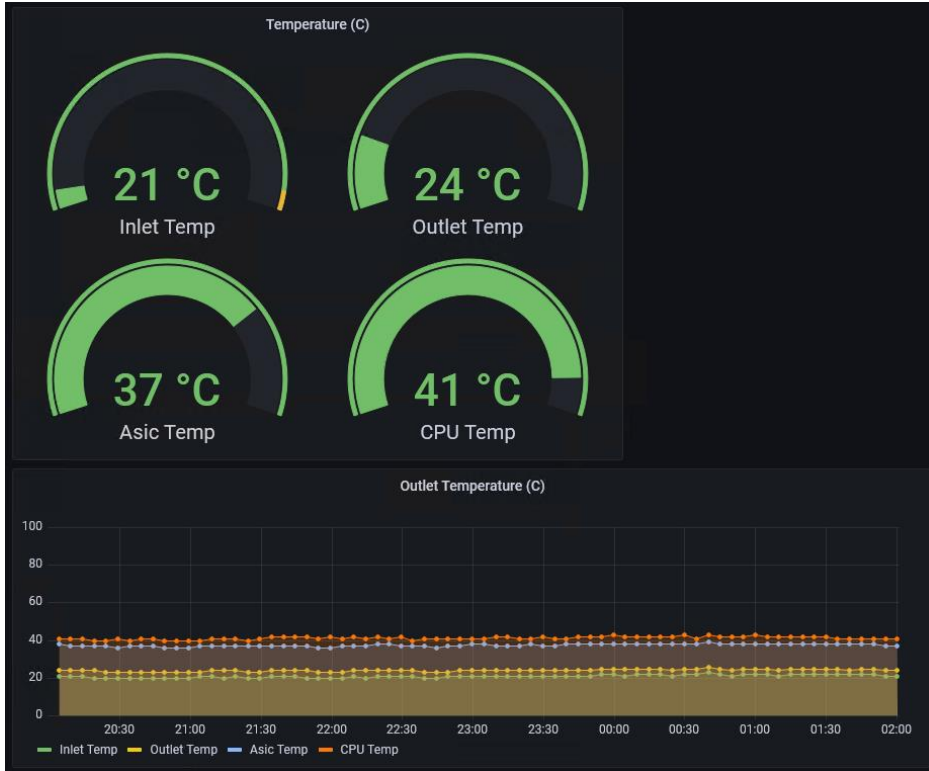
The License sensor is an additional sensor type aimed at monitoring the AutoMonX licensing and maintenance status. This sensor will let you know if your license or maintenance period is about to expire and helps you to renew it on time. This will help you to enjoy continues monitoring and prepare for renewal, without license ending unexpectedly.



12.17 Temperature

Supported in: Grafana, PRTG. Context: Device.

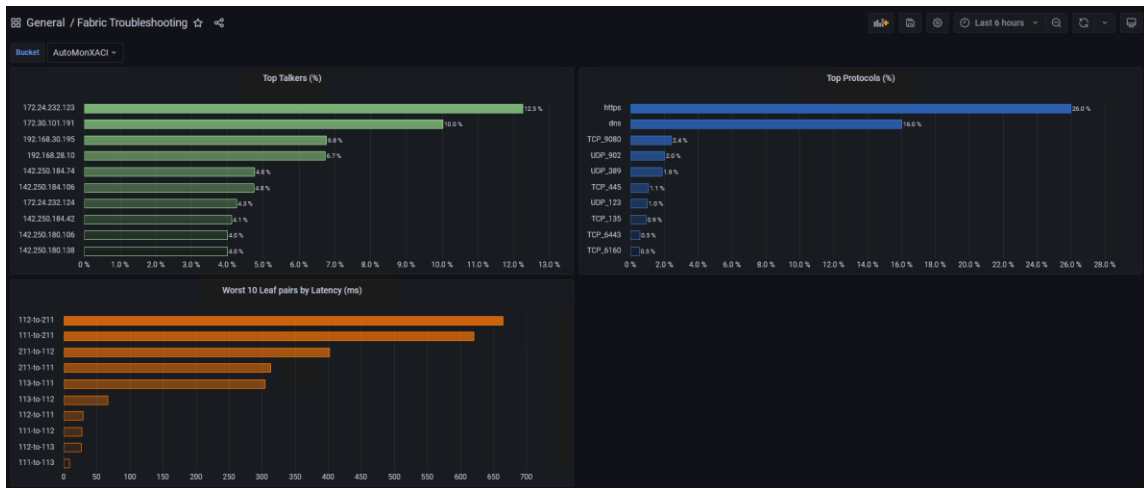
Currently only available as a Grafana panel, shows the Inlet, Outlet, ASIC and CPU temperature in Celsius, with thresholds as defined by Cisco.



12.18 Traffic Flows

Supported in: Grafana. Context: Entire Fabric.

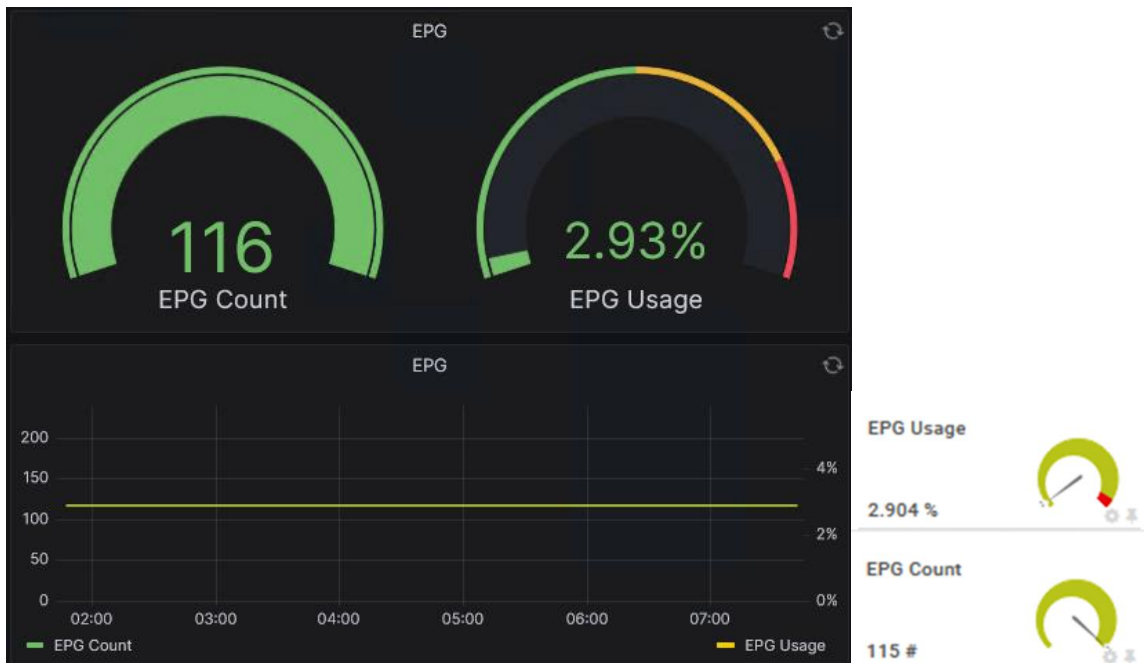
Only available as a Grafana dashboard, shows the Top Talkers, Top Protocols and Latency in milliseconds between the Cisco ACI nodes. Also available in every device dashboard. To support this, you must activate [NetFlow on the APIC server](#).



12.19 EPG – End Point Groups

Supported in: Grafana, PRTG. Context: Entire Fabric, Device.

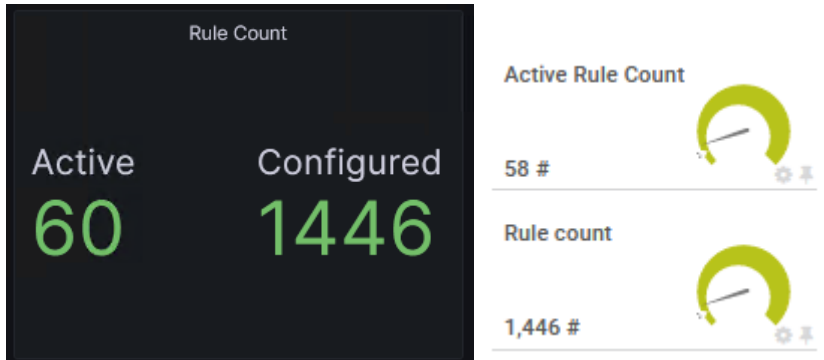
End Point Groups in the ACI environment. In PRTG the data is listed under Switch Health.



12.20 Contracts

Supported in: Grafana, PRTG. Context: Entire Fabric, Device.

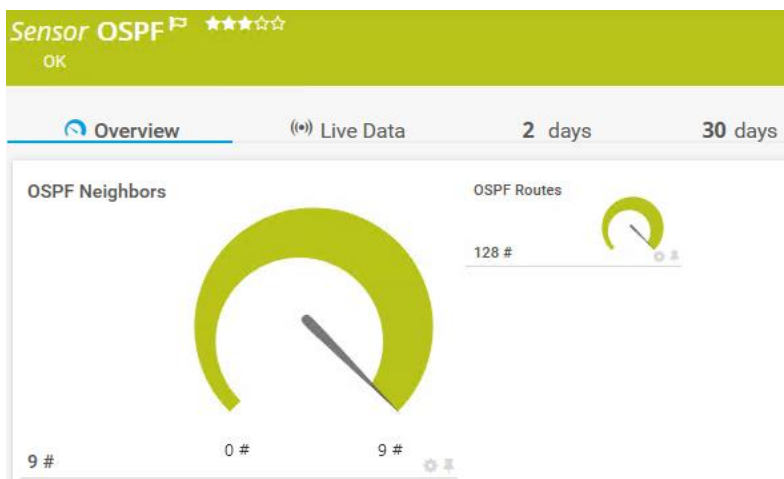
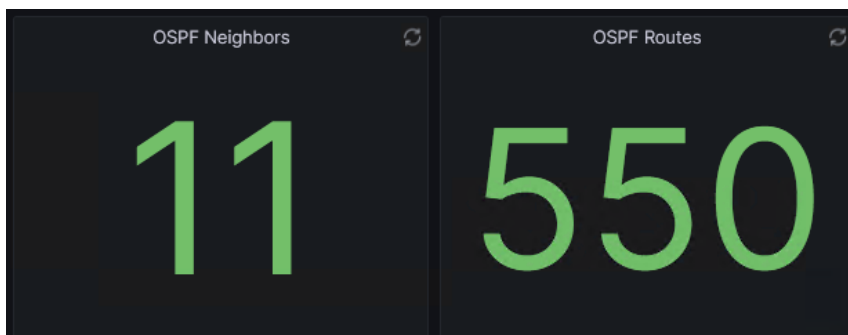
This sensor monitors the number of Contract rules between EPGs configured in ACI. In PRTG the data is listed under Switch Health.



12.21 OSPF

Supported in: Grafana, PRTG. Context: Device.

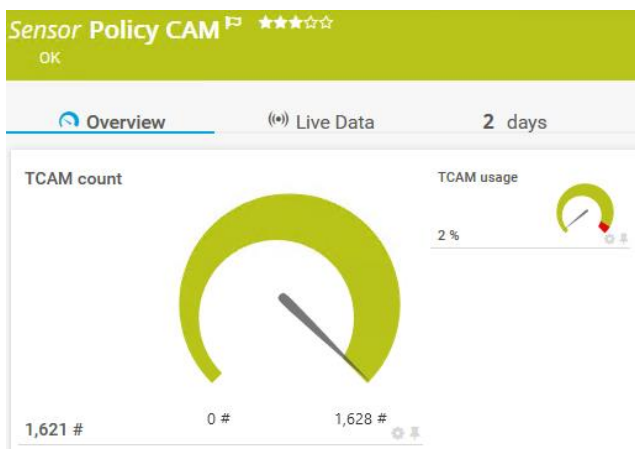
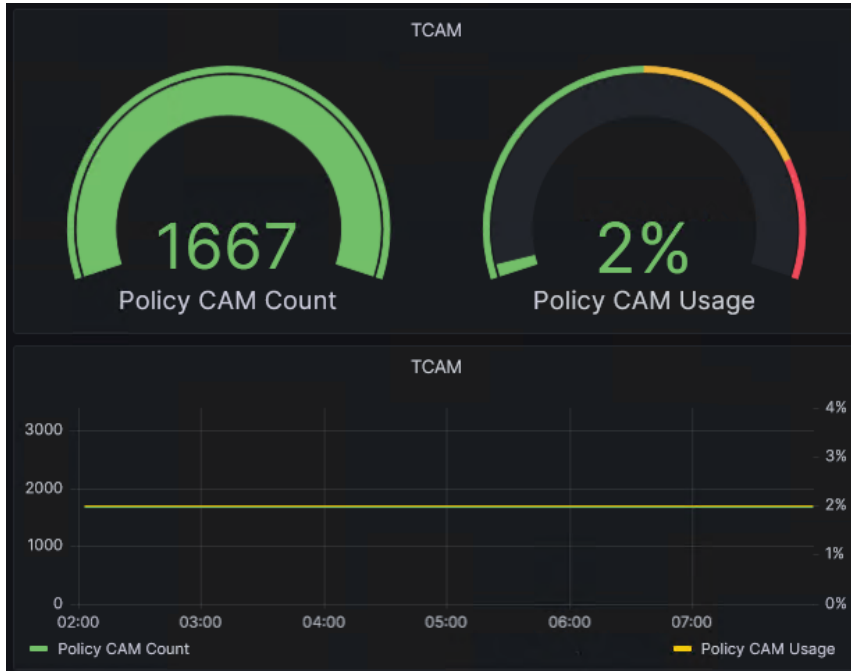
OSPF protocol statistics.



12.22 Policy CAM (TCAM)

Supported in: Grafana, PRTG. Context: Device.

Policy CAM usage statistics.



13 Troubleshooting

13.1 Troubleshooting the Cisco ACI Sensor Pack Installation

Problem Description	Troubleshooting Steps
Backend Service is not starting	<ol style="list-style-type: none"> 1. Run Check Config, check the results and fix any problems. Refer to Troubleshooting the ACI Configuration 2. Make sure your Cisco ACI User is set up OK. Refer to Troubleshooting the ACI Connection Error 3. Make sure the PRTG probe is open to the Internet and can access Cisco ACI 4. Use the service debug mode to check service errors. Refer to Debug Using Service Debug Mode
Discovery is not providing any results	<ol style="list-style-type: none"> 1. Make sure that the backend service is running 2. Make sure your Cisco ACI User has enough permissions. Refer to Troubleshooting the Cisco ACI Connection Permission 3. Submit a support request via support@automonx.com and send the following log files: Refer to Sending the Discovery Files to the support team.
Cisco ACI Sensors are Down with error message: The AutoMonX Cisco ACI service is down, cannot connect	<p>Make sure that the Cisco ACI connection parameters are correct (run Config Check)</p> <p>Make sure that Cisco ACI is not blocked by a proxy server or Firewall of your organization</p>

13.2 Troubleshooting the Cisco ACI Sensor Configuration

To analyze the status of the connection to Cisco ACI and the Cisco ACI Sensor Pack configuration, use the Config Check command line utility

Through command line: **AutoMonX_ACICollector.exe -config_check -username <user> -password <pass> -cluster <Cluster_Name>**

Below is an example of a successful configuration check:

```
Automonx Service status: running  
Login to APIC status: successful.
```

The Cisco ACI sensor was able to connect to Cisco ACI using the supplied credentials, the service is up and running.

13.3 Troubleshooting Cisco ACI Discovery Connection Errors

In case of a failed connection to Cisco ACI, an error will be displayed.

Possible causes can be that Cisco ACI is unreachable due to limitations of network access or incorrect credentials.

Check the Cisco ACI sensor settings using the instructions in [Section 5.1](#).

13.4 Collecting the Discovery Files for AutoMonX Support

In case of any other problems encountered during Cisco ACI discovery, open a case with our support team at support@automonx.com. You would need to provide the following information:

- Discovery log file -
AutoMonX\AsensorPacks\CiscoACI\Automonx_Discovery_out.log
- Discovery results in a form of a CSV file:
AutoMonX\SensorPacks\CiscoACI\Data\APIC_device_discovery.csv

13.5 Collecting Cisco ACI Service Debug information

To activate the service debugger, you would need to set the SERVICE_DEBUG variable to 1 (default is 0) in the Automonx_Backend_Service.ini file. This setting will activate the service debug mode upon the next start of the service.

During debug mode, a special log file is created. This file tracks all the Cisco ACI sensor service operations. This file needs to be examined by the AutomonX support team to detect any issues. Open a case with our support team at support@automonx.com. You would need to provide the following files:

- Cisco ACI Debug file –
AutoMonX\SensorPacks\CiscoACI\Logs\Automonx_ACIDebugLogger.log
- Backend Debug file -
AutoMonX\Backend\Logs\Automonx_BackendDebugLogger.log








14 Manual installation

14.1 Manually placing the Cisco ACI Sensor Pack files

Extract the content of the zip file with all the Cisco ACI Sensor Pack files and sub directories to the following directory on the monitoring server:

"<drive>:\Program Files (x86)\AutoMonX"

AutoMonX directory content:

-  3rdParty_Installations
-  Backend
-  Common
-  Docs
-  Grafana
-  OVL
-  SensorPacks

Backend directory would include the following files

Filename	Purpose
Log QueueBackend QueueScheduler	Sub directories for the service operation
ACI_Service_Monitor.exe AMX_Application_Server.exe AMX_InfluxDBStarter.cmd Automonx_Backend_Service.exe configWizardHelper.exe	Service executables
Automonx_Backend_Service.ini	Service configuration file
libgcc_s_seh-1.dll libstdc++-6.dll libwinpthread-1.dll	DLLs required for Monitoring Automation

Common directory would include the following files

Filename	Purpose
ExecutableActivation.dll FileHelpers.dll Newtonsoft.Json.dll Renci.SshNet.dll SensorAutoDisco_UI.exe	Discovery and monitoring User Interface files

SensorAutoDisco_UI.exe.config SensorAutoDisco_UI.ini SensorAutoDisco_UI.Lib.dll	
LicDetailsLocator.exe	Utility to gather the required details for license generation
AutoMonX_PRTG_Automation.exe AutoMonX_PRTG_Automation.ini	Monitoring Automation component for PRTG
AutoMonX_ReqFetch.dll libcrypto-1_1-x64.dll libgcc_s_seh-1.dll libssl-1_1-x64.dll libstdc++-6.dll libwinpthread-1.dll zlib1.dll	DLLs required for Monitoring Automation

SensorPacks\CiscoACI directory would include the following files:

Filename	Purpose
Creds Data Process QueueACI	Sub directories for the Cisco ACI sensor operation
Automonx_ACISummary.exe Automonx_ACICollector.exe	Cisco ACI sensor executables
APIC_config.ini APIC_info.json	Cisco ACI sensor configuration file APIC servers' information
Automonx_ACILicense.dat	Cisco ACI sensor license file
Discovery.cmd PRTG_Discovery.cmd Update_credentials.cmd	Helper scrips for performing cmd command
AutoMonX_ReqFetch.dll libcrypto-1_1-x64.dll libgcc_s_seh-1.dll libssl-1_1-x64.dll libstdc++-6.dll libwinpthread-1.dll zlib1.dll	Cisco ACI sensor DLL files

3rdParty_Installations directory content:

Filename	Purpose
grafana-enterprise-9.4.7.windows-amd64.msi	Grafana server installer
vcredist_x64.exe	Microsoft Visual C++ Redistributable
Win64OpenSSL_Light-3_0_1.msi vcredist_x64.exe	OpenSSL installers for generating self-signed certificates

3rdParty_Installations\InfluxDB directory content:

Filename	Purpose
AutoMonX_InfluxDB_Service.exe	Automonx service manager
influx.exe influxd.exe LICENSE README.md	InfluxDB related files
addSystemVar.cmd configureInfluxDB.bat libwinpthread-1.dll	Automonx service manager related files

Grafana directory content:

Filename	Purpose
APIC Logs.json Cisco ACI APIC Perf.json Cisco ACI Device Perf.json Cisco ACI Fabric by AutoMonX.json Cisco ACI Fex Perf.json Fabric overview.json Fabric Troubleshooting.json Self Monitoring Dashboard - AutoMonX.json TCAM and EPG Utilization.json Top Interfaces.json	Configuration files for Grafana Dashboards

OVL directory content:

Filename	Purpose
automonx.aci.linecards.ovl automonx.aci.nodefans.ovl automonx.aci.portmode.ovl automonx.aci.summarstatus.ovl	PRTG custom lookup file for the Azure sensor pack

14.2 Manually installing the Grafana server

Run the installation file: AutoMonX\3rdParty_Installations\grafana-enterprise-9.4.7.windows-amd64.msi

Open <http://127.0.0.1:3000/> and log in with username admin and password admin. You will now be asked to change the password.

Go to: Configuration->Data Sources->Add data source->type in “Influx” and press it. Name your DB. It is important to pick **Flux** as the Query Language. Enter the URL, toggle “Basic auth” and “With Credentials” and enter the User and Password you configured in the previous section (the influx credentials), as well as the already configured Organization, Token and Default Bucket. Press Save & test and make sure it is successful. If not, go over the information entered.

Go to: Dashboards->manage->import->Upload JSON file and pick one of the json files in AutoMonX\Installations folder. Repeat this action for every Json file. Each file corresponds to a Dashboards in Grafana. You will not see any data if the Backend service and the Cisco ACI sensor aren’t running.

14.3 Manual Backend Service Installation

Before installing the service, you must fill the INI file with correct parameters. The following table shows the configurable settings in the Automonx_Backend_Service.ini file.

Parameter	Default Value	Details
SENSOR_POLLING_INTERVAL	300	The time in seconds to wait between retrieving data from the APIC server.
SERVICE_RESTART_MIN	Empty	The time in minutes to restart the entire service. Leave empty so not to restart.
THREAD_NUMBER	Empty	The number of threads used by the service. When empty, the default is to use $N*2 - 1$, when N is the number of CPU cores in the system
SENSOR_MODE	influx	The mode the service must operate in. Options: prtg - to run with a PRTG server influx_prtg – to run with a PRTG server and send data to InfluxDB

		influx – the service activates the requests to the Cisco ACI sensor and sends data to InfluxDB
SENSORS	ACI	Must be set to ACI so that the service will properly activate Cisco ACI monitoring. If other AutoMonX Sensor Packs are downloaded, their names will be separated by commas.
SERVICE_DEBUG	Empty	Change to 1 before starting the service to collect debug data from the service.
URL	Empty	The full URL of the Influx server. For example: http://127.0.0.1:8086/
TOKEN	Empty	The InfluxDB token retrieved after the Influx installation and configuration
ORGANIZATION	Empty	The name of the organization as configured in the influx server
BUCKET	Empty	The name of the bucket as configured in the influx server

The following table shows the configurable settings in the APIC_config.ini file.

Parameter	Default Value	Details
APIC_POLLING_INTERVAL	Empty	Only used with PRTG mode
SENSOR_POLLING_INTERVAL	600	The max time in seconds before returning an error message when the data wasn't updated
INFLUX_SCHEDULER_DIR	C:/Program Files (x86)/AutoMonX/Backend/QueueScheduler/	Location for saving the sensor files to activate data retrieval. Only change if the files were installed not in the recommended path.
THREAD_NUMBER	Empty	The number of threads used by the service. When empty, the default is to use $N*2 - 1$, when N is the number of CPU cores in the system
DEBUG_LOG_DIR	Empty	Location for saving sensor specific debug logs

After filling the required information, start CMD as Administrator, navigate to <drive>:\Program Files (x86)\AutoMonX\Backend and run the following command to install the service:

```
Automonx_Backend_Service.exe -install
```

Note: This command must run with elevated permissions – this will pop up a User Access Control (UAC) message.

When the service installation was successful, the output would be as follows:

“AutoMonX Monitoring Service installation was successful!”

14.4 Manual Upgrade instructions

Upgrade Notes:

Make sure to follow the upgrade procedure carefully and avoid copying INI and the license (.dat) files from the zip file unless instructed. It is suggested to pause the Cisco ACI Sensor Pack sensors until the upgrade is completed.

- Download the latest build from <https://www.automonx.com/downloads>
- Extract the zip file to a temporary directory (i.e. C:\Temp)
- For PRTG integration only - Make Sure to Pause the Cisco ACI Sensor Group in PRTG
- Stop the AutoMonx Cisco ACI service:

```
net stop Automonx_Backend_Service
```

- Copy files:

Copy the following files extracted from the zip file to the AutoMonx\SensorPacks\CiscoACI directory (replace existing files)

- Automonx_ACICollector.exe
- Automonx_ACISummary.exe
- AutoMonX_ReqFetch.dll
- libcrypto-1_1-x64.dll
- libgcc_s_seh-1.dll
- libssl-1_1-x64.dll
- libstdc++-6.dll
- libwinpthread-1.dll
- zlib1.dll

Copy the following files from the extracted zip file to the AutoMonx\Common directory:

- AutoMonX_PRTG_Automation.exe
- AutoMonX_PRTG_Automation.ini
- AutoMonX_ReqFetch.dll
- ExecutableActivation.dll
- ExecutableActivation.pdb
- FileHelpers.dll
- libcrypto-1_1-x64.dll
- libgcc_s_seh-1.dll
- libssl-1_1-x64.dll
- libstdc++-6.dll
- libwinpthread-1.dll
- LicDetailsLocator.exe
- Newtonsoft.Json.dll
- Renci.SshNet.dll
- SensorAutoDisco_UI.exe
- SensorAutoDisco_UI.exe.config
- SensorAutoDisco_UI.ini
- SensorAutoDisco_UI.Lib.dll
- SensorAutoDisco_UI.Lib.pdb
- SensorAutoDisco_UI.pdb
- zlib1.dll

Copy the following files from the extracted zip file to the AutoMonx\Backend directory:

- AMX_Application_Server.exe
- Automonx_Backend_Service.exe
- libcrypto-1_1-x64.dll
- libgcc_s_seh-1.dll
- libssl-1_1-x64.dll
- libstdc++-6.dll
- libwinpthread-1.dll
- zlib1.dll

- Start the AutoMonx Cisco ACI service:

```
net start Automonx_Backend_Service
```

- For PRTG integration only - Copy the updated OVL files from the zip and make PRTG re-read them as explained in [Lookup files handling section](#)

- For PRTG integration only - Make Sure to **Resume** in PRTG the sensors in the Cisco ACI Sensor-related group(s)

14.5 Manual Discovery

Discovery of the Cisco ACI physical and logical components is performed by right clicking the following file and selecting Run as Administrator:

Discovery.cmd

You will be prompted to enter the cluster name as configured in the APIC_info.json file.

This will activate the discovery process, adding all monitoring objects and interfaces in the UP state. The window will close when the process is complete.

14.6 Manual PRTG Discovery

The Cisco ACI Sensor Pack contains a command line interface that automates the addition of Cisco ACI switches as devices to the PRTG system.

To use the automation CLI, first you must edit the file below that is in the AutoMonX\Common folder:

AutoMonX_PRTG_Automation.INI

PRTG_USER=<prtg_administrative_user>

PRTG_SERVER=<prtg_server_name>

- You need a user with read and write permissions to operate the program.
- You will need to create a target group in PRTG that will contain the Cisco ACI switches sensors.

Discovery is performed by right clicking the following file and selecting Run as Administrator:

PRTG_Discovery.cmd

You will be prompted to enter the cluster name as configured in the APIC_info.json file, and the Passhash of the PRTG user you entered earlier.

This will activate the discovery process, adding all monitoring objects and interfaces in the UP state. The window will close when the process is complete.

Note: Depending on the network connection, the Cisco APIC API response time and taking into account the size of your Cisco ACI deployment, the discovery should take a few minutes to complete.

15 Appendix A – Configuring ACL logging & Atomic Counters on the APIC

This section describes how to configure your APIC server to get information about latency and top talkers in your environment.

Enabling ACL Contract Permit and Deny Logging Using the GUI



Note The tenant that contains the permit logging is the tenant that contains the VRF that the EPG is associated to. This will not necessarily be the same tenant as the EPG or its associated contracts.

- Step 1** On the menu bar, choose **Tenants** > <tenant name>.
- Step 2** In the Navigation pane, expand **Contracts**, right-click **Standard**, and choose **Create Contract**.
- Step 3** In the Create Contract dialog box, perform the following actions:
- In the **Name** field, type the name for the contract.
 - In the **Scope** field, choose the scope for it (VRF, Tenant, or Global).
 - Optional. Set the target DSCP or QoS class to be applied to the contract.
 - Click the + icon to expand **Subjects**.
- Step 4** In the Create Contract Subject dialog box, perform the following actions:
- Step 5** Enter the name of the subject and an optional description.
- Step 6** Optional. From the drop-down list for the target DSCP, select the DSCP to be applied to the subject.
- Step 7** Leave **Apply Both Directions** checked, unless you want the contract to only be applied from the consumer to the provider, instead of in both directions.

- Step 8** Leave **Reverse Filter Ports** checked if you unchecked **Apply Both Directions** to swap the Layer 4 source and destination ports so that the rule is applied from the provider to the consumer.
- Step 9** Click the + icon to expand **Filters**.
- Step 10** In the **Name** drop-down list, choose an option; for example, click **arp**, **default**, **est**, or **icmp**, or choose a previously configured filter.
- Step 11** In the **Directives** drop-down list, click **log**.
- Step 12** (Optional) Change the Action to be taken with this subject to **Deny** (or leave the action to the default, **Permit**.
With Directive: log enabled, if the action for this subject is **Permit**, ACL permit logs track the flows and packets that are controlled by the subject and contract. If the action for this subject is **Deny**, ACL deny logs track the flows and packets.
- Step 13** (Optional) Set the priority for the subject.
- Step 14** Click **Update**.
- Step 15** Click **OK**.
- Step 16** Click **Submit**.
Logging is enabled for this contract.
-

Enabling ACL Contract Permit Logging Using the NX-OS CLI

- Step 1** To enable logging of packets or flows that were allowed to be sent because of Contract permit rules, use the following commands:

```
configure
tenant <tenantName>
contract <contractName> type <permit>
subject <subject Name>
access-group <access-list> <in/out/both> log
```

For example:

```
apic1# configure
```

```
apic1(config)# tenant BDMode1
```

```
apic1(config-tenant)# contract Logicmp type permit
```

```
apic1(config-tenant-contract)# subject icmp
```

```
apic1(config-tenant-contract-subj)# access-group arp both log
```

Step 2 To disable the permit logging use the **no** form of the access-group command; for example, use the no access-group arp both log command.

Configuring a contract for all communications and activating logging will provide the most accurate information about Top Talkers and Top Protocols.

Now let's activate latency monitoring

Configuring Atomic Counters

Step 1 In the menu bar, click **Tenants**.

Step 2 In the submenu bar, click the desired tenant.

Step 3 In the Navigation pane, expand the tenant and expand **Policies** and then expand **Troubleshoot**.

Step 4 Under **Troubleshoot**, expand **Atomic Counter Policy** and choose a traffic topology.
You can measure traffic between a combination of endpoints, endpoint groups, external interfaces, and IP addresses.

Step 5 Right-click the desired topology and choose **Add topology Policy** to open an **Add Policy** dialog box.

Step 6 In the **Add Policy** dialog box, perform the following actions:

- a. In the **Name** field, enter a name for the policy.
- b. choose or enter the identifying information for the traffic source.

The required identifying information differs depending on the type of source (endpoint, endpoint group, external interface, or IP address).

- c. choose or enter the identifying information for the traffic destination.

- d. (Optional) (Optional) In the **Filters** table, click the **+** icon to specify filtering of the traffic to be counted.
In the resulting **Create Atomic Counter Filter** dialog box, you can specify filtering by the IP protocol number (TCP=6, for example) and by source and destination IP port numbers.
- e. Click **Submit** to save the atomic counter policy.

Step 7 In the Navigation pane, under the selected topology, choose the new atomic counter policy.
The policy configuration is displayed in the Work pane.

Step 8 In the Work pane, click the **Operational** tab and click the **Traffic** subtab to view the atomic counter statistics.

Enabling Atomic Counters

To enable using atomic counters to detect drops and misrouting in the fabric and enable quick debugging and isolation of application connectivity issues, create one or more tenant atomic counter policies, which can be one of the following types:

- EP_to_EP—Endpoint to endpoint (dbgacEpToEp)
- EP_to_EPG—Endpoint to endpoint group (dbgacEpToEpg)
- EP_to_Ext—Endpoint to external IP address (dbgacEpToExt)
- EPG_to_EP—Endpoint group to endpoint (dbgacEpgToEp)
- EPG_to_EPG—Endpoint group to endpoint group (dbgacEpgToEpg)
- EPG_to_IP—Endpoint group to IP address (dbgacEpgToIp)
- Ext_to_EP—External IP address to endpoint (dbgacExtToEp)
- IP_to_EPG—IP address to endpoint group (dbgacIpToEpg)
- Any_to_EP—Any to endpoint (dbgacAnyToEp)
- EP_to_Any—Endpoint to any (dbgacEpToAny)

Currently, the Cisco ACI Sensor Pack supports the Ext IP to Ext IP configuration.

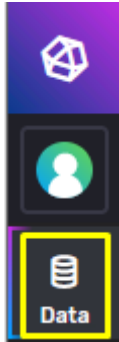
Full information in this Cisco article:

https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/4-x/troubleshooting/Cisco-APIC-Troubleshooting-Guide-42x/Cisco-APIC-Troubleshooting-Guide-42x_chapter_0110.html

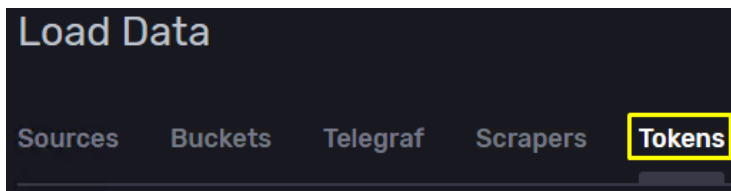
16 Appendix B – Configuring InfluxDB

InfluxDB is automatically configured by the Installer. To retrieve the InfluxDB API token follow the steps below:

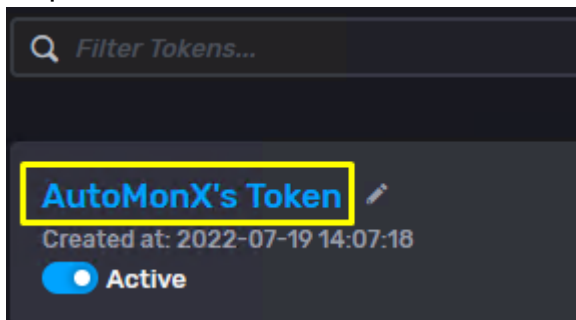
1. Click on "Data" in the leftmost panel:



- a. Under "Load Data" click on "Tokens":



- b. Under Token you will see the Token for the user you created in step b:



- c. Click on the blue writing and the Token will appear on the screen.
Note to write down the Token since you will use it later.

2. Make sure that the following information is at hand for later use:
 - a. InfluxDB URL (<http://127.0.0.1:8086>)
 - b. InfluxDB Username.
 - c. InfluxDB Organization.
 - d. InfluxDB Bucket.
 - e. InfluxDB Token.

17 Appendix C – User Management and Permissions in Grafana

To manage permissions in Grafana Dashboards you would need to perform the steps below.

- Navigate to Grafana main page and hover over the “shield”-shaped icon on the middle right of the page.
- Click on User on the context menu.
- Click on the blue button "New User" towards the upper right side of the screen.
- Choose Name, Email, Username, Password.

17.1 Create a Team in Grafana

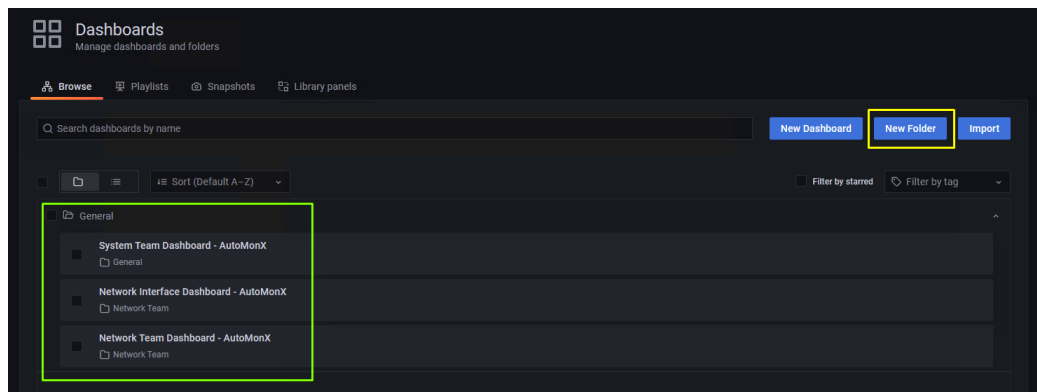
Teams in Grafana are like groups in Active Directory, this is the one of the methods to manage user access to dashboards.

- Navigate to Grafana main page and hover over the cog Icon middle right of the page.
- Click on Teams in the Context menu.
- Click on the Blue Button "New Team" in the middle of the screen.
- Choose a name for the team (The Email is not mandatory) and click "Create"
- When the group is created you can add users using the blue button "Add Member"
- To Add more groups or users to a group use the same steps.

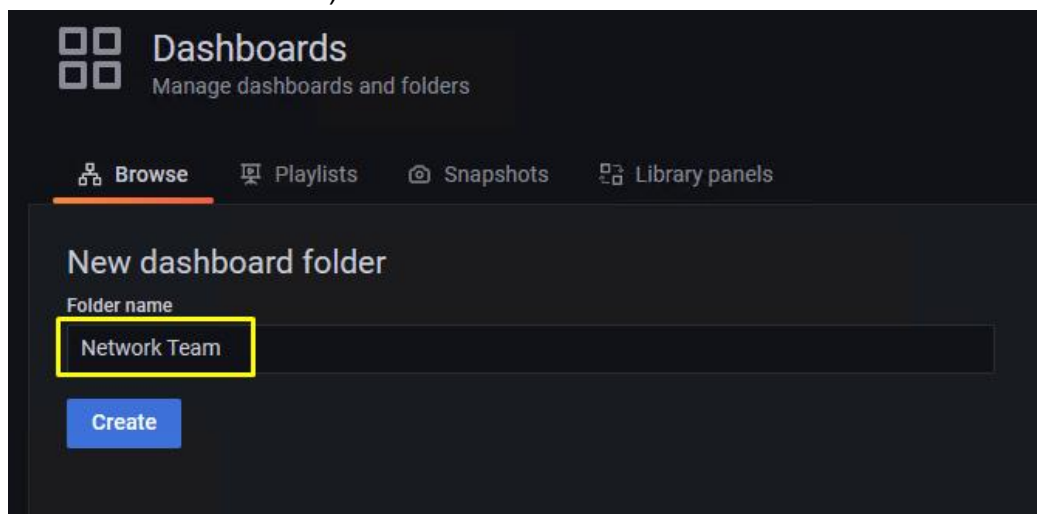
17.2 Create a Folder in Grafana

To manage user in Grafana you would need to create a Folder since the permissions of the default folder called "General" cannot be modified. To create a folder, perform the following steps:

- Go into Grafana main page and hover over the dashboard Icon on the middle right of the page.
- Click on Browse.
- Inside the "Browse Dashboards" page click on "New Folder":
In Green these are AutoMonX Default Dashboards.



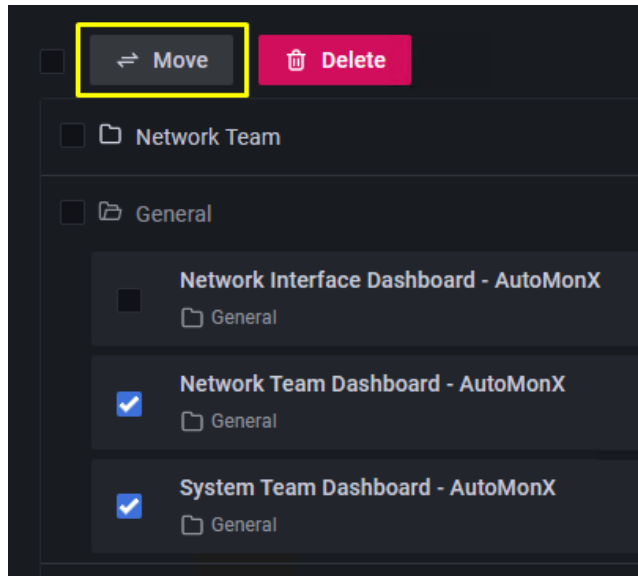
- Pick a name for the Folder (In our example we would use a "Network Team" folder) and Click "Create":



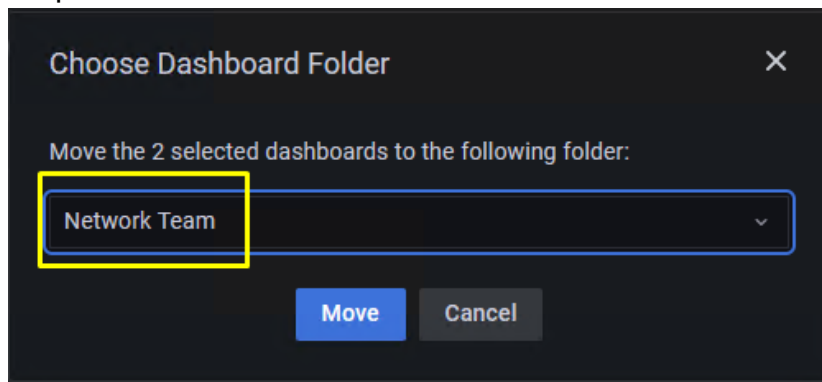
17.3 Move a Dashboard to Folder

To move the Dashboard into the Newly created Folder use the following steps

- Go into Grafana main page and hover over the dashboard Icon on the middle right of the page.
- Click on Browse.
- Tick the Dashboards that you would like to permission manage (In our example we would tick " Network Interface Dashboard" and "Network Team Dashboard") and Click on "Move":



- Select The newly created folder (in our case "Network Team") in the drop down menu and click on "Move" when done:



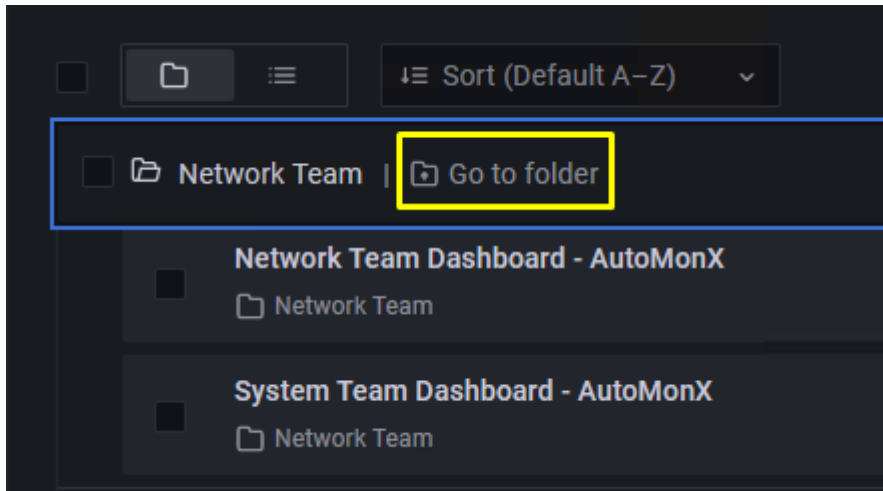
17.4 Manage permissions of a Folder

Folder Permissions can be Managed either with a Grafana Team ([Create a Team in Grafana](#))

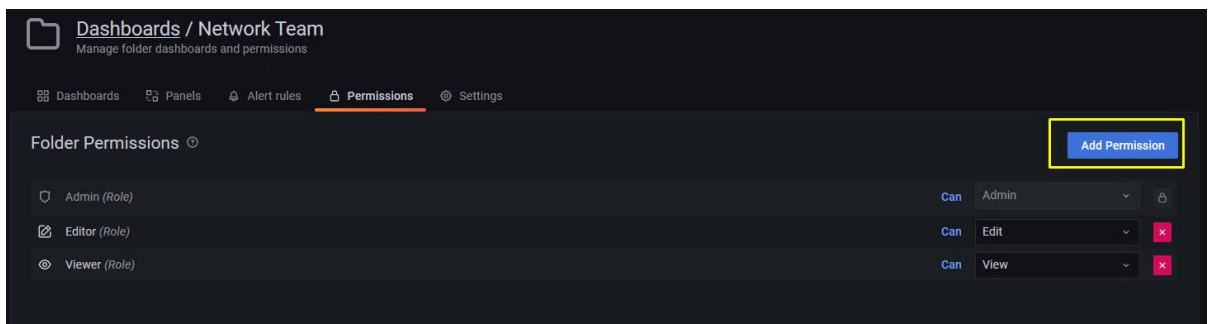
Or with a [specific user](#) (not recommended).

To Manage permissions of a folder do the following:

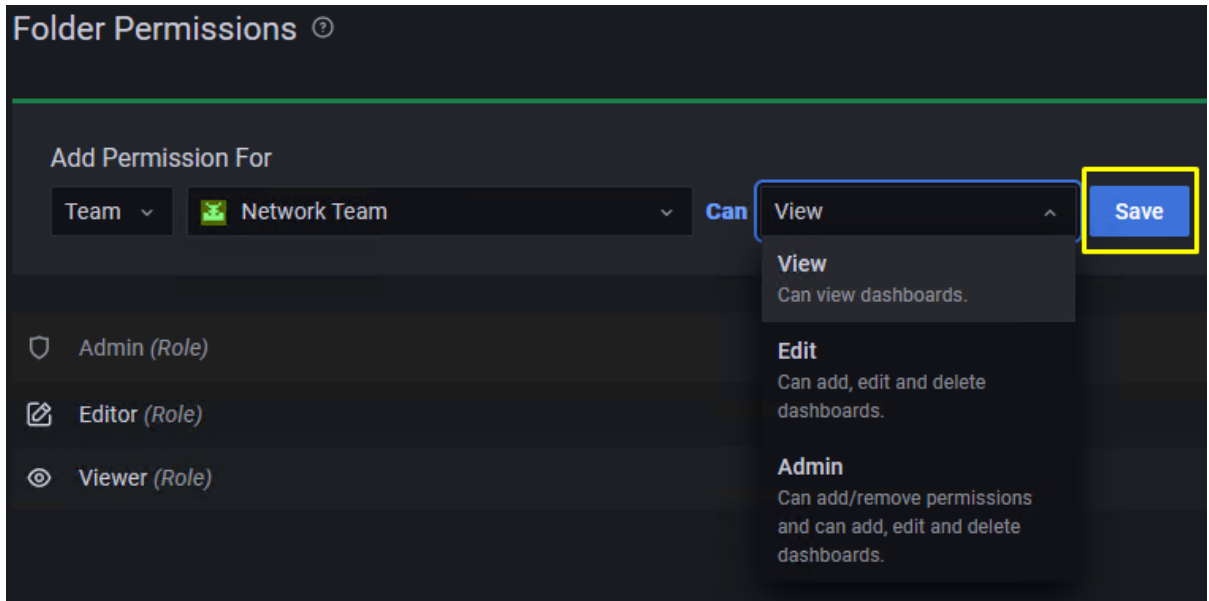
- Go into Grafana main page and hover over the dashboard Icon on the middle right of the page.
- Click on Browse.
- Hover with your mouse over the new folder (in our example "Network Team") and Click on "Go to folder":



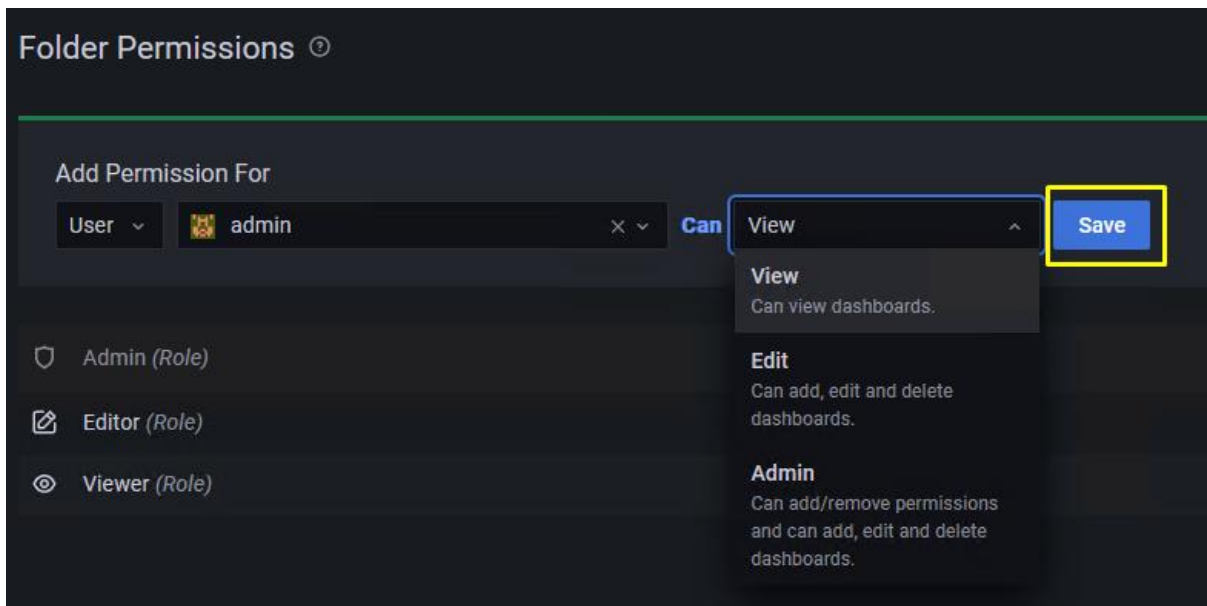
- Click on Permissions and then Click on "Add Permission":



- Now you can add a permission based on a [Team](#) (Recommended) or a [User](#) (Not Recommended):
- **Adding a [Team](#):**
- Choose Team in the Drop-down menu.
- Choose the Team you want to add permissions to.
- Choose what this Team can do and click Save.



- **Adding a User:**
 - Choose User in the Drop-down menu.
 - Choose the User you want to add permissions to.
- Choose what this User can do and click Save.



18 Appendix D – Acquiring PRTG Passhash

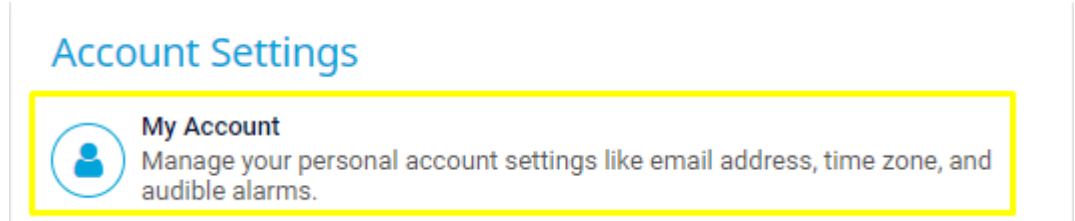
The PRTG passhash can be obtained from your PRTG installation in the following way:



- Log into your PRTG.
- Look at the Top Bar in the middle portion of the screen and locate Setup and click on it:



- Under Account Settings Click on "My Account"



- Under "User Account Settings" click "Show Passhash"
- Write Down the Passhash as you would need to use it later.

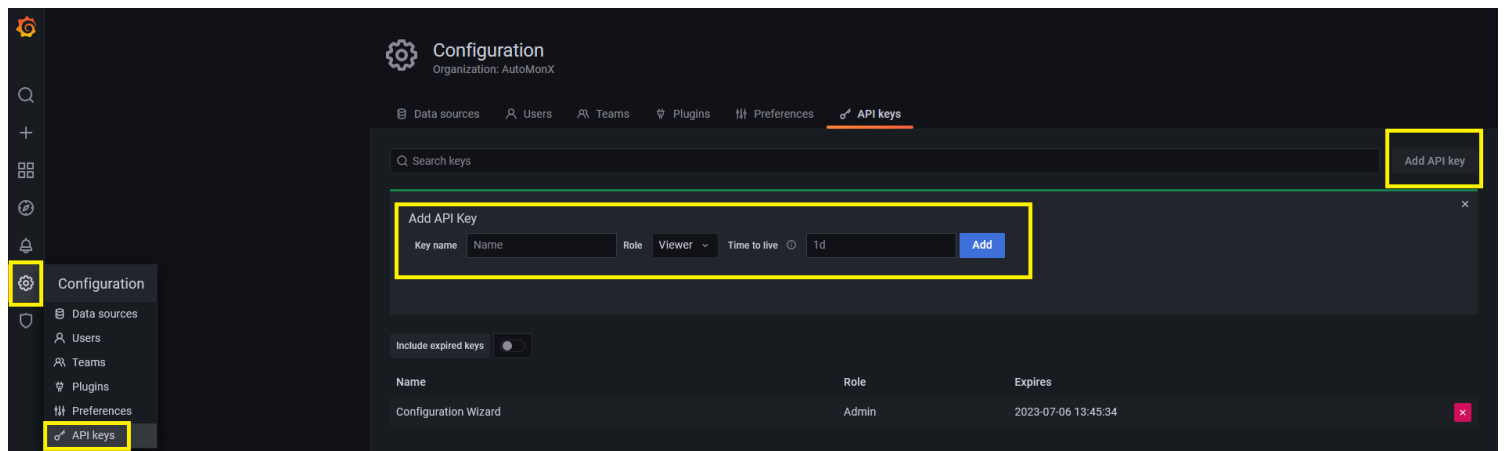
19 Appendix E – Configuring Grafana to work with HTTPs Protocol

By default, the Grafana server is installed with unsecure http. Follow the next steps to run Grafana with https.

1. Run the file <Application Directory>\3rdParty_Installations\vcredist_x64.exe Installer.
2. Run the file <Application Directory>\3rdParty_Installations\Win64OpenSSL_Light-3_0_1.msi Installer.
3. Open cmd as administrator and change directory (cd) to C:\Program Files\OpenSSL-Win64\bin
4. Run the command: *openssl.exe req -x509 -newkey rsa:4096 -keyout privatekey.key -out certificate.crt -days 20000*
5. Accept all defaults
6. Move the 2 files created into C:\Program Files\GrafanaLabs\grafana\conf\cert (create the cert folder if necessary).
7. Open the file C:\Program Files\GrafanaLabs\grafana\conf\defaults.ini
8. Change row 32 from http to https
9. Add to row 63 C:\Program Files\GrafanaLabs\grafana\conf\cert\certificate.crt
10. Add to row 64 C:\Program Files\GrafanaLabs\grafana\conf\cert\privatekey.key
11. Restart the Grafana service.

20 Appendix F – Create a Grafana API Key

1. Login to your Grafana Instance and hover with your mouse over the "Configuration" Icon left menu of the interface.
2. Click on API Keys.
3. Click on Add API Key.
4. Choose a name, set the role as Admin (Creating Dashboard requires high privilege via API for example) and we recommend leaving the "Time to live" property empty, since you might want to configure additional dashboards in the future.
5. When you are finished, click "Add".



21 Appendix G – Importing Default Dashboards into Grafana

If you already have an instance of Grafana installed, or you are interested in restoring the default Dashboards, you can follow the instruction below:

1. Login to your existing Grafana instance.
2. Hover over the dashboards Icon on the left-hand side menu.
3. Click On "Browse"
4. Click On "Import"
5. Click on "Upload JSON File" and navigate to <Automonx Install Directory>\Default_Dashboards and pick any of the default dashboards.
6. Click on import and the Dashboard should be Imported

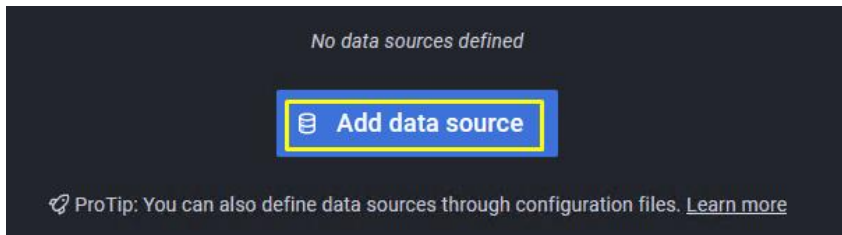
22 Appendix H – Creating the InfluxDB Data source in Grafana

If you already have an instance of Grafana installed, you can create the InfluxDB data source in the following way:

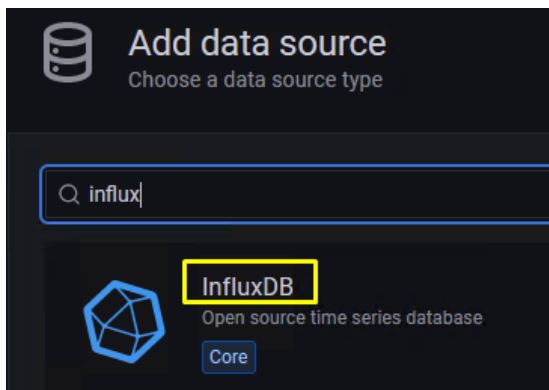
1. Click on the Cog icon in the leftmost panel:



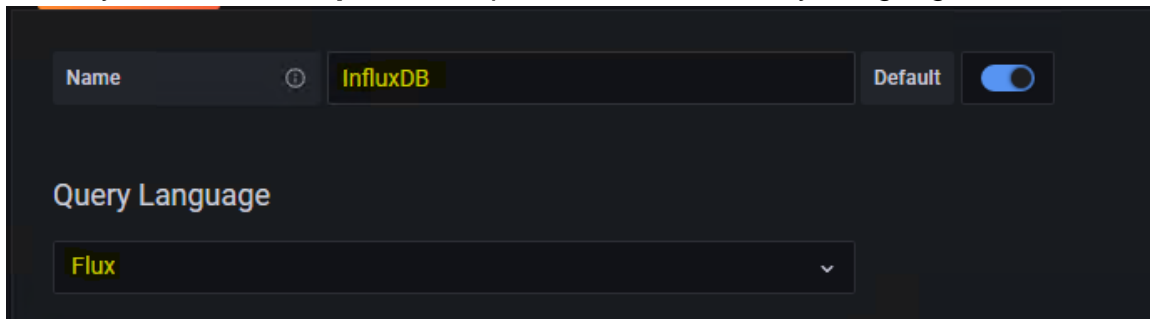
2. Click On Add data source:



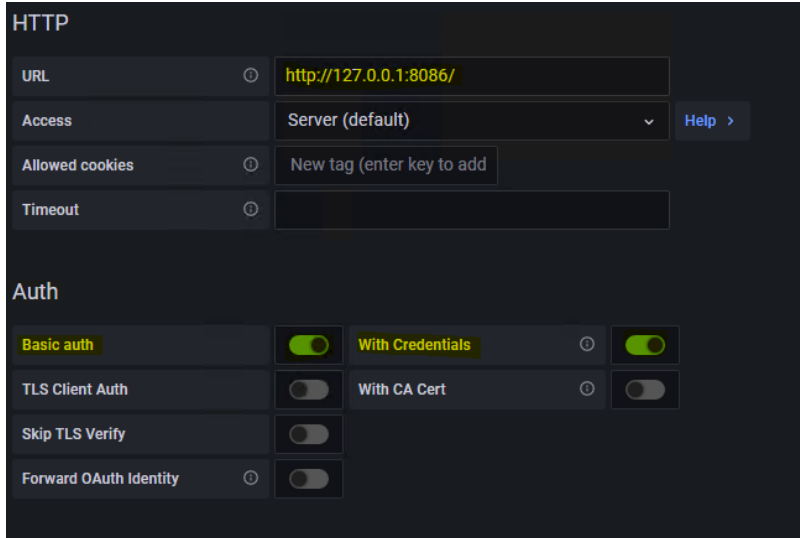
3. Search for influx on the search bar and click on Influx:



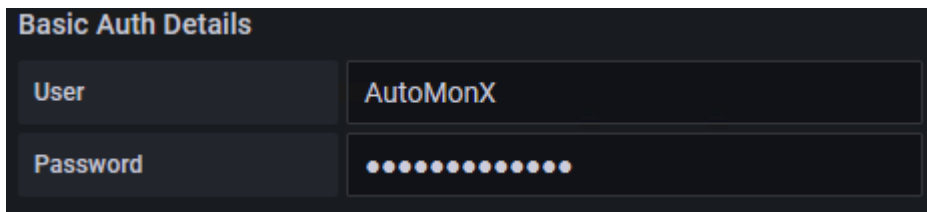
4. Name your DB. **It is important** to pick **Flux** as the Query Language:



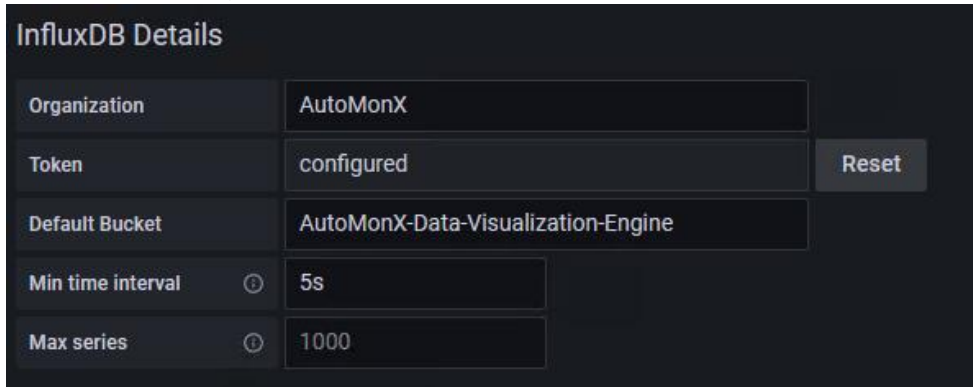
5. Enter the URL, toggle “**Basic auth**” and “**With Credentials**”:



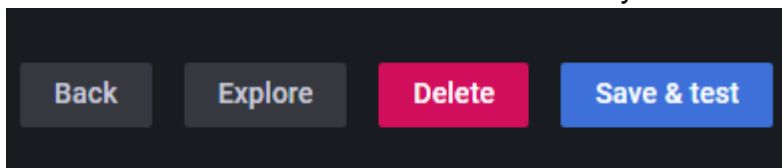
6. Enter the Username and Password you configured In Chapter 9.B in the InfluxDB User creation:



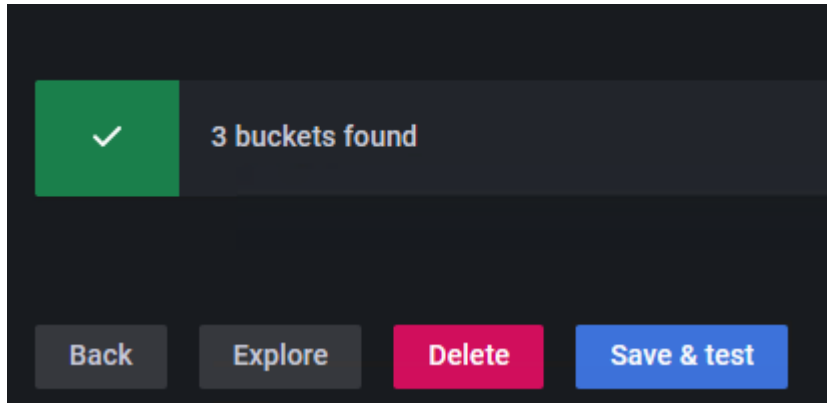
7. Enter the configured Initial Organization in the "Organization" field, Initial Bucket in the "Bucket" field, and Token in the "Token" field, leave everything else as is:



8. Press Save & test and make sure that the test is successful. If not, go over the information entered and correct any mistakes.



If Successful, you should get the number of buckets exist in an InfluxDB installation:

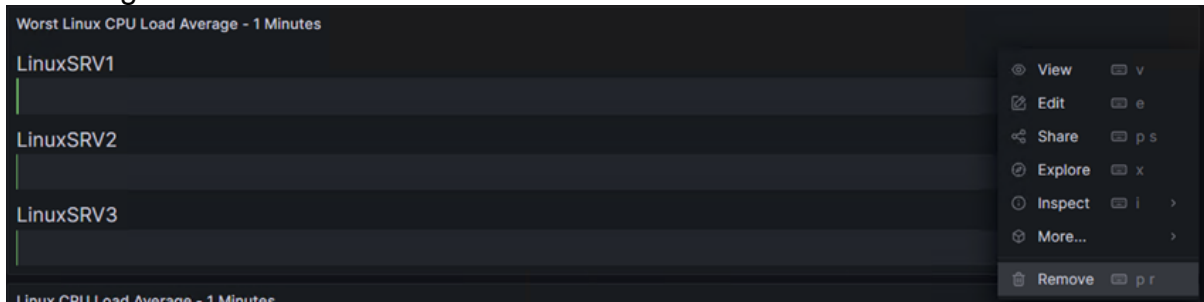


23 Appendix I – Editing Panels in Grafana

Deleting

Deleting a Grafana panel (Linux CPU Load for example) is very simple:

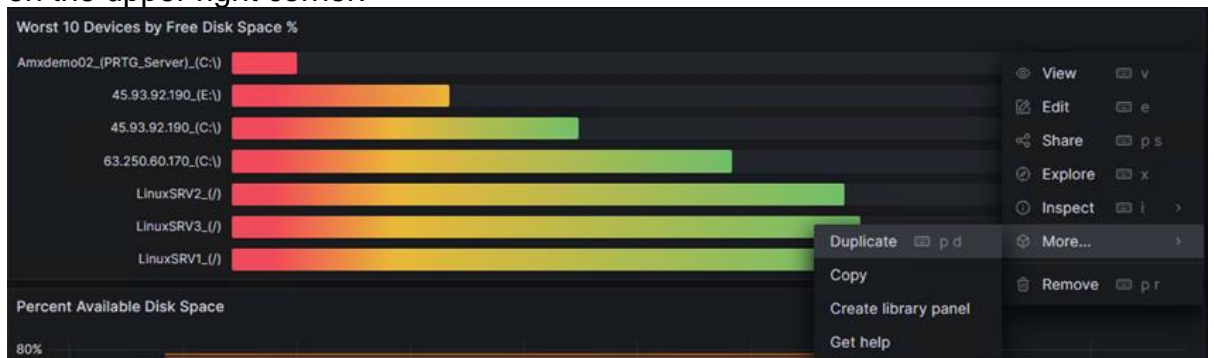
- Hover your mouse in the upper side of the Linux panel.
- Click on the three dots and then click on "Remove" as shown:
- Then save the dashboard for changes using the diskette on the upper right corner:



Duplicating

To duplicate a panel, it is very simple:

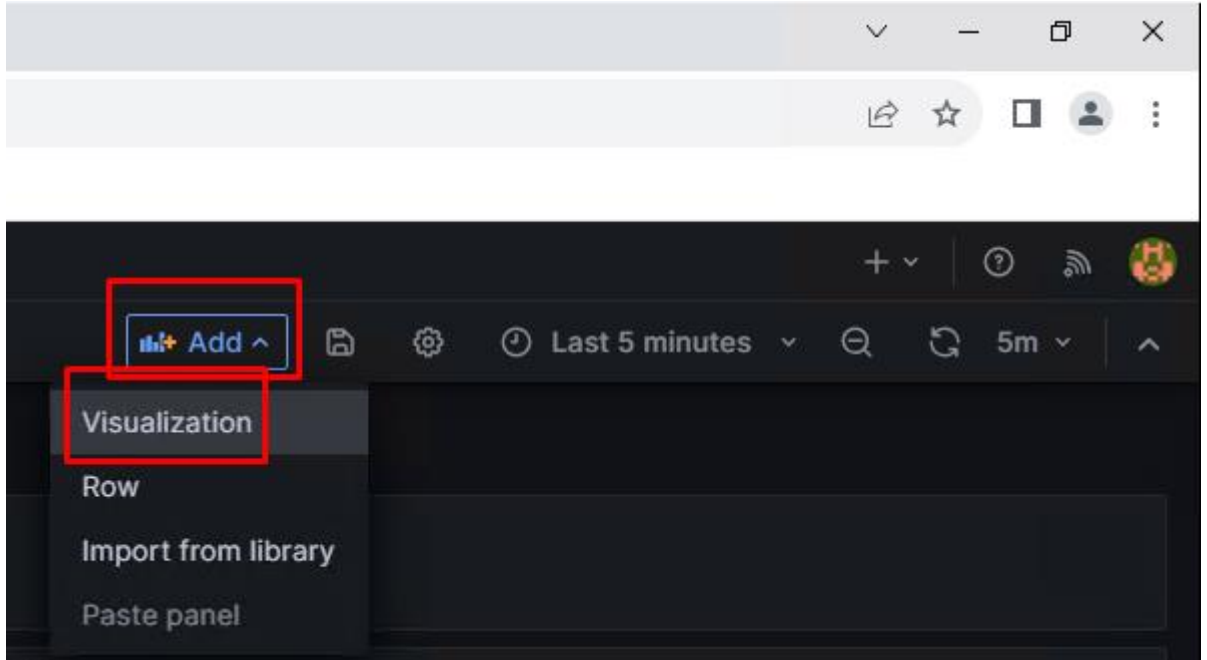
- Hover your mouse in the upper side of the Linux panel.
- Click on the "More...":
- Click on Duplicate:
- Don't forget to save changes after duplicating the panel using the diskette on the upper right corner.



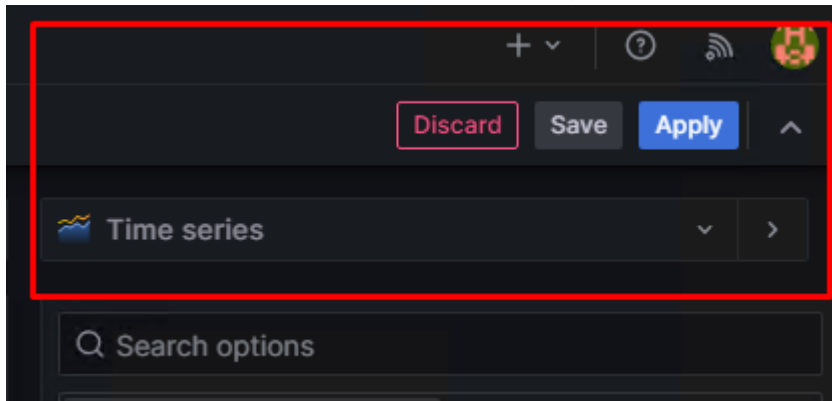
Creating

To create a new panel, do the following:

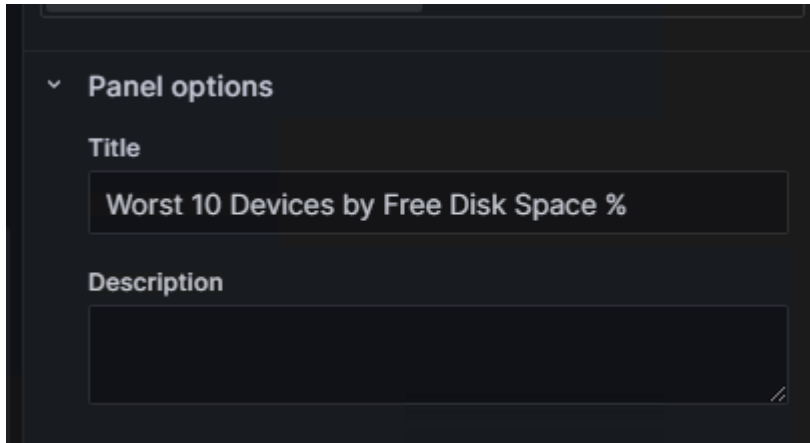
- Click on "Add"
- Click on Visualization:



- Then the panel is created.
- Select the wanted panel on the upper right corner of the webpage:



- Choose a name:



- Edit to your liking, and save this panel.

To edit a panel (and rename a panel), do the following:

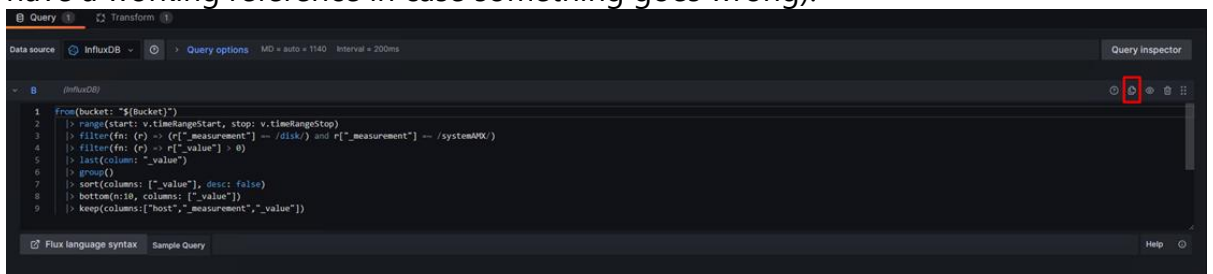
- Duplicate a panel using [Appendix K](#)

Note: It is highly recommended to duplicate an existing panel as it is much easier to work on with working template and have a backup if something goes wrong. But you can also Create a panel like shown above.

- Click on edit of the duplicated panel:



- Duplicate the query at the bottom (this would make it so much easier to have a working reference in case something goes wrong):



```

1 from(bucket: "${Bucket}")
2   |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
3   |> filter(fn: (r) => (r["_measurement"] == /disk/) and r["_measurement"] == /system/)
4   |> filter(fn: (r) => r["_value"] > 0)
5   |> last(column: "_value")
6   |> group()
7   |> sort(columns: ["_value"], desc: false)
8   |> bottom(n:10, columns: ["_value"])
9   |> keep(columns: ["host", "_measurement", "_value"])
  
```

- Then hide the duplicated query via the eye icon right next to the duplicate icon.

- Now you can modify the first query like this (We based this query on the EXCH server):
- Note: the /EXCH/ is a regular expression - meaning this would catch all server that hash EXCH in their name.
- For more customization you can reference the InfluxDB Flux query documentation

```

1 from(bucket: "${Bucket}")
2   |> range(start: v.timeRangeStart, stop: v.timeRangeStop)
3   |> filter(fn: (r) => (r["_measurement"] =~ /disk/) and r["host"] =~ /EXCH/ and r["_measurement"] =~ /systemAMX/)
4   |> filter(fn: (r) => r["_value"] > 0)
5   |> last(column: "_value")
6   |> group()
7   |> sort(columns: ["_value"], desc: false)
8   |> bottom(n:10, columns: ["_value"])
9   |> keep(columns:["host", "_measurement", "_value"])

```

- After that you should see only exchange server in the newly created disk space panel.
- To change the panel name go to the right side of the page and change to name to your liking:

