Hewlett Packard Enterprise

HPE IMC and Aruba OS-CX Switches Configuration Guide

IMC 7.3 E0710P06 edition

27-Nov-24

Hewlett Packard Enterprise

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Document Information

Version no.	Version date	Changes
1.1	15/09/2021	Published as knowledgebase article for IMC 706P06 release
1.2	04/10/2021	Formatting
1.3	19/11/2021	Solarwinds as SFTP server
1.4	27/04/2022	Update for IMC 706P11 release. 1. Core FTP SFTP server as SFTP server, latest version of Solarwinds is incompatible with IMC’s Windows requirements. 2. Updated list of support CX products, now searchable. 3. Software upgrade now fully functional. Association of switch image filenames to device types is manual. 4. RestAPI configuration test parameters have changed. Saving VLAN and ACL changes to startup configuration is necessary.
1.5	17/05/2022	RestAPI configuration test parameters change. Released for IMC 706P11
1.6	20/06/2022	Released to knowledgebase
1.7	27/07/2022	Released to web
2.0	21/09/2022	Updated device list for 708
2.1	22/11/2022	Internal release for 708
2.2	06/12/2022	Section 4 Note - work round to CX communication timeouts

Version no.	Version date	Changes
		during VLAN and ACL Management.
2.3	19/01/2023	Improved section 6. SFTP file transfer service. Modified section 3. SNMP is now read-write on CX
2.4	31/01/2023	Section 6. Replaced SFTP server with Solarwinds which supports SHA2
2.5	08/03/2023	Section 2. Updated list of supported Aruba Networks Devices. Section 4. ACL Management not supported on 6xxx devices. VLAN Management partially supported.
2.6	15/05/2023	Section 13. Software files associated with product family
2.7	15/05/2023	Updated list of devices for 708P03 Section 7 - specified Login Type should be SSH. If the default file transfer mode is not SFTP server, add all CX devices to Device transfer mode
3.0		Updated list of devices for 710 IMC uses version 10.09 of the CX Rest-API for VLAN management
3.1		Modified Section 9 Temperature Monitor Air Inlet Configuration

Version no.	Version date	Changes
3.2		Modified Section 9 Added section 10 Power Supply Monitor Configuration
4.		Modified Section 2 Listed only CX devices - under 1.3.6.1.4.1.47196.4 sysoid.
5.		Clarified VPN instance/VRF configuration in TFTP and SFTP file transfer mode
6.	27/11/2024	Added to section 9. Fan monitoring.

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1 Summary

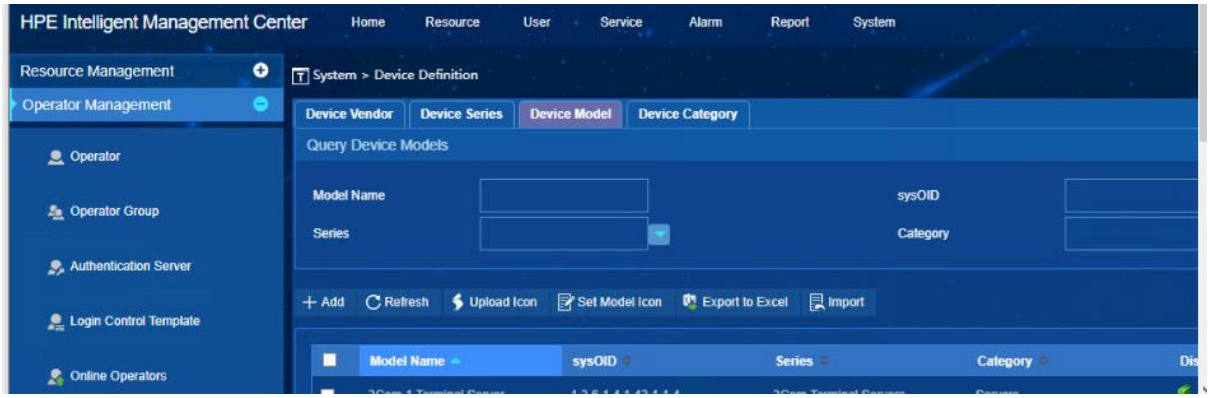
This document includes sample configurations for:

- OS CX devices version 10.7.x and above
- IMC 7.3 E0705 P12 and above
- Updated for IMC 7.3 E0708 P04 release

2 Supported Aruba Networks OS CX devices

Aruba devices listed in System >Resource Management > Device Definition > Device Models
On the discovery page, use the configure SSH and SNMP credentials under Access Parameter Settings. Advanced discovery is not yet supported for CX devices.

If a device is not in this list and it is discovered as 'Unknown SNMP device', go to System > Device Definition > Device Model and add the sysoid and device series/model model.



Model Name	sysOID	Series
Aruba 6200F 24G 4SFP+ Switch	1.3.6.1.4.1.47196.4.1.1.1.300	Aruba 6200 Switch Series
Aruba 6200F 24G Class4 PoE 4SFP+ 370W Switch	1.3.6.1.4.1.47196.4.1.1.1.301	Aruba 6200 Switch Series
Aruba 6200F 48G 4SFP+ Switch	1.3.6.1.4.1.47196.4.1.1.1.302	Aruba 6200 Switch Series
Aruba 6200F 48G Class4 PoE 4SFP+ 370W Switch	1.3.6.1.4.1.47196.4.1.1.1.303	Aruba 6200 Switch Series
Aruba 6200F 48G Class4 PoE 4SFP+ 740W Switch	1.3.6.1.4.1.47196.4.1.1.1.304	Aruba 6200 Switch Series
Aruba 6300F 24G PoE CLS 4 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.108	Aruba 6300 Switch Series
Aruba 6300F 24G/4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.110	Aruba 6300 Switch Series
Aruba 6300F 48G /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.109	Aruba 6300 Switch Series
Aruba 6300F 48G PoE CLS 4 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.107	Aruba 6300 Switch Series
Aruba 6300M 24G /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.106	Aruba 6300 Switch Series
Aruba 6300M 24G PoE CLS 4 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.104	Aruba 6300 Switch Series
Aruba 6300M 24SFP+ 4SFP56	1.3.6.1.4.1.47196.4.1.1.1.100	Aruba 6300 Switch Series
Aruba 6300M 24SR PoE CLS 6 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.102	Aruba 6300 Switch Series
Aruba 6300M 48G /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.105	Aruba 6300 Switch Series
Aruba 6300M 48G 4SFP56	1.3.6.1.4.1.47196.4.1.1.1.111	Aruba 6300 Switch Series
Aruba 6300M 48G PoE CLS 4 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.103	Aruba 6300 Switch Series
Aruba 6300M 48SR PoE CLS 6 /4SFP56 Swch	1.3.6.1.4.1.47196.4.1.1.1.101	Aruba 6300 Switch Series
Aruba 6405 Chassis	1.3.6.1.4.1.47196.4.1.1.1.150	Aruba 6400 Switch Series
Aruba 8320 32 40G x 472 5F 2PSU Bdl	1.3.6.1.4.1.47196.4.1.1.1.3	Aruba 8320 Switch Series
Aruba 8320 48 10/6 40 X472 5F 2PS Bndl	1.3.6.1.4.1.47196.4.1.1.1.2	Aruba 8320 Switch Series
Aruba 8320 48 T/6 40 X472 5 2 Bdl	1.3.6.1.4.1.47196.4.1.1.1.5	Aruba 8320 Switch Series

Aruba 8325-32C 32p 100G Switch	1.3.6.1.4.1.47196.4.1.1.70	Aruba 8325 Switch Series
Aruba 8325-48Y8C 48p 25G 8p 100G Switch	1.3.6.1.4.1.47196.4.1.1.50	Aruba 8325 Switch Series
Aruba JL675A 6100 48G CL4 4SFP+	1.3.6.1.4.1.47196.4.1.1.250	Aruba 6100 Switch Series
Aruba JL676A 6100 48G 4SFP+	1.3.6.1.4.1.47196.4.1.1.251	Aruba 6100 Switch Series
Aruba JL677A 6100 24G CL4 4SFP+	1.3.6.1.4.1.47196.4.1.1.252	Aruba 6100 Switch Series
Aruba JL678A 6100 24G 4SFP+	1.3.6.1.4.1.47196.4.1.1.253	Aruba 6100 Switch Series
Aruba JL679A 6100 12G CL4 2SFP+ 139W	1.3.6.1.4.1.47196.4.1.1.254	Aruba 6100 Switch Series
Aruba JL717A 8360-32Y4C	1.3.6.1.4.1.47196.4.1.1.400	Aruba 8360 Switch Series
Aruba JL718A 8360-16Y2C	1.3.6.1.4.1.47196.4.1.1.401	Aruba 8360 Switch Series
Aruba JL719C 8360-48Y6C v2 Switch	1.3.6.1.4.1.47196.4.1.1.422	Aruba 8360 Switch Series
Aruba JL720A 8360-48XT4C	1.3.6.1.4.1.47196.4.1.1.403	Aruba 8360 Switch Series
Aruba JL722A 8360-24XF2C	1.3.6.1.4.1.47196.4.1.1.405	Aruba 8360 Switch Series
Aruba JL724B 6200F 24G 4SFP+ Sw	1.3.6.1.4.1.47196.4.1.1.305	Aruba 6200 Switch Series
Aruba JL726B 6200F 48G 4SFP+ Sw	1.3.6.1.4.1.47196.4.1.1.307	Aruba 6200 Switch Series
Aruba JL817A 4100i 12G CL4/6 POE 2SFP+ DIN Sw	1.3.6.1.4.1.47196.4.1.1.450	Aruba 4100i Switch Series
Aruba JL818A 4100i 24G CL4/6 POE 4SFP+ Sw	1.3.6.1.4.1.47196.4.1.1.451	Aruba 4100i Switch Series
Aruba R0X25A 6410	1.3.6.1.4.1.47196.4.1.1.151	Aruba 6410 Switch Series
Aruba R0X25C 6410 v2 Chassis	1.3.6.1.4.1.47196.4.1.1.161	Aruba 6400 Switch Series
Aruba R8N85A 6000 48G CL4 4SFP Swch	1.3.6.1.4.1.47196.4.1.1.270	Aruba 6000 Switch Series
Aruba R8N86A 6000 48G 4SFP Swch	1.3.6.1.4.1.47196.4.1.1.271	Aruba 6000 Switch Series
Aruba R8N87A 6000 24G CL4 4SFP Swch	1.3.6.1.4.1.47196.4.1.1.272	Aruba 6000 Switch Series
Aruba R8N88A 6000 24G 4SFP Swch	1.3.6.1.4.1.47196.4.1.1.273	Aruba 6000 Switch Series
Aruba R8N89A 6000 12G CL4 2SFP 139W Swch	1.3.6.1.4.1.47196.4.1.1.274	Aruba 6000 Switch Series
Aruba R8Q67A 6200M 24G 4SFP+	1.3.6.1.4.1.47196.4.1.1.321	Aruba 6200 Switch Series
Aruba R8Q68A 6200M 24G CL4 PoE 4SFP+	1.3.6.1.4.1.47196.4.1.1.322	Aruba 6200 Switch Series
Aruba R8Q69A 6200M 48G 4SFP+	1.3.6.1.4.1.47196.4.1.1.323	Aruba 6200 Switch Series
Aruba R8Q70A 6200M 48G CL4 PoE 4SFP+	1.3.6.1.4.1.47196.4.1.1.324	Aruba 6200 Switch Series
Aruba R8Q71A 6200M 36G 12SR5 CL6 PoE 4SFP+	1.3.6.1.4.1.47196.4.1.1.325	Aruba 6200 Switch Series
Aruba R8Q72A 6200F 12G CL4 2G/2SFP+ 139W	1.3.6.1.4.1.47196.4.1.1.326	Aruba 6200 Switch Series
Aruba R8S89A 6300M 24SR CL6 PoE 2p50G 2p25G Switch	1.3.6.1.4.1.47196.4.1.1.116	Aruba 6300M Switch Series
Aruba R8S90A 6300M 48SR5 CL8 PoE 2p50G 2p25G Switch	1.3.6.1.4.1.47196.4.1.1.117	Aruba 6300M Switch Series
Aruba R8S91A 6300M 48SR5 CL6/CL8 2p50G 2p10G Switch	1.3.6.1.4.1.47196.4.1.1.118	Aruba 6300M Switch Series
Aruba R8S92A 6300M 24p SFP+ LRM 2p50G 2p25G Sw	1.3.6.1.4.1.47196.4.1.1.119	Aruba 6300M Switch Series
Aruba R8S96A CX 10000-48Y6C	1.3.6.1.4.1.47196.4.1.1.600	Aruba 10000 Switch Series
Aruba R8V08A 6200M 24G 4SFP+ TAA	1.3.6.1.4.1.47196.4.1.1.327	Aruba 6200 Switch Series
Aruba R8V11A 6200M 48G CL4 PoE 4SFP+ TAA	1.3.6.1.4.1.47196.4.1.1.330	Aruba 6200 Switch Series
Aruba R8V12A 6200M 36G 12SR5 CL6 4SFP+ TAA	1.3.6.1.4.1.47196.4.1.1.331	Aruba 6200 Switch Series
Aruba R8V13A 6200F 12G CL4 2G/2SFP+TAA	1.3.6.1.4.1.47196.4.1.1.332	Aruba 6200 Switch Series
Aruba R8Z96A 9300-32D 32p 400G 2P 10G Switch	1.3.6.1.4.1.47196.4.1.1.700	Aruba 9300 Switch Series
Aruba R9W94A 8100-24XF4C	1.3.6.1.4.1.47196.4.1.1.800	Aruba 8100 Switch Series
Aruba R9W95A 8100-24XT4XF4C	1.3.6.1.4.1.47196.4.1.1.801	Aruba 8100 Switch Series
Aruba R9W96A 8100-48XF4C	1.3.6.1.4.1.47196.4.1.1.802	Aruba 8100 Switch Series
Aruba R9W97A 8100-40XT8XF4C	1.3.6.1.4.1.47196.4.1.1.803	Aruba 8100 Switch Series
Aruba R9Y03A 6000 48G CL4 4SFP	1.3.6.1.4.1.47196.4.1.1.280	Aruba 6000 Switch Series
Aruba R9Y04A 6100 48G CL4 4SFP+	1.3.6.1.4.1.47196.4.1.1.260	Aruba 6100 Switch Series
Aruba S0M81A 6200F 24G 4SFP Sw	1.3.6.1.4.1.47196.4.1.1.310	Aruba 6200 Switch Series

Aruba S0M83A 6200F 48G 4SFP Sw	1.3.6.1.4.1.47196.4.1.1.1.312	Aruba 6200 Switch Series
Aruba SOM86A 6200F 24G 4SFP+ TAA Sw	1.3.6.1.4.1.47196.4.1.1.1.319	Aruba 6200 Switch Series
Aruba SOM90A 6200F 48G PoE 4SFP+ 740W TAA	1.3.6.1.4.1.47196.4.1.1.1.315	Aruba 6200 Switch Series
HPE Aruba 8400 Switch	1.3.6.1.4.1.47196.4.1.1.1.1	Aruba 8400 Series

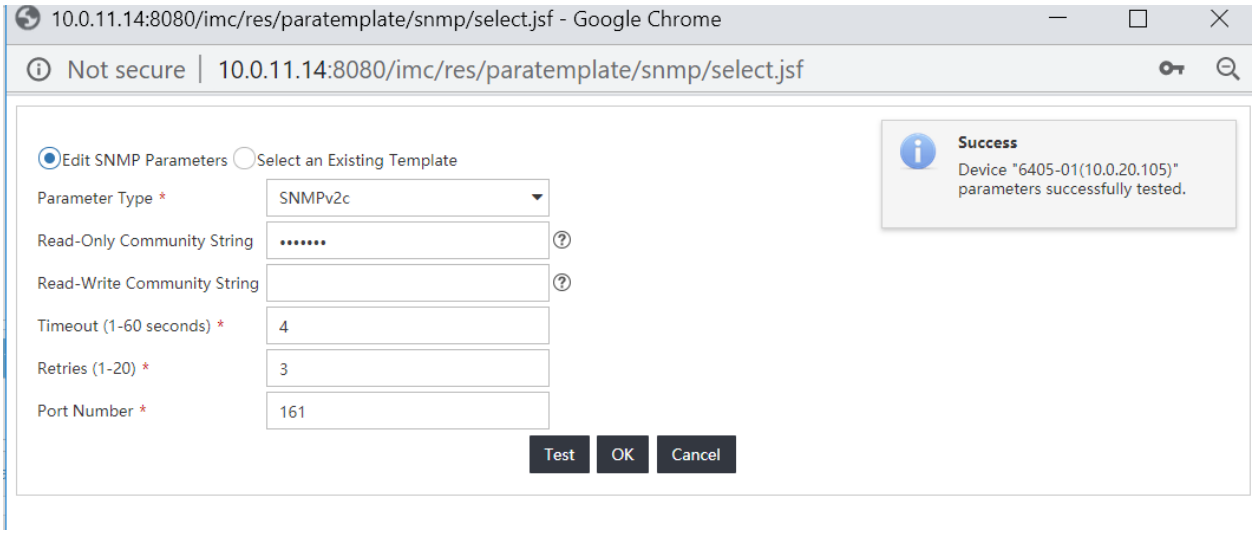
3 SNMP configuration

Management traffic has lower priority on the default VRF.

If the CX product supports a mgmt VRF, it is recommended to configure the switch to communicate with IMC for SNMP, RestAPI and all other management protocols (SSH ,TFTP, SFTP) via the management VRF.

Old versions of the Aruba OS-CX products are SNMP-read only. IMC uses RESTful API to manage VLANs and ACLs.

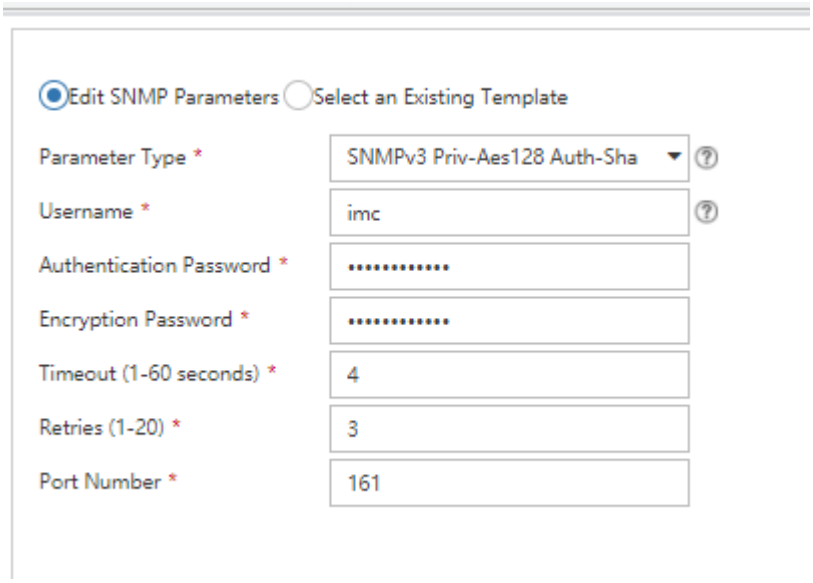
if the CX version does not support the write operation via SNMP, you may configure a blank write community string in IMC for SNMP V2.



Example SNMP V3 AOS-CX Switch Configuration

Replace mgmt with default if switch does not support mgmt vrf.

```
snmp-server vrf mgmt
snmpv3 user imc auth sha auth-pass ciphertext ‘password’ priv aes priv-pass ciphertext ‘password’
snmp-server host 110.110.114.95 trap version v3 user imc.
```



If IMC displays ‘device does not respond to SNMP’ alarms, test SNMP template and increase timeout as necessary.

4 RESTful API Configuration for change management

VLAN configuration and ACL management are supported via RESTful API.
Changes are made to the running configuration which needs to be saved to startup separately.

ACL management is not supported on 6xxx switches.
VLAN management may not be fully functional on 6xxx devices due to timeouts on the device side.

Note

If you experience a communication timeout during VLAN and ACL Management



from the switch, please synchronize the device to refresh the settings, as IMC may have successfully or partially changed the configuration on the switch and not received a response.

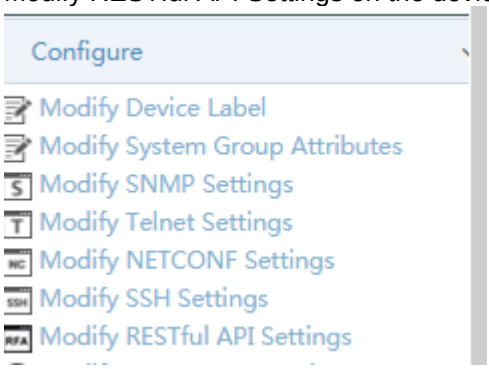
AOS-CX Switch Configuration

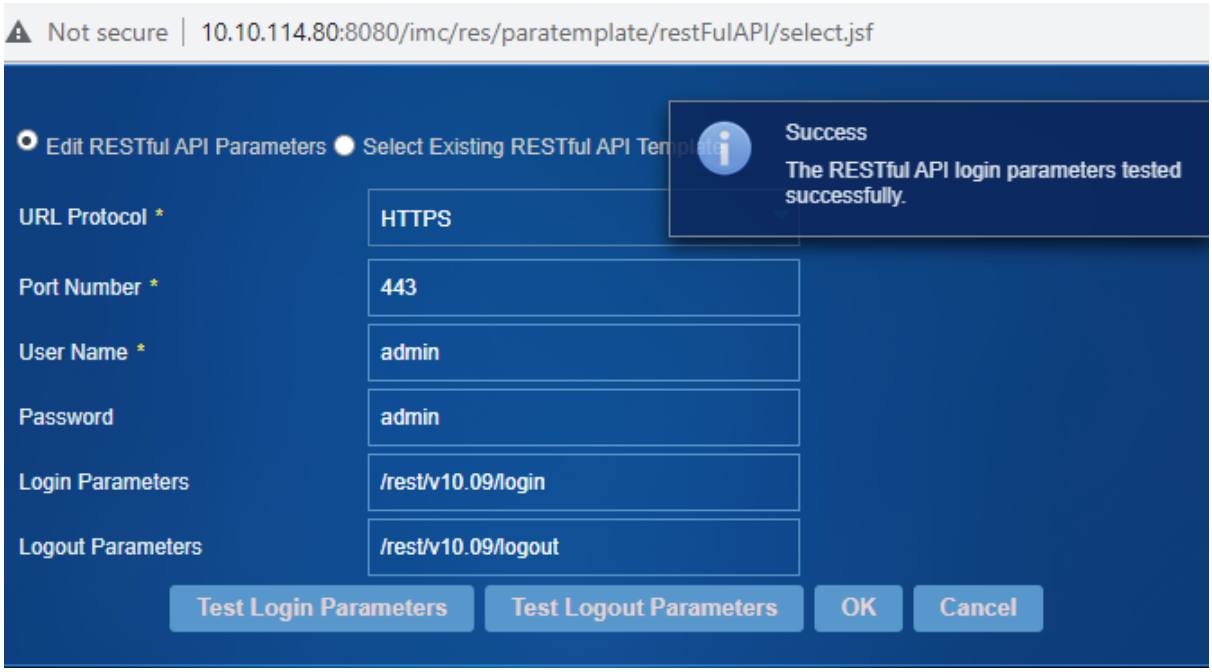
If using the mgmt VRF, configure as follows:

```
https-server rest access-mode read-write
https-server vrf mgmt
```

IMC Configuration

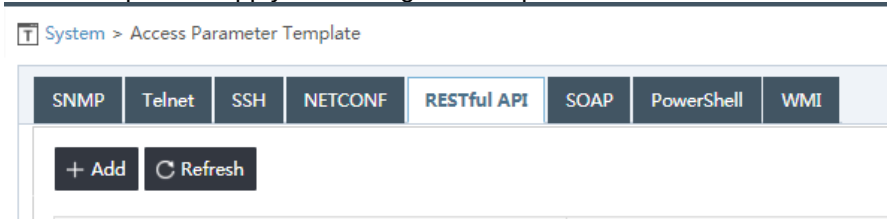
Modify RESTful API Settings on the device resource page. Use the SSH credentials.





IMC will use the specified port, username and password for VLAN management.
It uses version 10.09 of the CX Rest-API, even if a different version is configured in the login parameters.

Add a template to apply the settings to multiple devices:

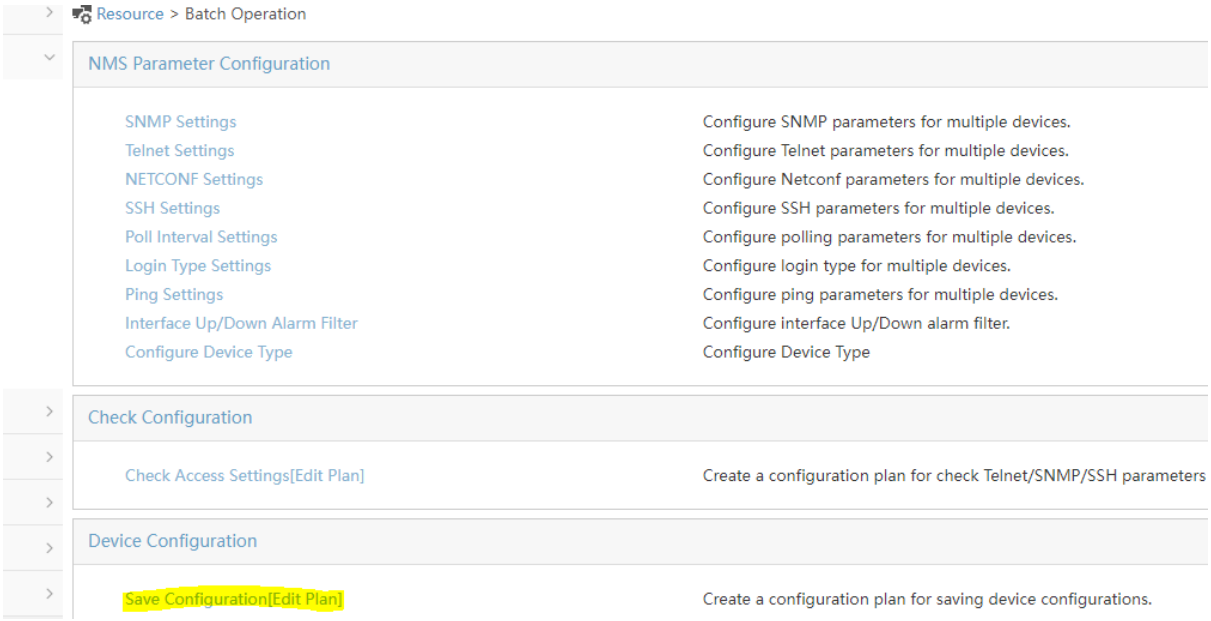


Note:

As CX SNMP management is read only, IMC is using the RestAPI for VLAN management and the switch makes the changes to the running configuration.

In order to save changes to the startup configuration, please use the Resource > Batch Operation >Save Configuration Plan.

The switch requires the user to save the configuration manually after making changes to the switches from IMC.



5 How to open SSH sessions on OS-CX devices configured with sha2

From IMC version 7.3706E0P11, IMC automatically adapts its ssh client to use the encryption supported by the device.

In earlier versions, manually create file $IMC/server/conf/putty07 as an empty file and restart IMC, following the readme.

6 TFTP and ‘SFTP Server’ file transfer modes

Configuration Backup/Restore, Software Upgrade, Compliance Check Task are deployed using scripts which require Login Type to be configured as SSH on the device page.

Software Upgrade is fully working from IMC version 708P03.

CX only supports TFTP and ‘SFTP Server’ file transfer modes.

Note ‘SFTP’ file transfer mode (where IMC is the client), is not supported by CX.

SFTP is the preferred file transfer protocol for CX.

TFTP may time out if the switch is not configured with a mgmt VRF, if it does not support the mgmt VRF, or if the switch does not receive a reply from IMC within one second.

An SFTP server which supports SHA2 encryption must be installed on the IMC server, with a specific user and the default path to IMC.

In IMC options, the SFTP server user is configured, and ‘SFTP Server mode’ is enabled for CX devices.

On Linux, you may use the native SFTP server.

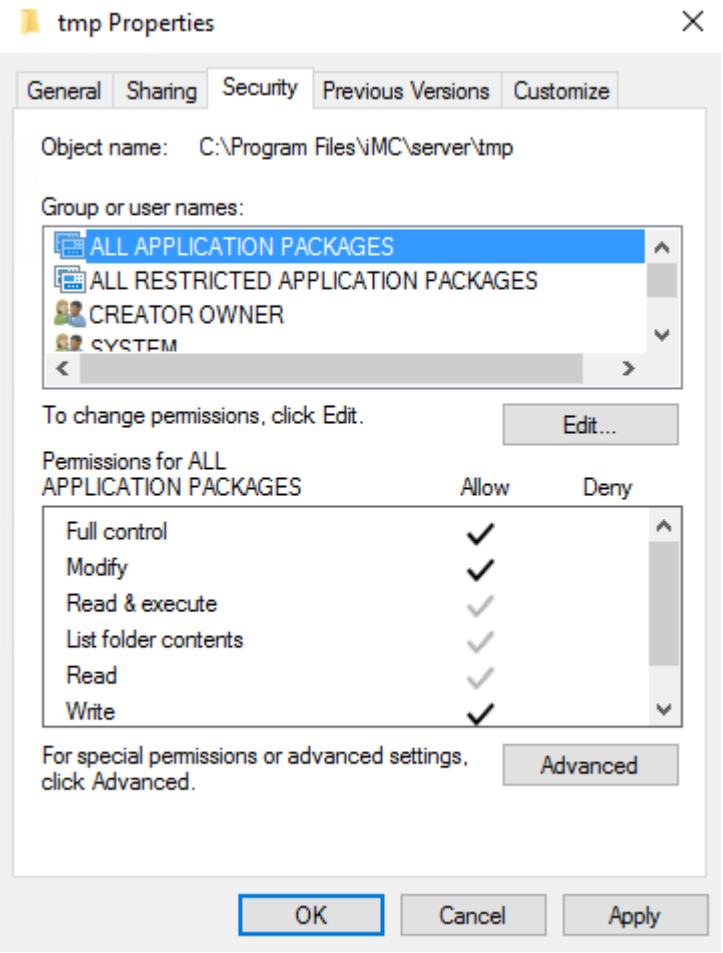
On Windows, the Solarwinds server is recommended.

Please check the encryption level of the SFTP server supports the level configured on the switch.

Example:

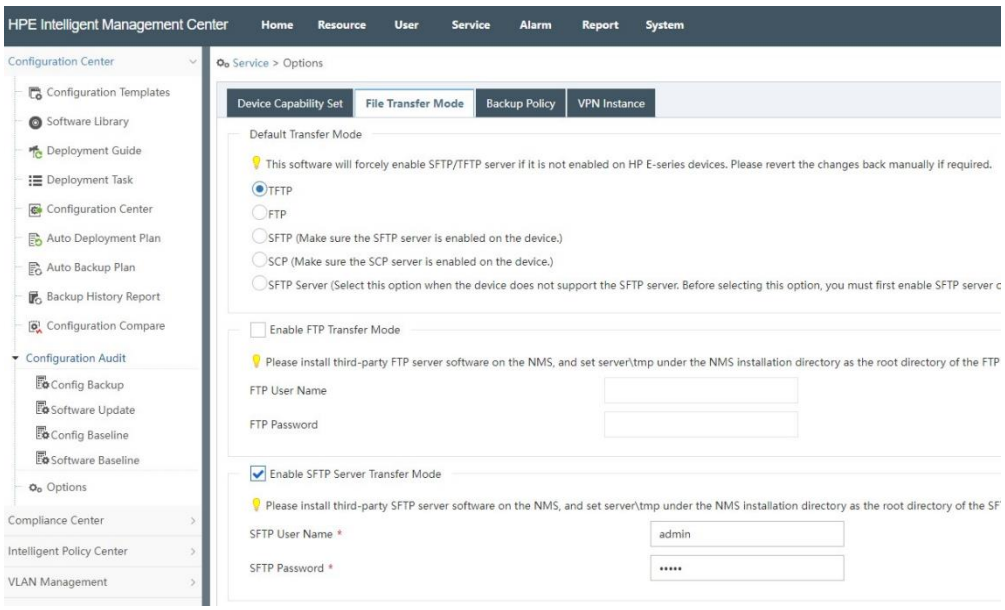
In IMC, configure SFTP Server file transfer mode.

Modify permissions for all Windows Logon users for $IMC/server/tmp to full control.

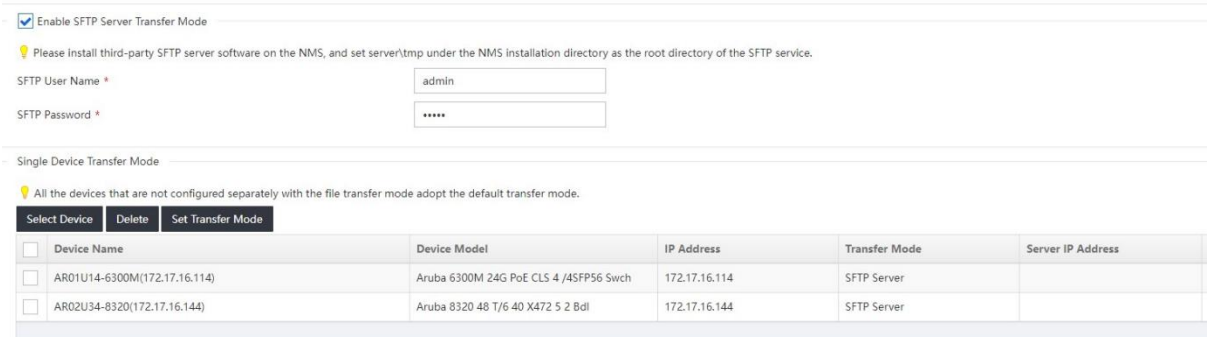


Service > Configuration Center > Options:

- enable SFTP server Transfer Mode and VPN Instance
- configure SFTP server credentials
- configure SFTP Server transfer mode for CX devices



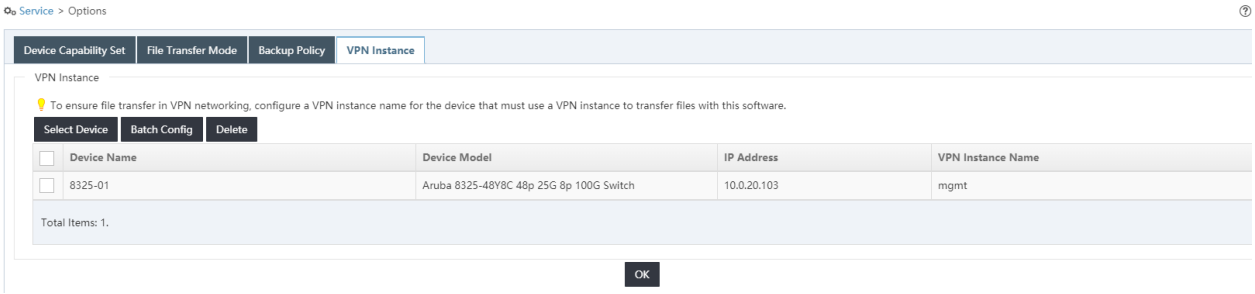
If the default transfer mode is not SFTP server, add all CX devices to Single Device transfer mode and set transfer mode to SFTP server



Note, the Server IP address is the IMC server, it can be left blank if the IMC server has a single IP address.

If using the default VRF for file transfer, do not configure a VPN instance name with default..

If using a non-default vrf (mgmt), configure the VRF name in Service -> Configuration Management -> Option -> VPN Options, VPN instance name.



Download Solarwinds SFTP/SCP server:

https://www.solarwinds.com/free-tools/free-sftp-server/registration

Enter registration details and download SolarWinds-SFTP-SCP-Server.zip

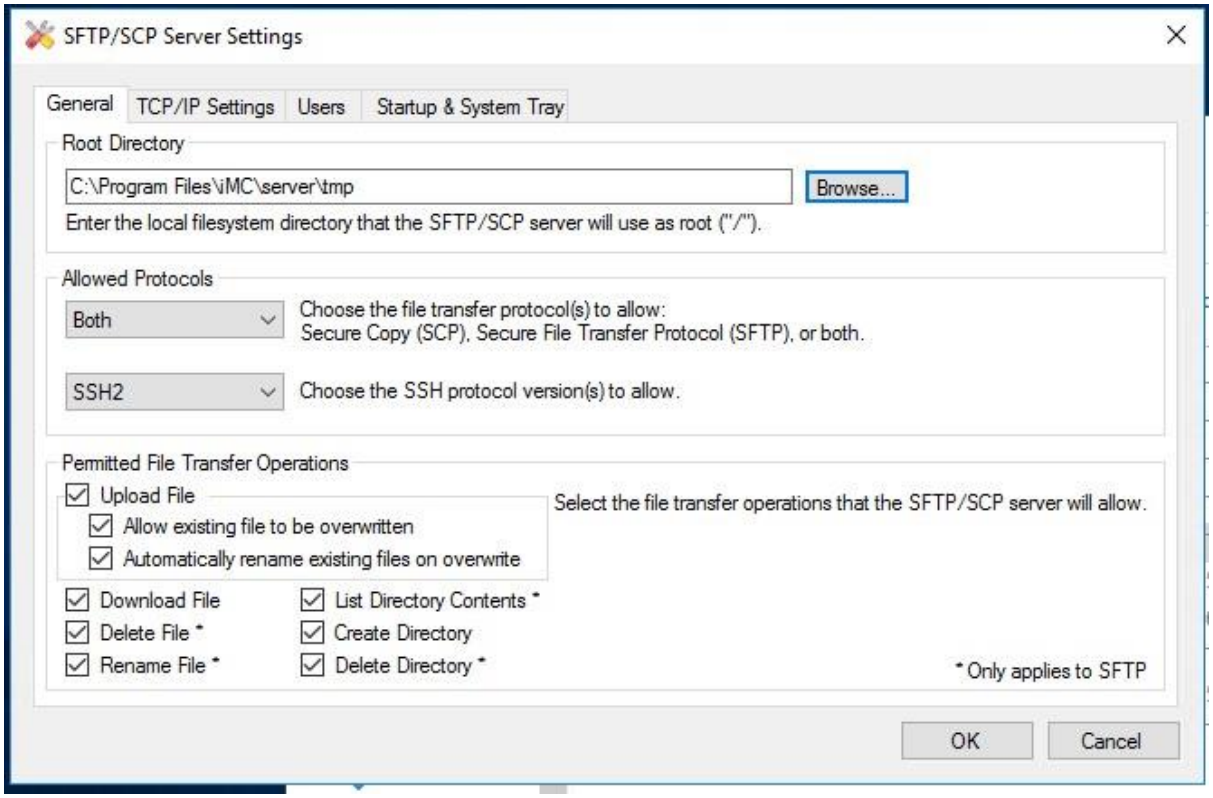
Extract zip and run SftpServerInstaller.msi

Go to folder:

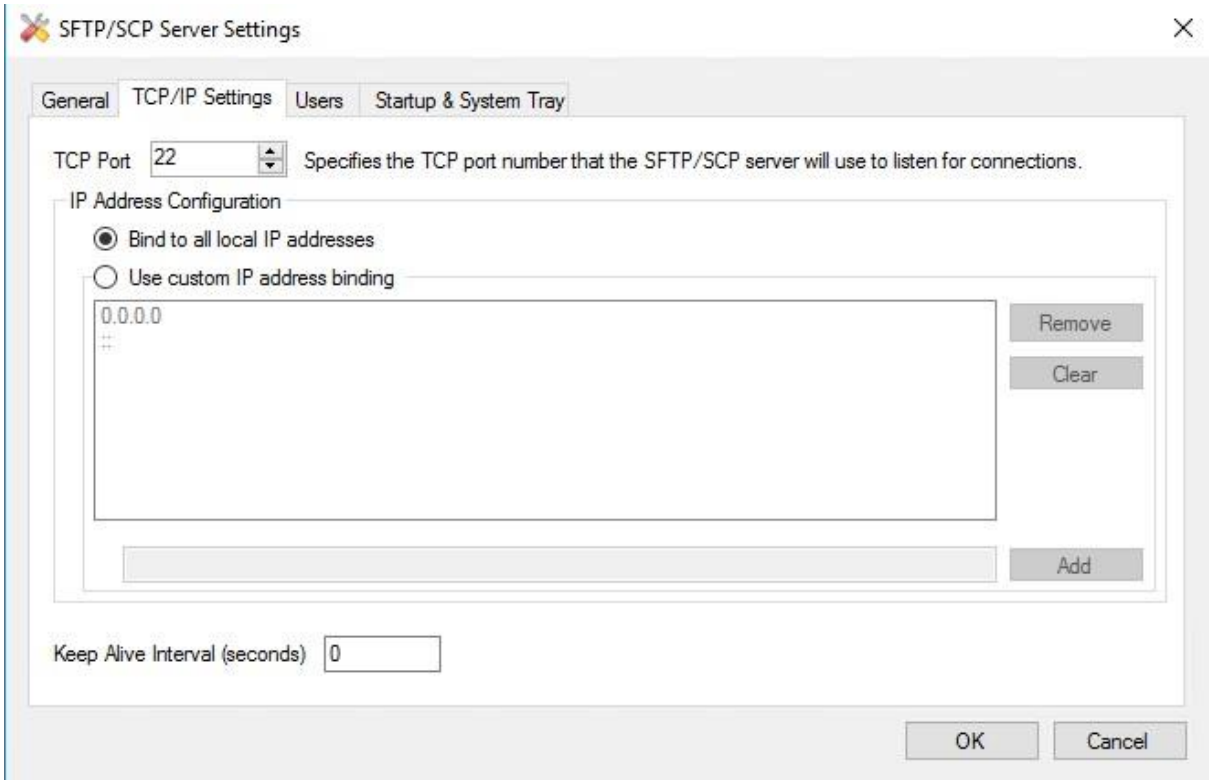
C:\Program Files (x86)\SolarWinds\SFTP & SCP Server

Run ScpServerTray.exe

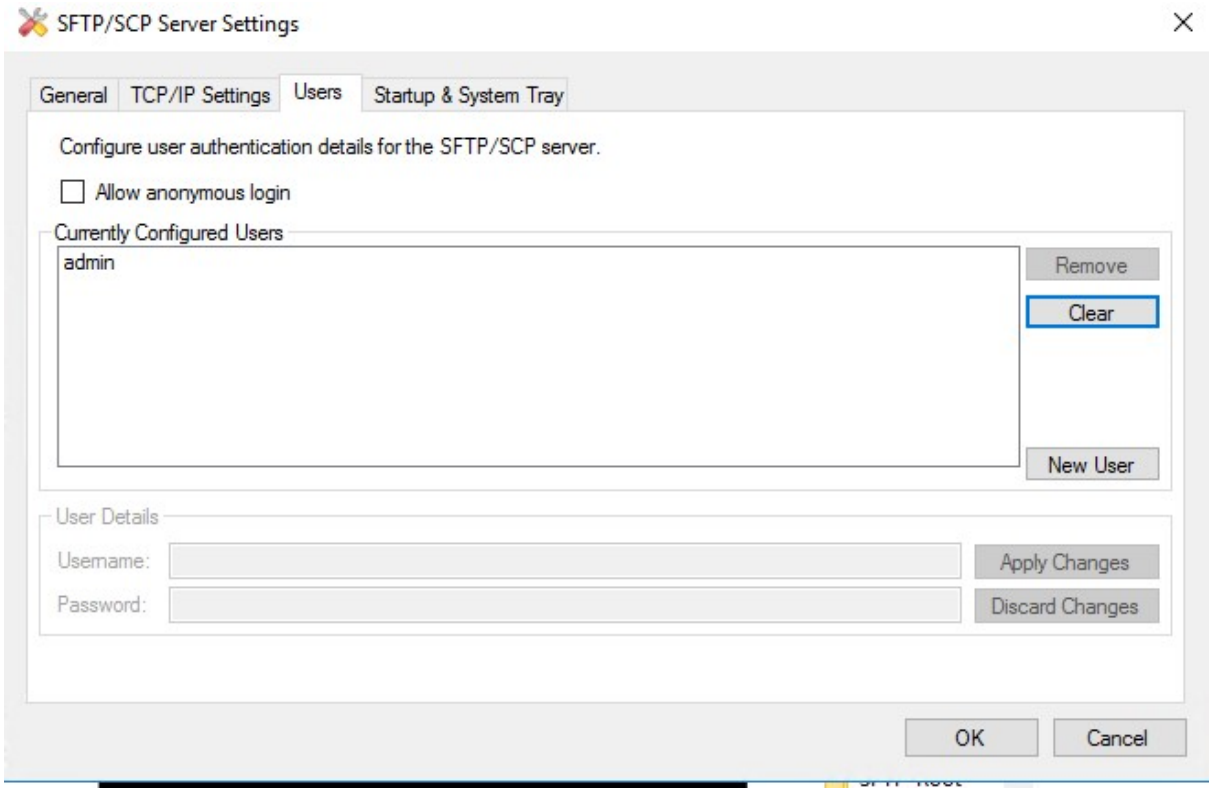
Configure Root Directory in General Tab


SFTP/SCP Server Settings
General
TCP/IP Settings
Users
Startup & System Tray
Root Directory
C:\Program Files\iMC\server\tmp
Browse...
Enter the local filesystem directory that the SFTP/SCP server will use as root ("/").
Allowed Protocols
Both
Choose the file transfer protocol(s) to allow:
Secure Copy (SCP), Secure File Transfer Protocol (SFTP), or both.
SSH2
Choose the SSH protocol version(s) to allow.
Permitted File Transfer Operations
Upload File
Allow existing file to be overwritten
Automatically rename existing files on overwrite
Select the file transfer operations that the SFTP/SCP server will allow.
Download File
List Directory Contents *
Delete File *
Create Directory
Rename File *
Delete Directory *
* Only applies to SFTP
OK
Cancel

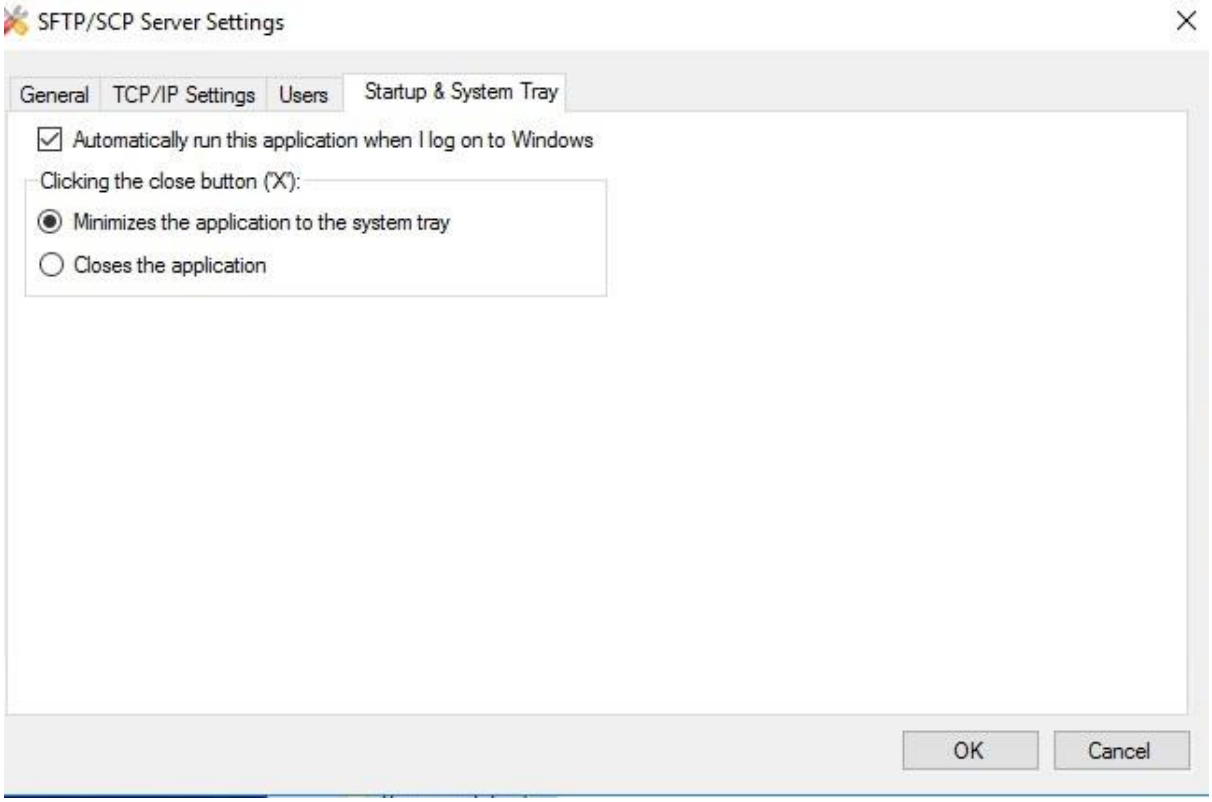
No changes to TCP/IP settings in Solarwinds. Ensure port 22 is open on firewalls and IMC's server, eg Windows defender, etc.



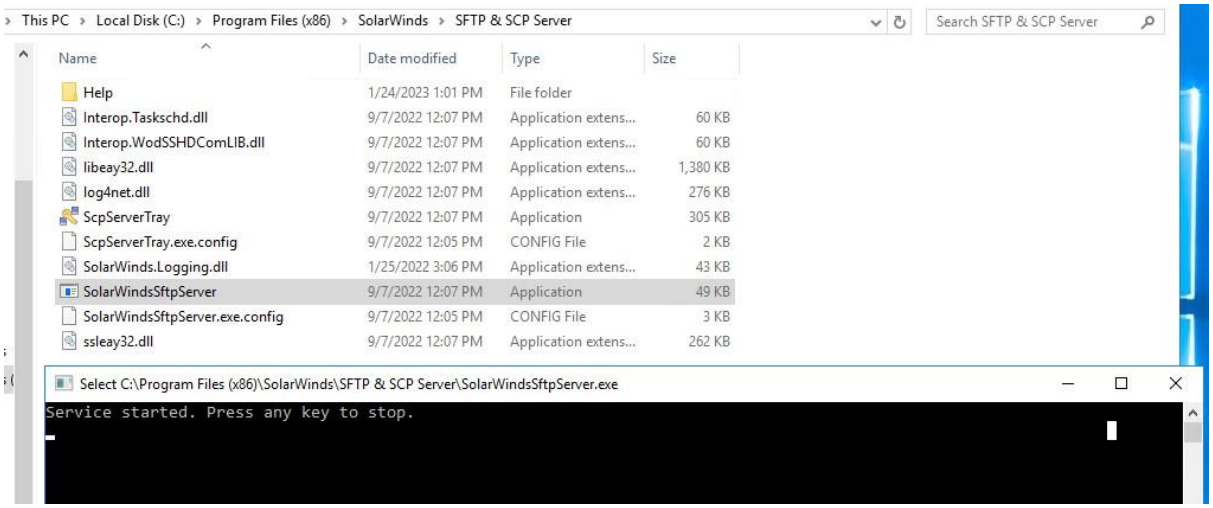
Enter SFTP server user credentials as configured in IMC's Service > Configuration Center > Options > Enable SFTP server Transfer Mode:



Select Automatically run this application when I log on Windows

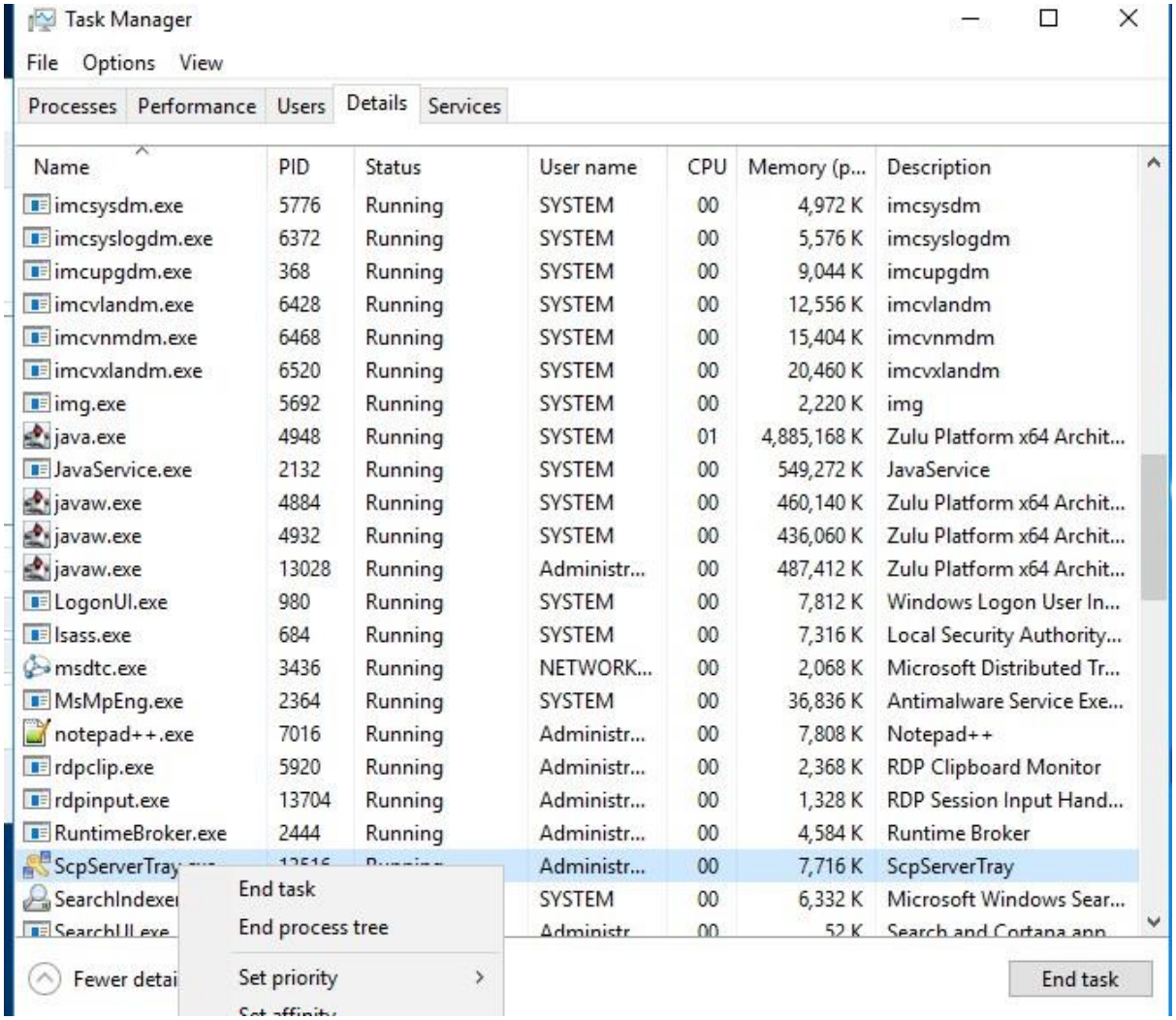


Double click on SolaWindsSFTPServer.exe to start the server.



A quirk:

Once you minimize the SCP tray, you can no longer maximise it. To redisplay the tray, end process tree in Task Manager and launch it again.



7 Temperature Monitor Configuration

For temperature monitoring, IMC reads a standard MIB object in the Entity table in Celsius. This MIB object is not supported by Aruba OS CX, the following private MIB object is recommended. Therefore we need to remove the standard temperature monitor from CX devices and set up another global index monitor on arubaWiredTempSensorTemperature. MIB object 1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.

The instance of this MIB object is variable, according to device type and sensor type. It is necessary to choose the desired instance using a MIB browser, before creating the monitor.

MIB Object definition

Aruba CX switches support the MIB object arubaWiredTempSensorTemperature, a field in table arubaWiredTempSensorTable, which has 4 indexes.

```
INDEX      {
             arubaWiredTempSensorGroupIndex,
             arubaWiredTempSensorSlotTypeIndex,
             arubaWiredTempSensorSlotIndex,
             arubaWiredTempSensorIndex
           }
```

In order to create a monitor for the Air Inlet sensor, we need to identify the 4 indexes of the table row representing the particular Air Inlet sensor instance we want to monitor.

The example below describes how to create an IMC performance monitor for an instance of the Aruba CX Inlet Air temperature sensor.

Steps:

- Download ArubaWiring-Network-OID, Aruba-Wired-Chassis , Aruba-Tempsensor MIBs from:

https://networkingsupport.hpe.com/downloads;fileTypes=SOFTWARE;products=Aruba%20Switches;softwareGroups=ArubaOS-CX;fileContents=MIB

- Load the MIBs into the IMB MIB browser
- Find the MIB table which contains the temperature sensors.
- Find the Inlet Air temperature sensor instance within the table
- Create a Global Performance Index in IMC for the MIB object + instance.
- As the temperature is expressed in milli Celsius, divide the temperature by 1000 to display Celsius.
- Configure the alarm thresholds for the monitor
- Create a monitor for the global index and assign it to the devices that support the same temperature sensor instance.
- Repeat the process for other temperature sensor instances.

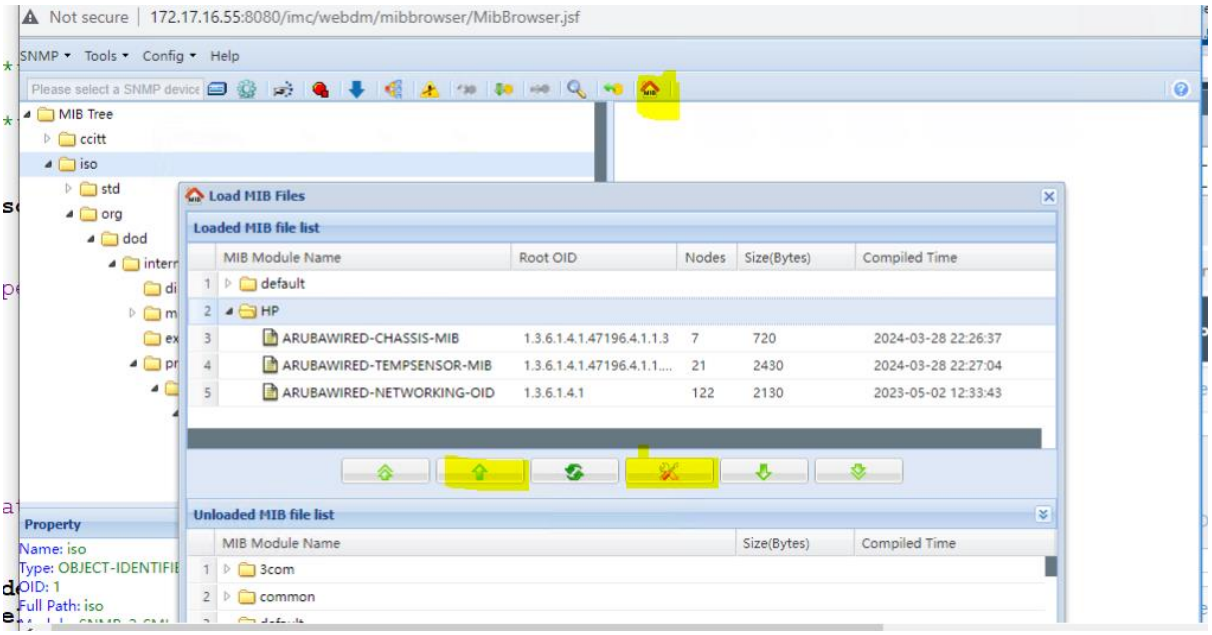
Find the instance of the sensor.

Select the OS-CX device page in IMC and click MIB Management.

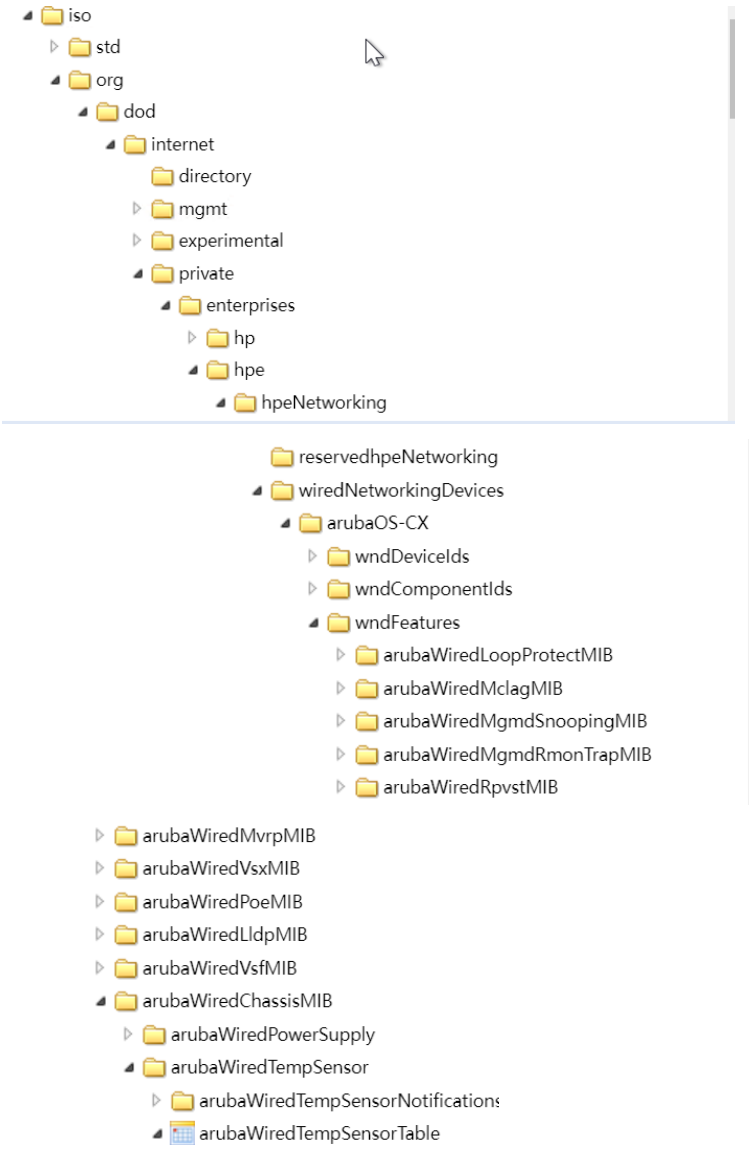
Click Load MIB Files.

Compile the following MIBs: ArubaWired-Networking-OID, ArubaWired-Chassis-MIB and Aruba-Tempsensor-MIB.

Load these three MIBs.



Navigate to arubaWiredTempSensorTempTable in the MIB tree.



Select the srubWiredTempSensorTable, right mouse click and click Table View.

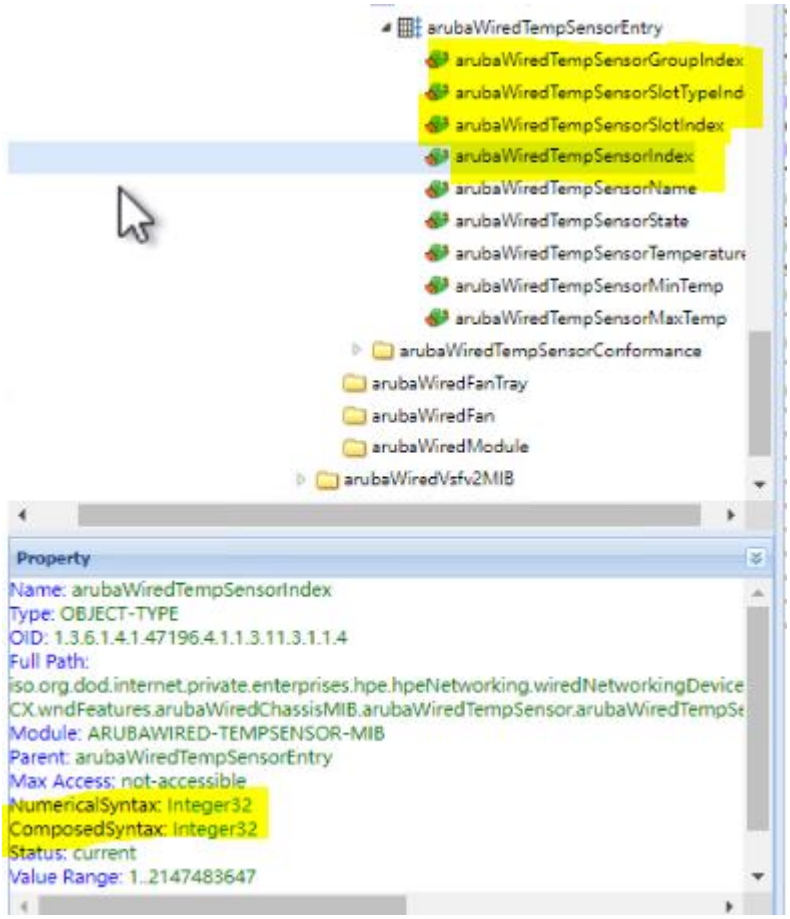
Table View

	Instance	arubaWiredTe...	arubaWiredTe...	arubaWiredTe...	arubaWiredTe...	arubaWiredTempSensor...	arubaW
1	1.3.1.1	Not Available	Not Available	Not Available	Not Available	1/1-PHY-01-08	normal
2	1.3.1.2	Not Available	Not Available	Not Available	Not Available	1/1-PHY-09-16	normal
3	1.3.1.3	Not Available	Not Available	Not Available	Not Available	1/1-PHY-17-24	normal
4	1.4.1.1	Not Available	Not Available	Not Available	Not Available	1/1-Inlet-Air	normal
5	1.4.1.2	Not Available	Not Available	Not Available	Not Available	1/1-Switch-ASIC-Internal	normal
6	1.4.1.3	Not Available	Not Available	Not Available	Not Available	1/1-Switch-CPU-1	normal
7	1.4.1.4	Not Available	Not Available	Not Available	Not Available	1/1-Switch-CPU-2	normal

1.4.1.1 is the instance for Inlet-Air. Note there may be more than one instance of Inlet-Air, and the process below will have to be repeated

Find the table index information for theType field in the Global Index Page

Select each index in the table and make a note the name and type (they are all integers). These will be used to fill in the Type field in the Global Index page.



The 4 indexes are:

arubaWiredTempSensorGroupIndex, Integer

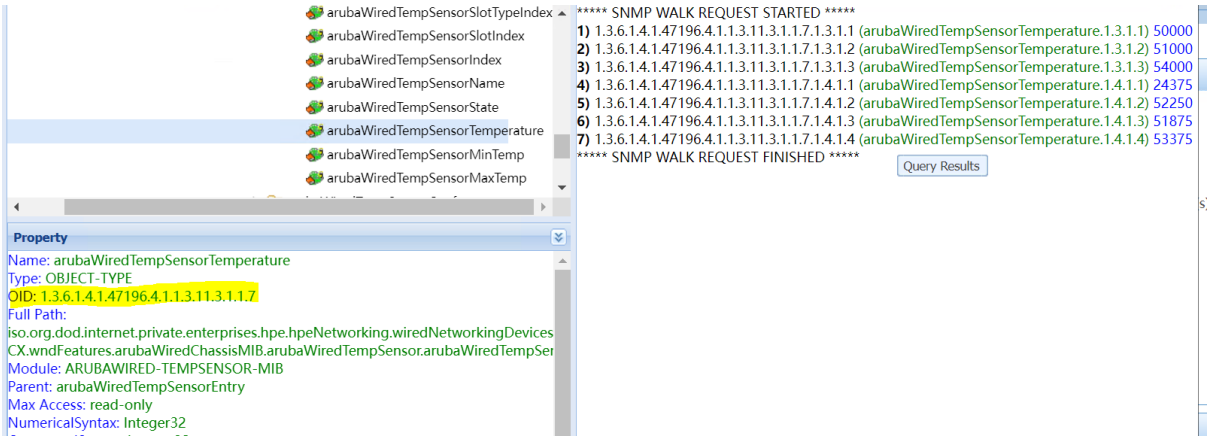
arubaWiredTempSensorSlotTypeIndex, Integer

arubaWiredTempSensorSlotIndex,Integer

arubaWiredTempSensorIndex, Integer

Find the MIB OID for arubaWiredTempSensorTemperature MIB object.

Continue navigating to arubaWiredTempSensorTemperature object within the table.



Select the object and click walk to see the values for testing later.

Calculate the Label and Formula

The label is the full MIB OID for the monitor given by the OID for ArubaWiredSensorTemperature in the property pane of the MIB manager and the numeric instance we previously found.

1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.1

Open Resource > Performance Management > Create Global Index Settings

Check the tip:

1.3.6.1.2.1.11.1.2@ means to monitor the performance data of an instance that index value is 2 of the metric MIB object with multiple instances.

Add the special character @ to indicate the MIB object is an instance in a table.

1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.4@

The temperature is expressed in milli Celsius by the device, we want to divide the formula by 1000 to display the temperature in Celsius.

1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.4@/1000

Open Performance Management > Global Index Settings and select Add Custom Index.

Select Type to calculate the index:

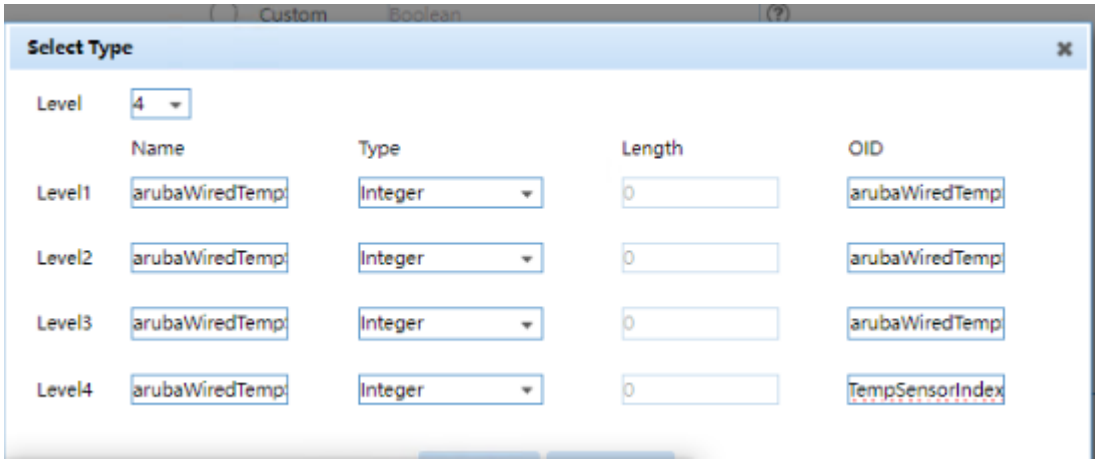
Enter the previously found 4 level indexes OIDs and type Integer.

arubaWiredTempSensorGroupIndex, Integer

arubaWiredTempSensorSlotTypeIndex, Integer

arubaWiredTempSensorSlotIndex,Integer

arubaWiredTempSensorIndex, Integer



The result of the index type is:

Type: [index1[2]:arubaWiredTempSensorGroupIndex:1:0].[index2[2]: arubaWiredTempSensorSlotTypeIndex:1:0].[index3[2]:arubaWiredTempSensorSlotIndex:1:0].[index4[2]:arubaWiredTempSensorIndex:1:0]]

Enter the following information:

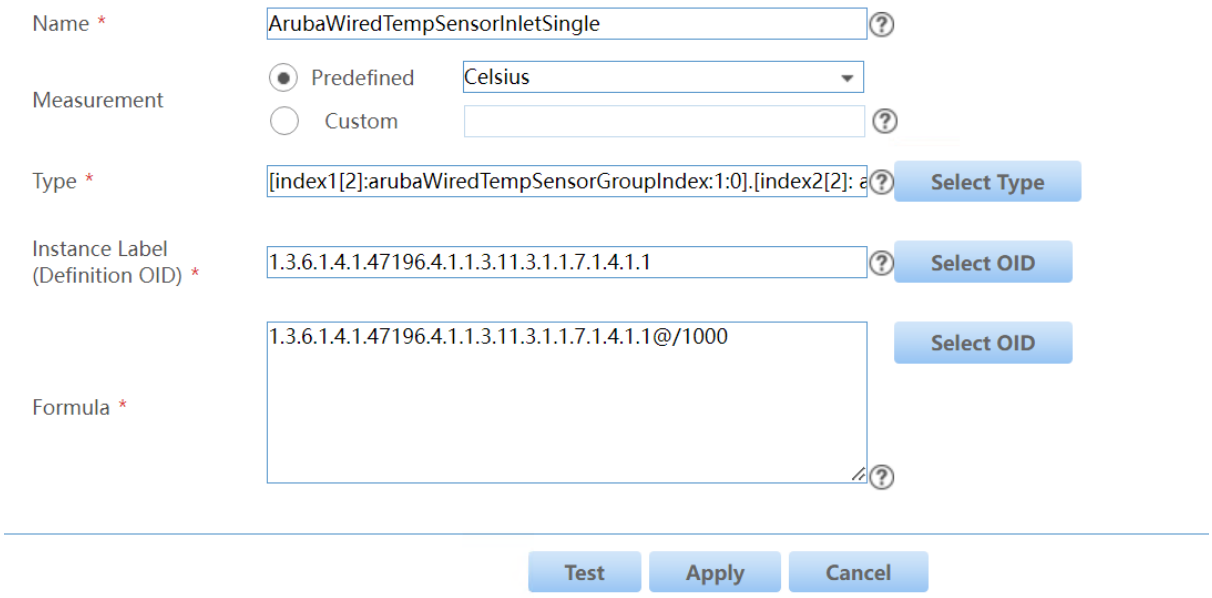
Name: ArubaWiredTempSensorInletSingle

Measurement predefined Celsius

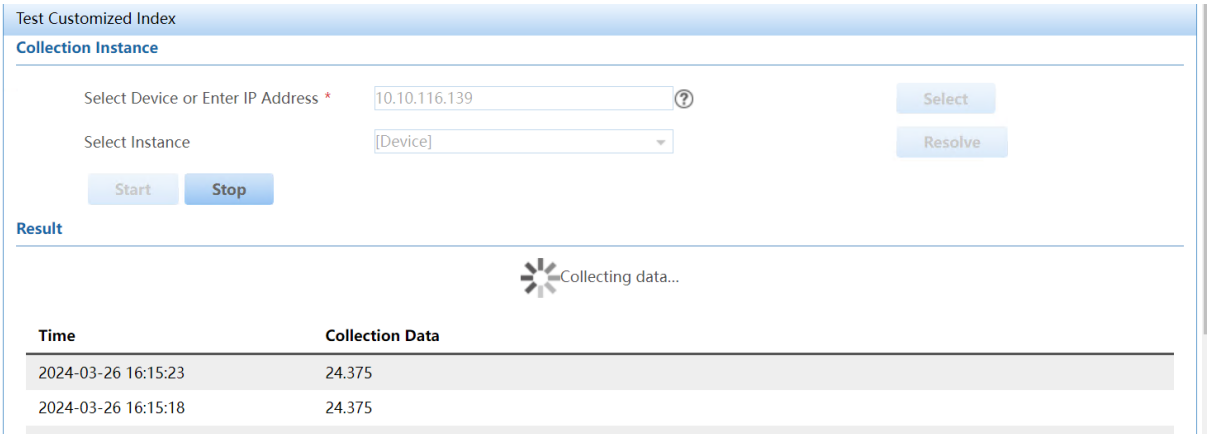
Type: [index1[2]:arubaWiredTempSensorGroupIndex:1:0].[index2[2]: arubaWiredTempSensorSlotTypeIndex:1:0].[index3[2]:arubaWiredTempSensorSlotIndex:1:0].[index4[2]:arubaWiredTempSensorIndex:1:0]]

Label: 1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.1

Formula: 1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.1@/1000



Click test, select device and click resolve. Note the value of the temperature under collection data should match in Celsius the CLI output and MIB walk.



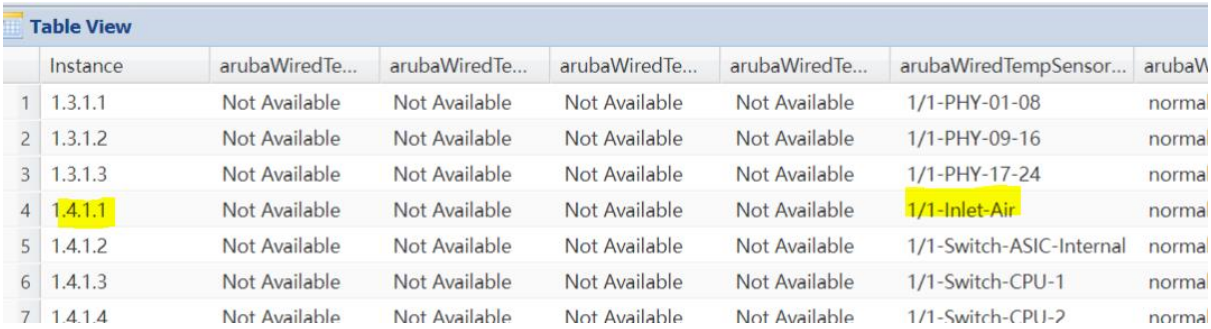
Click Apply to create this global index.

Create a new Global Index for further instances of the Inlet-Air sensor.

Add a new global index settings and replace the indexes of the first Inlet-Air sensor in the MIB table view (in green below) with the indexes of the additional Inlet-Air sensors.

Label: 1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.1

Formula: 1.3.6.1.4.1.47196.4.1.1.3.11.3.1.1.7.1.4.1.1@/1000



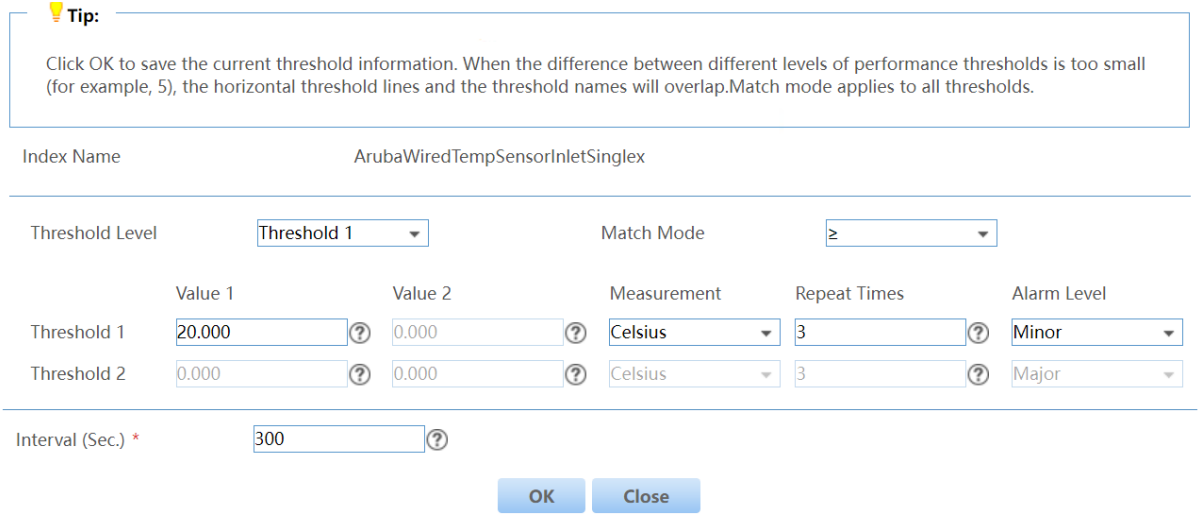
	Instance	arubaWiredTe...	arubaWiredTe...	arubaWiredTe...	arubaWiredTe...	arubaWiredTempSensor...	arubaW
1	1.3.1.1	Not Available	Not Available	Not Available	Not Available	1/1-PHY-01-08	normal
2	1.3.1.2	Not Available	Not Available	Not Available	Not Available	1/1-PHY-09-16	normal
3	1.3.1.3	Not Available	Not Available	Not Available	Not Available	1/1-PHY-17-24	normal
4	1.4.1.1	Not Available	Not Available	Not Available	Not Available	1/1-Inlet-Air	normal
5	1.4.1.2	Not Available	Not Available	Not Available	Not Available	1/1-Switch-ASIC-Internal	normal
6	1.4.1.3	Not Available	Not Available	Not Available	Not Available	1/1-Switch-CPU-1	normal
7	1.4.1.4	Not Available	Not Available	Not Available	Not Available	1/1-Switch-CPU-2	normal

Configure the monitor threshold settings

Modify Index in global index settings. Monitor will be under User defined. Configure default alarm thresholds as desired.



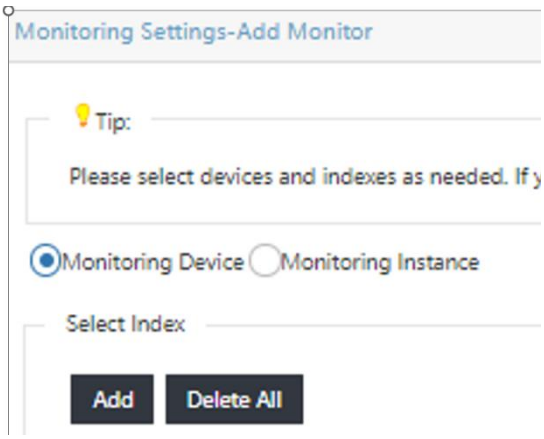
For our test, configure threshold to alarm if value is greater or equal to 20..

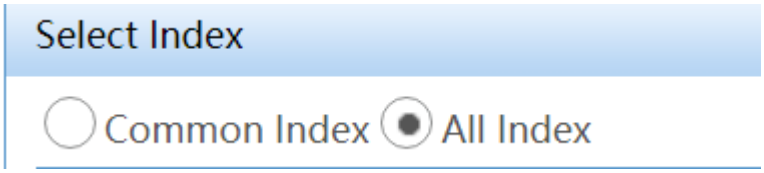


Assign new monitor to device 10.10.116.139

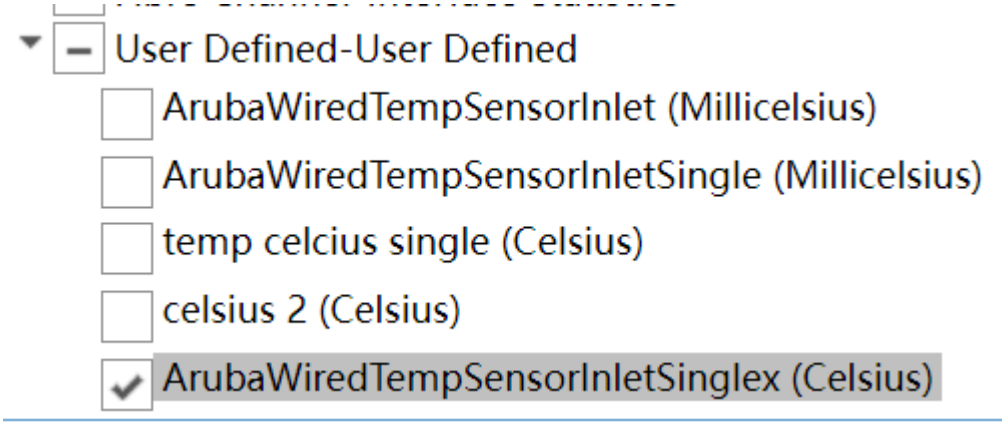
Select Performance Monitor > Monitoring Settings > Add monitor

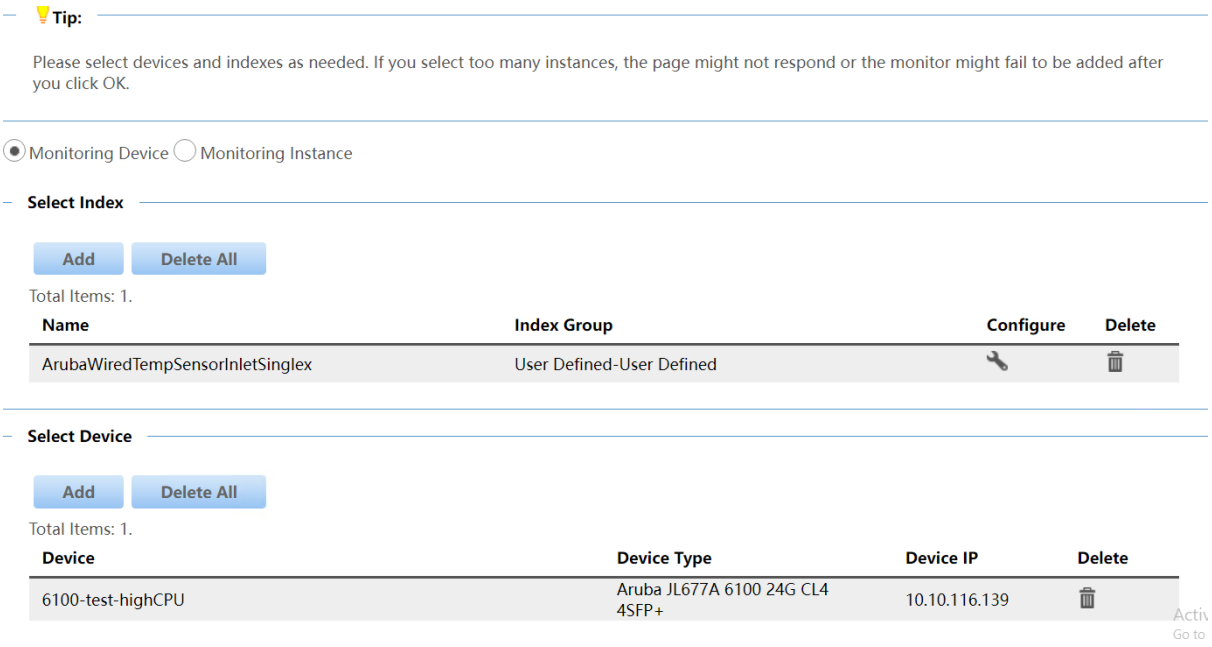
Select monitoring device, all index and user defined.

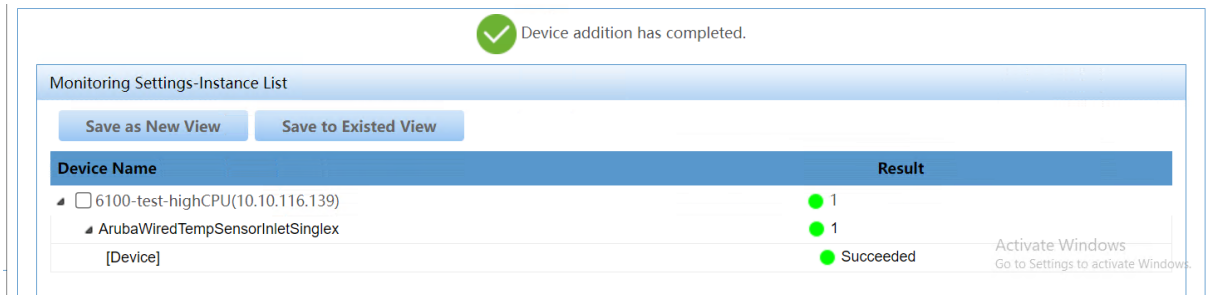




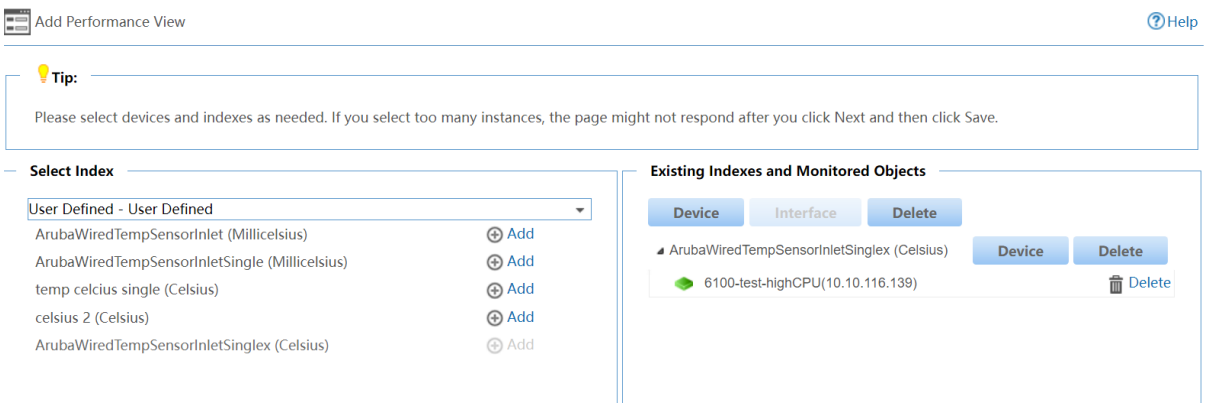
Click on the monitor just created.

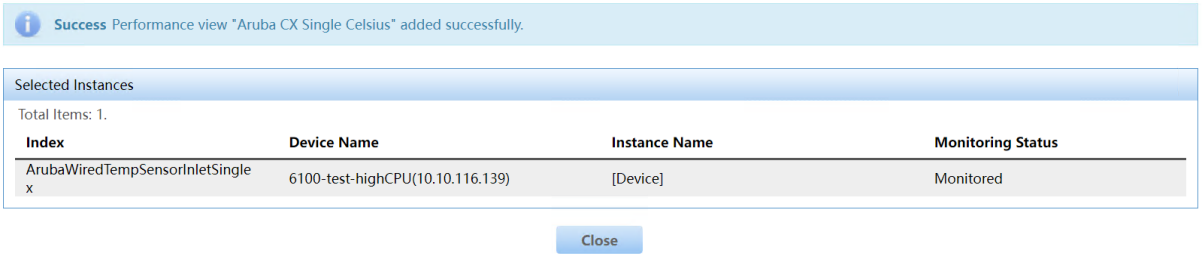


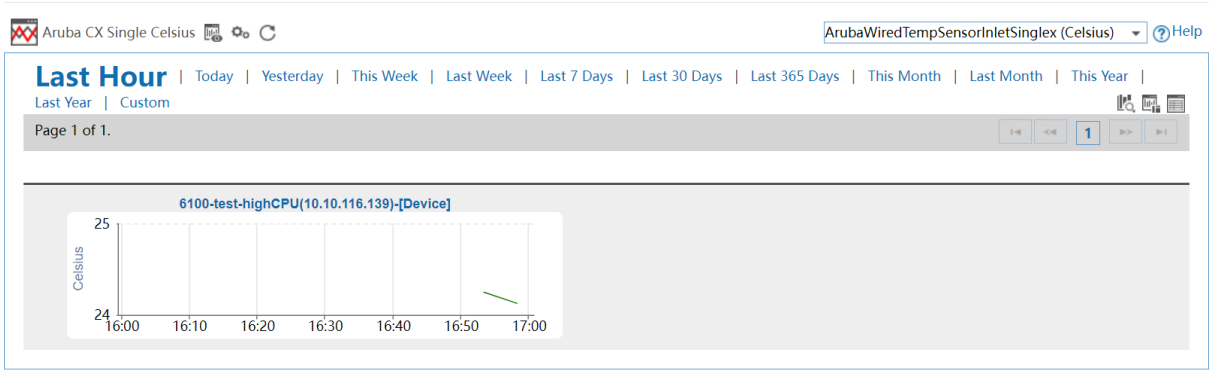




Create Performance View







Alarm is raised as sensor value is greater than 20

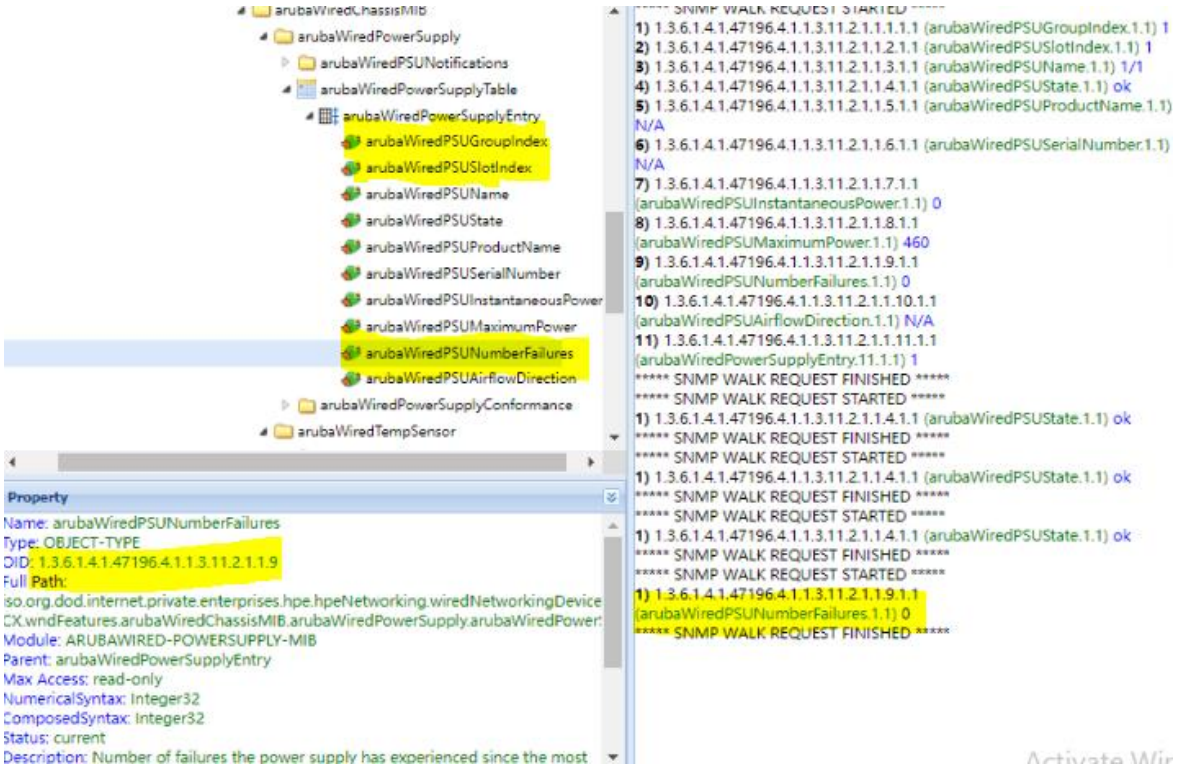
	Minor	6100-test-highCPU(10.10.116.139)	The Sys...	The instance "[Device]" of "performance task" "ArubaWiredTempSensorInletSinglex" is in threshold 1 range (">=20"), current value is "24.125".	Unacknowledged	2024-03-26 17:04:21	

8 Power Supply Monitor Configuration

Please refer to chapter 9 to understand field calculations, how to create monitors and set alarm thresholds.

The MIB object arubaWiredPSUState cannot be monitored as a statistics because the value is a string (‘ok) and not an integer.

Monitor arubaWiredPSUNumberFailures in the same table which is of type integer32.



This example is for the power supply monitor in group index 1 slot index1, there may be additional power supplies and they will require their own monitor. This can be achieved by replacing the last two digits in the OIDs below in Label and Instance as highlighted, with the additional power supply indexes from the MIB walk. For example, Label: 1.3.6.1.4.1.47196.4.1.1.3.11.2.1.1.9.1.2 will represent power supply in group 1 slot 2.

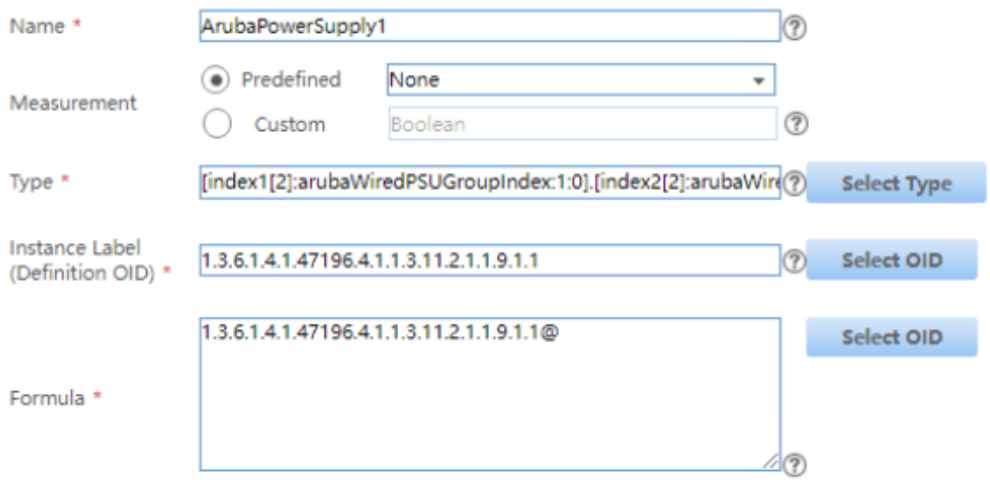
Open Performance Management > Global Index Settings and select Add Custom Index.

Type:

[index1[2]:arubaWiredPSUGroupIndex:1:0].[index2[2]:arubaWiredPSUSlotIndex:1:0]

Label: 1.3.6.1.4.1.47196.4.1.1.3.11.2.1.1.9.1.1

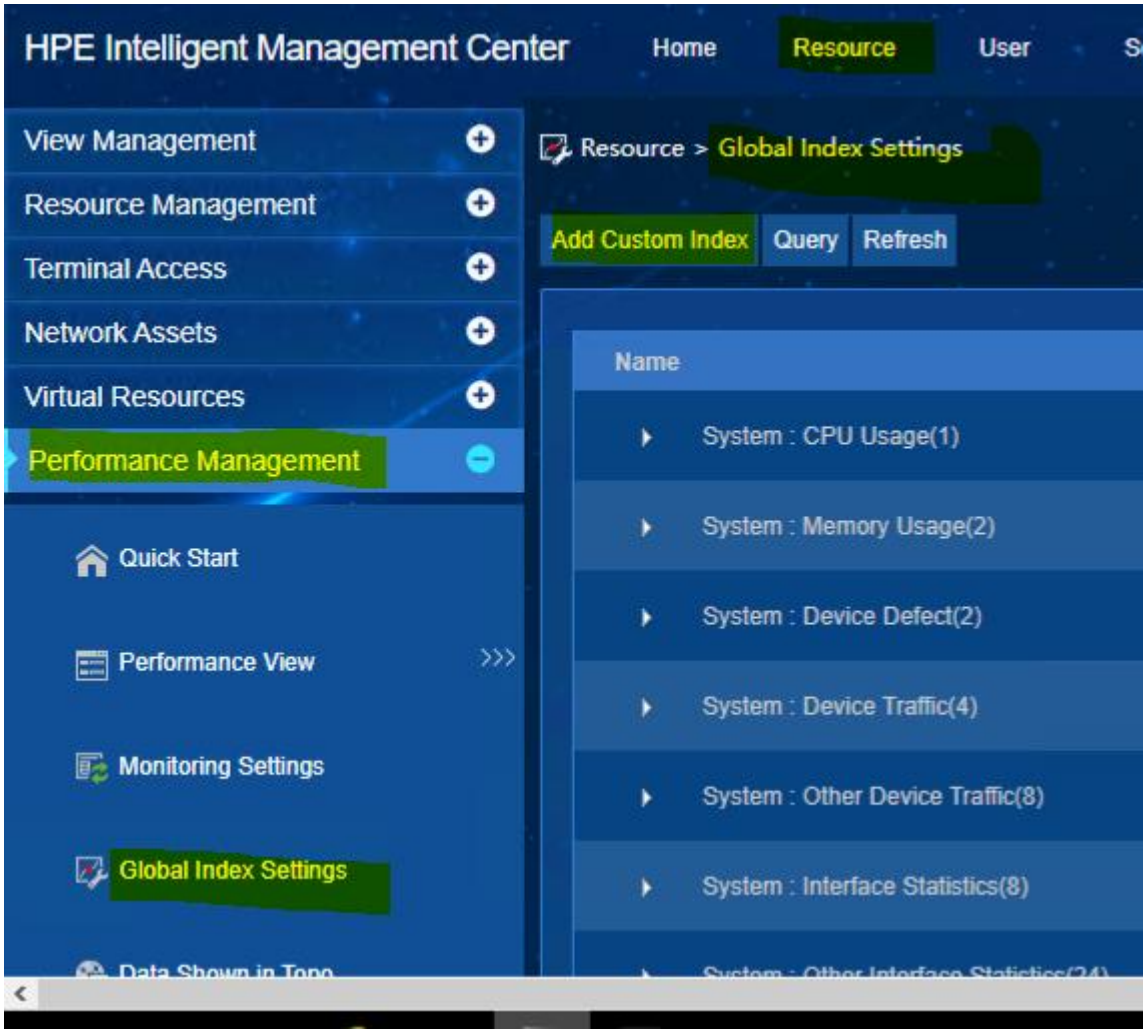
Instance: 1.3.6.1.4.1.47196.4.1.1.3.11.2.1.1.9.1.1@

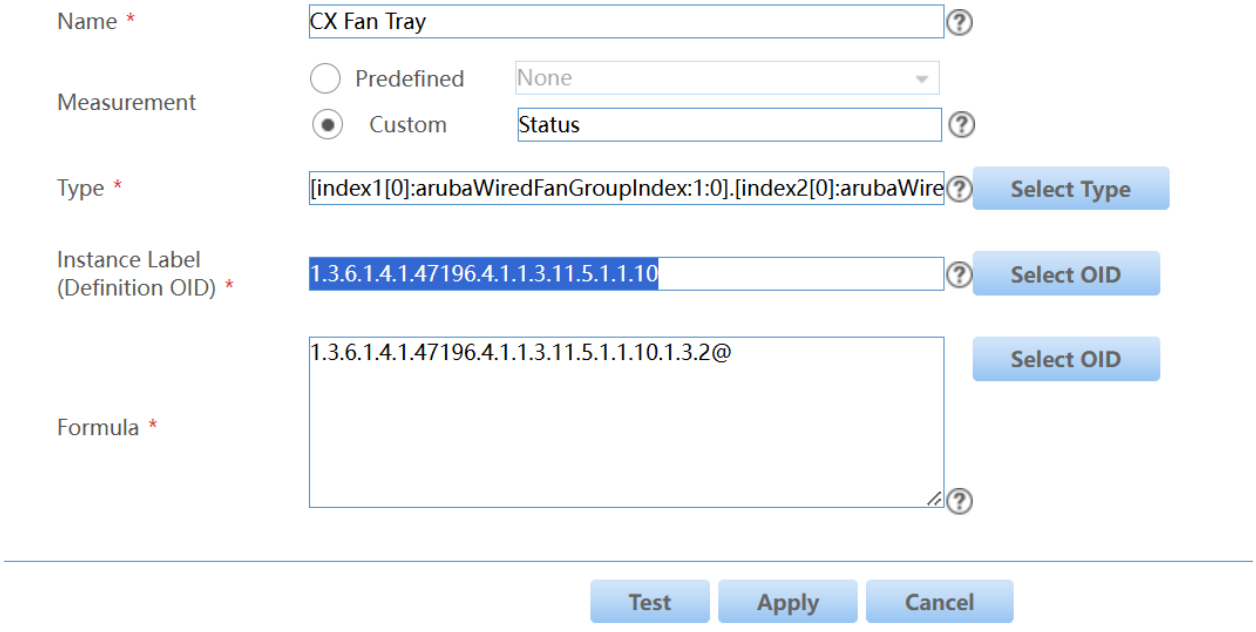


9 Fan Monitor Configuration

Compile and load ARUBAWIRED-CHASSIS-MIB.mib and ARUBAWIRED-FAN-MIB.mib into MIB Management.

Open Resource > Performance Management > Create Global Index Settings and Add Global Index.





Input as follows:

Type is:

[index1[0]:arubaWiredFanGroupIndex:1:0].[index2[0]:arubaWiredFanGroupIndex:1:0].[index3[0]:arubaWiredFanSlotIndex:1:0]

Instance label is the MIB object we want to monitor, arubaWiredFanStateEnum:

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10

Formula is the MIB object, the fan instance and the @ character. To monitor fan instance 1.3.2 input 1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10.1.3.2@.

You will need to create a new monitor for each instance. Simply replace 1.3.2 with the new instance.

The Fan state can have the following values, OK is 4, fault is 5.

arubaWiredFanStateEnum OBJECT-TYPE

SYNTAX INTEGER {

unknown (1),

empty (2),

uninitialized (3),

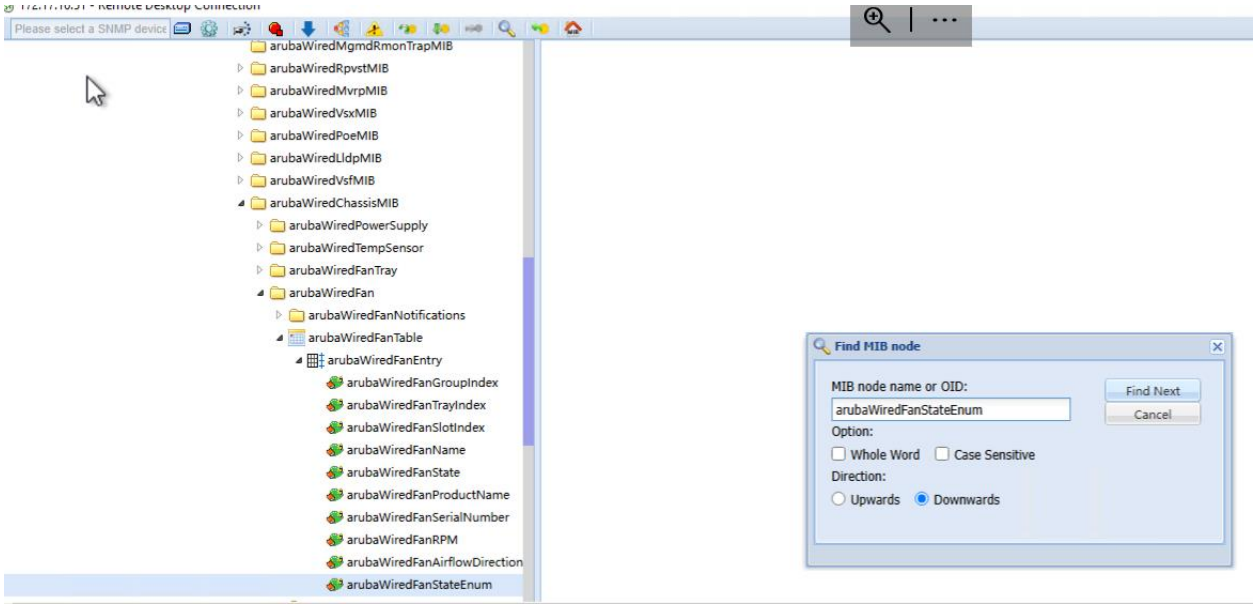
ok (4),

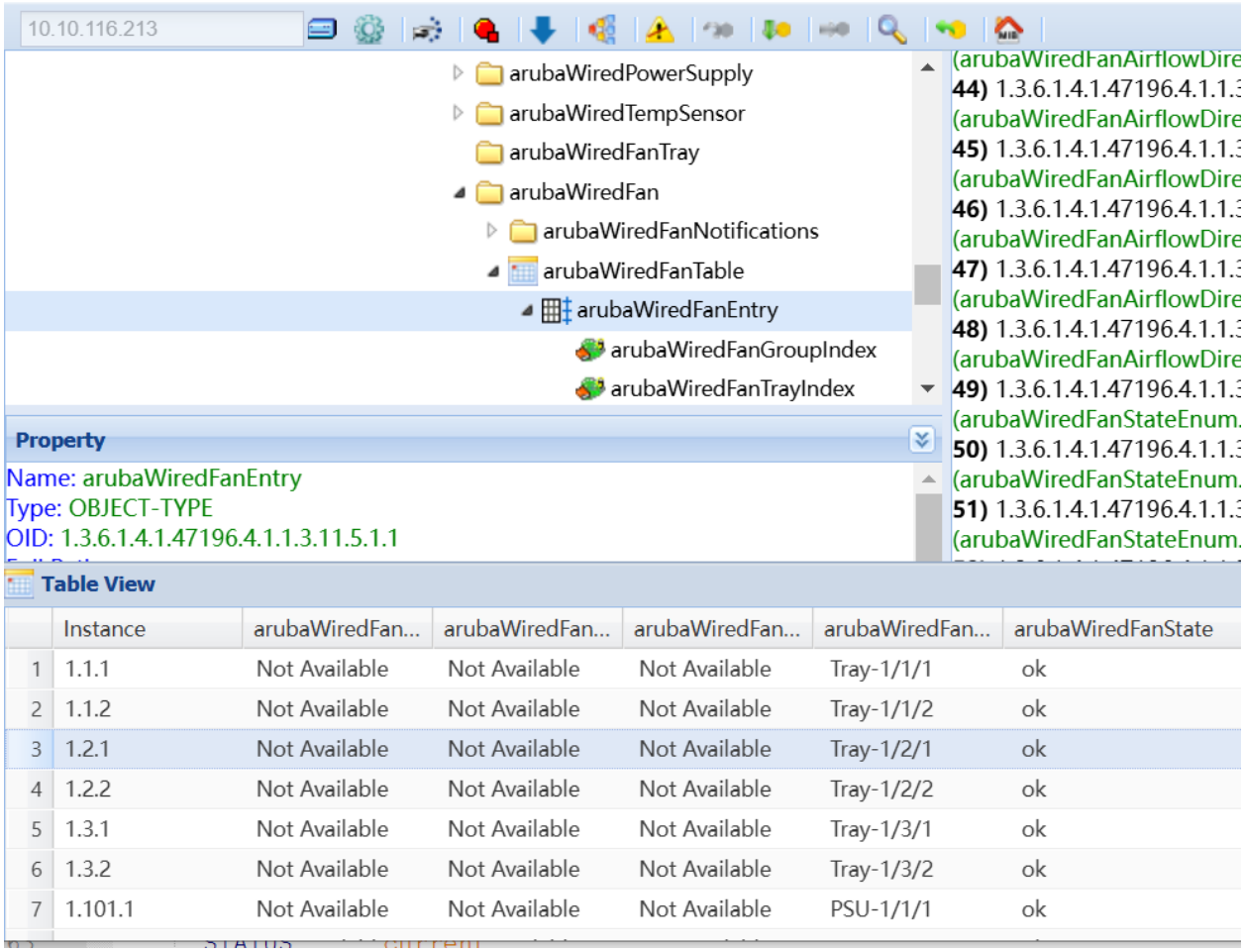
fault (5)

}

Detailed description of how the values have been calculated.

In MIB Manager, display table view for arubaWiredFanEntry



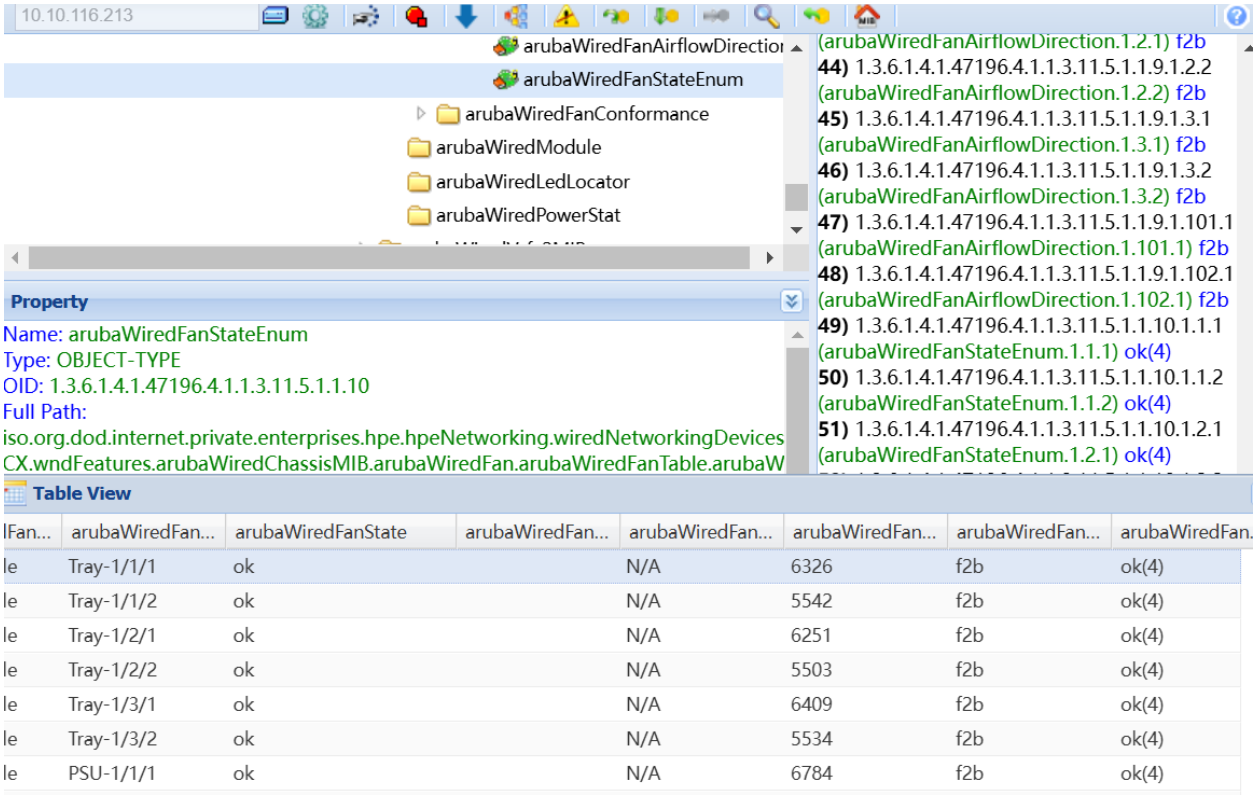


The OID for arubaWiredFanState is 1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.5, the MIB instances are between 1.1.1 and 1.3.2.

Calculate the Label and Formula The label is the full MIB OID for the monitor given by the OID for arubaWiredFanState in the property pane of the MIB manager and the numeric instance we previously found. 1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.5.1.1.1

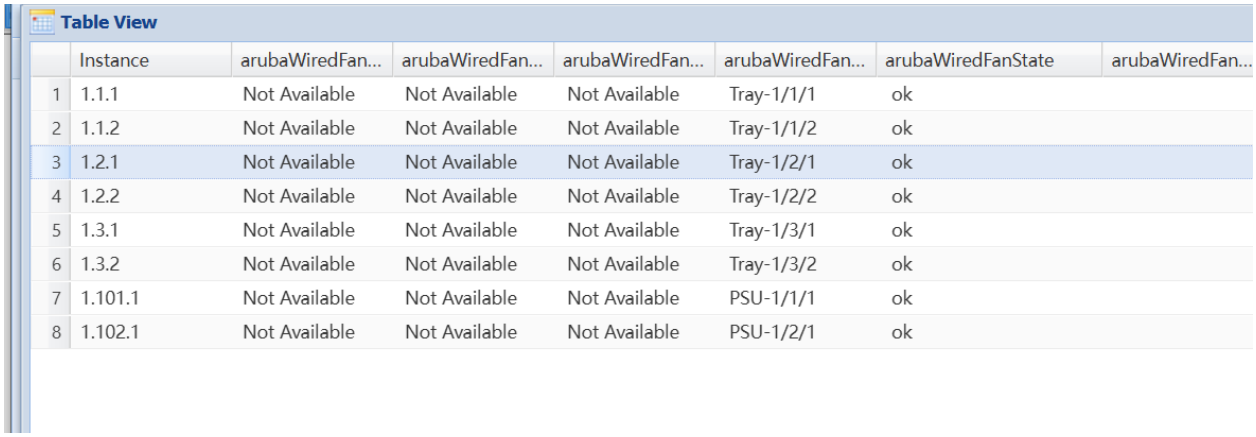
Open Resource > Performance Management > Create Global Index Settings

The OID to be monitored for Aruba CX fan status is arubaWiredFanStateEnum , 1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10



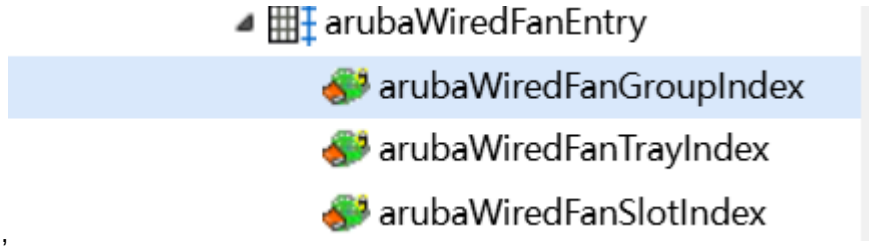
lFan...	arubaWiredFan...	arubaWiredFanState	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFan.
le	Tray-1/1/1	ok		N/A	6326	f2b	ok(4)
le	Tray-1/1/2	ok		N/A	5542	f2b	ok(4)
le	Tray-1/2/1	ok		N/A	6251	f2b	ok(4)
le	Tray-1/2/2	ok		N/A	5503	f2b	ok(4)
le	Tray-1/3/1	ok		N/A	6409	f2b	ok(4)
le	Tray-1/3/2	ok		N/A	5534	f2b	ok(4)
le	PSU-1/1/1	ok		N/A	6784	f2b	ok(4)

The table view faninstances we want to monitor are from 1.1.1 to 1.3.2. This example will monitor instance 1.3.2.



	Instance	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFanState	arubaWiredFan...
1	1.1.1	Not Available	Not Available	Not Available	Tray-1/1/1	ok	
2	1.1.2	Not Available	Not Available	Not Available	Tray-1/1/2	ok	
3	1.2.1	Not Available	Not Available	Not Available	Tray-1/2/1	ok	
4	1.2.2	Not Available	Not Available	Not Available	Tray-1/2/2	ok	
5	1.3.1	Not Available	Not Available	Not Available	Tray-1/3/1	ok	
6	1.3.2	Not Available	Not Available	Not Available	Tray-1/3/2	ok	
7	1.101.1	Not Available	Not Available	Not Available	PSU-1/1/1	ok	
8	1.102.1	Not Available	Not Available	Not Available	PSU-1/2/1	ok	

Using MIB manager, find the MIB OIDs and types of the 3 indexes of the WiredFanTable to program into the monitor.



,

Double click on each entry to display the names and OIDs of the index:

arubaWiredFanGroupIndex

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.1

arubaWiredFanTrayIndex

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.2

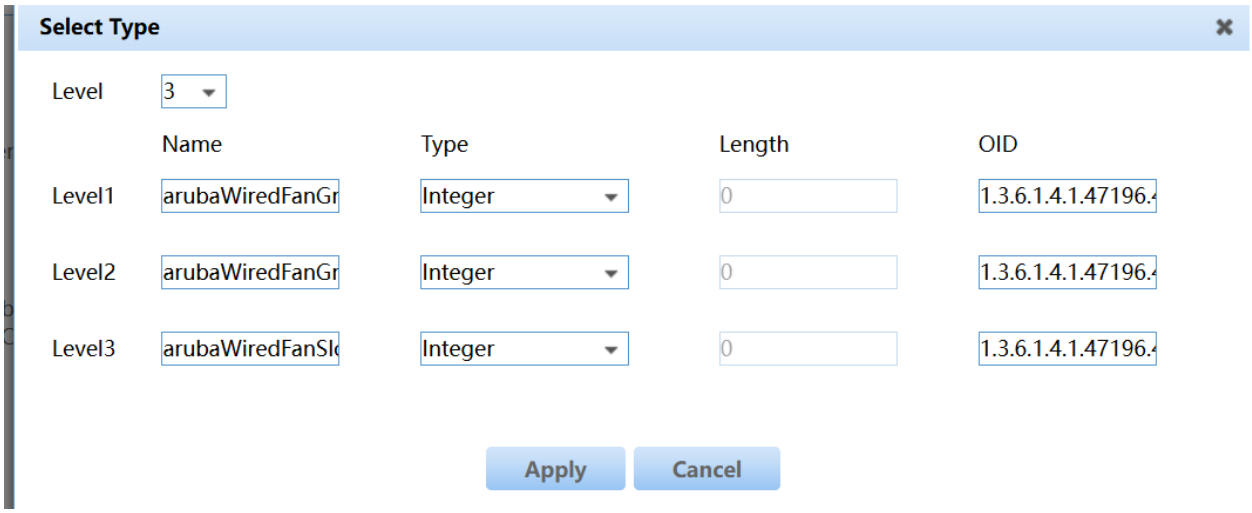
arubaWiredFanSlotIndex

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.3

Open Performance Management > Global Index Settings and select Add Custom Index.

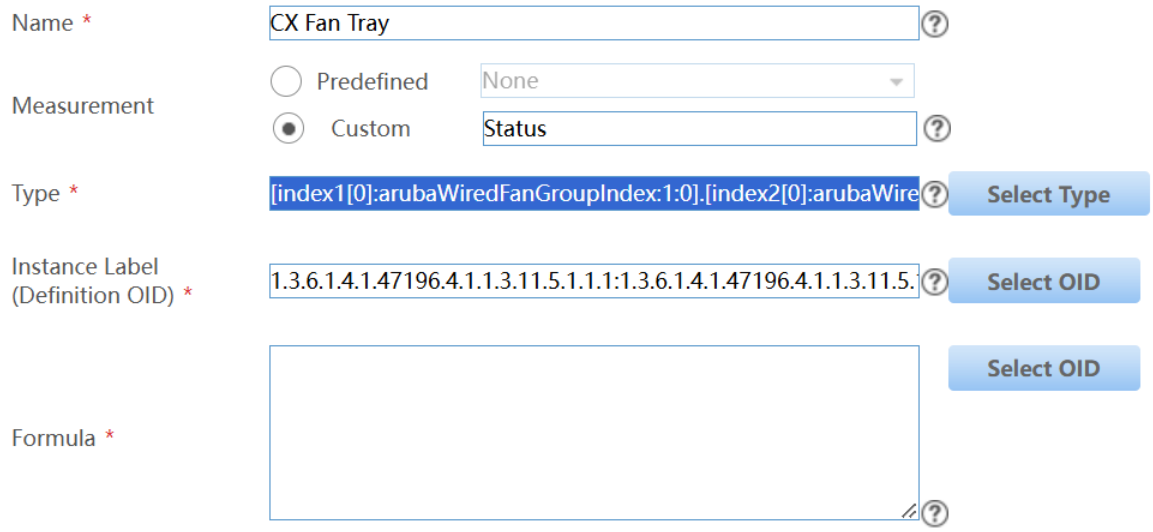
Click select type button.

Enter name and OID for each of the 3 table indexes and apply.



The result of the index type is:

[index1[0]:arubaWiredFanGroupIndex:1:0].[index2[0]:arubaWiredFanGroupIndex:1:0].[index3[0]:aruba WiredFanSlotIndex:1:0]



Click Instance label Select OID and input the OID of the MIB object we want to monitor, arubaWiredFanStateEnum:

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10

Check the tip on screen for the formula: *1.3.6.1.2.1.11.1.2@ means to monitor the performance data of an instance that index value is 2 of the metric MIB object with multiple instances. Add the special character @ to indicate the MIB object is an instance in a table*.

We have to add the instance to 1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10. Previously we chose to monitor instance 1.3.2, from MIB Manager:

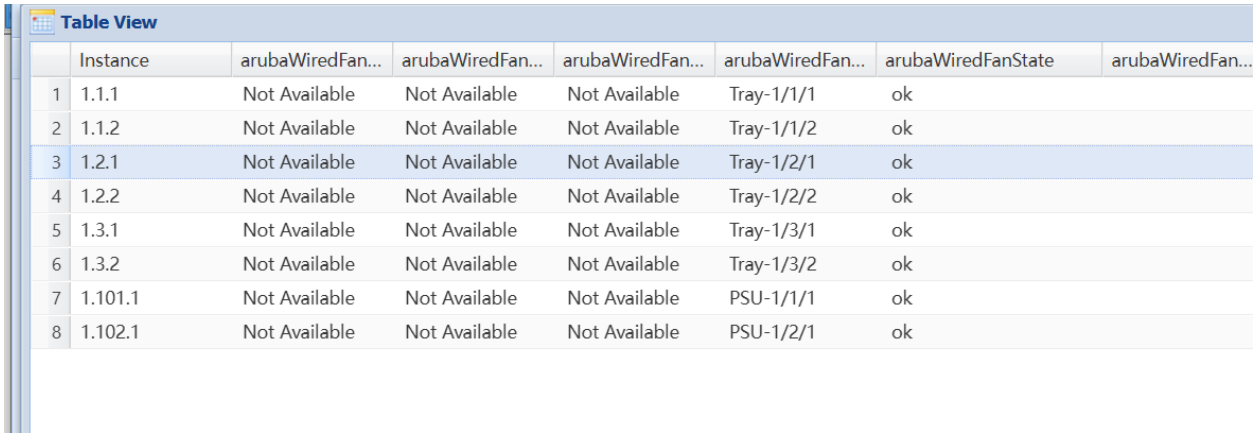


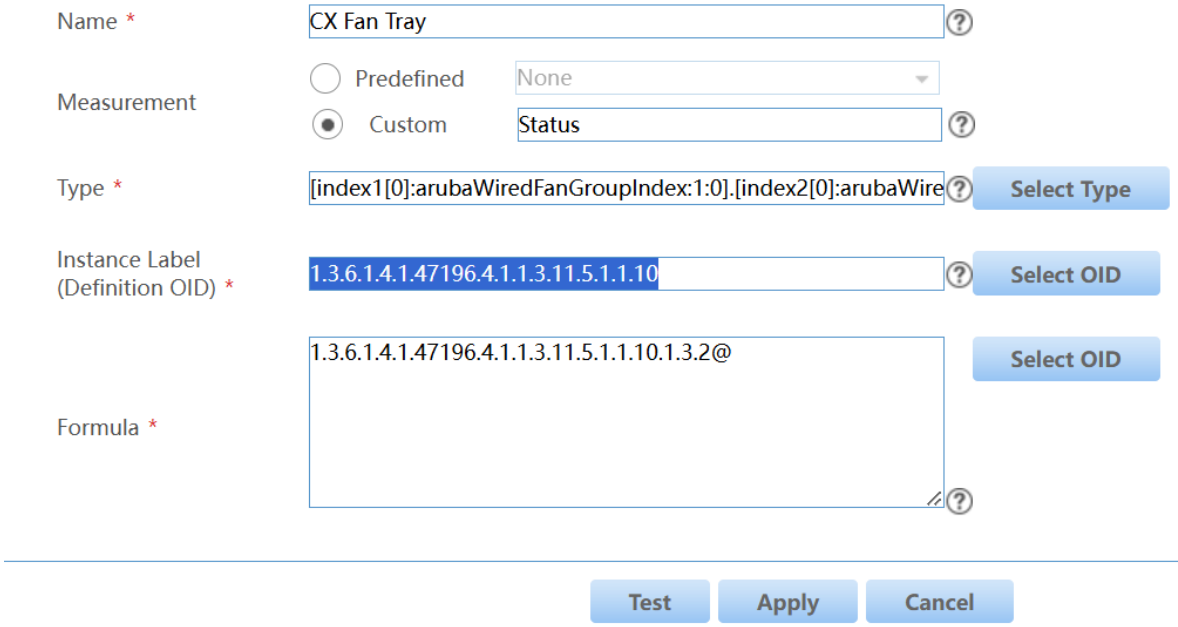
Table View

	Instance	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFan...	arubaWiredFanState	arubaWiredFan...
1	1.1.1	Not Available	Not Available	Not Available	Tray-1/1/1	ok	
2	1.1.2	Not Available	Not Available	Not Available	Tray-1/1/2	ok	
3	1.2.1	Not Available	Not Available	Not Available	Tray-1/2/1	ok	
4	1.2.2	Not Available	Not Available	Not Available	Tray-1/2/2	ok	
5	1.3.1	Not Available	Not Available	Not Available	Tray-1/3/1	ok	
6	1.3.2	Not Available	Not Available	Not Available	Tray-1/3/2	ok	
7	1.101.1	Not Available	Not Available	Not Available	PSU-1/1/1	ok	
8	1.102.1	Not Available	Not Available	Not Available	PSU-1/2/1	ok	

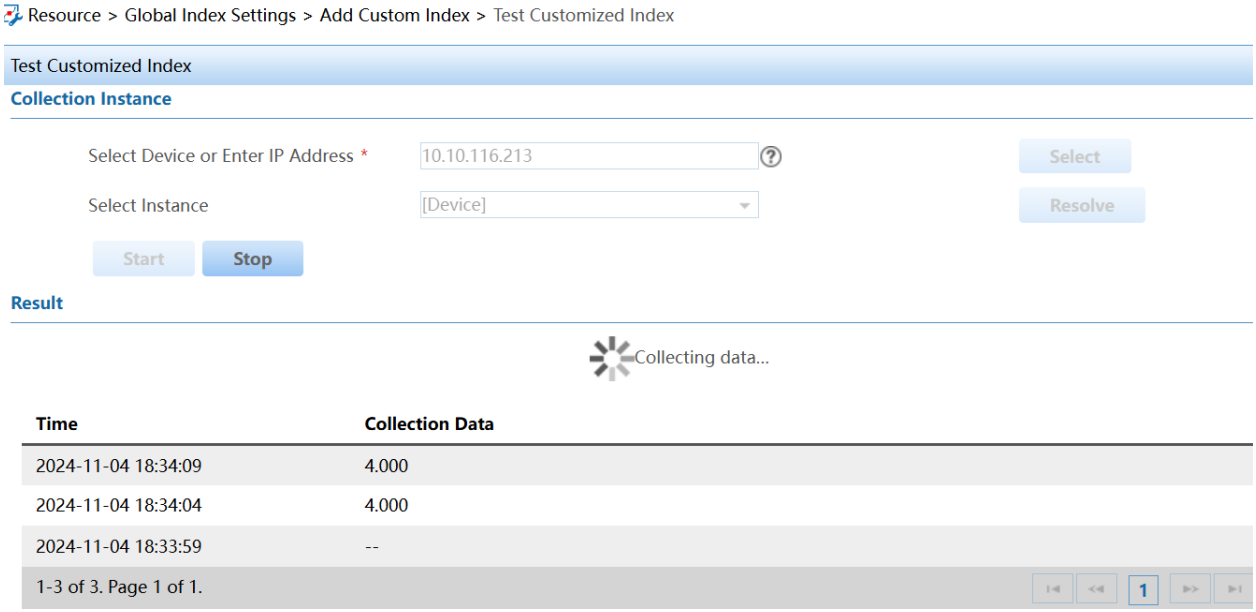
So the formula is:

1.3.6.1.4.1.47196.4.1.1.3.11.5.1.1.10.1.3.2@.

This is the completed page.



We now proceed to test. Select our device, click resolve and test. The value is 4.



The Fan state can have the following values, OK is 4.

arubaWiredFanStateEnum OBJECT-TYPE

SYNTAX INTEGER {

unknown (1),

empty (2),

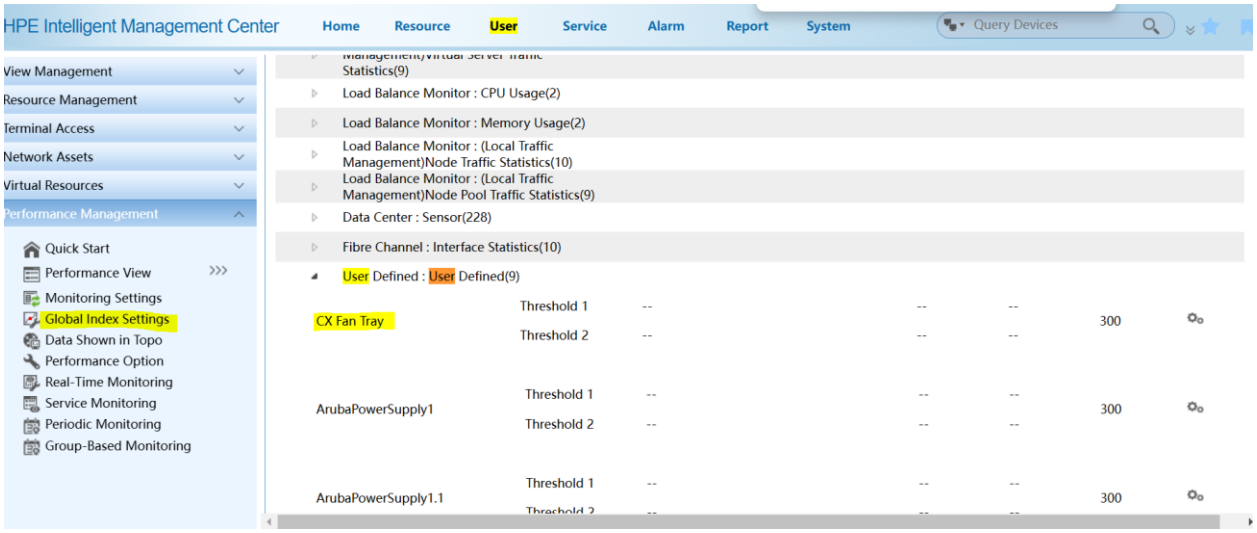
uninitialized (3),

ok (4),

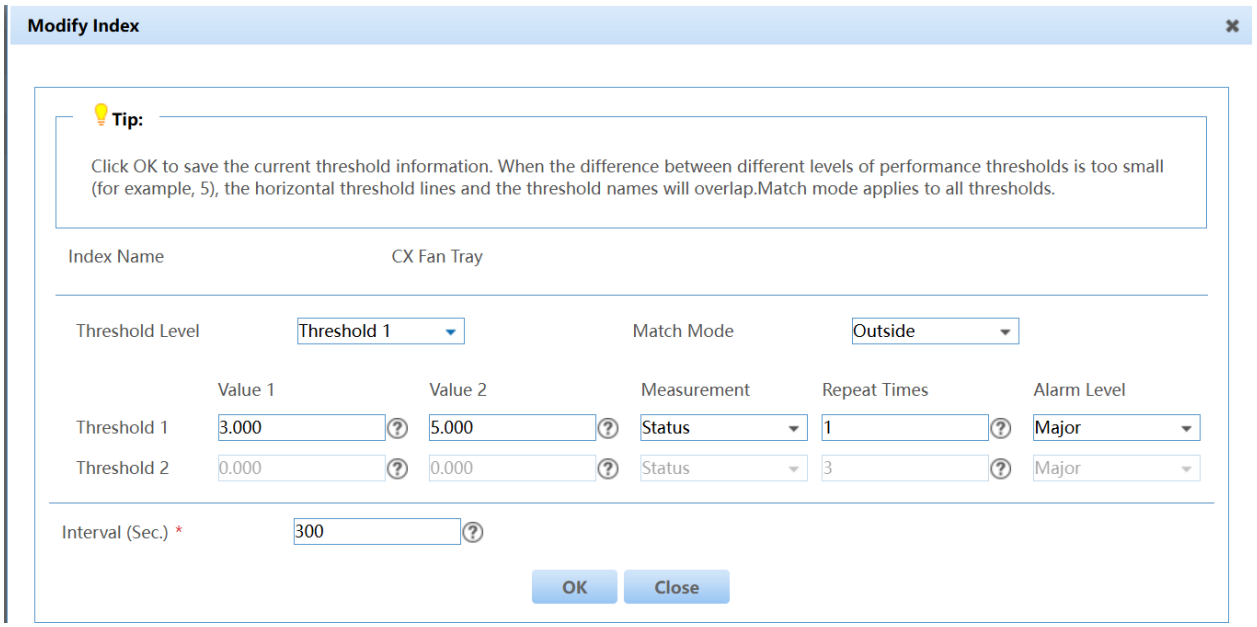
fault (5)

}

Now we configure the global alarm thresholds: Performance Management > Global Index Settings, we find the CX Fan Tray monitor under the last entry, user defined.



As OK is (4), we configure the monitor to alarm if the value is not = 4. We modify index:



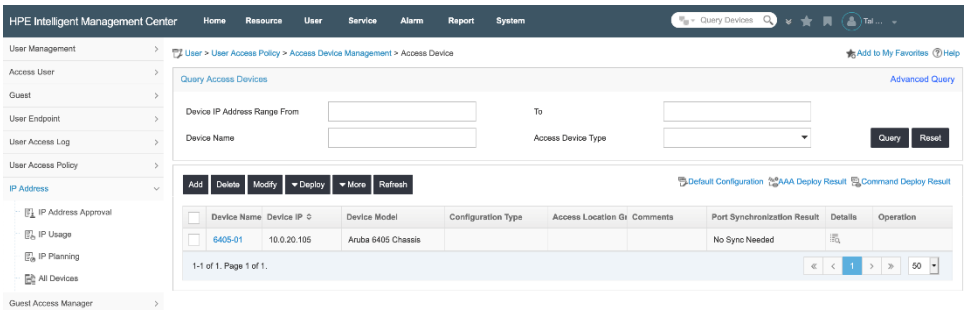


10 Radius authentication with IMC UAM

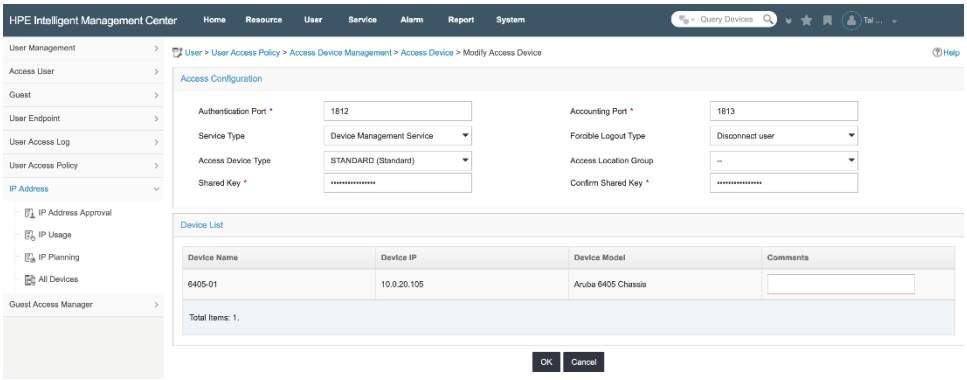
Supported by UAM 7.3E0611 and above

IMC Configuration

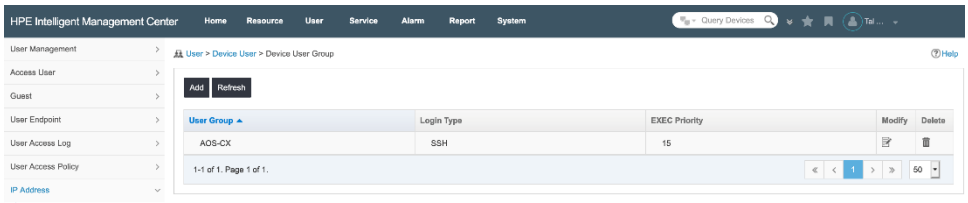
Go to User>User Access Policy>Access Device Management>Access Device and configure the access device:



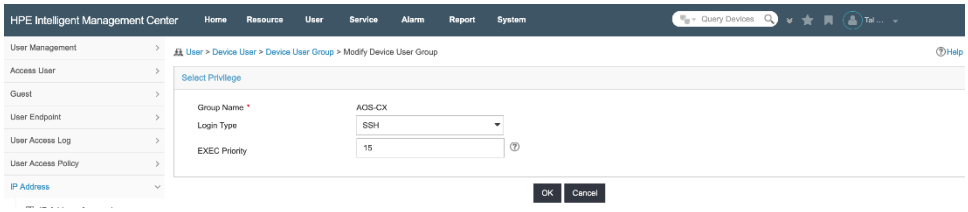
Configure Service Type to Device Management Service, and set Access Device Type to Standard:



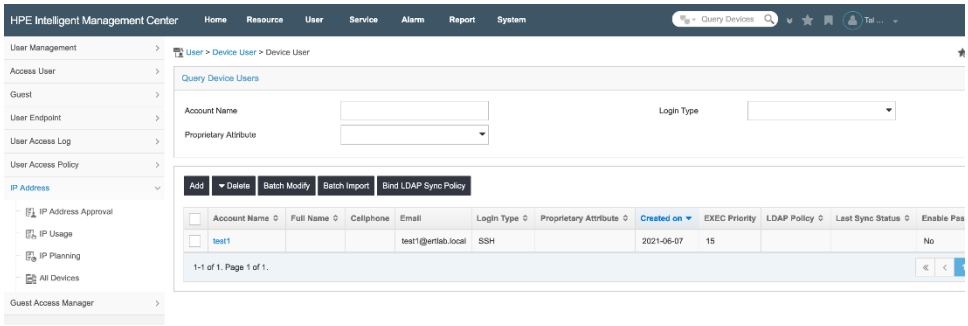
User>Device User>Device User Group, and create new user group:



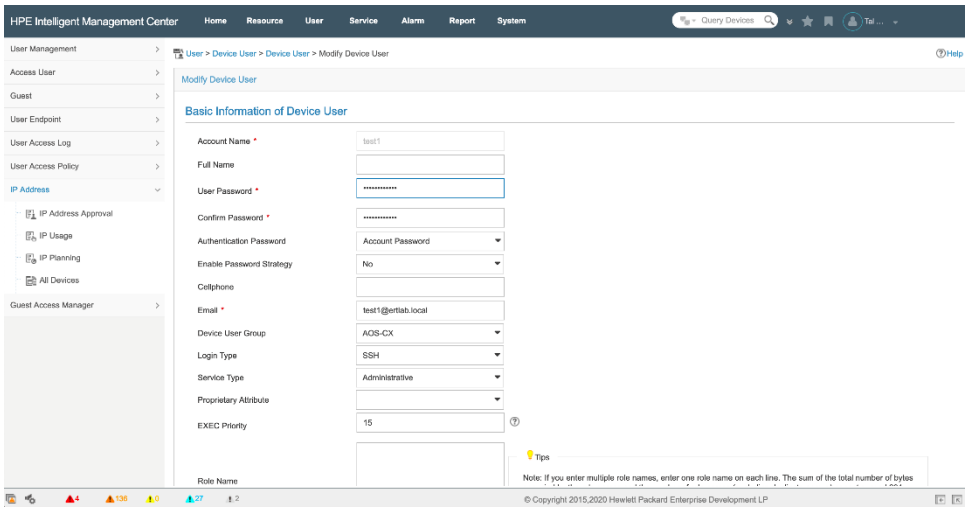
Login type will be SSH and EXEC priority will be 15:



User>Device User>Device User, and configure the user account:



Configure this account for Device User Group AOS-CX, which we configured in previous step, and change service type to Administrative:



AOS-CX Switch Configuration

```
radius-server timeout 3
radius-server retries 3
radius-server service-type in-access-request
radius-server host 10.0.11.14 vrf mgmt key plaintext <PASSWORD>
!
aaa group server radius CPPM-RADIUS
    server 10.0.11.14 vrf mgmt
!
aaa authentication allow-fail-through
aaa authentication login ssh group IMC-RADIUS local
```

11 NTA – SFLOW Configuration

OS-CX Switch Configuration

OS-CX only supports inbound traffic analysis.

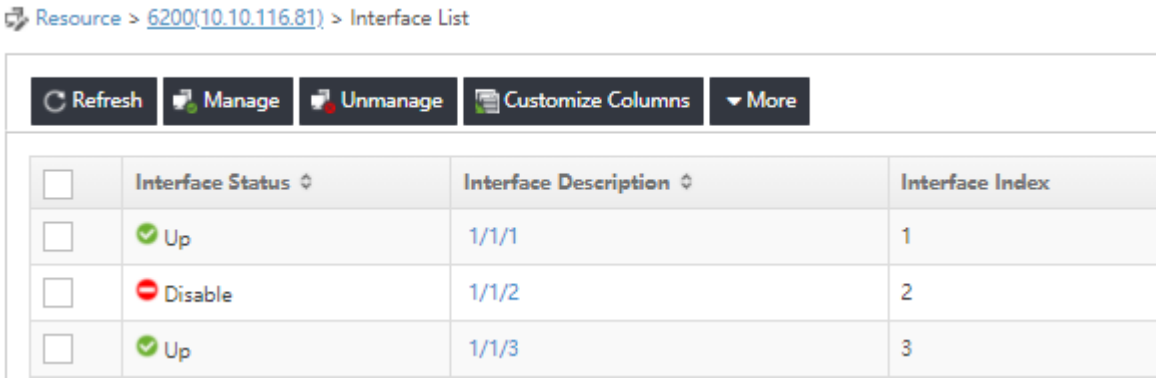
Configure: switch source IP, IMC IP, Interfaces, sampling rate and polling interval

```
sflow agent-ip 110.110.116.81
sflow collector 1*10.110.114.95 port 6343 vrf mgmt*
interface 1/1/1
sflow
sflow sampling 4096
sflow polling 30
```

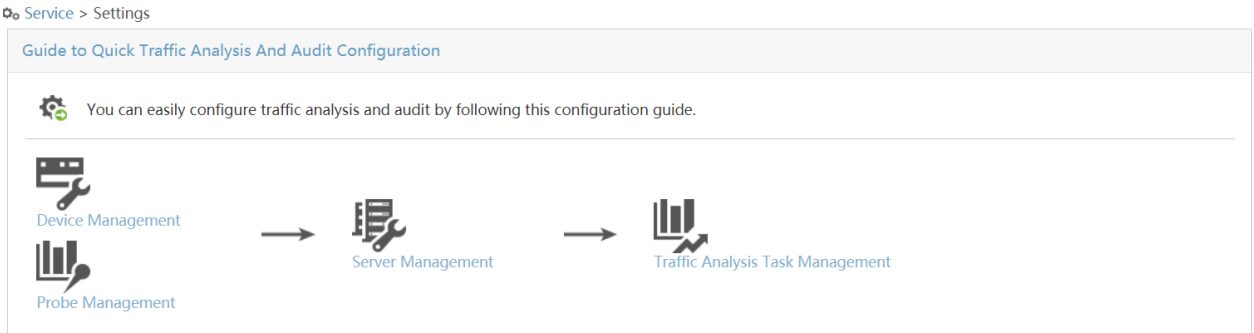
In a test lab environment, you may configure frequent sampling and polling for quicker display, note this may affect switch performance.

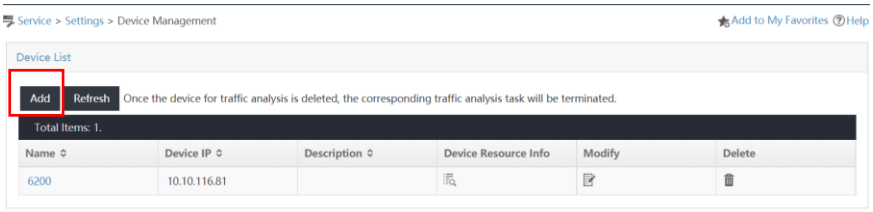
```
sflow sampling 10
sflow polling 10
```

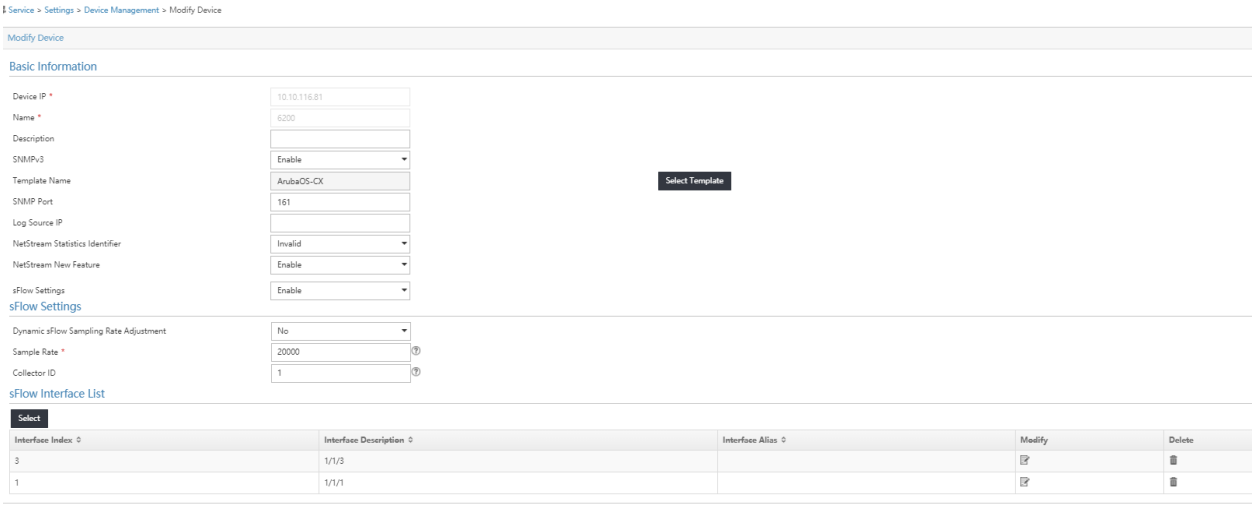
NTA Configuration

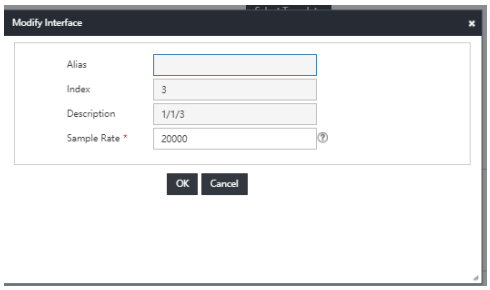


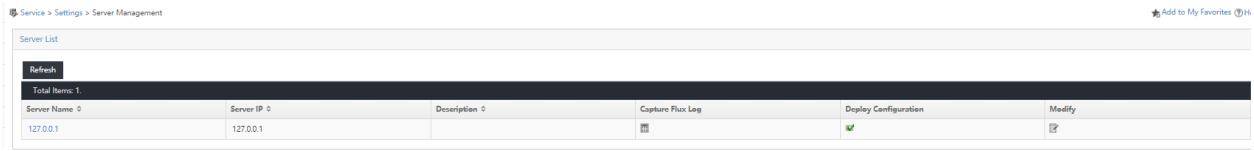
Service> Traffic Analysis and Audit > Settings

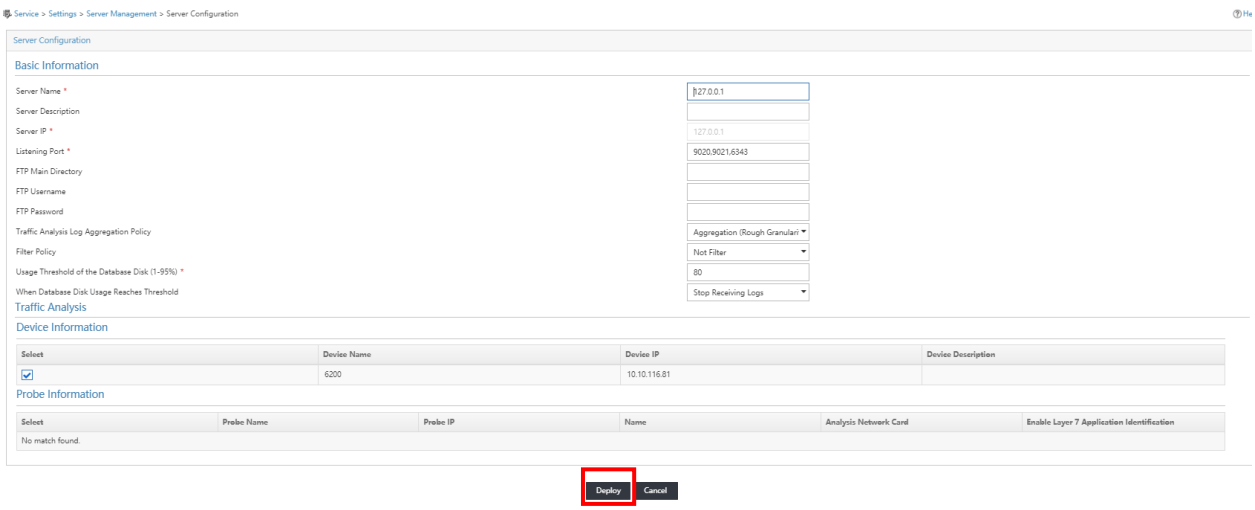


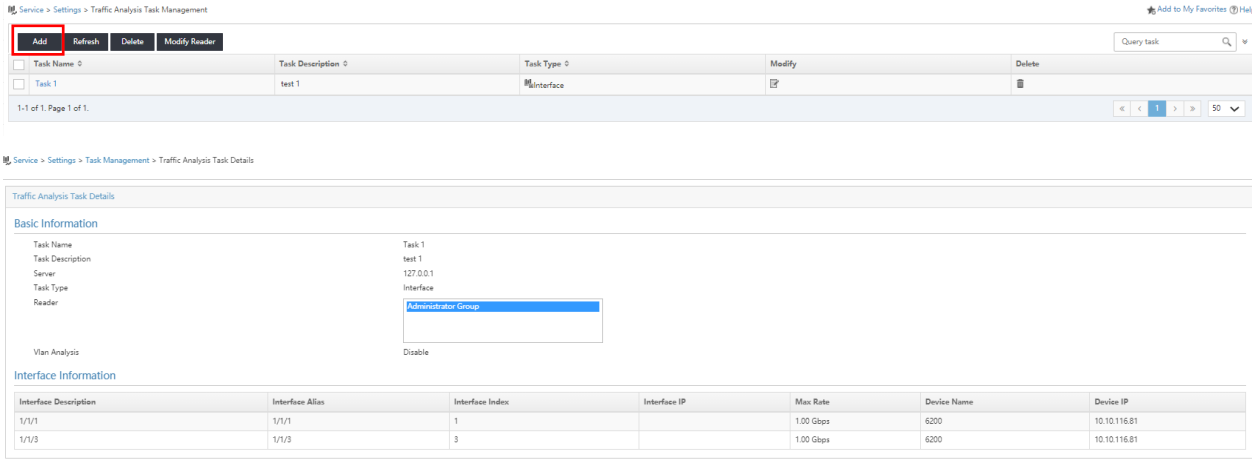

Service > Settings > Device Management
Add to My Favorites
Help
Device List
Add
Refresh
Once the device for traffic analysis is deleted, the corresponding traffic analysis task will be terminated.
Total Items: 1.
Name
Device IP
Description
Device Resource Info
Modify
Delete
6200
10.10.116.81


Service > Settings > Device Management > Modify Device
Modify Device
Basic Information
Device IP *
10.10.116.81
Name *
6200
Description
SNMPv3
Enable
Template Name
ArubaOS-CX
Select Template
SNMP Port
161
Log Source IP
NetStream Statistics Identifier
Invalid
NetStream New Feature
Enable
sFlow Settings
Enable
sFlow Settings
Dynamic sFlow Sampling Rate Adjustment
No
Sample Rate *
20000
Collector ID
1
sFlow Interface List
Select
Interface Index
Interface Description
Interface Alias
Modify
Delete
3
1/1/3
1
1/1/1


Modify Interface
Alias
Index
3
Description
1/1/3
Sample Rate *
20000
OK
Cancel

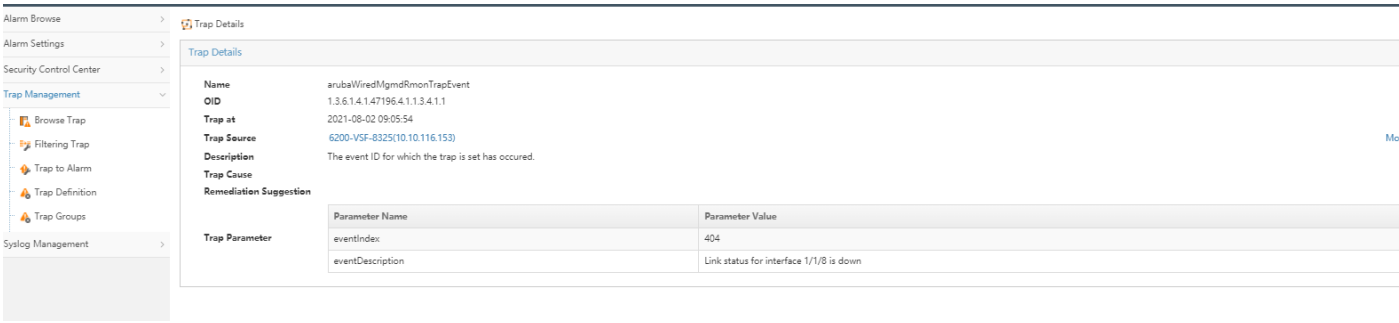

Service > Settings > Server Management
Add to My Favorites
Server List
Refresh
Total Items: 1.
Server Name
Server IP
Description
Capture Flux Log
Deploy Configuration
Modify
127.0.0.1
127.0.0.1


Service > Settings > Server Management > Server Configuration
Server Configuration
Basic Information
Server Name *
127.0.0.1
Server Description
Server IP *
127.0.0.1
Listening Port *
9020,9021,6343
FTP Main Directory
FTP Username
FTP Password
Traffic Analysis Log Aggregation Policy
Aggregation (Rough Granularit
Filter Policy
Not Filter
Usage Threshold of the Database Disk (1-95%) *
80
When Database Disk Usage Reaches Threshold
Stop Receiving Logs
Traffic Analysis
Device Information
Select
Device Name
Device IP
Device Description
6200
10.10.116.81
Probe Information
Select
Probe Name
Probe IP
Name
Analysis Network Card
Enable Layer 7 Application Identification
No match found.
Deploy
Cancel



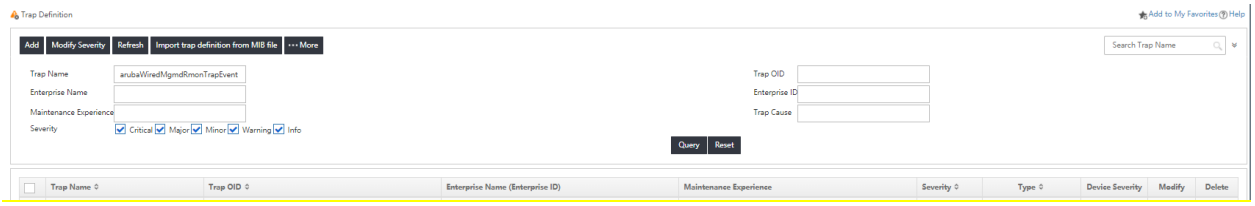
12 RMON Trap Description configuration

RMON traps description will be automatically configured in IMC version 7.3 E0706P01

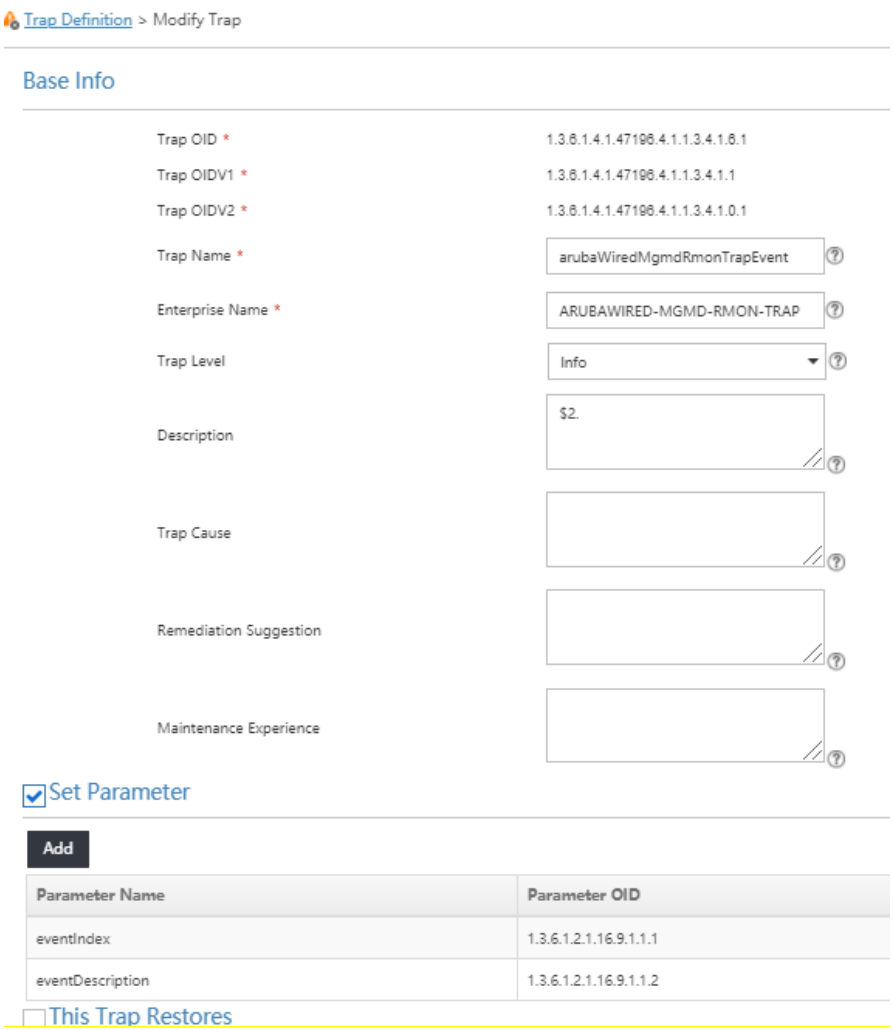


To configure IMC to display the eventDescription from the RMON traps sent from the device:

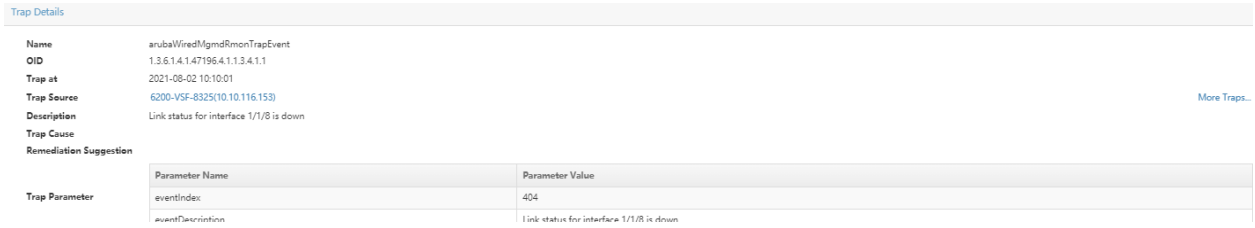
Query trap name ‘arubaWiredMgmdRmonTrapEvent’ in Alarms > Trap Management > Trap Definition



Modify Description to $2.



Result:



1. Send SNMP traps for link state changes

   If interface status (link up/down) traps are required, the interface needs to be configured with the following highlighted command:

#show run int 1/1/25
interface 1/1/25
no shutdown
mtu 9198
trap link-status

lag 1
exit

13 Topology (except MSTP topology), Terminal Access, Real Time Location.

OS CX devices minimum version 10.7.x is recommended and IMC 706P06.

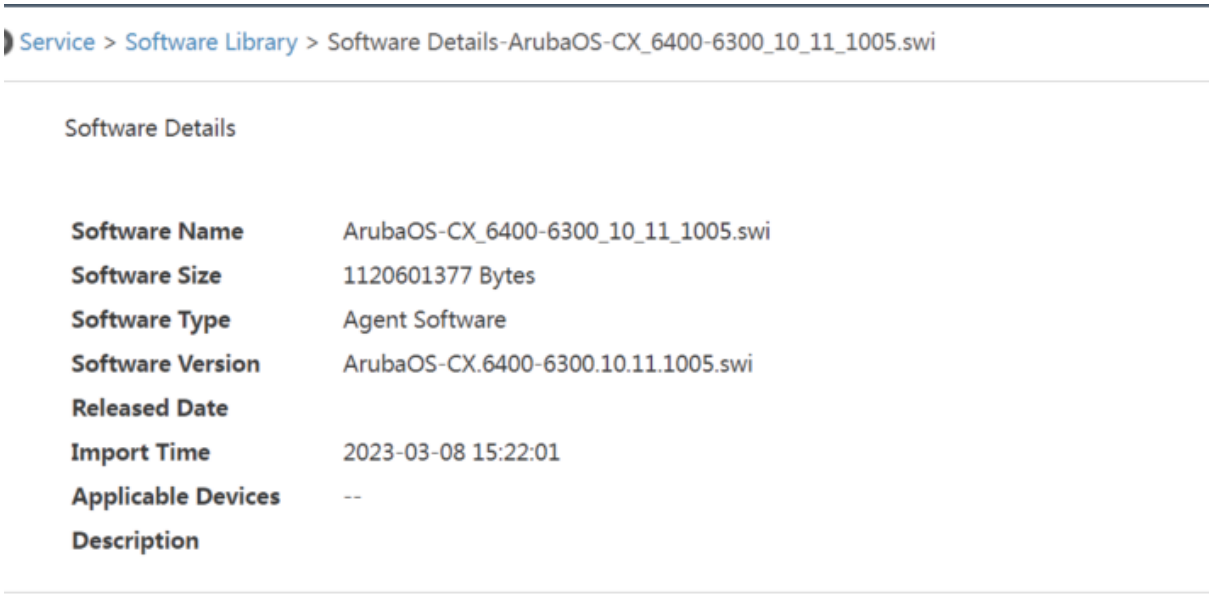
14 Renaming software files

In order for IMC to associate software files to the correct product, it is necessary to rename software files which are applicable to multiple device types, currently:

ArubaOS-CX_6400-6300..swi

ArubaOS-CX_6100-6000..swi

For example after importing file ArubaOS-CX_6400-6300_10_11_1005.swi , into the library, the field Applicable Devices is empty.



Rename the same file ArubaOS-CX_6300_10_11_1005.swi, import it into the software library, and the applicable devices list is complete.

Service > Software Library > Software Details-ArubaOS-CX_6300_10_11_1005.swi

Software Details

Software Name	ArubaOS-CX_6300_10_11_1005.swi
Software Size	1120601377 Bytes
Software Type	Agent Software
Software Version	ArubaOS-CX.6300.10.11.1005.swi
Released Date	
Import Time	2023-03-08 19:12:54
Applicable Devices	Aruba 6300F 24G PoE CLS 4 /4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1.108); Aruba 6300F 24G/4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1 /4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1.107); Aruba 6300M 24G /4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1.106); Aruba 6300M 24G 4SFP56(1.3.6.1.4.1.47196.4.1.1.100); Aruba 6300M 24SR PoE CLS 6 /4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1.102); Aruba 6300M 4SFP56(1.3.6.1.4.1.47196.4.1.1.111); Aruba 6300M 48G PoE CLS 4 /4SFP56 Swch(1.3.6.1.4.1.47196.4.1.1.103); Aruba 6300M 4 2p50G 2p25G Switch(1.3.6.1.4.1.47196.4.1.1.116); Aruba R8S90A 6300M 48SR5 CL8 PoE 2p50G 2p25G Switch(1.3.6.1.4.1.4719 Switch(1.3.6.1.4.1.47196.4.1.1.118); Aruba R8S92A 6300M 24p SFP+ LRM 2p50G 2p25G Sw(1.3.6.1.4.1.47196.4.1.1.119);
Description	