anuta networks

atom

ATOM User & Admin Guide

version 11.8

Table of Contents

Getting Started with ATOM

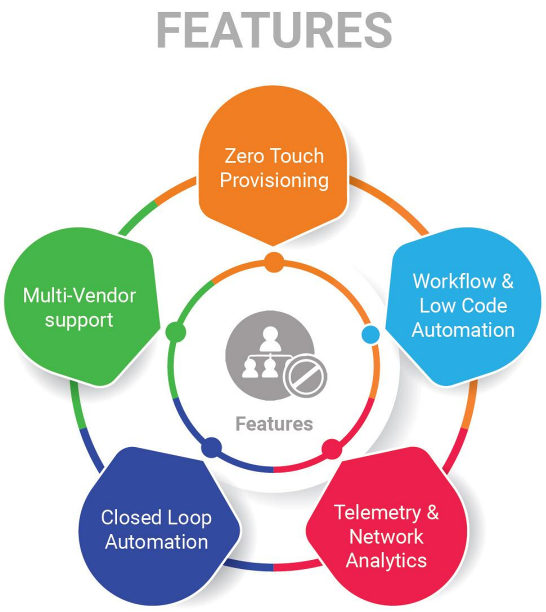
Intended Audience

This document is intended for Network Administrators & Operators that are using ATOM to perform Network management, configuration management, services automation and MOPs.

References

1. ATOM Deployment Guide - All aspects of ATOM Deployment including sizing and deployment process
2. ATOM User Guide - Master **[This Document]**
3. ATOM User Guide - Remote Agent Deployment Guide
4. ATOM User Guide - Performance Management & Alerting
5. ATOM User Guide - Network Configuration Compliance, Reporting & Remediation
6. ATOM API Guide - Discusses all external interfaces and integration flows
7. ATOM Platform Guide - Discusses Service model, Device model and Workflow development

ATOM Solution Overview



Following sections provide a brief overview of ATOM Features.

Configuration Management

ATOM provides Configuration management capabilities for a wide variety of devices. This includes configuration archival, scheduling, trigger driven configuration sync, configuration diff etc.,

Topology

ATOM provides topology discovery through CDP & LLDP. Topology can be displayed hierarchically using Resource Pools (Device Groups). Topology overlays Alarms and Performance information.

Collection & Reporting

ATOM supports collection of network operational and performance data through various protocols like SNMP, SNMP Trap, Syslog & Telemetry. Such information can be visualized in ATOM as reports or can be rendered on Grafana as Charts. Admin guide discusses Report customization in further detail.

Network Automation

ATOM provides Model driven Network automation for stateful services. Stateful services involve a Service model (YANG) and some business logic. Service model development is covered in ATOM Platform guide. Admin guide discusses how to deploy & operate a service.

Workflow & Low Code Automation

ATOM provides an intuitive graphical designer to design, deploy and execute simple or complicated network operations and procedures. It allows the administrator to configure pre-checks, post-checks and approval flow. Workflow creation flows will be covered in the ATOM Platform Guide. Admin guide discusses how to deploy & operate.

Telemetry & Network Analytics

In today's economy, data is the new oil. Anuta's ATOM helps organizations collect a massive amount of network data from thousands of devices and generate detailed in-depth insights that will help them deliver innovative applications and solutions to their customers. ATOM can collect network data from a variety of sources including model-driven telemetry, SNMP and Syslog. The diverse data format of each source is normalized to provide a single consistent view to the administrator. Grafana is packaged as part of ATOM to view historical data, observe patterns and predict future trends. Organizations can integrate their Big Data and AI platform with ATOM to generate business insights from the network element configuration and operational state.

Procedure to Create Native Telemetry Collection

- Create a new Telemetry Collection
  - Provide the name of collection
  - Choose Junos as platform
  - Select the transport as UDP which we will auto select the encoding as compact GPB with Dial Out Mode
- To configure resource filtering on device, select the filtering tab and choose the sensor name in dropdown & add regex pattern to configure
  - Select ALL option, if we have same resource filter across sensors
- Once the telemetry collection is provisioned, users can't edit the entry.
  - Subscription is not required in this case.

Closed Loop Automation

Anuta ATOM allows administrators to define a baseline behavior of their network and remediation actions to be initiated on any violation of this behavior. ATOM collects a large amount of network data from multi-vendor infrastructure using Google Protobufs and stores it in a time series database. ATOM correlation engine constantly monitors and compares the collected data with the baseline behavior to detect any deviations. On any violation, the pre-defined remediation action is triggered thereby always maintaining network consistency.

The solution simplifies troubleshooting by providing the context of the entire network. Customers can define KPI metrics and corrective actions to automate SLA compliance.

Multi-Vendor support

Anuta ATOM has the most comprehensive vendor support. It supports thousands of devices spanning across 45+ vendors and automates all the use-cases including Data Center Automation, InterCloud, Micro-Segmentation, Security as a Service, LBaaS, Campus/Access, Branch/WAN, IP/MPLS Edge, Virtual CPE, and NFV.

General Concepts

RBAC

Various ATOM Features and Levels of Access (Read, Create, Delete) are customized through RBAC. This is described in further Detail in User Management.

In case you are not able to access certain Feature or Policy / Data please contact your System Administrator.

Model Driven User Interface

Various ATOM Features are Model Driven or Driven by the Dynamic Pluggable Artifacts. Some of the following fall into this category:

1. Device Packages
2. Service Packages
3. Workflow
4. Reports

In case you do not find certain functionality expected in ATOM, please contact support@anutanetworks.com or your System Administrator.

Multi Tenancy

ATOM supports Multi-Tenancy across organizations and Sub-Tenancy within an Organization. This allows to vertically slice Any Data / Policies as per the business requirements of the Customer. Multi-Tenancy including Sharing, Wild Card usage to share across multiple Sub-tenants, Users within a Sub-Tenant and more details are discussed in ATOM Multi Tenancy & Sub-Tenancy

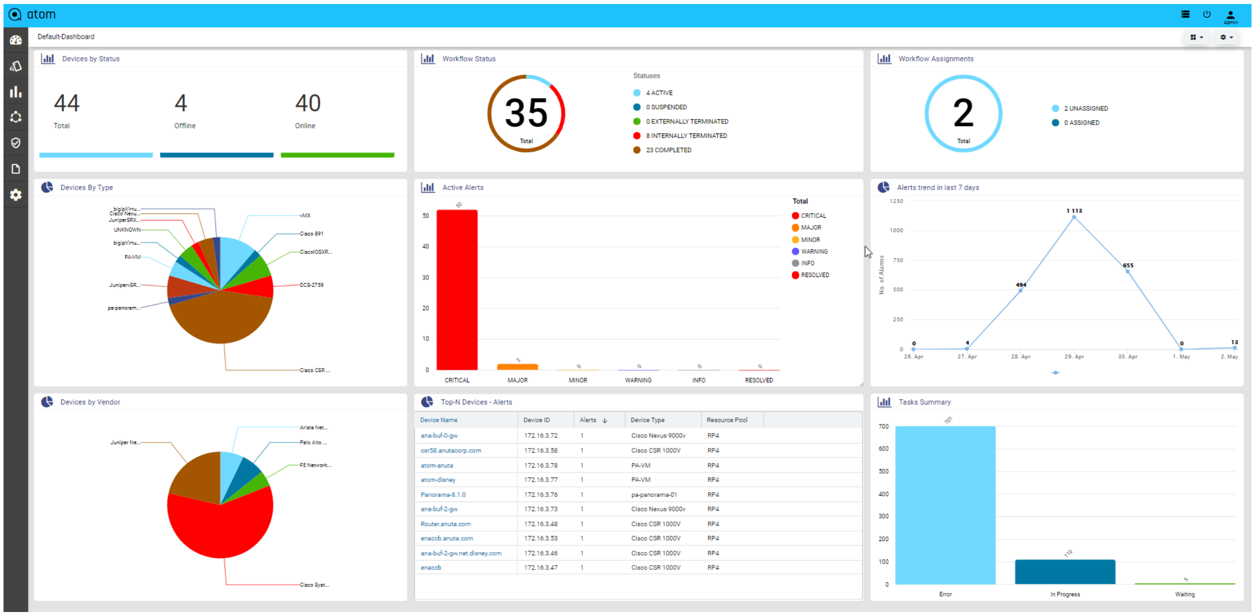
In case you are not able to access certain Feature or Policy / Data please contact your System Administrator.

Viewing the Dashboard

Dashboard provides a simple, integrated, comprehensive view of the data associated with the resources managed by ATOM. Information about the devices, services, service approvals are available “at-a-glance” for the administrator.

Starting from the 7.x release, Dashboard, the landing page of ATOM, is organized into dashlets. A dashlet is an individual component that can be added to or removed from a dashboard. Each dashlet is a reusable unit of functionality, providing a summary of the feature or the function supported by ATOM and is rendered as a result of the custom queries written in DSL.

You can customize the look of the Dashboard, by adding the dashlets of your choice, and dragging and dropping (the extreme right corner of the dashlet) to the desired location on the dashboard.



Device Name	Device ID	Alerts ↓	Device Type	Resource Pool
ana-buf-0-gw	172.16.3.72	1	Cisco Nexus 9000v	RP4
csr58.anutacorp.com	172.16.3.58	1	Cisco CSR 1000V	RP4
atom-anuta	172.16.3.78	1	PA-VM	RP4
atom-disney	172.16.3.77	1	PA-VM	RP4
Panorama-8.1.0	172.16.3.76	1	pa-panorama-01	RP4
ana-buf-2-gw	172.16.3.73	1	Cisco Nexus 9000v	RP4
Router.anuta.com	172.16.3.48	1	Cisco CSR 1000V	RP4
enaccb.anuta.com	172.16.3.53	1	Cisco CSR 1000V	RP4
ana-buf-2-gw.net.disney.com	172.16.3.46	1	Cisco CSR 1000V	RP4
enaccb	172.16.3.47	1	Cisco CSR 1000V	RP4

Each dashlet contains the summary or the overview of the feature or the functionality supported by ATOM.

For example, the dashlet “Device” displays the summary of devices managed by ATOM.

Some of the statistics that can be of interest in this dashlet could be as follows:

- Total number of devices
- Number of online devices
- Number of offline devices

These statistics can be gathered by ATOM and displayed in the corresponding dashlet depending on the DSL query written for each of them. You can save the layout containing the dashlets of your choice and set in a particular order.

Resource Management

ATOM Resource management involves device credential management, device onboarding through discovery or manual import, configuration archival, topology discovery & visualization, resource pools (device grouping), IP Address Management etc.,

Following table provides a quick summary of the activities that can be Resource Management activities.

If you want to..	Navigate to ...

Credential Sets, Credential Maps and Devices	Resource Manager > Devices
Device Discovery	Resource Manager > Devices > Discovery
Visualize Topology	Resource Manager > Network > Topology
Create & Visualize Logical & Hierarchical Network Device Groups/Resource Pools	Resource Manager > Network > Resource Pools
Create physical locations	Resource Manager > Locations

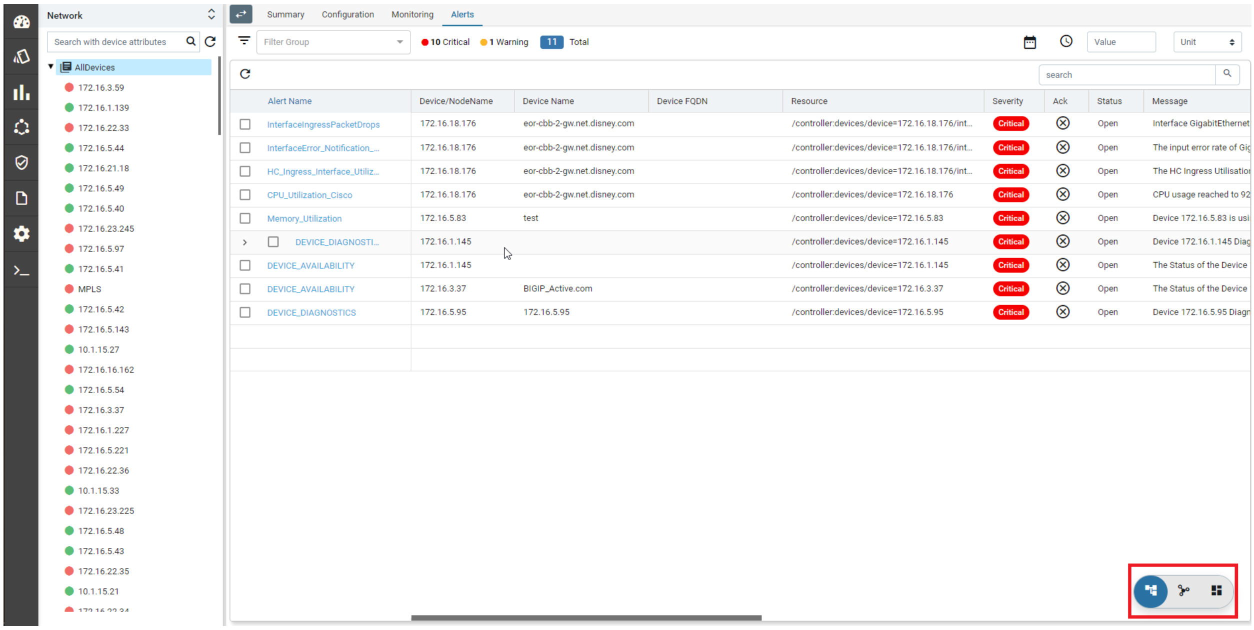
Device Management

Device Management involves onboarding of devices and working with Device inventory, Configuration, Monitoring & Alerts. Devices can be added Manually, through an API or Automated Discovery using CDP/LLDP.

All Device Mgmt activities can be performed from Device Explorer & Grid View. Following are the three main views for a Device.

- Grid View - Grid layout of all Devices & and action on a device(s)
- Tree View - Device Group based tree view of devices that provides a much easier way to toggle between devices and inspect various device characteristics.
- Topology View - Devices can be visualized in a Topology view
- Device Detail View - On Clicking a Device from Tree View or Grid View a detailed view of the device is presented. This is same as the view when a device is selected from the Tree view

Grid, Tree view & Topology Views can be toggled using the view selector button available at the bottom right hand side corner of the page.



Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack	Status	Message
□ InterfaceIngressPacketDrops	172.16.18.176	eor-cbb-2-gw.net.disney.com		/controller:devices/device=172.16.18.176/int...	Critical	⊗	Open	Interface GigabitEthernet
□ InterfaceError_Notification_...	172.16.18.176	eor-cbb-2-gw.net.disney.com		/controller:devices/device=172.16.18.176/int...	Critical	⊗	Open	The input error rate of Gig
□ HC_Ingress_Interface_Utiliz...	172.16.18.176	eor-cbb-2-gw.net.disney.com		/controller:devices/device=172.16.18.176/int...	Critical	⊗	Open	The HC Ingress Utilisation
□ CPU_Utilization_Cisco	172.16.18.176	eor-cbb-2-gw.net.disney.com		/controller:devices/device=172.16.18.176	Critical	⊗	Open	CPU usage reached to 92
□ Memory_Utilization	172.16.5.83	test		/controller:devices/device=172.16.5.83	Critical	⊗	Open	Device 172.16.5.83 is usi
› □ DEVICE_DIAGNOSTI...	172.16.1.145			/controller:devices/device=172.16.1.145	Critical	⊗	Open	Device 172.16.1.145 Diag
□ DEVICE_AVAILABILITY	172.16.1.145			/controller:devices/device=172.16.1.145	Critical	⊗	Open	The Status of the Device
□ DEVICE_AVAILABILITY	172.16.3.37	BIGIP_Active.com		/controller:devices/device=172.16.3.37	Critical	⊗	Open	The Status of the Device
□ DEVICE_DIAGNOSTICS	172.16.5.95	172.16.5.95		/controller:devices/device=172.16.5.95	Critical	⊗	Open	Device 172.16.5.95 Diagn

Credential Management

ATOM provides multiple functions like Provisioning, Inventory Collection etc. Function like Provisioning can be various ways - Payload (CLI vs YANG or Other) over a Given Transport (SSH, Telnet, HTTP(S), etc.,). For example, based on the use case ATOM Workflow Engine can use various Payload + Transport mechanisms to perform Provisioning actions. ATOM helps accomplish this using:

- Credential Sets - Define the Transport/Connectivity & Authentication to the devices
- Credential Profile - Maps Credential Sets to various functions in ATOM

This addresses various scenarios, some as follows:

- Reuse of same SNMP Credentials across the entire Network, while retaining Device/Vendor Specific Transport for Provisioning.
- Inventory Collection Via SNMP for a Given Vendor/Device vs Telemetry for another

Credential Sets

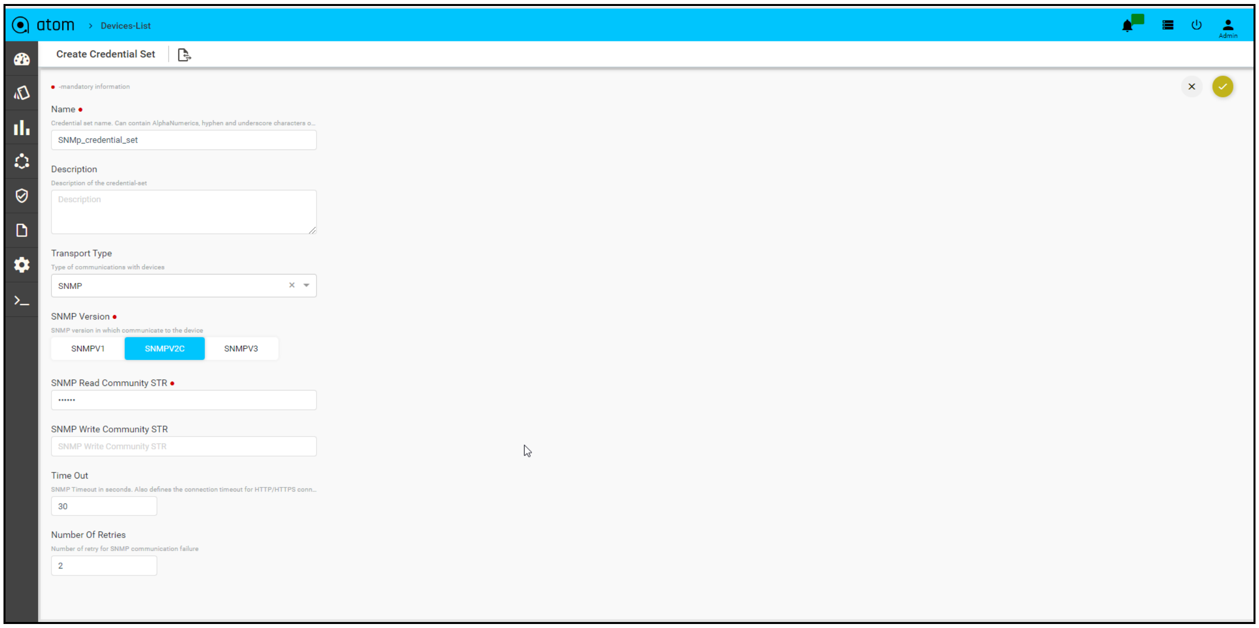
Following section provides guidance on how to configure device credentials in ATOM.

1. Navigate to **Resource Manager** > **Devices** > **Grid View(Icon)** > **Credential Sets**
2. Create/Edit a Credential Set
   - **Name**: Enter a string that will be used to identify the Credential Set
   - Description: Enter a description w.r.t the created Credential Set(Optional)

SNMP Transport credentials:

Select Transport type as “SNMP” can view below option

- **SNMP version**: Select the version of SNMP that should be used for device communication
- **SNMP Read Community String**: Enter the string that is used by the device to authenticate ATOM before it can retrieve the configuration from the device
- **SNMP Write Community String**: Enter the string that is used by the device to authenticate ATOM while writing configuration to the device
- **Timeout:** Enter the time taken for the response from the device in seconds.
- **Number Of Retries:** Enter the number of times the SNMP request is sent when a timeout occurs.



● -mandatory information

Name ●
Credential set name. Can contain AlphaNumerics, hyphen and underscore characters o...
SNMp_credential_set

Description
Description of the credential-set
Description

Transport Type
Type of communications with devices
SNMP

SNMP Version ●
SNMP version in which communicate to the device
SNMPV1 [✓ SNMPV2C] SNMPV3

SNMP Read Community STR ●
••••••

SNMP Write Community STR
SNMP Write Community STR

Time Out
SNMP Timeout in seconds. Also defines the connection timeout for HTTP/HTTPS conn...
30

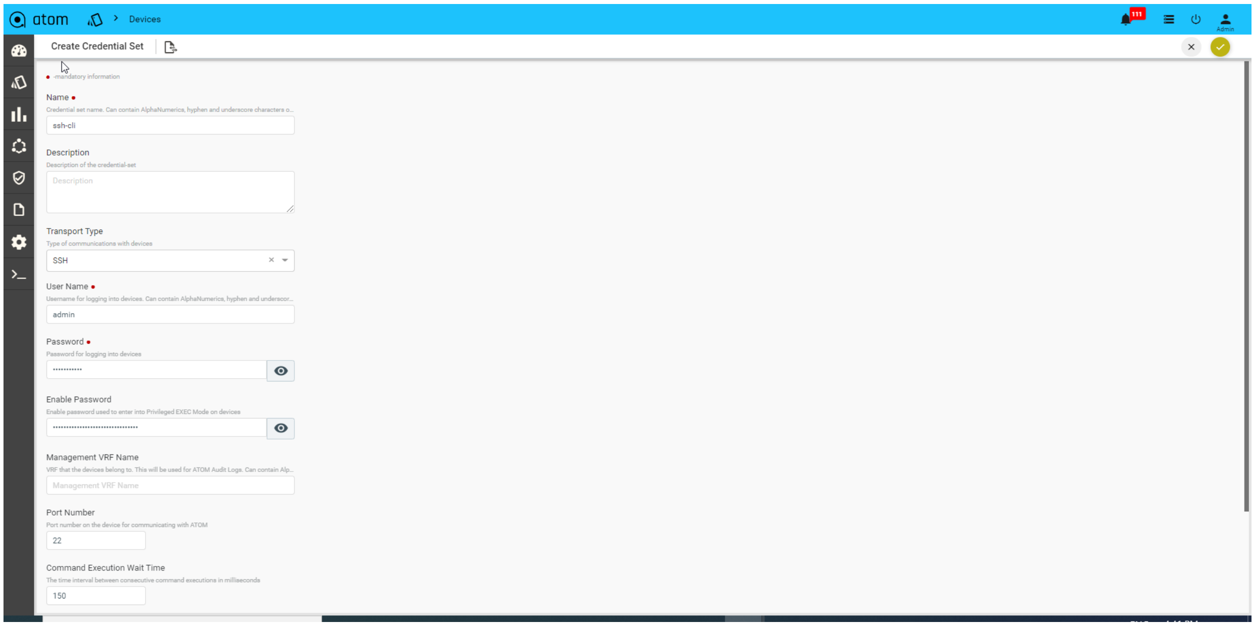
Number Of Retries
Number of retry for SNMP communication failure
2

CLI Device(SSH/TELNET) Transport Credentials:

Select Transport type as “SSH/TELNET”

- **User name**: Enter a string that should be used to login to the device
- **Password**: Enter a string that used be a password for logging into the device
- **Enable Password**: Enter a password to enter into the privilege exec mode of the device.
- **Mgmt-VRF-Name**: Enter the name of the management VRF configured on the device. This will be used by ATOM to retrieve the audit logs from the device.

- **Port Number:** Enter the number of the port on the device that should be used for communication with ATOM
- **Command Execution Wait Time**: Enter the number (in millisecs) that ATOM should wait for the consecutive commands to be executed on the device. Enter any number between 10 to 30000.
- **CLI Configure Command TimeOut**: Enter the time (in seconds) that ATOM should wait for the command line prompt on the device to appear. Enter any between 1 to 1200.
- **Max Connections:** Enter the number of max connections that can be opened for a given device at any time.



Create Credential Set

● -mandatory information

Name ●
Credential set name. Can contain AlphaNumerics, hyphen and underscore characters o...
ssh-cli

Description
Description of the credential-set
Description

Transport Type
Type of communications with devices
SSH

User Name ●
Username for logging into devices. Can contain AlphaNumerics, hyphen and underscor...
admin

Password ●
Password for logging into devices
••••••••••••

Enable Password
Enable password used to enter into Privileged EXEC Mode on devices
••••••••••••••••••••••••••••••••

Management VRF Name
VRF that the devices belong to. This will be used for ATOM Audit Logs. Can contain Alp...
Management VRF Name

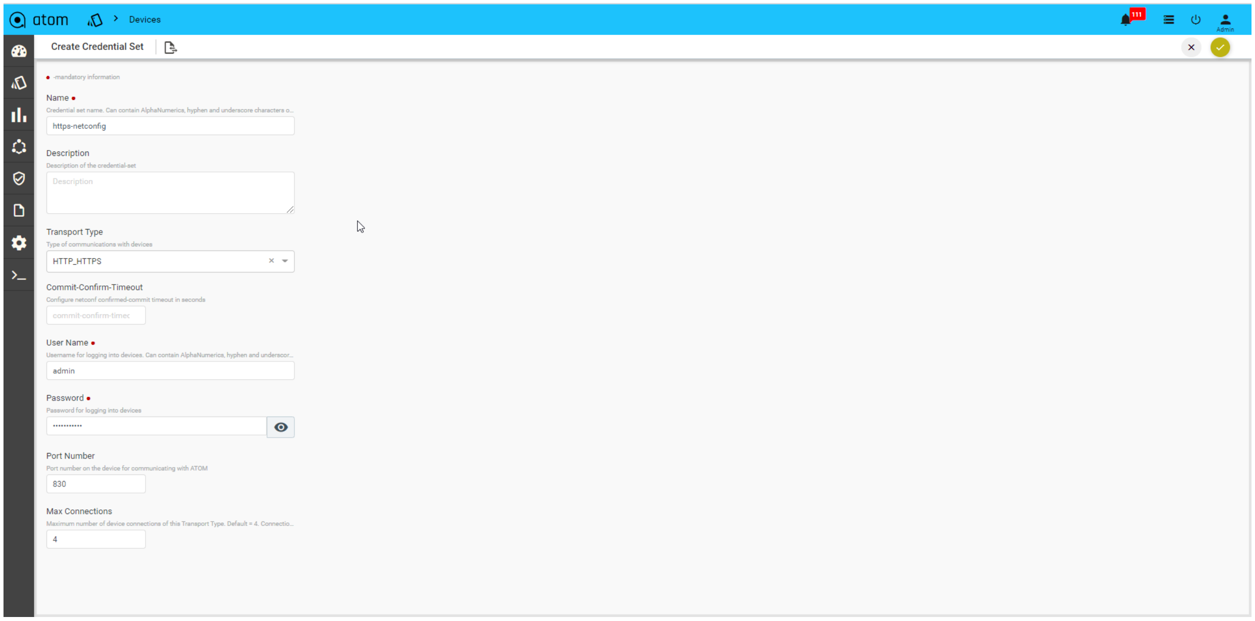
Port Number
Port number on the device for communicating with ATOM
22

Command Execution Wait Time
The time interval between consecutive command executions in milliseconds
150

API Device Transport Credential:

Select Transport type as “HTTP_HTTPS / GRPC”

- **User name**: Enter a string that should be used to login to the device
- **Password**: Enter a string that used be a password for logging into the device
- **Port Number:** Enter the number of the port on the device that should be used for communication with ATOM.
- **Max Connections:** Enter the number of max connections that can be opened for a given device at any time.



● -mandatory information

Name ●
Credential set name. Can contain AlphaNumerics, hyphen and underscore characters o...
https-netconfig

Description
Description of the credential-set
Description

Transport Type
Type of communications with devices
HTTP_HTTPS

Commit-Confirm-Timeout
Configure netconf confirmed-commit timeout in seconds
commit-confirm-timec

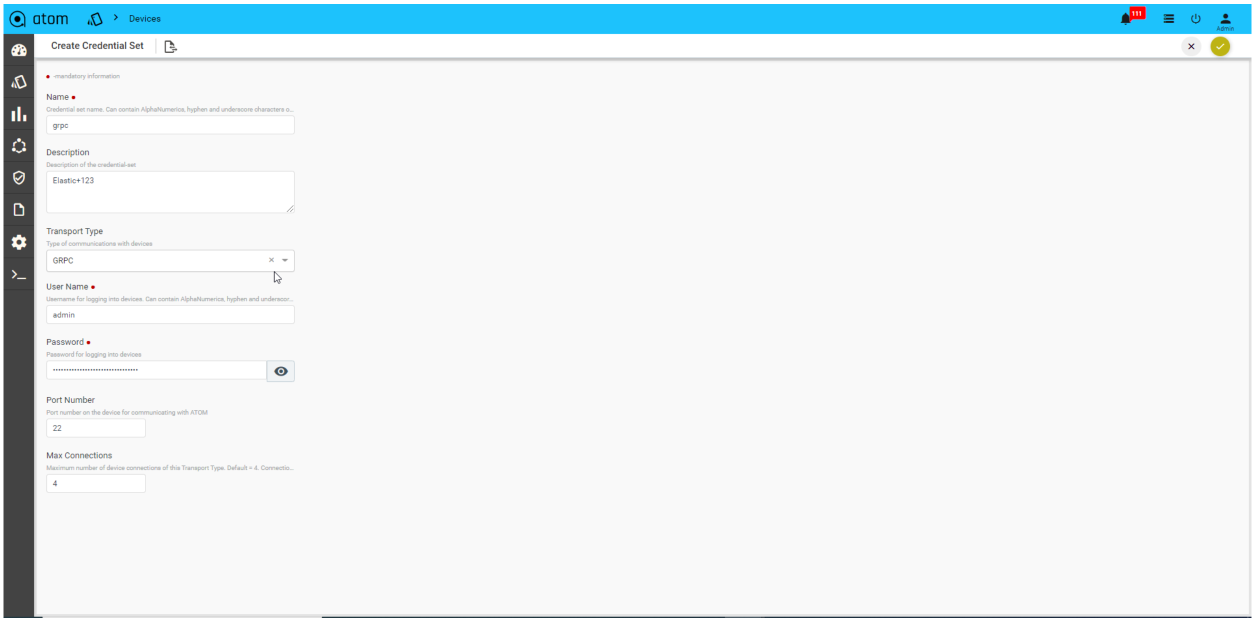
User Name ●
Username for logging into devices. Can contain AlphaNumerics, hyphen and underscor...
admin

Password ●
Password for logging into devices
••••••••••••

Port Number
Port number on the device for communicating with ATOM
830

Max Connections
Maximum number of device connections of this Transport Type. Default = 4. Connectio...
4

GRPC Transport credential:



● -mandatory information

Name ●
Credential set name. Can contain AlphaNumerics, hyphen and underscore characters o...
grpc

Description
Description of the credential-set
Elastic+123

Transport Type
Type of communications with devices
GRPC

User Name ●
Username for logging into devices. Can contain AlphaNumerics, hyphen and underscor...
admin

Password ●
Password for logging into devices
••••••••••••••••••••••••••••••••

Port Number
Port number on the device for communicating with ATOM
22

Max Connections
Maximum number of device connections of this Transport Type. Default = 4. Connectio...
4

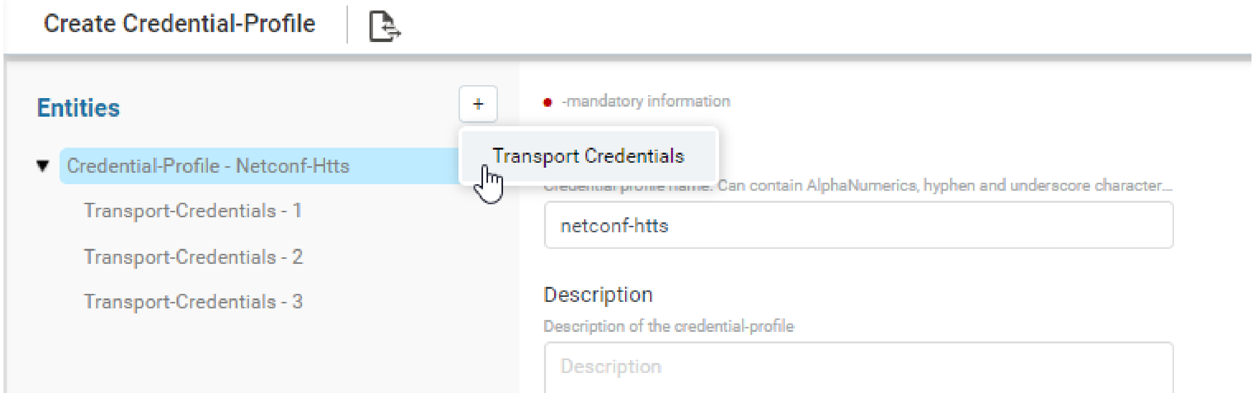
Credential Profile

By default, ATOM has the following out of the box functions:

- Config Provisioning
- SNMP
- Telemetry
- HTTP provisioning
- NETCONF provisioning

Navigate to **Resource Manager > Devices > Grid View(Icon) > Credential Profile**

1. Here, provide the name of credential profile, description and add the transport credentials by choosing the appropriate functions.



- Credential-Profile - Netconf-Htts
  - Transport-Credentials - 1
  - Transport-Credentials - 2
  - Transport-Credentials - 3

● -mandatory information

Credential profile name. Can contain AlphaNumerics, hyphen and underscore character...

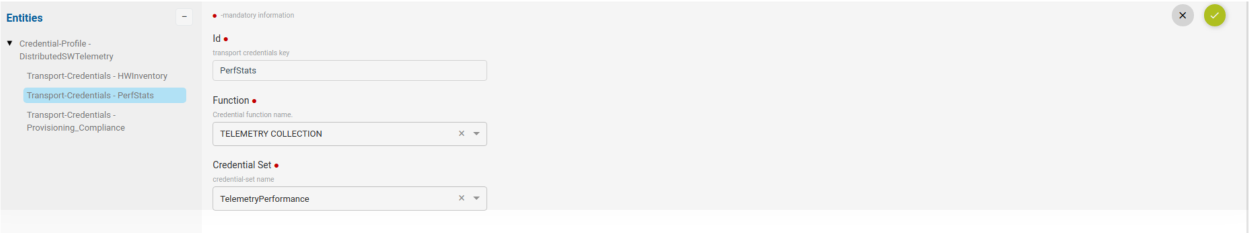
netconf-htts

Description

Description of the credential-profile

Description

2. Below is the snapshot to attach the credential set with function.



- Credential-Profile - DistributedSWTelemetry
  - Transport-Credentials - HWInventory
  - Transport-Credentials - PerfStats
  - Transport-Credentials - Provisioning_Compliance

● -mandatory information

Id ●

transport credentials key

PerfStats

Function ●

Credential function name.

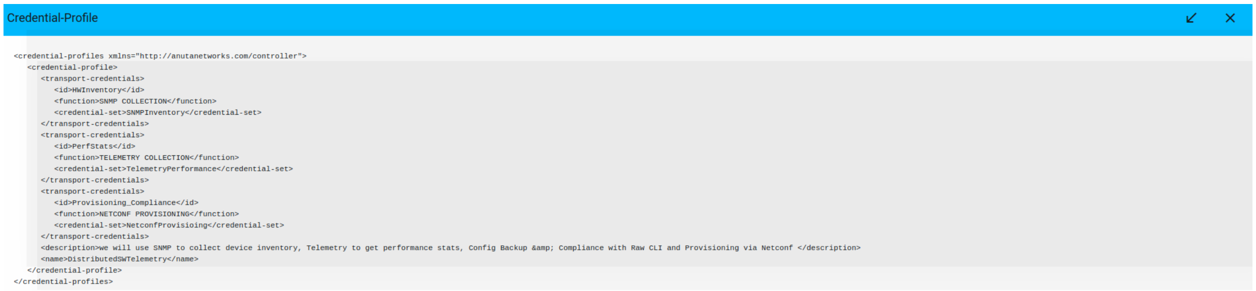
TELEMETRY COLLECTION

Credential Set ●

credential-set name

TelemetryPerformance

Credential profile payload in XML:



```
<credential-profiles xmlns="http://anutanetworks.com/controller">
   <credential-profile>
      <transport-credentials>
         <id>HWInventory</id>
         <function>SNMP COLLECTION</function>
         <credential-set>SNMPInventory</credential-set>
      </transport-credentials>
      <transport-credentials>
         <id>PerfStats</id>
         <function>TELEMETRY COLLECTION</function>
         <credential-set>TelemetryPerformance</credential-set>
      </transport-credentials>
      <transport-credentials>
         <id>Provisioning_Compliance</id>
         <function>NETCONF PROVISIONING</function>
         <credential-set>NetconfProvisioing</credential-set>
      </transport-credentials>
      <description>we will use SNMP to collect device inventory, Telemetry to get performance stats, Config Backup &amp; Compliance with Raw CLI and Provisioning via Netconf </description>
      <name>DistributedSWTelemetry</name>
   </credential-profile>
</credential-profiles>
```

Credential Maps

Credential Map allows users to map multiple Credentials Profiles to an IP-Address range. This addresses the following use cases:

- Device Discovery - When ATOM needs to Perform Discovery using SNMP Sweep or CDP/LLDP. Since devices are yet to be onboarded, explicit assignment is not available.
- Credential profile is mandatory when onboarding a device.

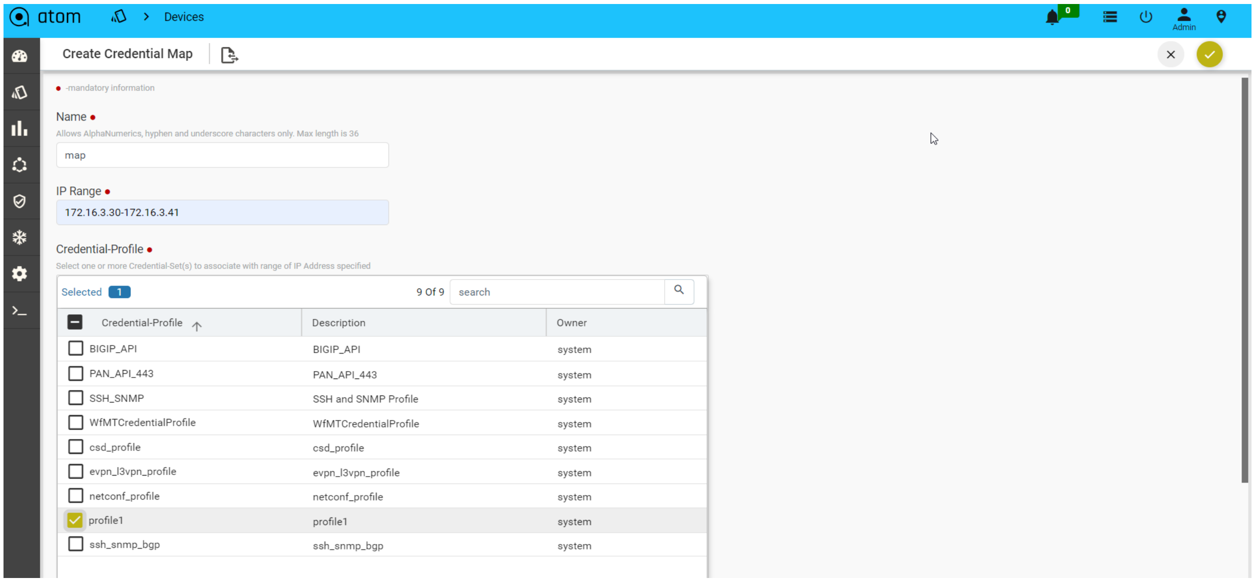
When ATOM needs credentials for a device and explicit Device to Credential Profile is not available, ATOM will cycle through the IP Address range and use the first credential profile that works. The successful Credential Profile is mapped to the device. This process is repeated whenever ATOM is unsuccessful communicating with the device using the current assigned credential profile.

To create a Credential Map:

1. Navigate to **Resource Manager** > **Devices** > **Grid View(Icon) > Credential Maps**
2. Create/Edit **Create Credential Map**:
   - **Name**: Enter a name for the Credential Map
   - **Start-IP-address**: Enter an IP address in the range from which ATOM starts the sweep for locating the devices.
   - **End-IP-address**: Enter an IP address in the range beyond which ATOM will not continue the sweep for locating the devices.

   Note: The Start and the End IP address are the range of IP addresses of the devices.

   - **Credential Profile**: Select one or more Credential Profiles shown.



● -mandatory information

Name ●
Allows AlphaNumerics, hyphen and underscore characters only. Max length is 36
map

IP Range ●
172.16.3.30-172.16.3.41

Credential-Profile ●
Select one or more Credential-Set(s) to associate with range of IP Address specified

Selected 1 9 Of 9 search

	Credential-Profile	Description	Owner
□	BIGIP_API	BIGIP_API	system
□	PAN_API_443	PAN_API_443	system
□	SSH_SNMP	SSH and SNMP Profile	system
□	WfMTCredentialProfile	WfMTCredentialProfile	system
□	csd_profile	csd_profile	system
□	evpn_l3vpn_profile	evpn_l3vpn_profile	system
□	netconf_profile	netconf_profile	system
☑	profile1	profile1	system
□	ssh_snmp_bgp	ssh_snmp_bgp	system

Device Onboarding

Devices can be onboarded into ATOM using an API, Manually through User Interface of Discovery using CDP/LLDP.

Discovering Devices:

Devices discovery is covered in section - Device Discovery

Adding Device Manually:

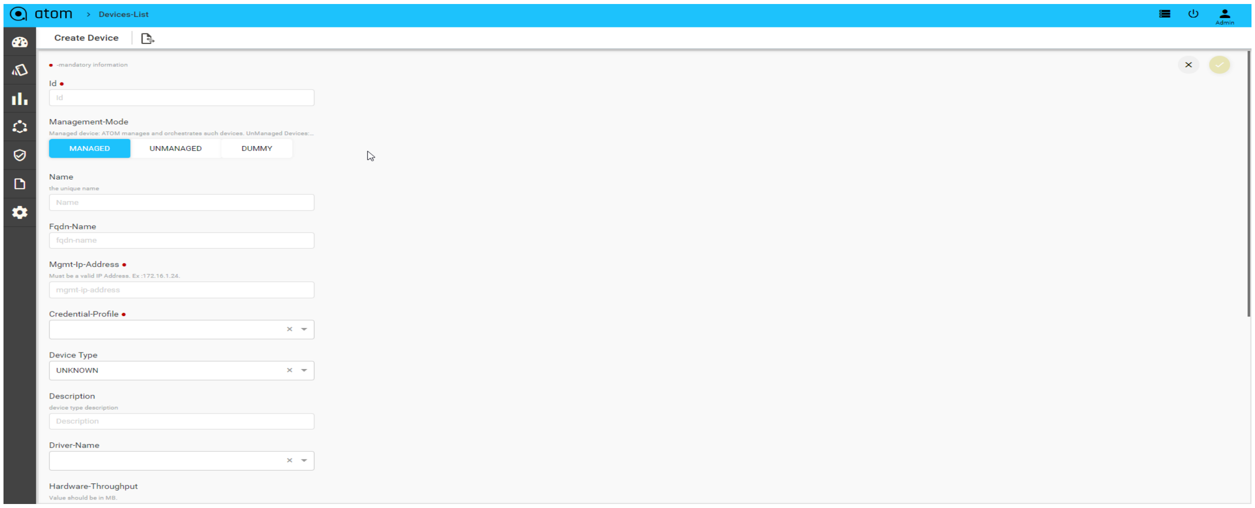
We may have scenarios where device discovery is not viable. Some reasons below:

- Lack of support for Layer 2 discovery support on the device
- Operational/Administrative reason to not use LLDP/CDP
- SNMP Sweep discovery is not suitable - IP Address Range are not well defined, contiguous or some other reasons

Before you begin, it’s mandatory to define Credential Sets & Credential Profiles.

To Add/Edit a Device:

1. Navigate to **Resource Manager** > **Devices (Grid View)**
2. Add - Select **Add** action
    a. **IP address**: Enter the IP address of the device
    b. **Credential Profile**: Select the Credential Profile of the device
    c. **Driver name**: Driver can be selected for API devices.
    d. **Latitude & Longitude:** is a measurement on a globe or map of location north or south of the Equator on devices
3. Modify - Select Device & Select **Edit** action
4. Delete - Select one/more device(s) and Select Delete Action



● -mandatory information

Id ●

Management-Mode
Managed device: ATOM manages and orchestrates such devices. UnManaged Devices:...
MANAGED | UNMANAGED | DUMMY

Name
the unique name

Fqdn-Name

Mgmt-Ip-Address ●
Must be a valid IP Address. Ex :172.16.1.24.

Credential-Profile ●

Device Type: UNKNOWN

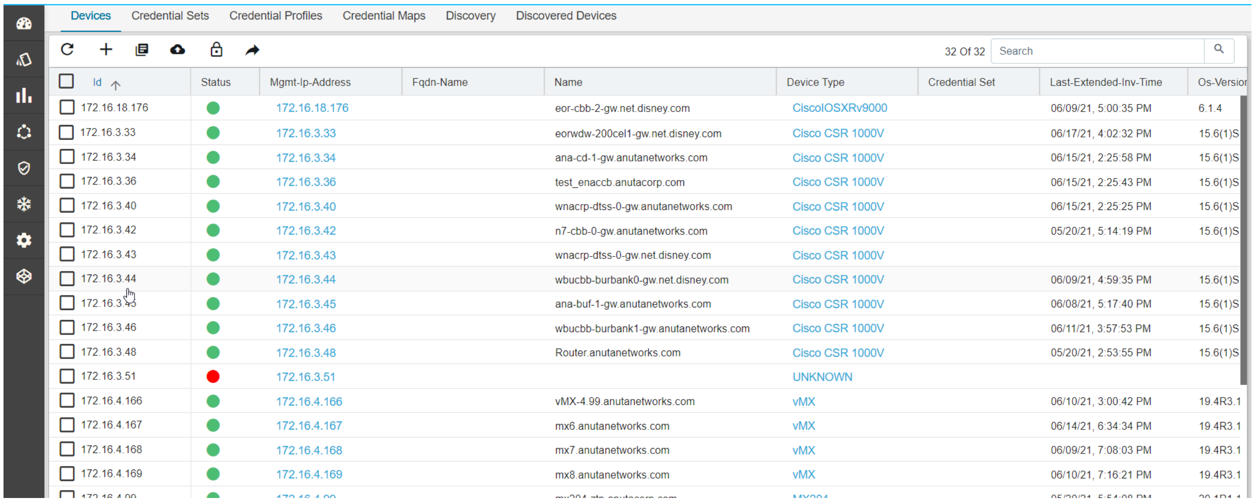
Description
device type description

Driver-Name

Hardware-Throughput
Value should be in MB.

Upon device addition, ATOM will perform the following:

Added Devices are shown in Devices grid and Device status will be shown in **Green** if device is SNMP reachable and ATOM is able to work with the device successfully.

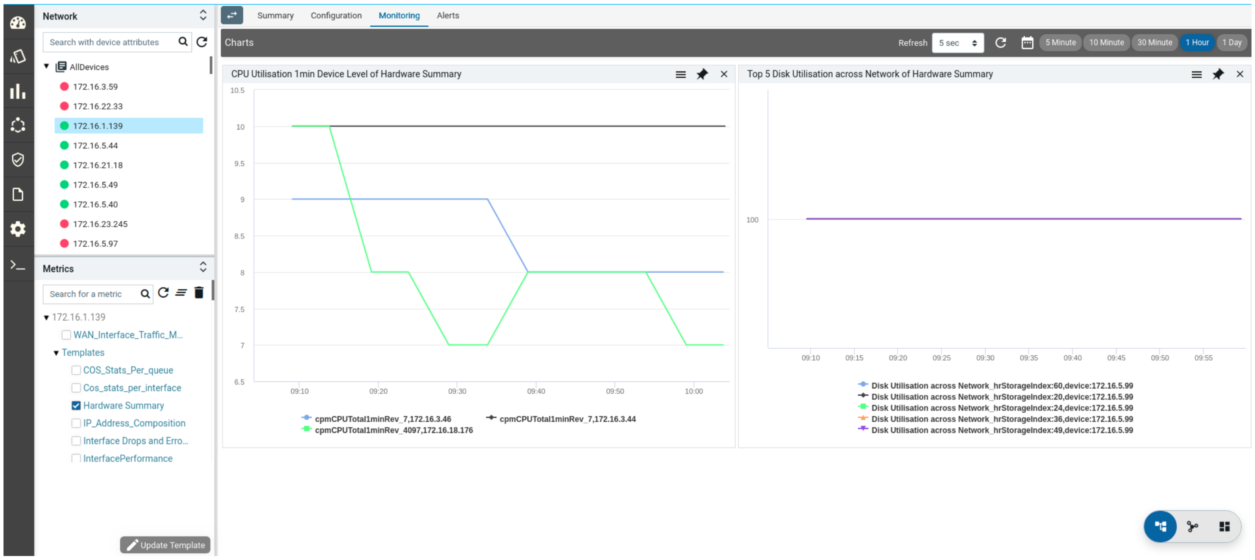


□ Id	Status	Mgmt-Ip-Address	Fqdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Versior
□ 172.16.18.176	●	172.16.18.176		eor-cbb-2-gw.net.disney.com	CiscoIOSXRv9000		06/09/21, 5:00:35 PM	6.1.4
□ 172.16.3.33	●	172.16.3.33		eorwdw-200cel1-gw.net.disney.com	Cisco CSR 1000V		06/17/21, 4:02:32 PM	15.6(1)S
□ 172.16.3.34	●	172.16.3.34		ana-cd-1-gw.anutanetworks.com	Cisco CSR 1000V		06/15/21, 2:25:58 PM	15.6(1)S
□ 172.16.3.36	●	172.16.3.36		test_enaccb.anutacorp.com	Cisco CSR 1000V		06/15/21, 2:25:43 PM	15.6(1)S
□ 172.16.3.40	●	172.16.3.40		wnacrp-dtss-0-gw.anutanetworks.com	Cisco CSR 1000V		06/15/21, 2:25:25 PM	15.6(1)S
□ 172.16.3.42	●	172.16.3.42		n7-cbb-0-gw.anutanetworks.com	Cisco CSR 1000V		05/20/21, 5:14:19 PM	15.6(1)S
□ 172.16.3.43	●	172.16.3.43		wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V			
□ 172.16.3.44	●	172.16.3.44		wbucbb-burbank0-gw.net.disney.com	Cisco CSR 1000V		06/09/21, 4:59:35 PM	15.6(1)S
□ 172.16.3.45	●	172.16.3.45		ana-buf-1-gw.anutanetworks.com	Cisco CSR 1000V		06/08/21, 5:17:40 PM	15.6(1)S
□ 172.16.3.46	●	172.16.3.46		wbucbb-burbank1-gw.anutanetworks.com	Cisco CSR 1000V		06/11/21, 3:57:53 PM	15.6(1)S
□ 172.16.3.48	●	172.16.3.48		Router.anutanetworks.com	Cisco CSR 1000V		05/20/21, 2:53:55 PM	15.6(1)S
□ 172.16.3.51	●	172.16.3.51			UNKNOWN			
□ 172.16.4.166	●	172.16.4.166		vMX-4.99.anutanetworks.com	vMX		06/10/21, 3:00:42 PM	19.4R3.1
□ 172.16.4.167	●	172.16.4.167		mx6.anutanetworks.com	vMX		06/14/21, 6:34:34 PM	19.4R3.1
□ 172.16.4.168	●	172.16.4.168		mx7.anutanetworks.com	vMX		06/09/21, 7:08:03 PM	19.4R3.1
□ 172.16.4.169	●	172.16.4.169		mx8.anutanetworks.com	vMX		06/10/21, 7:16:21 PM	19.4R3.1
□ 172.16.4.99	●	172.16.4.99		mx204-ztp.anutacorp.com	MX204		05/20/21, 5:54:08 PM	20.1R1.1

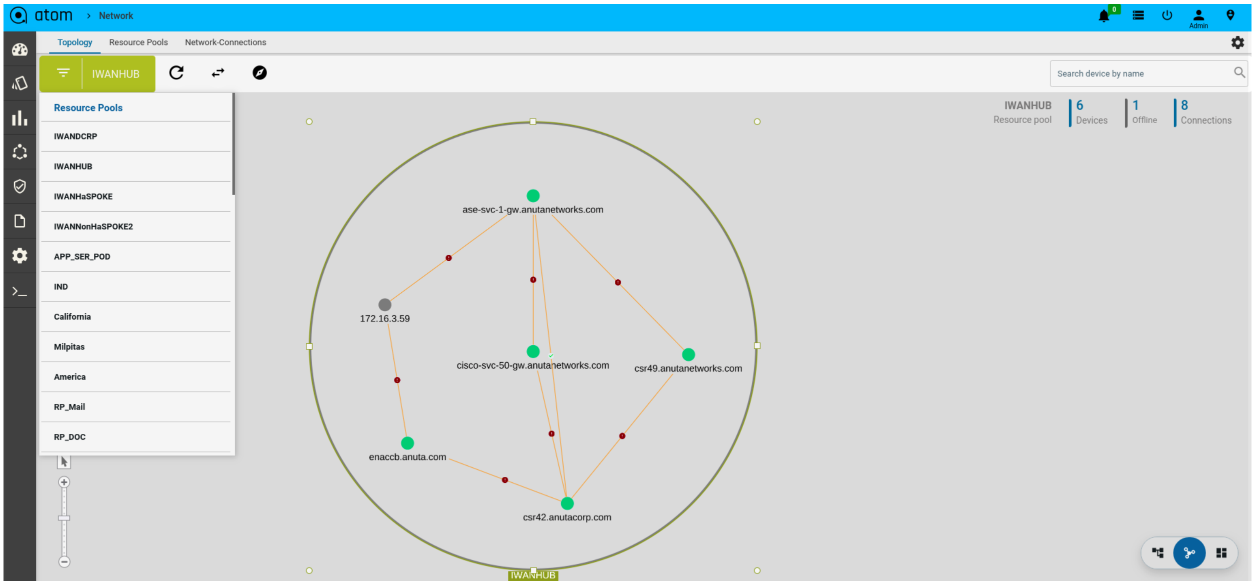
Device Views

ATOM has 3 views for the devices - Tree (Device Explorer), Topology and Grid.

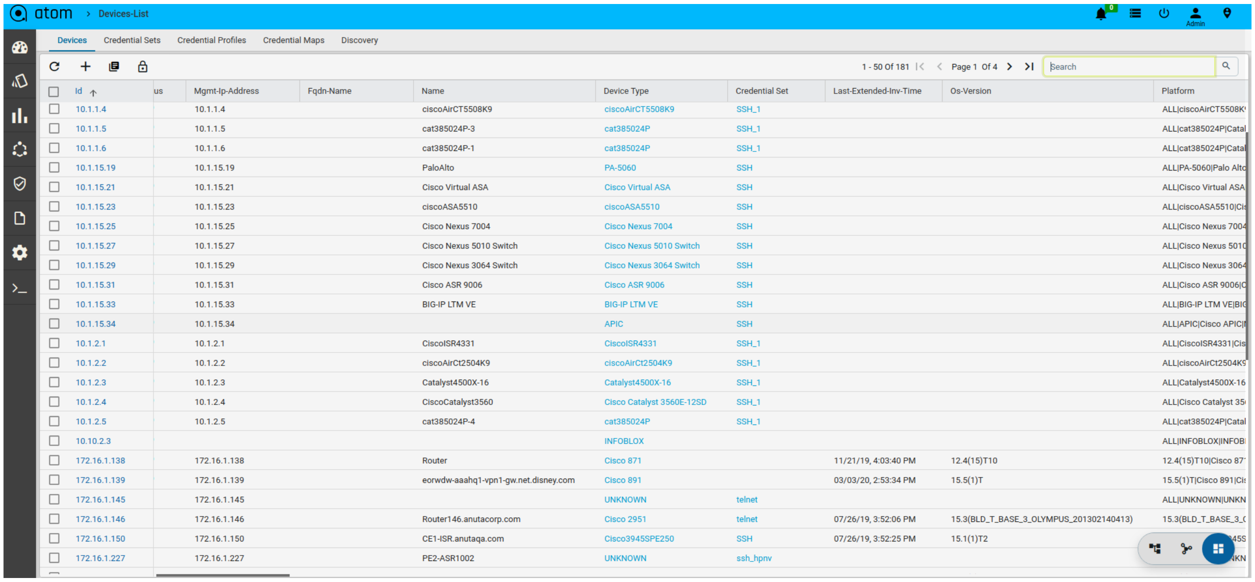
1. Tree View:


Network
Search with device attributes
AllDevices
172.16.3.59
172.16.22.33
172.16.1.139
172.16.5.44
172.16.21.18
172.16.5.49
172.16.5.40
172.16.23.245
172.16.5.97
Metrics
Search for a metric
172.16.1.139
WAN_Interface_Traffic_M...
Templates
COS_Stats_Per_queue
Cos_stats_per_interface
Hardware Summary
IP_Address_Composition
Interface Drops and Erro...
InterfacePerformance
Update Template
Summary
Configuration
Monitoring
Alerts
Charts
Refresh
5 sec
5 Minute
10 Minute
30 Minute
1 Hour
1 Day
CPU Utilisation 1min Device Level of Hardware Summary
10.5
10
9.5
9
8.5
8
7.5
7
6.5
09:10
09:20
09:30
09:40
09:50
10:00
cpmCPUTotal1minRev_7,172.16.3.46
cpmCPUTotal1minRev_7,172.16.3.44
cpmCPUTotal1minRev_4097,172.16.18.176
Top 5 Disk Utilisation across Network of Hardware Summary
100
09:10
09:15
09:20
09:25
09:30
09:35
09:40
09:45
09:50
09:55
Disk Utilisation across Network_hrStorageIndex:60,device:172.16.5.99
Disk Utilisation across Network_hrStorageIndex:20,device:172.16.5.99
Disk Utilisation across Network_hrStorageIndex:24,device:172.16.5.99
Disk Utilisation across Network_hrStorageIndex:36,device:172.16.5.99
Disk Utilisation across Network_hrStorageIndex:49,device:172.16.5.99

2. Topology View



3. Grid View:



□	Id	us	Mgmt-Ip-Address	Fqdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Version	Platform
□	10.1.1.4		10.1.1.4		ciscoAirCT5508K9	ciscoAirCT5508K9	SSH_1			ALL|ciscoAirCT5508K
□	10.1.1.5		10.1.1.5		cat385024P-3	cat385024P	SSH_1			ALL|cat385024P|Catal
□	10.1.1.6		10.1.1.6		cat385024P-1	cat385024P	SSH_1			ALL|cat385024P|Catal
□	10.1.15.19		10.1.15.19		PaloAlto	PA-5060	SSH			ALL|PA-5060|Palo Alto
□	10.1.15.21		10.1.15.21		Cisco Virtual ASA	Cisco Virtual ASA	SSH			ALL|Cisco Virtual ASA
□	10.1.15.23		10.1.15.23		ciscoASA5510	ciscoASA5510	SSH			ALL|ciscoASA5510|Cis
□	10.1.15.25		10.1.15.25		Cisco Nexus 7004	Cisco Nexus 7004	SSH			ALL|Cisco Nexus 7004
□	10.1.15.27		10.1.15.27		Cisco Nexus 5010 Switch	Cisco Nexus 5010 Switch	SSH			ALL|Cisco Nexus 5010
□	10.1.15.29		10.1.15.29		Cisco Nexus 3064 Switch	Cisco Nexus 3064 Switch	SSH			ALL|Cisco Nexus 3064
□	10.1.15.31		10.1.15.31		Cisco ASR 9006	Cisco ASR 9006	SSH			ALL|Cisco ASR 9006|C
□	10.1.15.33		10.1.15.33		BIG-IP LTM VE	BIG-IP LTM VE	SSH			ALL|BIG-IP LTM VE|BIG
□	10.1.15.34		10.1.15.34			APIC	SSH			ALL|APIC|Cisco APIC|
□	10.1.2.1		10.1.2.1		CiscoISR4331	CiscoISR4331	SSH_1			ALL|CiscoISR4331|Cis
□	10.1.2.2		10.1.2.2		ciscoAirCt2504K9	ciscoAirCt2504K9	SSH_1			ALL|ciscoAirCt2504K9
□	10.1.2.3		10.1.2.3		Catalyst4500X-16	Catalyst4500X-16	SSH_1			ALL|Catalyst4500X-16
□	10.1.2.4		10.1.2.4		CiscoCatalyst3560	Cisco Catalyst 3560E-12SD	SSH_1			ALL|Cisco Catalyst 35
□	10.1.2.5		10.1.2.5		cat385024P-4	cat385024P	SSH_1			ALL|cat385024P|Catal
□	10.10.2.3					INFOBLOX				ALL|INFOBLOX|INFOB
□	172.16.1.138		172.16.1.138		Router	Cisco 871		11/21/19, 4:03:40 PM	12.4(15)T10	12.4(15)T10|Cisco 87
□	172.16.1.139		172.16.1.139		eorwdw-aaahq1-vpn1-gw.net.disney.com	Cisco 891		03/03/20, 2:53:34 PM	15.5(1)T	15.5(1)T|Cisco 891|Cis
□	172.16.1.145		172.16.1.145			UNKNOWN	telnet			ALL|UNKNOWN|UNKN
□	172.16.1.146		172.16.1.146		Router146.anutacorp.com	Cisco 2951	telnet	07/26/19, 3:52:06 PM	15.3(BLD_T_BASE_3_OLYMPUS_201302140413)	15.3(BLD_T_BASE_3_(
□	172.16.1.150		172.16.1.150		CE1-ISR.anutaqa.com	Cisco3945SPE250	SSH	07/26/19, 3:52:25 PM	15.1(1)T2	45S
□	172.16.1.227		172.16.1.227		PE2-ASR1002	UNKNOWN	ssh_hpnv			KN

Device Explorer

Device explorer view will provide the devices, its associated config and observability elements in logical hierarchy. This view contains the available device-groups and its associated devices . By default, all the devices are part of **AllDevices** Group.

Device group will have all the corresponding device details Each group and node will have the following sections:

1. **Summary** : It provides the device platform, version, serial number, current operating OS, Device hardware health, Interface summary, Config compliance violations and Active alerts and recent activity.

2. **Configuration :** it provides the entire summary of config related operations.
    a. **Config Archive** : It shows the each config retrieval, type, retrieval & parsing status.
    b. **Changelog :** provides the summary of change in configuration such as number of lines added, deleted or modified and at what time & corresponding changes.
    c. **Config Data :** it will provide the entire config tree through YANG models parsing. This is not applicable for any device group as they can have heterogeneous models based on the grouping criteria & provisioning interface such as ATOM abstract device models, OC or Native models.
3. **Monitoring :** It contains all possible templates & charts through inheritance from its group or node level. It will show the default template by default as its monitoring summary. Refer Monitoring Guide for more details.
4. **Alerts :** It will show the all active alerts and its history by default. Alert filter view is also available to search & prioritise the alerts. Refer Alerting Guide for more details.

Each device-group view will have a Summary dashboard which can be customizable.

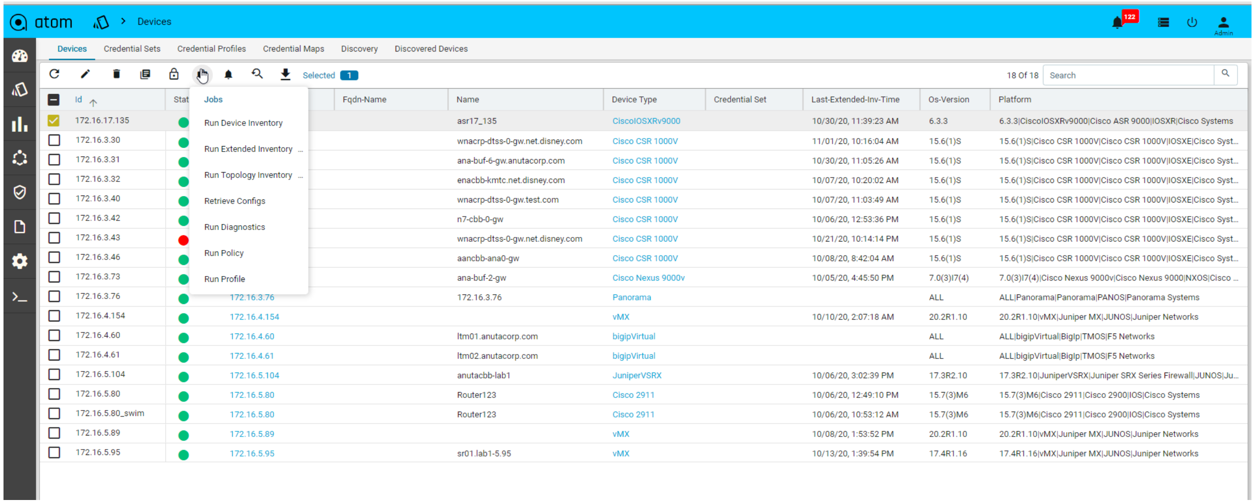
Device Actions

ATOM supports common actions on Device. These actions can be performed from Device Grid view on one or more devices or from within the Device specific view and will be discussed in Device Summary section.

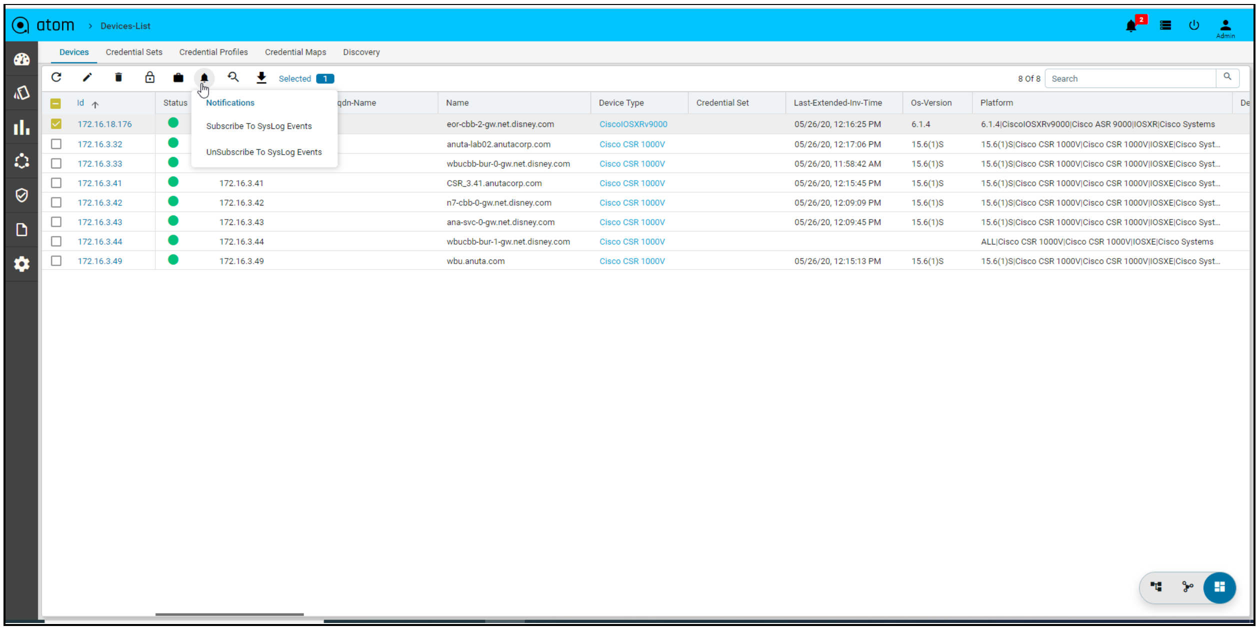
Jobs & Subscriptions

Various Collection & Diagnostics jobs can be invoked.

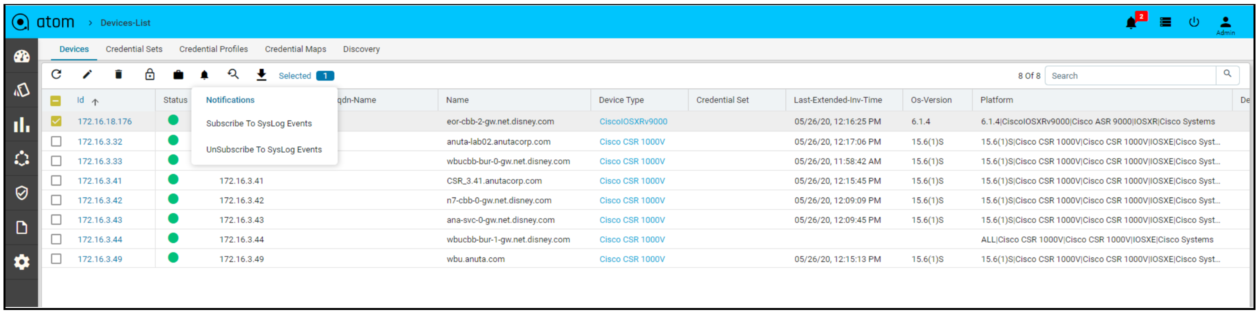
1. Navigate to **Devices** > select one or more devices
2. Click on the **Jobs** and select the job to run
    a. Jobs action -> Run Device Inventory
    b. Jobs action -> Run Extended Inventory
    c. Jobs action -> Run Topology Inventory
    d. Jobs action -> Retrieve Configs
    e. Jobs action -> Run Diagnostics
    f. Jobs action -> Run Policy
    g. Jobs action -> Run Profile
3. Click on the **Subscriptions** to configure Syslog Subscription on the Devices
    a. This will result in ATOM being configured as a Syslog receiver and is a configuration change on the device.



	Id	Stat		Fqdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Version	Platform
☑	172.16.17.135	●			asr17_135	CiscoIOSXRv9000		10/30/20, 11:39:23 AM	6.3.3	6.3.3|CiscoIOSXRv9000|Cisco ASR 9000|IOSXR|Cisco Systems
☐	172.16.3.30	●			wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V		11/01/20, 10:16:04 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.31	●			ana-buf-6-gw.anutacorp.com	Cisco CSR 1000V		10/30/20, 11:05:26 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.32	●			enacbb-kmtc.net.disney.com	Cisco CSR 1000V		10/07/20, 10:20:02 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.40	●			wnacrp-dtss-0-gw.test.com	Cisco CSR 1000V		10/07/20, 11:03:49 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.42	●			n7-cbb-0-gw	Cisco CSR 1000V		10/06/20, 12:53:36 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.43	●			wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V		10/21/20, 10:14:14 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.46	●			aancbb-ana0-gw	Cisco CSR 1000V		10/08/20, 8:42:04 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...
☐	172.16.3.73	●			ana-buf-2-gw	Cisco Nexus 9000v		10/05/20, 4:45:50 PM	7.0(3)I7(4)	7.0(3)I7(4)|Cisco Nexus 9000v|Cisco Nexus 9000|NXOS|Cisco ...
☐	172.16.3.76	●	172.16.3.76		172.16.3.76	Panorama			ALL	ALL|Panorama|Panorama|PANOS|Panorama Systems
☐	172.16.4.154	●	172.16.4.154			vMX		10/10/20, 2:07:18 AM	20.2R1.10	20.2R1.10|vMX|Juniper MX|JUNOS|Juniper Networks
☐	172.16.4.60	●	172.16.4.60		ltm01.anutacorp.com	bigipVirtual			ALL	ALL|bigipVirtual|BigIp|TMOS|F5 Networks
☐	172.16.4.61	●	172.16.4.61		ltm02.anutacorp.com	bigipVirtual			ALL	ALL|bigipVirtual|BigIp|TMOS|F5 Networks
☐	172.16.5.104	●	172.16.5.104		anutacbb-lab1	JuniperVSRX		10/06/20, 3:02:39 PM	17.3R2.10	17.3R2.10|JuniperVSRX|Juniper SRX Series Firewall|JUNOS|Ju...
☐	172.16.5.80	●	172.16.5.80		Router123	Cisco 2911		10/06/20, 12:49:10 PM	15.7(3)M6	15.7(3)M6|Cisco 2911|Cisco 2900|IOS|Cisco Systems
☐	172.16.5.80_swim	●	172.16.5.80		Router123	Cisco 2911		10/06/20, 10:53:12 AM	15.7(3)M6	15.7(3)M6|Cisco 2911|Cisco 2900|IOS|Cisco Systems
☐	172.16.5.89	●	172.16.5.89			vMX		10/08/20, 1:53:52 PM	20.2R1.10	20.2R1.10|vMX|Juniper MX|JUNOS|Juniper Networks
☐	172.16.5.95	●	172.16.5.95		sr01.lab1-5.95	vMX		10/13/20, 1:39:54 PM	17.4R1.16	17.4R1.16|vMX|Juniper MX|JUNOS|Juniper Networks



	Id	Status		qdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Version	Platform	De
☑	172.16.18.176	●			eor-cbb-2-gw.net.disney.com	CiscoIOSXRv9000		05/26/20, 12:16:25 PM	6.1.4	6.1.4|CiscoIOSXRv9000|Cisco ASR 9000|IOSXR|Cisco Systems	
☐	172.16.3.32	●			anuta-lab02.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:17:06 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.33	●			wbucbb-bur-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 11:58:42 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.41	●	172.16.3.41		CSR_3.41.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:15:45 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.42	●	172.16.3.42		n7-cbb-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:09 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.43	●	172.16.3.43		ana-svc-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:45 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.44	●	172.16.3.44		wbucbb-bur-1-gw.net.disney.com	Cisco CSR 1000V				ALL|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Systems	
☐	172.16.3.49	●	172.16.3.49		wbu.anuta.com	Cisco CSR 1000V		05/26/20, 12:15:13 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	



	Id	Status		qdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Version	Platform	De
☑	172.16.18.176	●			eor-cbb-2-gw.net.disney.com	CiscoIOSXRv9000		05/26/20, 12:16:25 PM	6.1.4	6.1.4|CiscoIOSXRv9000|Cisco ASR 9000|IOSXR|Cisco Systems	
☐	172.16.3.32	●			anuta-lab02.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:17:06 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.33	●			wbucbb-bur-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 11:58:42 AM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.41	●	172.16.3.41		CSR_3.41.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:15:45 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.42	●	172.16.3.42		n7-cbb-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:09 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.43	●	172.16.3.43		ana-svc-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:45 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	
☐	172.16.3.44	●	172.16.3.44		wbucbb-bur-1-gw.net.disney.com	Cisco CSR 1000V				ALL|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Systems	
☐	172.16.3.49	●	172.16.3.49		wbu.anuta.com	Cisco CSR 1000V		05/26/20, 12:15:13 PM	15.6(1)S	15.6(1)S|Cisco CSR 1000V|Cisco CSR 1000V|IOSXE|Cisco Syst...	

Exporting Device Information:

You can export the device information of the devices either in the XML or JSON format.

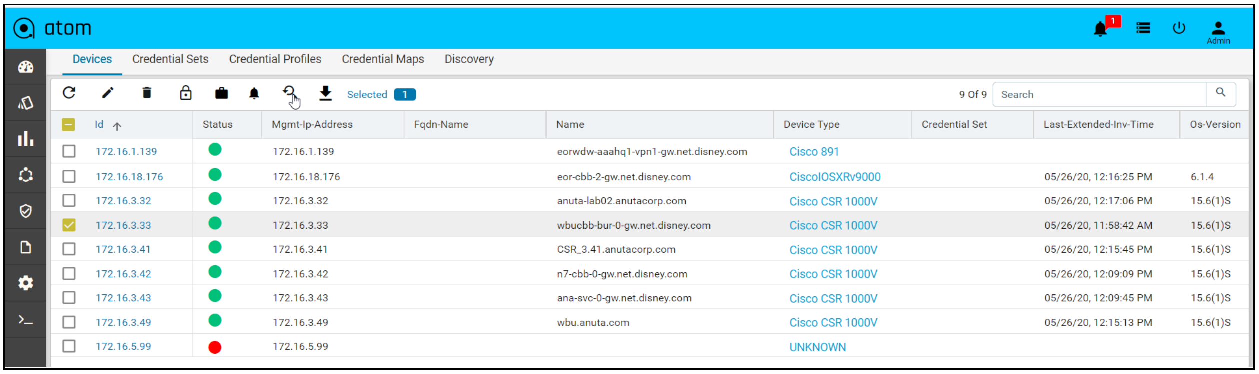
1. Navigate to **Resource Manager** > **Devices > Grid View(Icon) > Devices**
2. Select one or more devices

3. Click the **View/Download** button and select either the XML or JSON

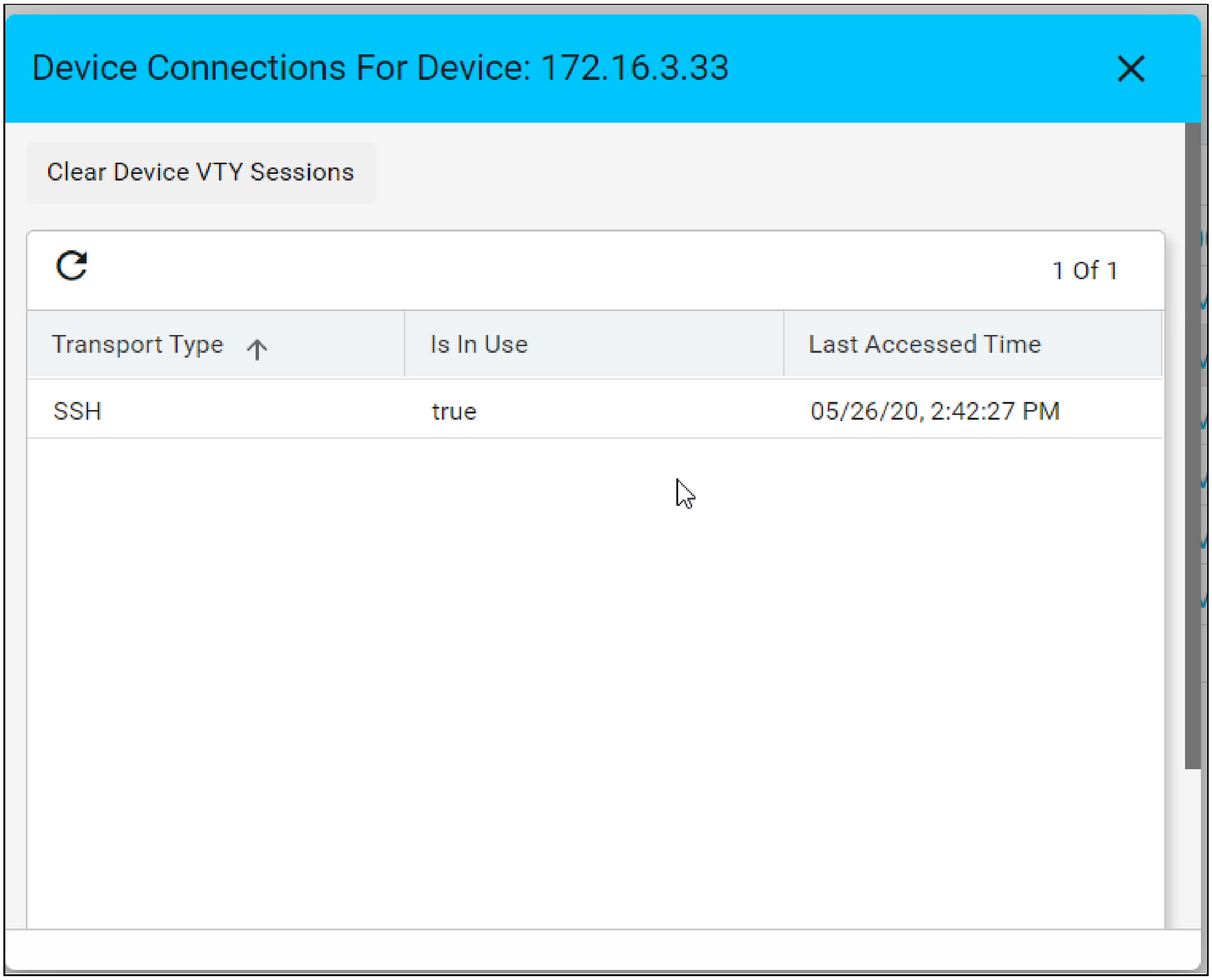
VTY Sessions

This is used to view the active vty sessions.

1. Navigate to **Resource Manager** > **Devices > Grid View(Icon) > Devices**
2. Select any device
3. Click the **VTY Sessions** button



	Id	Status	Mgmt-Ip-Address	Fqdn-Name	Name	Device Type	Credential Set	Last-Extended-Inv-Time	Os-Version
□	172.16.1.139	●	172.16.1.139		eorwdw-aaahq1-vpn1-gw.net.disney.com	Cisco 891			
□	172.16.18.176	●	172.16.18.176		eor-cbb-2-gw.net.disney.com	CiscoIOSXRv9000		05/26/20, 12:16:25 PM	6.1.4
□	172.16.3.32	●	172.16.3.32		anuta-lab02.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:17:06 PM	15.6(1)S
☑	172.16.3.33	●	172.16.3.33		wbucbb-bur-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 11:58:42 AM	15.6(1)S
□	172.16.3.41	●	172.16.3.41		CSR_3.41.anutacorp.com	Cisco CSR 1000V		05/26/20, 12:15:45 PM	15.6(1)S
□	172.16.3.42	●	172.16.3.42		n7-cbb-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:09 PM	15.6(1)S
□	172.16.3.43	●	172.16.3.43		ana-svc-0-gw.net.disney.com	Cisco CSR 1000V		05/26/20, 12:09:45 PM	15.6(1)S
□	172.16.3.49	●	172.16.3.49		wbu.anuta.com	Cisco CSR 1000V		05/26/20, 12:15:13 PM	15.6(1)S
□	172.16.5.99	●	172.16.5.99			UNKNOWN			



Device Connections For Device: 172.16.3.33

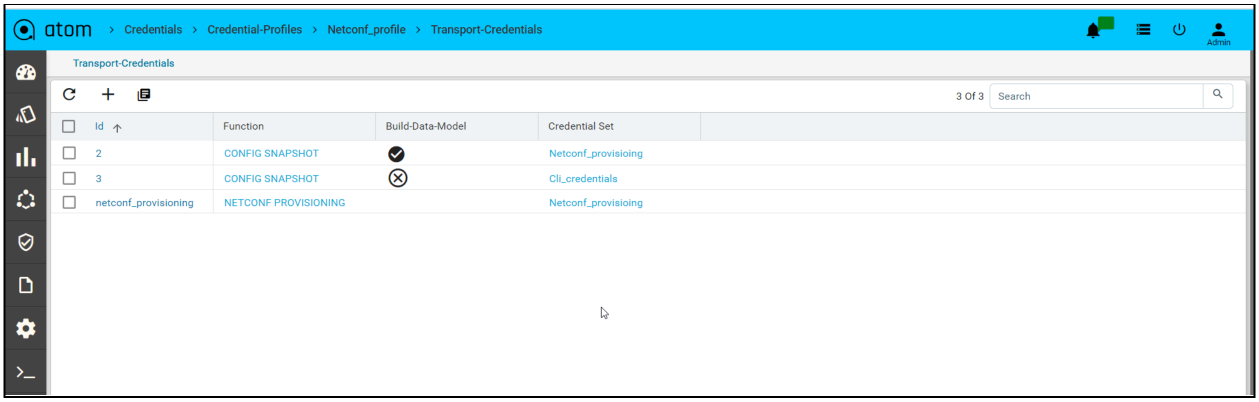
Transport Type	Is In Use	Last Accessed Time
SSH	true	05/26/20, 2:42:27 PM

Default Jobs

Below are the jobs which run during the device onboarding process in the mentioned order.

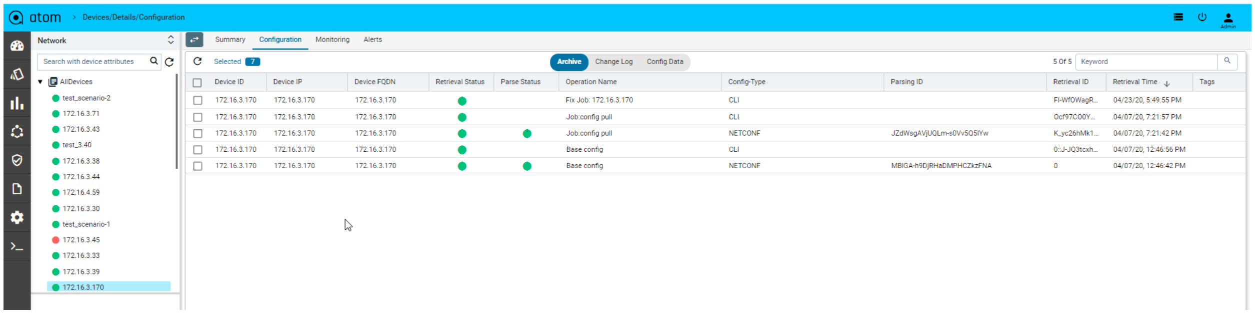
1. **Device Inventory** : It gathers the Platform, OS Version through SNMP and gets the Device to ONLINE. If the platform is not found in ATOM then check Platform guide on
2. **Device Extended Inventory** : It collects the Serial Number, Interface performance, health, availability etc.,
3. **Device Diagnostics :** ATOM will perform the reachability check through Ping, SNMP and Telnet/SSH if they are applicable.
4. **Base Config Pull or Config Retrieval** : It will retrieve the configuration and persist in the database. Configuration will be collected if the credential function is set to Config SNAPSHOT or any of the PROVISIONING functions. Build data model flag is used to parse the configuration into YANG entities from the specified config source snapshot.

Below is the example, to backup cli and netconf xml config and parse the xml version.



□	Id	Function	Build-Data-Model	Credential Set
□	2	CONFIG SNAPSHOT	✓	Netconf_provisioing
□	3	CONFIG SNAPSHOT	☒	Cli_credentials
□	netconf_provisioning	NETCONF PROVISIONING		Netconf_provisioing

Config Type column will show us the source of config retrieval.



□	Device ID	Device IP	Device FQDN	Retrieval Status	Parse Status	Operation Name	Config-Type	Parsing ID	Retrieval ID	Retrieval Time	Tags
□	172.16.3.170	172.16.3.170	172.16.3.170	●		Fix Job: 172.16.3.170	CLI		FI-WfOWagR...	04/23/20, 5:49:55 PM	
□	172.16.3.170	172.16.3.170	172.16.3.170	●		Job:config pull	CLI		Ocf97C0OY...	04/07/20, 7:21:57 PM	
□	172.16.3.170	172.16.3.170	172.16.3.170	●	●	Job:config pull	NETCONF	JZdWsgAVjUQLm-s0Vv5Q5IYw	K_yc26hMk1...	04/07/20, 7:21:42 PM	
□	172.16.3.170	172.16.3.170	172.16.3.170	●		Base config	CLI		0:J-JQ3tcxh...	04/07/20, 12:46:56 PM	
□	172.16.3.170	172.16.3.170	172.16.3.170	●	●	Base config	NETCONF	MBIGA-h9DjRHaDMPHCZkzFNA	0	04/07/20, 12:46:42 PM	

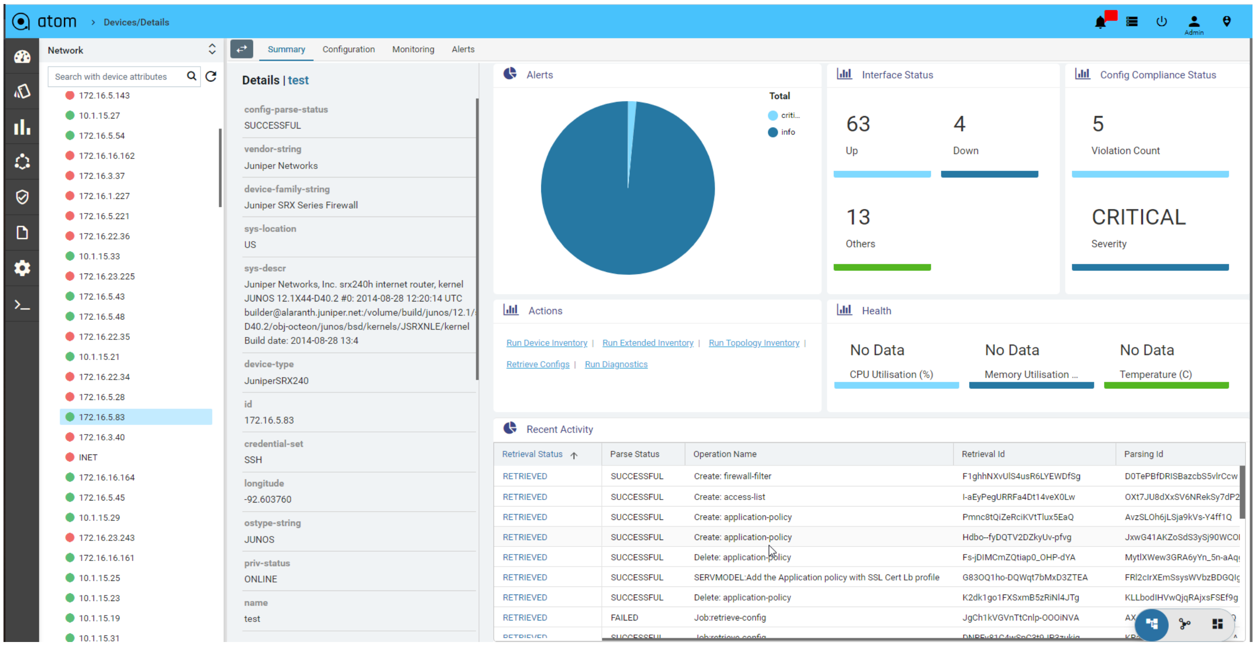
All the above operations can be customized for any platform as required and scheduled similar to other collection jobs.

Device Summary

Device summary view provides a quick snapshot of important device attributes including Alarm summary, interface summary, recent configuration change history and health.

Device Summary also provides access to most popular device actions and quick links to frequently used activities.

1. Navigate to **Devices** > select a device
2. Click on the **Device > Summary>** to view the details associated with each attribute.



Details | test

config-parse-status
SUCCESSFUL

vendor-string
Juniper Networks

device-family-string
Juniper SRX Series Firewall

sys-location
US

sys-descr
Juniper Networks, Inc. srx240h internet router, kernel JUNOS 12.1X44-D40.2 #0: 2014-08-28 12:20:14 UTC builder@alaranth.juniper.net:/volume/build/junos/12.1/ D40.2/obj-octeon/junos/bsd/kernels/JSRXNLE/kernel Build date: 2014-08-28 13:4

device-type
JuniperSRX240

id
172.16.5.83

credential-set
SSH

longitude
-92.603760

ostype-string
JUNOS

priv-status
ONLINE

name
test

Retrieval Status ↑	Parse Status	Operation Name	Retrieval Id	Parsing Id
RETRIEVED	SUCCESSFUL	Create: firewall-filter	F1ghhNXvUlS4usR6LYEWDfSg	D0TePBfDRISBazcbS5vlrCcw
RETRIEVED	SUCCESSFUL	Create: access-list	I-aEyPegURRFa4Dt14veX0Lw	OXt7JU8dXxSV6NRekSy7dP2
RETRIEVED	SUCCESSFUL	Create: application-policy	Pmnc8tQiZeRciKVtTlux5EaQ	AvzSLOh6jLSja9kVs-Y4ff1Q
RETRIEVED	SUCCESSFUL	Create: application-policy	Hdbo--fyDQTV2DZkyUv-pfvg	JxwG41AKZoSdS3ySj90WCOI
RETRIEVED	SUCCESSFUL	Delete: application-policy	Fs-jDIMCmZQtiap0_OHP-dYA	MytlXWew3GRA6yYn_5n-aAq
RETRIEVED	SUCCESSFUL	SERVMODEL:Add the Application policy with SSL Cert Lb profile	G83OQ1ho-DQWqt7bMxD3ZTEA	FRl2clrXEmSsysWVbzBDGQIg
RETRIEVED	SUCCESSFUL	Delete: application-policy	K2dk1go1FXSxmB5zRiNl4JTg	KLLbodIHVwQjqRAjxsFSEf9g
RETRIEVED	FAILED	Job:retrieve-config	JgCh1kVGVnTtCnlp-OOOiNVA	AX

Configuration Management

Configuration Archive

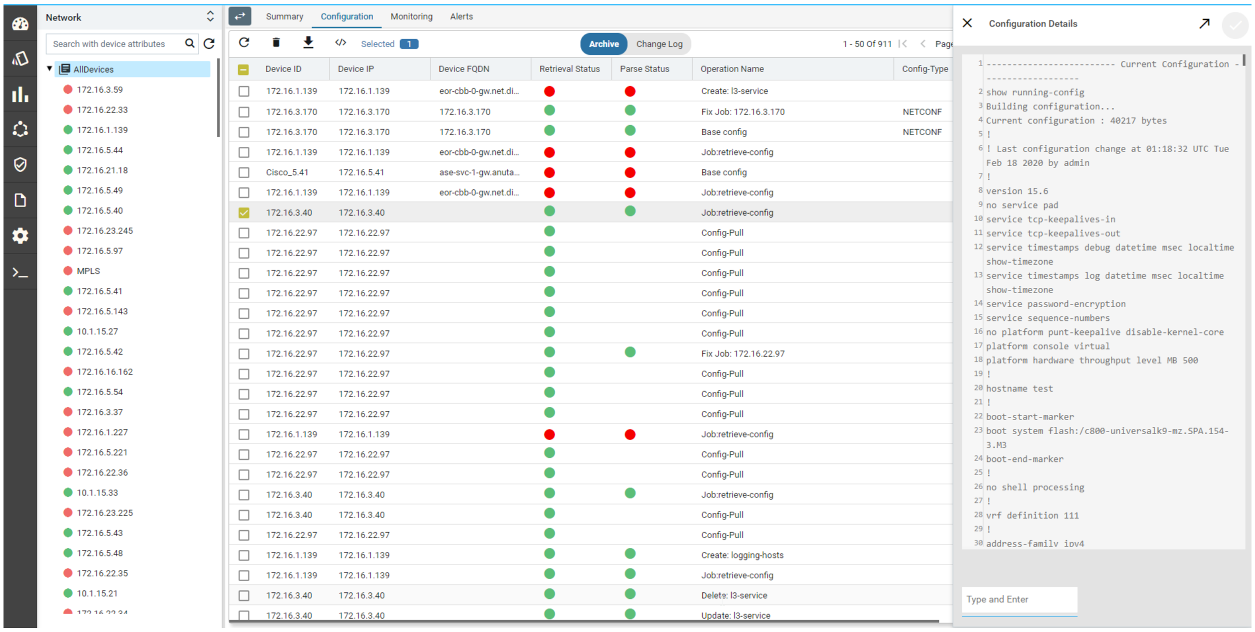
ATOM Collects Network or Server Configuration through API, NETCONF or CLI over Telnet or SSH. ATOM Provides the following Configuration Management relations functions:

1. Fetch, archive, and deploy device configurations
2. Build Stateful Configuration Model for:
    a. Devices that support YANG Over NETCONF
    b. Devices where Device YANG Model is mapped to Concrete API or CLI
3. Stateful Configuration - Support Create, Update, Delete
4. Stateful Configuration - Configuration Drift & Transactions
5. Compare Startup vs Running
6. Compare Running vs Latest Archived
7. Compare Two Versions of the Same Device
8. Compare Two Versions of Different Devices
9. Base Config vs Latest Version of Multiple Devices
10. Search and generate reports on archived data
11. Compare and label configurations, compare configurations with a baseline, and check for compliance.

12. You can use the Baseline template to compare with other device configurations and generate a report that lists all the devices that are non-compliant with the Baseline template.
13. You can easily deploy the Baseline template to the same category of devices in the network with dynamic inputs.
14. You can import or export a Baseline template/Config archives.
15. Set Up Event-Triggered Archiving
16. Synchronize Running and Startup Device Configurations
17. Deploy an External Configuration File to a Device
18. Roll Back a Device's Configuration To an Archived Version

ATOM Collects Device configuration periodically as configured in Jobs->Configuration or upon a config change event from the device. To trigger configuration collection through config change notification, ATOM should be configured to receive config change notification through SNMP Trap or Syslog.

1. To view Device(s) Configuration - Navigate to **Devices** > select a device(s)
2. Click on the **"Configuration > Archive"** Tab
3. Select an Entry in the Grid
4. In Details view - CLI/XML Configuration is displayed



- 🔴 172.16.3.59
- 🔴 172.16.22.33
- 🟢 172.16.1.139
- 🟢 172.16.5.44
- 🟢 172.16.21.18
- 🟢 172.16.5.49
- 🟢 172.16.5.40
- 🔴 172.16.23.245
- 🔴 172.16.5.97
- 🔴 MPLS
- 🟢 172.16.5.41
- 🔴 172.16.5.143
- 🟢 10.1.15.27
- 🟢 172.16.5.42
- 🔴 172.16.16.162
- 🟢 172.16.5.54
- 🔴 172.16.3.37
- 🔴 172.16.1.227
- 🔴 172.16.5.221
- 🔴 172.16.22.36
- 🟢 10.1.15.33
- 🔴 172.16.23.225
- 🟢 172.16.5.43
- 🟢 172.16.5.48
- 🔴 172.16.22.35
- 🟢 10.1.15.21
- 🔴 172.16.22.34

▣	Device ID	Device IP	Device FQDN	Retrieval Status	Parse Status	Operation Name	Config-Type
□	172.16.1.139	172.16.1.139	eor-cbb-0-gw.net.di...	🔴	🔴	Create: l3-service	
□	172.16.3.170	172.16.3.170	172.16.3.170	🟢	🟢	Fix Job: 172.16.3.170	NETCONF
□	172.16.3.170	172.16.3.170	172.16.3.170	🟢	🟢	Base config	NETCONF
□	172.16.1.139	172.16.1.139	eor-cbb-0-gw.net.di...	🔴	🔴	Job:retrieve-config	
□	Cisco_5.41	172.16.5.41	ase-svc-1-gw.anuta...	🔴	🔴	Base config	
□	172.16.1.139	172.16.1.139	eor-cbb-0-gw.net.di...	🔴	🔴	Job:retrieve-config	
☑	172.16.3.40	172.16.3.40		🟢	🟢	Job:retrieve-config	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢	🟢	Fix Job: 172.16.22.97	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.1.139	172.16.1.139		🔴	🔴	Job:retrieve-config	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.3.40	172.16.3.40		🟢	🟢	Job:retrieve-config	
□	172.16.3.40	172.16.3.40		🟢		Config-Pull	
□	172.16.22.97	172.16.22.97		🟢		Config-Pull	
□	172.16.1.139	172.16.1.139		🟢	🟢	Create: logging-hosts	
□	172.16.1.139	172.16.1.139		🟢	🟢	Job:retrieve-config	
□	172.16.3.40	172.16.3.40		🟢	🟢	Delete: l3-service	
□	172.16.3.40	172.16.3.40		🟢	🟢	Update: l3-service	

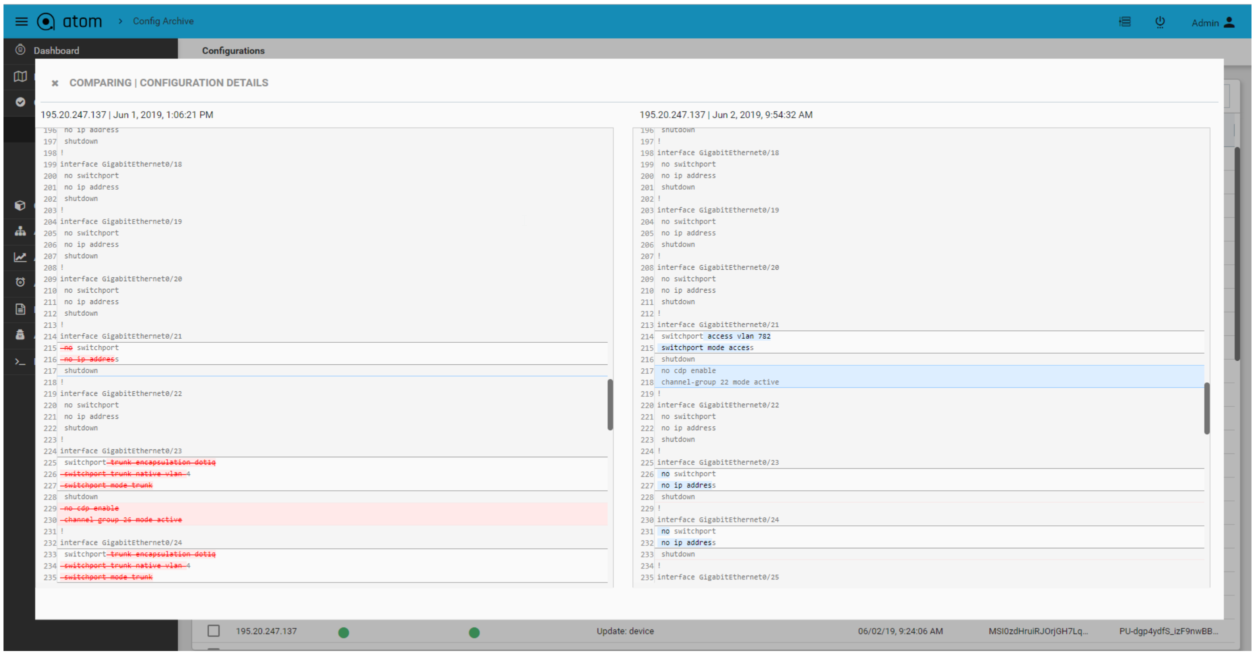
```
------------------------ Current Configuration -
------------------
show running-config
Building configuration...
Current configuration : 40217 bytes
!
! Last configuration change at 01:18:32 UTC Tue
Feb 18 2020 by admin
!
version 15.6
no service pad
service tcp-keepalives-in
service tcp-keepalives-out
service timestamps debug datetime msec localtime
show-timezone
service timestamps log datetime msec localtime
show-timezone
service password-encryption
service sequence-numbers
no platform punt-keepalive disable-kernel-core
platform console virtual
platform hardware throughput level MB 500
!
hostname test
!
boot-start-marker
boot system flash:/c800-universalk9-mz.SPA.154-
3.M3
boot-end-marker
!
no shell processing
!
vrf definition 111
!
address-family ipv4
```

Configuration Diff:

Configuration differences across various revisions can be viewed by selecting two versions from the Configuration archive grid.

1. To view Device(s) Configuration - Navigate to **Devices** > select a device(s)
2. Click on the "**Configuration > Archive**" Tab

3. Search configuration grid using tags or other attributes
4. Select two configuration revisions
5. Click on “**Compare**” to launch configuration diff view



× COMPARING | CONFIGURATION DETAILS

195.20.247.137 | Jun 1, 2019, 1:06:21 PM

```
 no ip address
 shutdown
!
interface GigabitEthernet0/18
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/19
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/20
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/21
~~no~~ switchport
~~no ip addres~~s
 shutdown
!
interface GigabitEthernet0/22
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/23
 switchport~~ trunk encapsulation dot1q~~
~~ switchport trunk native vlan ~~4
~~ switchport mode trunk~~
 shutdown
~~ no cdp enable~~
~~ channel-group 26 mode active~~
!
interface GigabitEthernet0/24
 switchport~~ trunk encapsulation dot1q~~
~~ switchport trunk native vlan ~~4
~~ switchport mode trunk~~
```

195.20.247.137 | Jun 2, 2019, 9:54:32 AM

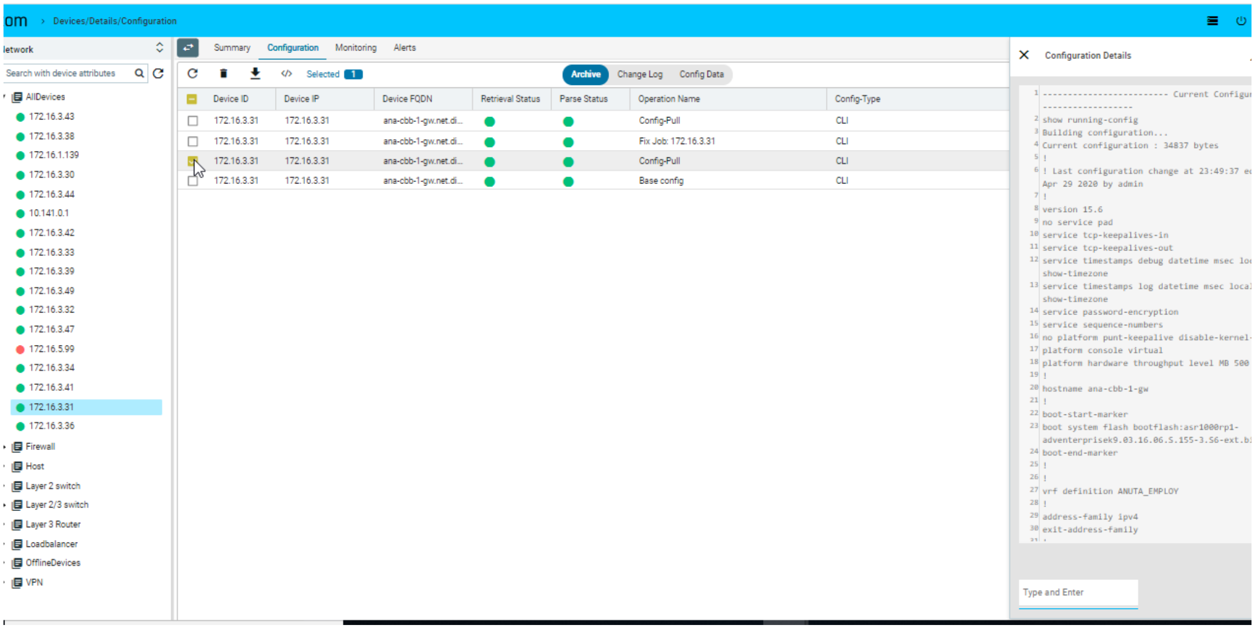
```
 shutdown
!
interface GigabitEthernet0/18
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/19
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/20
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/21
 switchport access vlan 782
 switchport mode access
 shutdown
 no cdp enable
 channel-group 22 mode active
!
interface GigabitEthernet0/22
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/23
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/24
 no switchport
 no ip address
 shutdown
!
interface GigabitEthernet0/25
```

□ 195.20.247.137 ● ● Update: device 06/02/19, 9:24:06 AM MSI0zdHruiRJOrjGH7Lq... PU-dgp4ydfS_izF9nwBB...

Configuration Tagging:

Configuration version can be tagged using user provided flags or tags. This can be used for filtering and comparison of configuration revisions.

1. To view Device(s) Configuration - Navigate to **Devices** > select a device(s)
2. Click on the “**Configuration > Archive**” Tab
3. Select an entry from the configuration revision grid
4. Click on **“Update Tags”**
5. Enter one or more tags in the lower right of the configuration details view



	Device ID	Device IP	Device FQDN	Retrieval Status	Parse Status	Operation Name	Config-Type
□	172.16.3.31	172.16.3.31	ana-cbb-1-gw.net.di...	●	●	Config-Pull	CLI
□	172.16.3.31	172.16.3.31	ana-cbb-1-gw.net.di...	●	●	Fix Job: 172.16.3.31	CLI
☑	172.16.3.31	172.16.3.31	ana-cbb-1-gw.net.di...	●	●	Config-Pull	CLI
□	172.16.3.31	172.16.3.31	ana-cbb-1-gw.net.di...	●	●	Base config	CLI

```
------------------------ Current Configu
-----------------
show running-config
Building configuration...
Current configuration : 34837 bytes
!
! Last configuration change at 23:49:37 e
Apr 29 2020 by admin
!
version 15.6
no service pad
service tcp-keepalives-in
service tcp-keepalives-out
service timestamps debug datetime msec lo
show-timezone
service timestamps log datetime msec loca
show-timezone
service password-encryption
service sequence-numbers
no platform punt-keepalive disable-kernel
platform console virtual
platform hardware throughput level MB 500
!
hostname ana-cbb-1-gw
!
boot-start-marker
boot system flash bootflash:asr1000rp1-
adventerprisek9.03.16.06.S.155-3.S6-ext.b
boot-end-marker
!
!
vrf definition ANUTA_EMPLOY
!
address-family ipv4
exit-address-family
```

Configuration Change Log

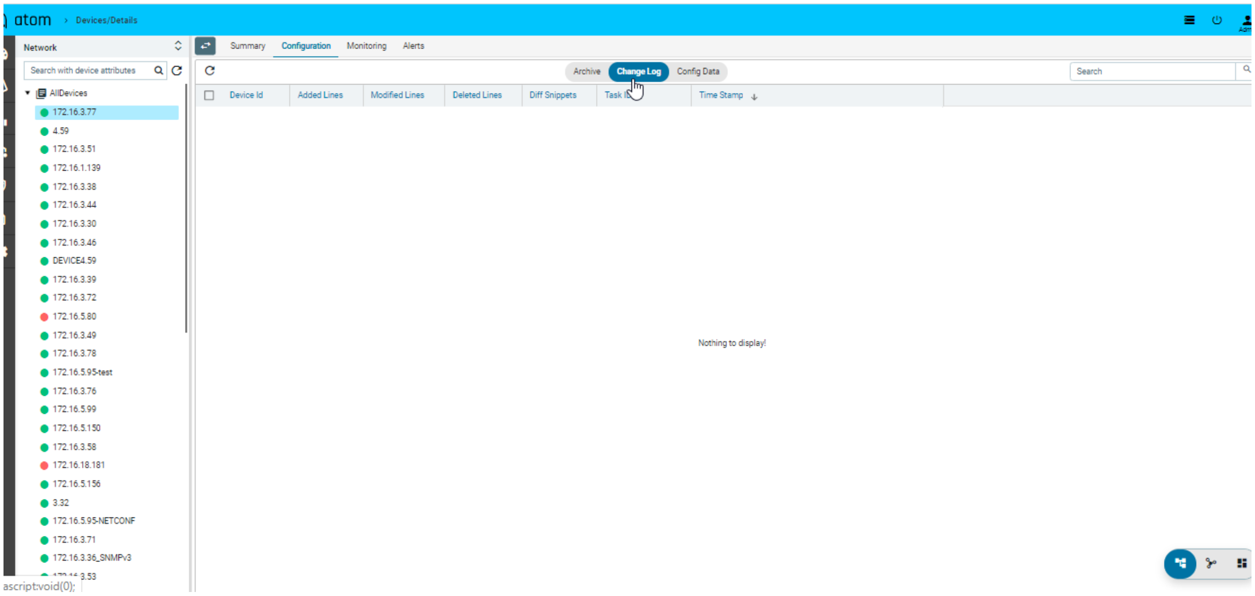
Configuration archive provides full comparison of device configuration changes across revisions. ATOM provides another view to see only config modifications only.

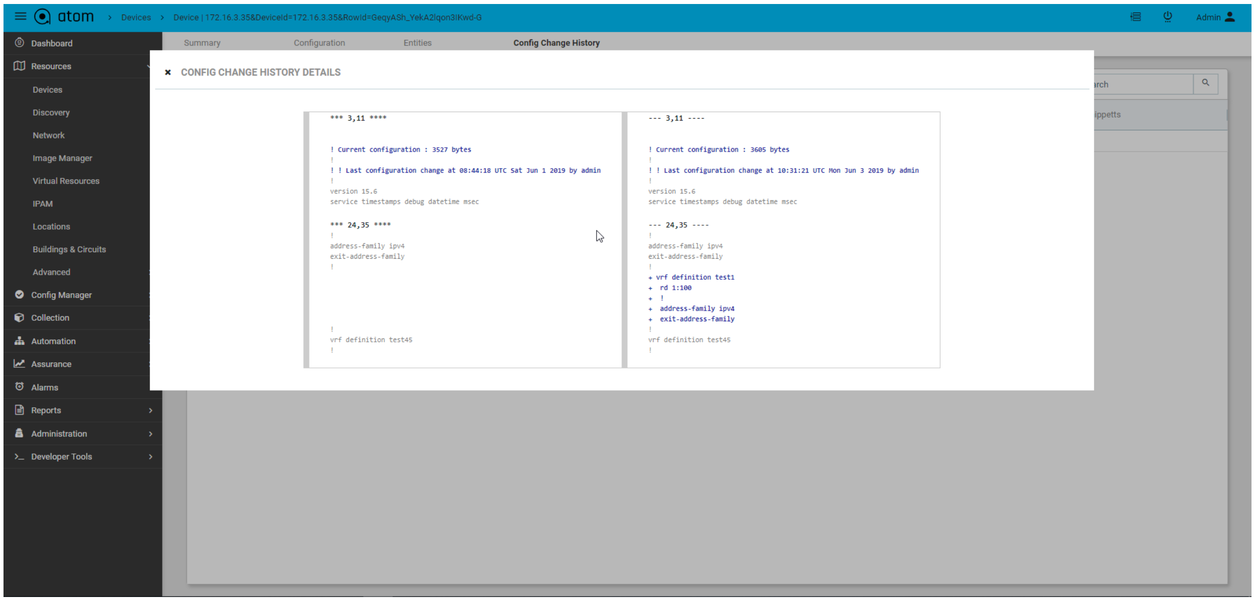
This can be enabled from Admin Settings.

1. Administrations > System> General settings> Admin settings
2. Edit "**Admin Settings**"
3. Set "**generate-config-inventory-event**" to true

Config change history for devices can be tracked as follows:

1. Navigate to **Devices (Tree View)** > select device(s)
2. Click on the "Configuration" Tab
3. Click on the "Change Log" Tab





```
*** 3,11 ****


! Current configuration : 3527 bytes
!
! ! Last configuration change at 08:44:18 UTC Sat Jun 1 2019 by admin
!
version 15.6
service timestamps debug datetime msec

*** 24,35 ****
!
address-family ipv4
exit-address-family
!





!
vrf definition test45
!
```

```
--- 3,11 ----


! Current configuration : 3605 bytes
!
! ! Last configuration change at 10:31:21 UTC Mon Jun 3 2019 by admin
!
version 15.6
service timestamps debug datetime msec

--- 24,35 ----
!
address-family ipv4
exit-address-family
!
+ vrf definition test1
+  rd 1:100
+  !
+  address-family ipv4
+  exit-address-family
!
vrf definition test45
!
```

Configuration Change Management - Create/Update/Delete

Configuration archive discussed in the “Configuration Management” section provides a Read-Only view of Device CLI configuration. Additionally, ATOM provides Model driven configuration for create, update & delete. This includes the following:

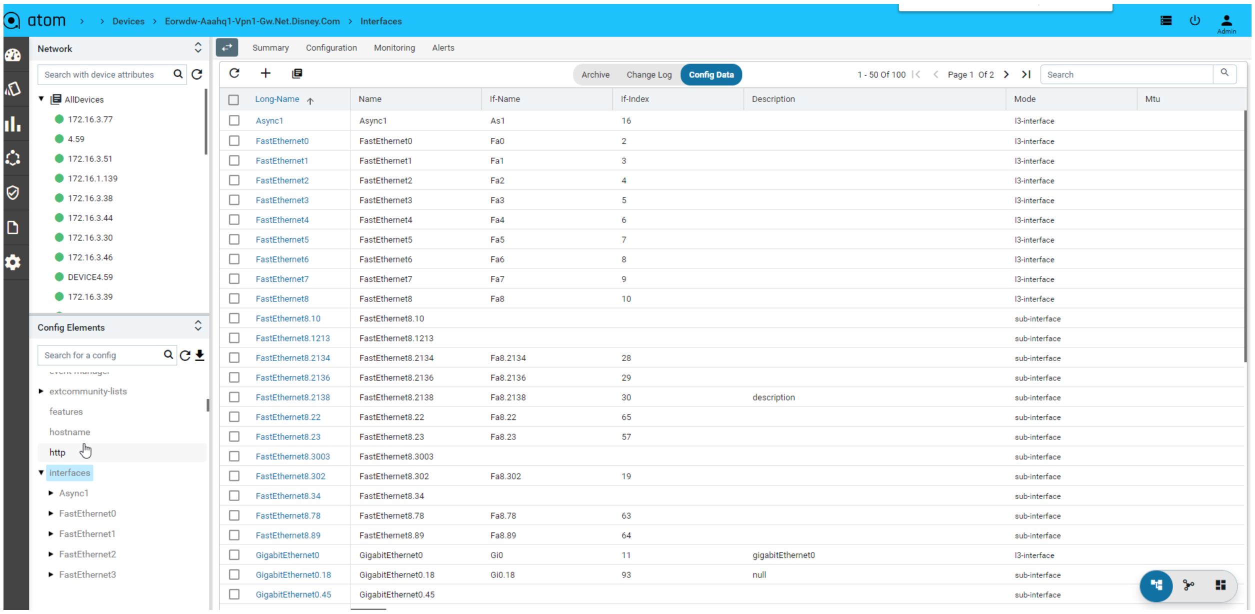
1. Discovery of Device configuration
2. Show a tree view of the configuration
3. Create/Edit/Delete of Device configuration

Configuration Editing can be done from “**Config Data**” view:

1. To view Device Configuration - Navigate to **Devices** > select a device

2. Click on the **Configuration**> **Config Data** Tab
3. From the Tree view select a node and possible operations are shown on the right hand side

   Note: Create/Edit/Delete from here will send configuration instructions to the device. ATOM should be set to interactive mode from the Administration page.

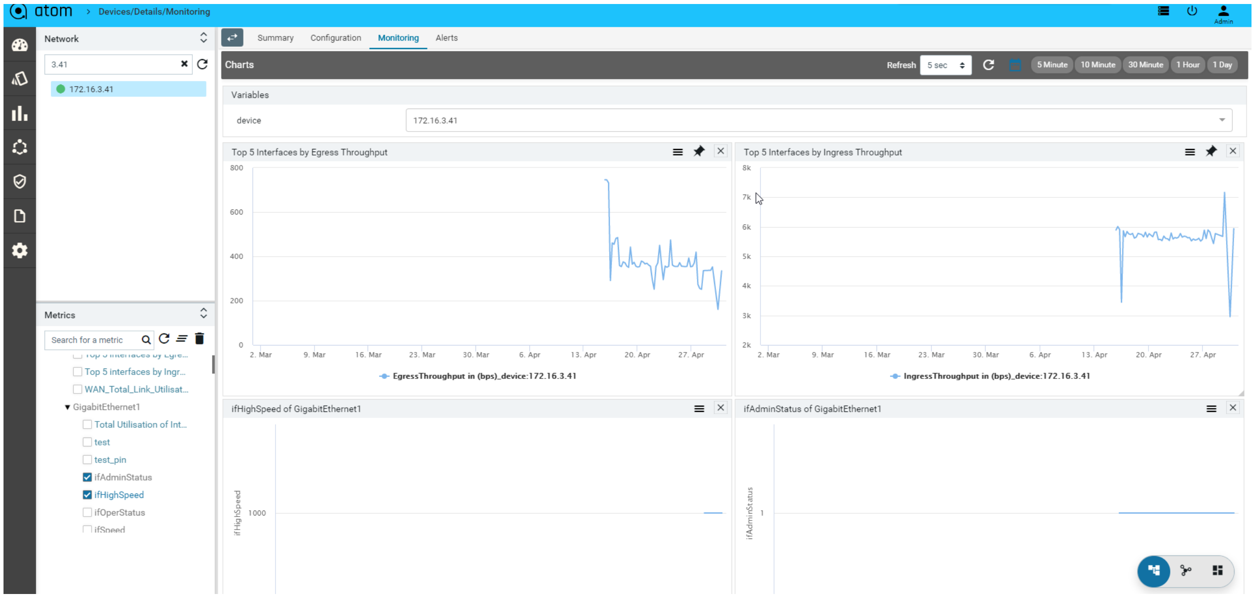


Long-Name	Name	If-Name	If-Index	Description	Mode	Mtu
Async1	Async1	As1	16		l3-interface	
FastEthernet0	FastEthernet0	Fa0	2		l3-interface	
FastEthernet1	FastEthernet1	Fa1	3		l3-interface	
FastEthernet2	FastEthernet2	Fa2	4		l3-interface	
FastEthernet3	FastEthernet3	Fa3	5		l3-interface	
FastEthernet4	FastEthernet4	Fa4	6		l3-interface	
FastEthernet5	FastEthernet5	Fa5	7		l3-interface	
FastEthernet6	FastEthernet6	Fa6	8		l3-interface	
FastEthernet7	FastEthernet7	Fa7	9		l3-interface	
FastEthernet8	FastEthernet8	Fa8	10		l3-interface	
FastEthernet8.10	FastEthernet8.10				sub-interface	
FastEthernet8.1213	FastEthernet8.1213				sub-interface	
FastEthernet8.2134	FastEthernet8.2134	Fa8.2134	28		sub-interface	
FastEthernet8.2136	FastEthernet8.2136	Fa8.2136	29		sub-interface	
FastEthernet8.2138	FastEthernet8.2138	Fa8.2138	30	description	sub-interface	
FastEthernet8.22	FastEthernet8.22	Fa8.22	65		sub-interface	
FastEthernet8.23	FastEthernet8.23	Fa8.23	57		sub-interface	
FastEthernet8.3003	FastEthernet8.3003				sub-interface	
FastEthernet8.302	FastEthernet8.302	Fa8.302	19		sub-interface	
FastEthernet8.34	FastEthernet8.34				sub-interface	
FastEthernet8.78	FastEthernet8.78	Fa8.78	63		sub-interface	
FastEthernet8.89	FastEthernet8.89	Fa8.89	64		sub-interface	
GigabitEthernet0	GigabitEthernet0	Gi0	11	gigabitEthernet0	l3-interface	
GigabitEthernet0.18	GigabitEthernet0.18	Gi0.18	93	null	sub-interface	
GigabitEthernet0.45	GigabitEthernet0.45				sub-interface	

Device Inventory (SNMP)

All Device inventory collected through SNMP Collection job is shown in Entities view. Following provides guidance on

1. To view Device Configuration - Navigate to **Devices** > select a device
2. Click on the “**Monitoring**” Tab
3. Collected data will be shown under MIB-name


atom
Devices/Details/Monitoring
Admin
Network
3.41
172.16.3.41
Metrics
Search for a metric
Top 5 interfaces by Egre...
Top 5 interfaces by Ingr...
WAN_Total_Link_Utilisat...
GigabitEthernet1
Total Utilisation of Int...
test
test_pin
ifAdminStatus
ifHighSpeed
ifOperStatus
ifSpeed
Summary
Configuration
Monitoring
Alerts
Charts
Refresh
5 sec
5 Minute
10 Minute
30 Minute
1 Hour
1 Day
Variables
device
172.16.3.41
Top 5 Interfaces by Egress Throughput
800
600
400
200
0
2. Mar
9. Mar
16. Mar
23. Mar
30. Mar
6. Apr
13. Apr
20. Apr
27. Apr
EgressThroughput in (bps)_device:172.16.3.41
Top 5 Interfaces by Ingress Throughput
8k
7k
6k
5k
4k
3k
2k
IngressThroughput in (bps)_device:172.16.3.41
ifHighSpeed of GigabitEthernet1
ifHighSpeed
1000
ifAdminStatus of GigabitEthernet1
ifAdminStatus
1

Adding Unmanaged devices

Some devices, with feature capabilities such as L2 only, L2 and L3 both, L3 only, can be manually added to the Devices table. Such devices are not managed by ATOM and it does neither generate configurations nor push any configurations on them. Multiple unmanaged devices can be on-boarded into the resource pool and each such device can be used during service instantiation.

To add an Unmanaged device, do the following:

1. Navigate to **Resources** > **Devices** > **Add Device**
2. In the **Create device** screen, select the Unmanaged option

   Enter values in the following fields:

   - **Host Name**: Enter a name for the device
   - **Device Capability**: Select one or more capabilities from the available list.

     For example, if you want the device to behave as a L3 device, choose **L3Router** from the list.
   - **Device Type**: Select the category of the device that it belongs to. 3. Add network connections between the null device and it's peer device as follows:
   - **Source Interface**: Select the interface, on the null device, from which the network connection should originate.
   - **Peer Device**: Select the device, managed by ATOM, as the peer device.
   - **Peer Interface**: Select the interface on the peer device where the network connection should terminate.

Adding Dummy devices

In some scenarios, you may have to create devices for which configurations are created as a part of a service but are not pushed to any actual device. These logical entities are termed Dummy Devices and they do not have any real world counterparts with a pingable IP address.

Network Topology

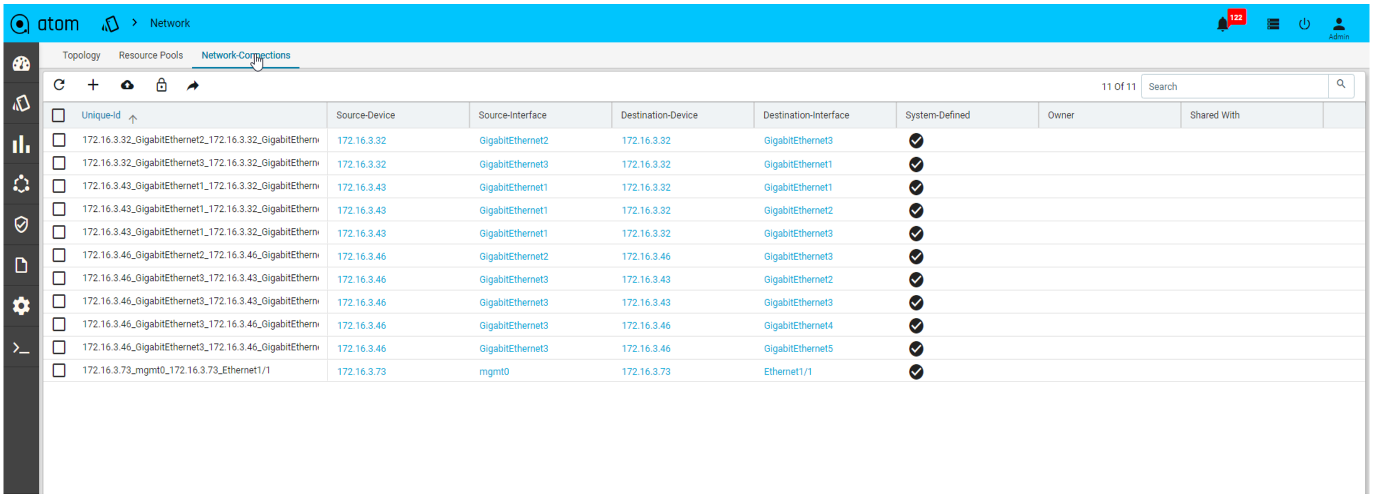
Network Connections

Network connectivity is discovered between devices using Layer 2 discovery protocols - CDP & LLDP. In cases where CDP/LLDP is not supported or enabled on the device, Network connections can be added Manually using Network connections .

NOTE: Network connections should be added manually between the devices that have LACP port channels configured on them.

To add a Network Connection, do the following:

1. Go to **Resource Manager** > **Network**
2. Click **Network Connections** and click **Add**.
3. In the Create Network Connection screen, enter the values in the following fields:
    - **Unique ID**: This is a system-generated ID for a network connection.
    - **Source Device**: Select a Device (origin of the network connection)
    - **Source Interface** : Enter a name for the interface on the source device
    - **Destination Device**: Select a Device (the end of the network connection)
    - **Destination Interface:** Enter a name for the interface on the destination device. A Network Connection is established between the interfaces of the source and the destination devices.



□	Unique-Id	Source-Device	Source-Interface	Destination-Device	Destination-Interface	System-Defined	Owner	Shared With
□	172.16.3.32_GigabitEthernet2_172.16.3.32_GigabitEthern	172.16.3.32	GigabitEthernet2	172.16.3.32	GigabitEthernet3	✓		
□	172.16.3.32_GigabitEthernet3_172.16.3.32_GigabitEthern	172.16.3.32	GigabitEthernet3	172.16.3.32	GigabitEthernet1	✓		
□	172.16.3.43_GigabitEthernet1_172.16.3.32_GigabitEthern	172.16.3.43	GigabitEthernet1	172.16.3.32	GigabitEthernet1	✓		
□	172.16.3.43_GigabitEthernet1_172.16.3.32_GigabitEthern	172.16.3.43	GigabitEthernet1	172.16.3.32	GigabitEthernet2	✓		
□	172.16.3.43_GigabitEthernet1_172.16.3.32_GigabitEthern	172.16.3.43	GigabitEthernet1	172.16.3.32	GigabitEthernet3	✓		
□	172.16.3.46_GigabitEthernet2_172.16.3.46_GigabitEthern	172.16.3.46	GigabitEthernet2	172.16.3.46	GigabitEthernet3	✓		
□	172.16.3.46_GigabitEthernet3_172.16.3.43_GigabitEthern	172.16.3.46	GigabitEthernet3	172.16.3.43	GigabitEthernet2	✓		
□	172.16.3.46_GigabitEthernet3_172.16.3.43_GigabitEthern	172.16.3.46	GigabitEthernet3	172.16.3.43	GigabitEthernet3	✓		
□	172.16.3.46_GigabitEthernet3_172.16.3.46_GigabitEthern	172.16.3.46	GigabitEthernet3	172.16.3.46	GigabitEthernet4	✓		
□	172.16.3.46_GigabitEthernet3_172.16.3.46_GigabitEthern	172.16.3.46	GigabitEthernet3	172.16.3.46	GigabitEthernet5	✓		
□	172.16.3.73_mgmt0_172.16.3.73_Ethernet1/1	172.16.3.73	mgmt0	172.16.3.73	Ethernet1/1	✓		

Network Topology

All the devices for each of which network connections are available are displayed in the topology view.

Resource Pools

A resource pool is a logical abstraction for flexible management of resources managed by ATOM. A resource pool can contain child resource pools and you can create a hierarchy of shared resources. The resource pools at a higher level are called parent resource pools. Users can create child resource pools of the parent resource pool or of any user-created child resource pool. Each child resource pool owns some of the parent's resources and can, in turn, have a hierarchy of child resource pools to represent successively smaller units of resources.

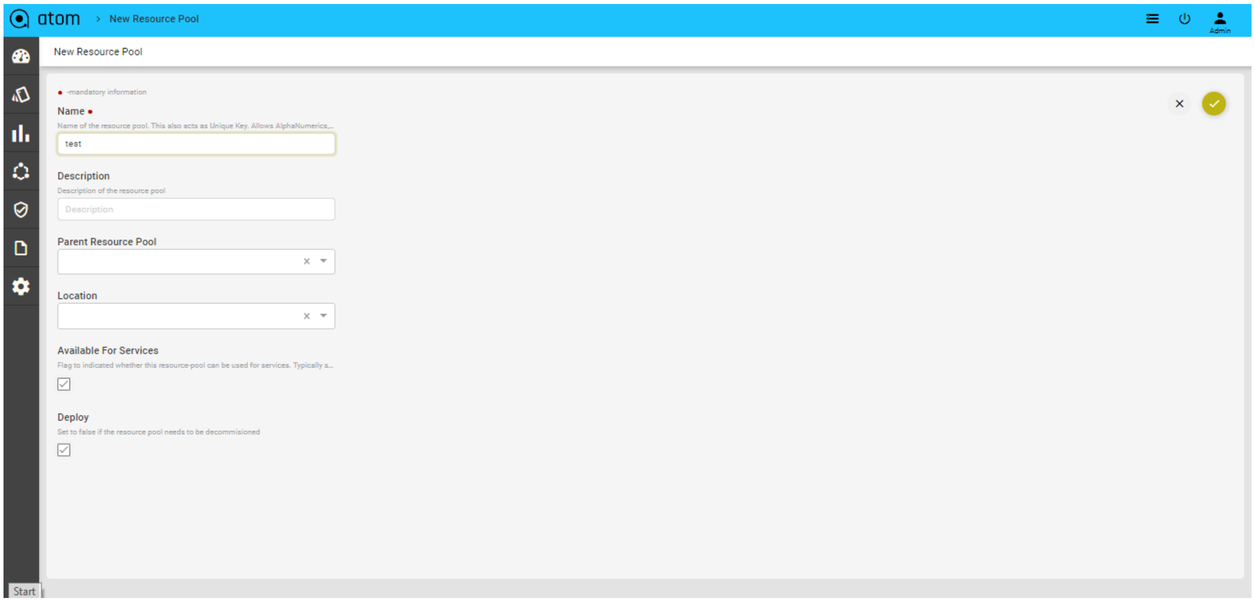
Resource pools allow you to delegate control over the resources of a host and by creating multiple resource pools as direct children of the host, you can delegate control of the resource pools to tenants or users within the organizations.

Using resource pools can yield the following benefits to the administrator:

- Flexible hierarchical organization
- Isolation between pools, sharing within pools
- Access control and delegation

Creating a Resource Pool

1. Navigate to **Resource Manager** > **Network** > **Resource Pools**
2. In the right pane, click the **Add Resource Pool** button to create a Resource Pool
3. In the **Create Resource Pool**, enter values in the fields are displayed: .



New Resource Pool

● -mandatory information

Name ●
Name of the resource pool. This also acts as Unique Key. Allows AlphaNumerics,...
test

Description
Description of the resource pool
Description

Parent Resource Pool

Location

Available For Services
Flag to indicated whether this resource-pool can be used for services. Typically s...
☑

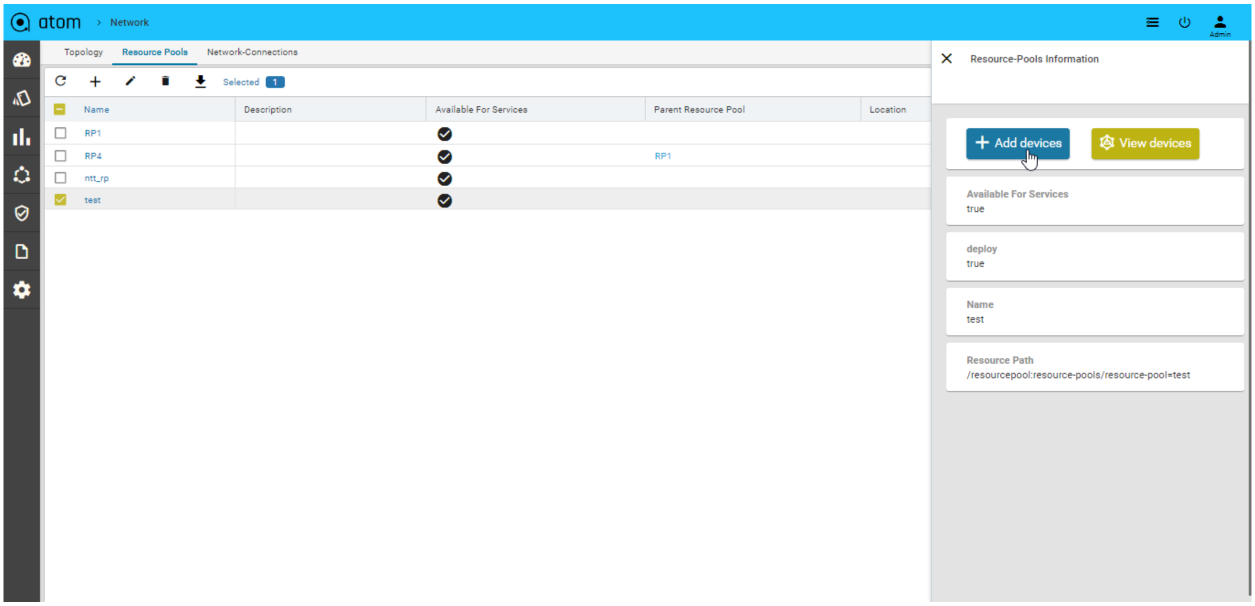
Deploy
Set to false if the resource pool needs to be decommisioned
☑

- **Name**: Enter a name for the resource pool
- **Description**: Enter some descriptive text for the created resource pool
- **Available for Services**: Select this option if the resource pool can be used for creating services.
- **Parent Resource Pool**: Select a resource pool that should act as the parent for this resource pool that is being created.
- **Location**: Select the name of the site or the geographical location where this resource pool should be created. See the section, "Locations" for more information about creating Locations and Location types.
- **Deploy**: Select this option if the resource pool should be deployed or used in services.

Adding Devices to a Resource Pool

1. Click the created resource pool to add the required devices to it.

   Select Resource pool > Add Devices



☐	Name	Description	Available For Services	Parent Resource Pool	Location
☐	RP1		✓		
☐	RP4		✓	RP1	
☐	ntt_rp		✓		
☑	test		✓		

Available For Services
true

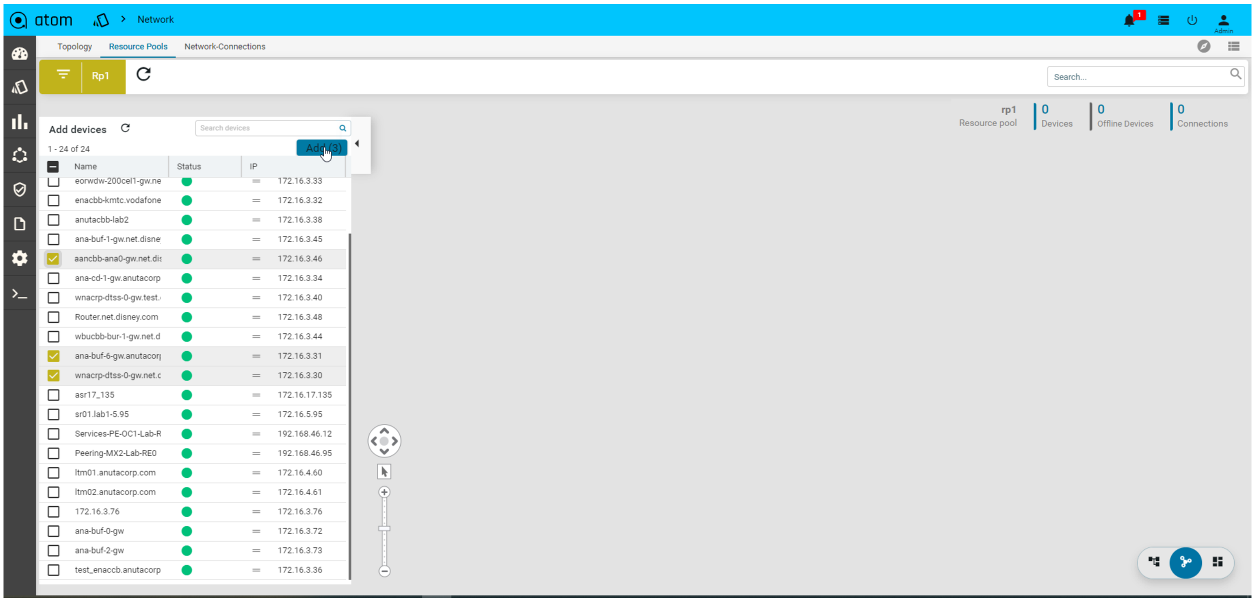
deploy
true

Name
test

Resource Path
/resourcepool:resource-pools/resource-pool=test

2. All the devices available in ATOM are displayed in the left pane.

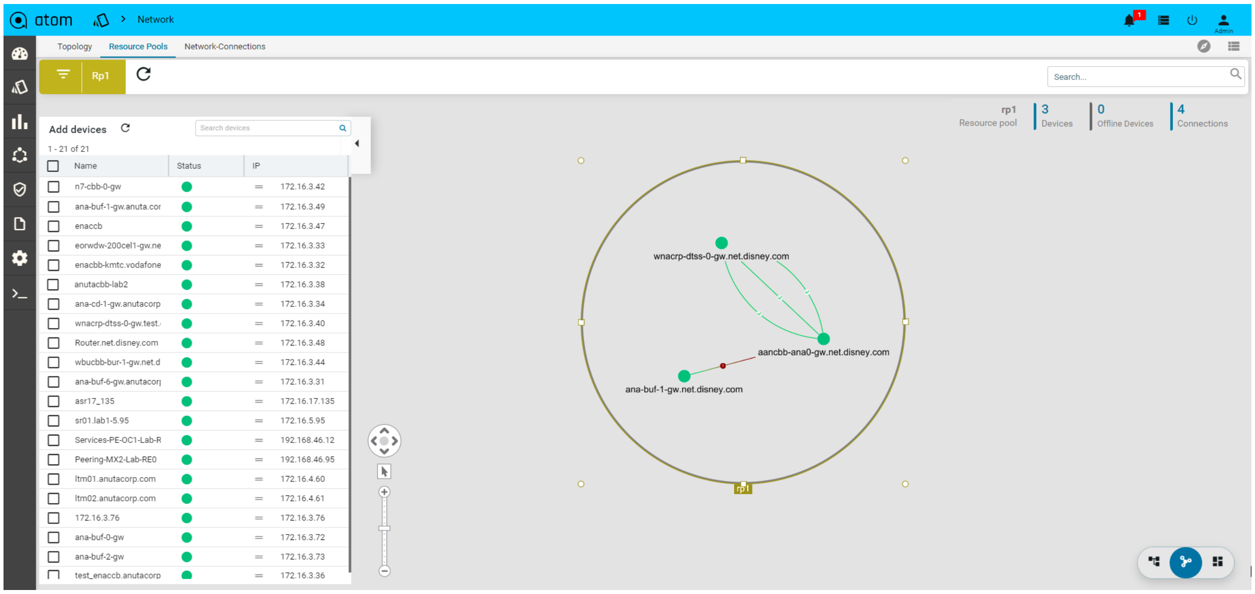
3. Click **Add** to include the required devices in the resource pool



1 - 24 of 24

☐	Name	Status	IP
☐	eorwdw-200cel1-gw.ne	●	172.16.3.33
☐	enacbb-kmtc.vodafone	●	172.16.3.32
☐	anutacbb-lab2	●	172.16.3.38
☐	ana-buf-1-gw.net.disne	●	172.16.3.45
☑	aancbb-ana0-gw.net.dis	●	172.16.3.46
☐	ana-cd-1-gw.anutacorp	●	172.16.3.34
☐	wnacrp-dtss-0-gw.test.	●	172.16.3.40
☐	Router.net.disney.com	●	172.16.3.48
☐	wbucbb-bur-1-gw.net.d	●	172.16.3.44
☑	ana-buf-6-gw.anutacor	●	172.16.3.31
☑	wnacrp-dtss-0-gw.net.c	●	172.16.3.30
☐	asr17_135	●	172.16.17.135
☐	sr01.lab1-5.95	●	172.16.5.95
☐	Services-PE-OC1-Lab-R	●	192.168.46.12
☐	Peering-MX2-Lab-RE0	●	192.168.46.95
☐	ltm01.anutacorp.com	●	172.16.4.60
☐	ltm02.anutacorp.com	●	172.16.4.61
☐	172.16.3.76	●	172.16.3.76
☐	ana-buf-0-gw	●	172.16.3.72
☐	ana-buf-2-gw	●	172.16.3.73
☐	test_enaccb.anutacorp	●	172.16.3.36

4. Select the device from the **Drag and Drop the devices** pane to the right pane All the selected devices are now part of the resource pool created earlier.



Add devices

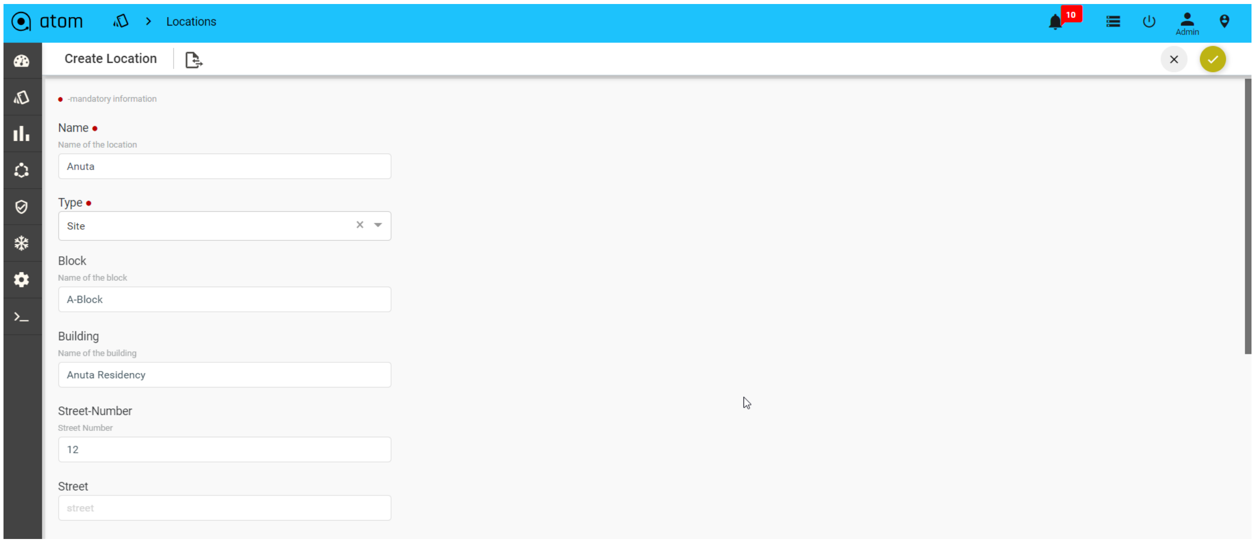
1 - 21 of 21

☐ Name	Status	IP
☐ n7-cbb-0-gw	●	172.16.3.42
☐ ana-buf-1-gw.anuta.cor	●	172.16.3.49
☐ enaccb	●	172.16.3.47
☐ eorwdw-200cel1-gw.ne	●	172.16.3.33
☐ enacbb-kmtc.vodafone	●	172.16.3.32
☐ anutacbb-lab2	●	172.16.3.38
☐ ana-cd-1-gw.anutacorp	●	172.16.3.34
☐ wnacrp-dtss-0-gw.test.	●	172.16.3.40
☐ Router.net.disney.com	●	172.16.3.48
☐ wbucbb-bur-1-gw.net.d	●	172.16.3.44
☐ ana-buf-6-gw.anutacorp	●	172.16.3.31
☐ asr17_135	●	172.16.17.135
☐ sr01.lab1-5.95	●	172.16.5.95
☐ Services-PE-OC1-Lab-R	●	192.168.46.12
☐ Peering-MX2-Lab-RE0	●	192.168.46.95
☐ ltm01.anutacorp.com	●	172.16.4.60
☐ ltm02.anutacorp.com	●	172.16.4.61
☐ 172.16.3.76	●	172.16.3.76
☐ ana-buf-0-gw	●	172.16.3.72
☐ ana-buf-2-gw	●	172.16.3.73
☐ test_enaccb.anutacorp	●	172.16.3.36

Locations

Devices & Resources Pools can be attached to a Physical Location. Location tagging allows devices and resource pools to be visualized on a Geographical Map in topology view.

1. To Create/Edit a Location - **Resource Manager** > **Locations** > **Resources-Location** >click **Add Location**
2. In the **Create Location** screen, enter values in the fields described:
   - **Name**: Add the name of for the data center or the site that you want to create.
   - **Type**: Select from the pre-defined location types from the drop-down menu. (preferably select Site)
   - **Block**: Enter the name of the block where the location is situated
   - **Building**: Enter the name of the Building
   - **Street Number**: Enter the number of the street where the Building is located
   - **Latitude:** Enter the latitude of the site.
   - **Longitude:** Enter the longitude of the site.
   - **Street**: Enter the street name where the building is located.
     - **Country:** Select a country from a pre populated list available in ATOM
     - **City**: Select a specific city contained in the chosen country.
     - **State**: Enter the name of the State or province to which the city belongs.
     - **Zip Code**: Enter the zip code of the City where the Site is located.
     - **Parent Location**: Select one of the predefined locations (of the type, Region or Country) defined earlier.



• -mandatory information

Name •
Name of the location
Anuta

Type •
Site

Block
Name of the block
A-Block

Building
Name of the building
Anuta Residency

Street-Number
Street Number
12

Street
street

For assigning the created Location to a Resource pool, refer to section, "Creating a Resource Pool".

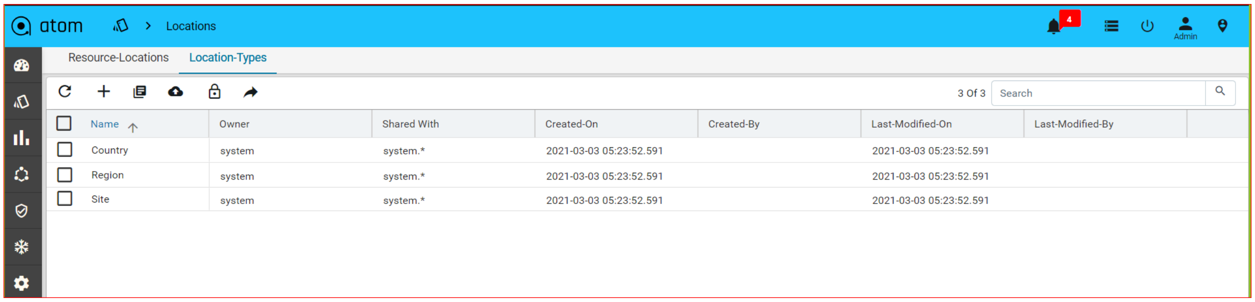
After the successful allocation of the Resource Pool to the given Location, you can view it on the map. Select the created Resource Pool and click **View on Map**

Location Types

Add the types of the location that should be associated with a Location.

Navigate to **Resource Manager** > **Locations** > **Location Types.**

The default location types available in ATOM are Region, Country, and Data Center



□	Name	Owner	Shared With	Created-On	Created-By	Last-Modified-On	Last-Modified-By
□	Country	system	system.*	2021-03-03 05:23:52.591		2021-03-03 05:23:52.591	
□	Region	system	system.*	2021-03-03 05:23:52.591		2021-03-03 05:23:52.591	
□	Site	system	system.*	2021-03-03 05:23:52.591		2021-03-03 05:23:52.591	

IPAM

IP Address Pool Group

For effective management of IP addresses, you can arrange IP addresses as an ordered collection and use them while instantiating a service.

1. Navigate to **Resource Manager** > **IPAM** > **IP Address Pool Groups**
2. Click **Add IP Address Pool Group** in the right pane

3. In the **Create IP Address Pool Group** screen, enter values in the fields:
    a. **Name**: Enter the name of the IP address pool group
    b. **Label**: Enter the name of the label that describes the IP address pool group
    c. Click **Add** to add IP Address Pools to be included in the IP Address Pool Group

IP Address Pools

A range of IP addresses can be assigned to a pool and associated with a resourcepool.All these IP addresses will be used during the instantiation of the service.

1. Navigate to **Resource Manager** > **IPAM** > **IP**4- **Address Pools**

2. Click **Add IP Address Pool** on the right pane and enter values in the following fields:

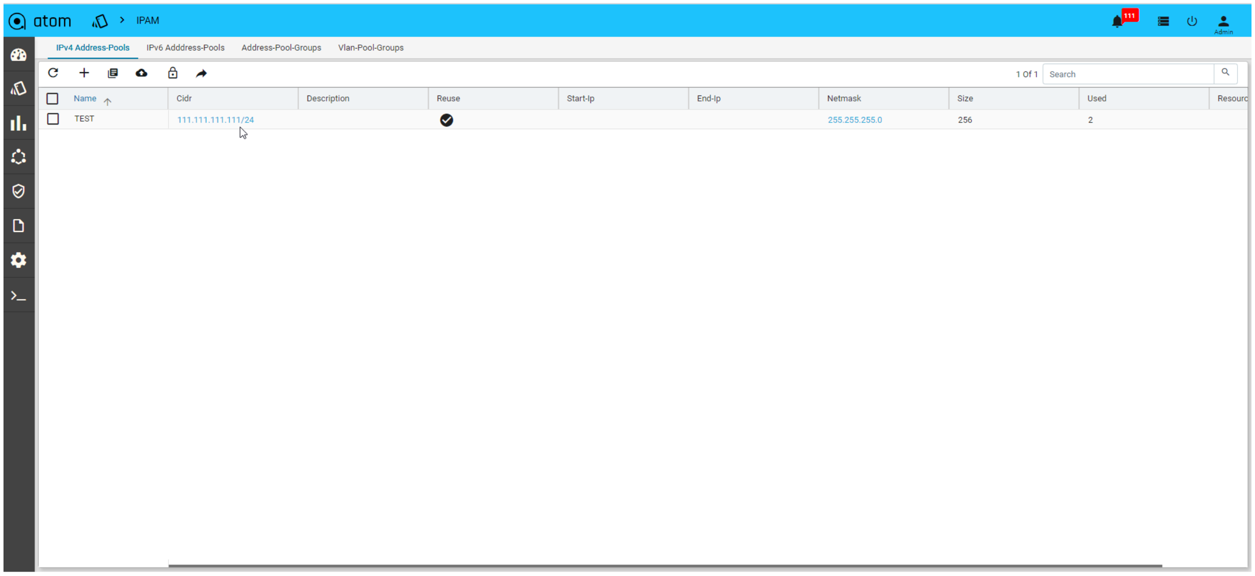
- **Name**: Enter a unique name for the IP address pool
- **CIDR**: Enter the CIDR (IP address followed by a slash and number)
- **Description**: Enter the description for the created IP Address Pool
- **Reuse**: Select this option if the IP addresses contained in this pool should be reused across different services.
- **Start IP**:Enter the start IP address of the range of IP addresses
- **End IP**: Enter the last IP address in the IP address range.
- **Resource Pool**: Select the Resource pool to which these IP addresses should be assigned. All the services that are created in these Resource Pools will use these IP addresses.

    Creating IP address entries

    IP Address entries are the IP Address Pools that have been reserved for a service.

    • Click **IP address pool** > **Action** > **IP address entries**

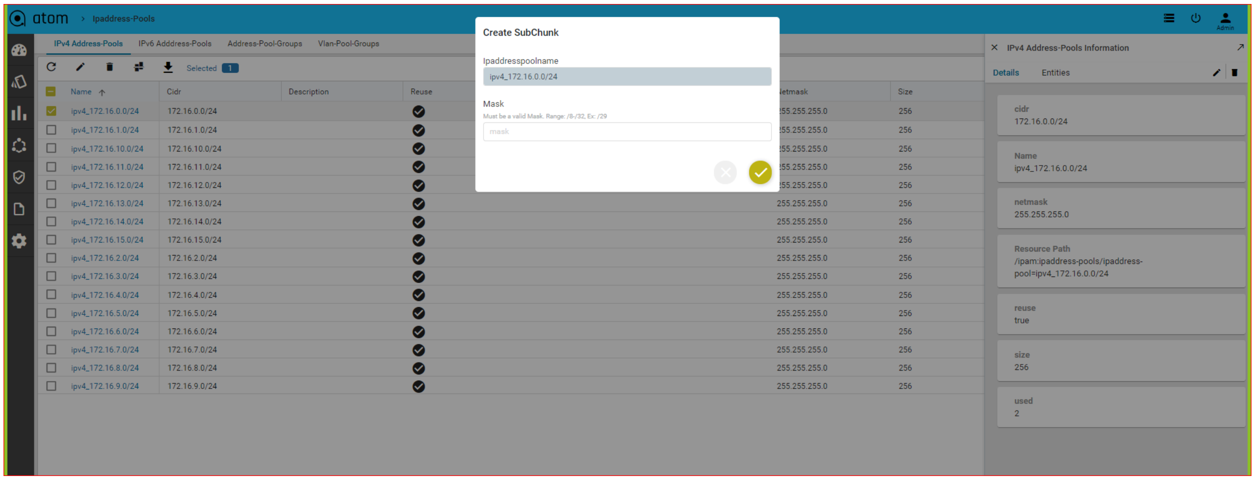
IPV4



	Name	Cidr	Description	Reuse	Start-Ip	End-Ip	Netmask	Size	Used	Resourc
□	TEST	111.111.111.111/24		✓			255.255.255.0	256	2	

Creating Sub Chunks of the IP Address Pools:

The network contained in an IP address pool can be divided into two or more networks within it. The resulting sub chunks can be used for different services to be configured on a resource pool tied with the parent IP address pool.



Create SubChunk

Ipaddresspoolname: ipv4_172.16.0.0/24

Mask: mask
Must be a valid Mask. Range: /8-/32, Ex: /29

	Name	Cidr	Description	Reuse	Netmask	Size
☑	ipv4_172.16.0.0/24	172.16.0.0/24		✓	255.255.255.0	256
□	ipv4_172.16.1.0/24	172.16.1.0/24		✓	255.255.255.0	256
□	ipv4_172.16.10.0/24	172.16.10.0/24		✓	255.255.255.0	256
□	ipv4_172.16.11.0/24	172.16.11.0/24		✓	255.255.255.0	256
□	ipv4_172.16.12.0/24	172.16.12.0/24		✓	255.255.255.0	256
□	ipv4_172.16.13.0/24	172.16.13.0/24		✓	255.255.255.0	256
□	ipv4_172.16.14.0/24	172.16.14.0/24		✓	255.255.255.0	256
□	ipv4_172.16.15.0/24	172.16.15.0/24		✓	255.255.255.0	256
□	ipv4_172.16.2.0/24	172.16.2.0/24		✓	255.255.255.0	256
□	ipv4_172.16.3.0/24	172.16.3.0/24		✓	255.255.255.0	256
□	ipv4_172.16.4.0/24	172.16.4.0/24		✓	255.255.255.0	256
□	ipv4_172.16.5.0/24	172.16.5.0/24		✓	255.255.255.0	256
□	ipv4_172.16.6.0/24	172.16.6.0/24		✓	255.255.255.0	256
□	ipv4_172.16.7.0/24	172.16.7.0/24		✓	255.255.255.0	256
□	ipv4_172.16.8.0/24	172.16.8.0/24		✓	255.255.255.0	256
□	ipv4_172.16.9.0/24	172.16.9.0/24		✓	255.255.255.0	256

IPv4 Address-Pools Information

Details | Entities

cidr: 172.16.0.0/24

Name: ipv4_172.16.0.0/24

netmask: 255.255.255.0

Resource Path: /ipam:ipaddress-pools/ipaddress-pool=ipv4_172.16.0.0/24

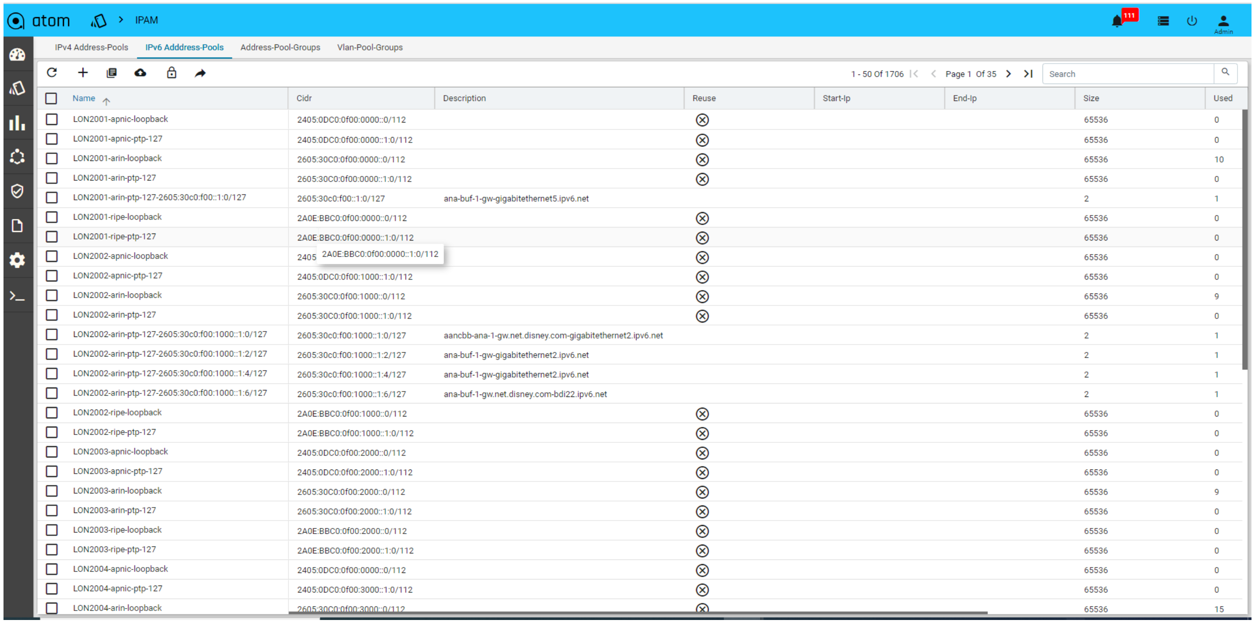
reuse: true

size: 256

used: 2

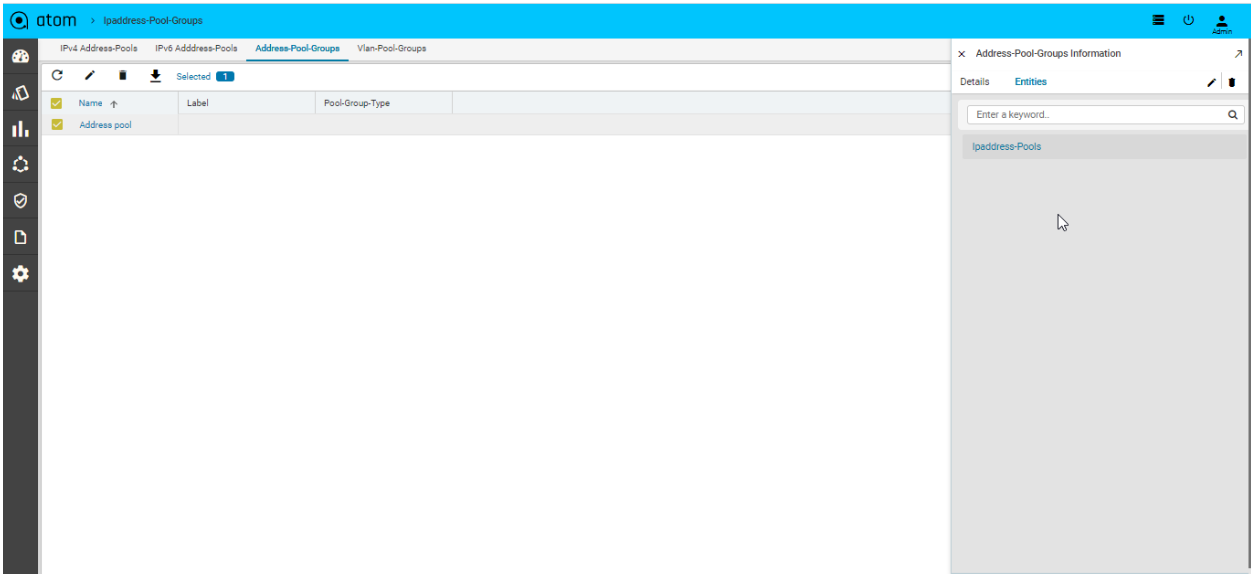
IPV6:

Resource Manager > **IPAM** > **IP**6- **Address Pools**



□	Name	Cidr	Description	Reuse	Start-Ip	End-Ip	Size	Used
□	LON2001-apnic-loopback	2405:0DC0:0f00:0000::0/112		⊗			65536	0
□	LON2001-apnic-ptp-127	2405:0DC0:0f00:0000::1:0/112		⊗			65536	0
□	LON2001-arin-loopback	2605:30C0:0f00:0000::0/112		⊗			65536	10
□	LON2001-arin-ptp-127	2605:30C0:0f00:0000::1:0/112		⊗			65536	0
□	LON2001-arin-ptp-127-2605:30c0:f00::1:0/127	2605:30c0:f00::1:0/127	ana-buf-1-gw-gigabitethernet5.ipv6.net				2	1
□	LON2001-ripe-loopback	2A0E:BBC0:0f00:0000::0/112		⊗			65536	0
□	LON2001-ripe-ptp-127	2A0E:BBC0:0f00:0000::1:0/112		⊗			65536	0
□	LON2002-apnic-loopback	2405 2A0E:BBC0:0f00:0000::1:0/112		⊗			65536	0
□	LON2002-apnic-ptp-127	2405:0DC0:0f00:1000::1:0/112		⊗			65536	0
□	LON2002-arin-loopback	2605:30C0:0f00:1000::0/112		⊗			65536	9
□	LON2002-arin-ptp-127	2605:30C0:0f00:1000::1:0/112		⊗			65536	0
□	LON2002-arin-ptp-127-2605:30c0:f00:1000::1:0/127	2605:30c0:f00:1000::1:0/127	aancbb-ana-1-gw.net.disney.com-gigabitethernet2.ipv6.net				2	1
□	LON2002-arin-ptp-127-2605:30c0:f00:1000::1:2/127	2605:30c0:f00:1000::1:2/127	ana-buf-1-gw-gigabitethernet2.ipv6.net				2	1
□	LON2002-arin-ptp-127-2605:30c0:f00:1000::1:4/127	2605:30c0:f00:1000::1:4/127	ana-buf-1-gw-gigabitethernet2.ipv6.net				2	1
□	LON2002-arin-ptp-127-2605:30c0:f00:1000::1:6/127	2605:30c0:f00:1000::1:6/127	ana-buf-1-gw.net.disney.com-bdi22.ipv6.net				2	1
□	LON2002-ripe-loopback	2A0E:BBC0:0f00:1000::0/112		⊗			65536	0
□	LON2002-ripe-ptp-127	2A0E:BBC0:0f00:1000::1:0/112		⊗			65536	0
□	LON2003-apnic-loopback	2405:0DC0:0f00:2000::0/112		⊗			65536	0
□	LON2003-apnic-ptp-127	2405:0DC0:0f00:2000::1:0/112		⊗			65536	0
□	LON2003-arin-loopback	2605:30C0:0f00:2000::0/112		⊗			65536	9
□	LON2003-arin-ptp-127	2605:30C0:0f00:2000::1:0/112		⊗			65536	0
□	LON2003-ripe-loopback	2A0E:BBC0:0f00:2000::0/112		⊗			65536	0
□	LON2003-ripe-ptp-127	2A0E:BBC0:0f00:2000::1:0/112		⊗			65536	0
□	LON2004-apnic-loopback	2405:0DC0:0f00:0000::0/112		⊗			65536	0
□	LON2004-apnic-ptp-127	2405:0DC0:0f00:3000::1:0/112		⊗			65536	0
□	LON2004-arin-loopback	2605:30C0:0f00:3000::0/112		⊗			65536	15

Address-pool-Groups



☑	Name	Label	Pool-Group-Type
☑	Address pool		

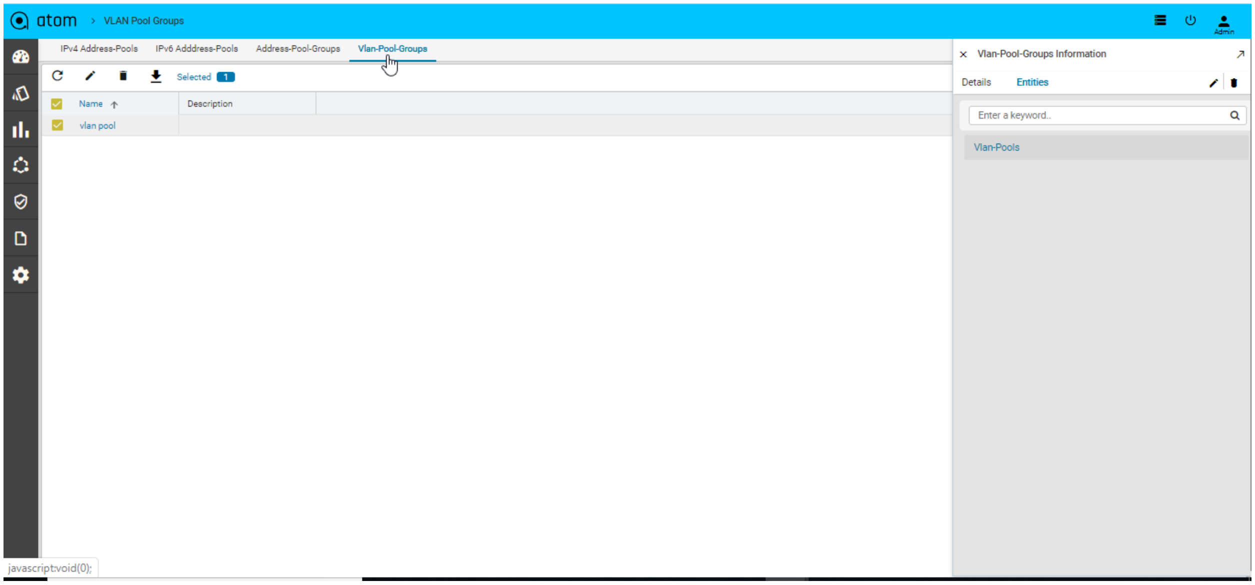
VLAN Groups

You can define VLAN groups and VLAN pools and define them as resource boundaries for a tenant in such a way that these VLAN Pools can be used during service instantiation on a resource pool.

Adding VLAN Groups

1. Navigate to **Resources** > **IPAM** > **VLAN Groups**

2. In the right pane, click **Add VLAN Pool Group**
3. In the **Create VLAN Pool Group** screen, enter values in the following fields:
   - Name: Enter a name for VLAN Group
   - Description:
4. Click **Actions** > **vlan pools** > **vlan pool** to create VLAN pools in the VLAN group:
5. Enter values in the following fields:
   - **Start VLAN**: Enter a number from the valid VLAN range. (1-4096)
   - **End VLAN**: Enter a number from the valid range (1-4096)
   - Click **Add** to add the required resource pools to the VLAN Pools
   - Click the **vlan pool** > click **Actions** to add allocated VLAN.

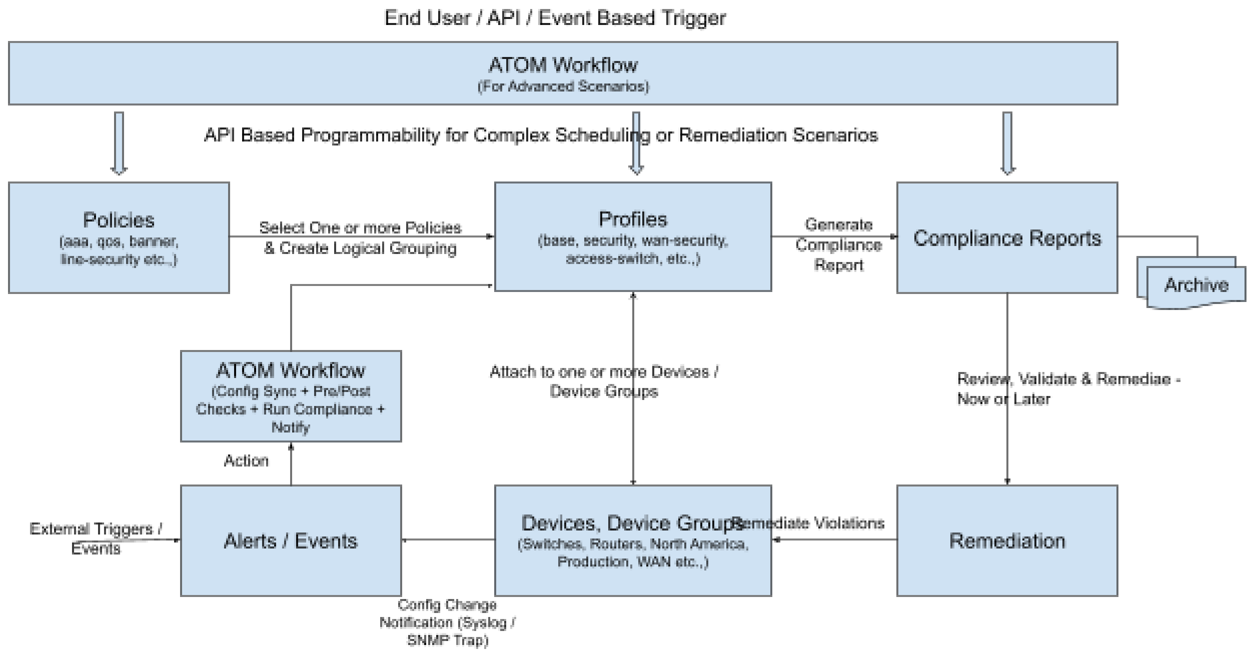


Configuration Compliance

Configuration Compliance feature allows users to Define & Enforce Configuration Compliance Standards. This is realized within ATOM using the following primitives.

1. Policies - Define Configuration standards & Remediation Policy by Device Family, Device Type, OS Type etc.,
2. Profiles - Group multiple policies and apply configuration standards on one or more devices
3. Reports - Comprehensive compliance reporting view at device level
4. Remediation - Fix Policy Violations on one or more devices

Following diagram summarizes the overall flow.


End User / API / Event Based Trigger
ATOM Workflow
(For Advanced Scenarios)
API Based Programmability for Complex Scheduling or Remediation Scenarios
Policies
(aaa, qos, banner, line-security etc.,)
Select One or more Policies & Create Logical Grouping
Profiles
(base, security, wan-security, access-switch, etc.,)
Generate Compliance Report
Compliance Reports
Archive
ATOM Workflow
(Config Sync + Pre/Post Checks + Run Compliance + Notify
Attach to one or more Devices / Device Groups
Review, Validate & Remediae - Now or Later
Action
External Triggers / Events
Alerts / Events
Devices, Device Groups
(Switches, Routers, North America, Production, WAN etc.,)
Remediate Violations
Remediation
Config Change Notification (Syslog / SNMP Trap)

Configuration Compliance Can address the following scenarios:

1. Check If a particular configuration is present
2. Check If a particular configuration contains a given pattern / should NOT contain a given pattern.
3. Check If a particular configuration contains stale/unwanted configuration.
4. Check for User defined parameterized values (Dynamic inputs) in configuration.
5. Arithmetic checks to enforce thresholds on resource usage and capacity planning. Example:- Per device Max 100 vrfs to be configured or 20 Vlans to be enabled or 10 bgp sessions per vrf
6. Group parameterized values to apply the policy. Example valid Values: 'Any', 'AnyEthernet', 'FastEthernet0/.*' etc.

7. Regex and Jinja2 Parsers In & Between conditions
8. Apply filters on configuration to categorize config blocks. Ex:- Access vs trunk based on link speed, Ports description satisfying regex classifiers,Ports which are admin up and contain IP.
9. Inventory checks for NETCONF/YANG parameters using XPath based expressions.
10. Parse as Blocks to split the entire running configuration into blocks and search for the condition match criteria value within each block.
11. Custom Block split definitions based on the start and end expressions you provide in the Block Start Expression and Block End Expression text boxes.
12. Evaluate each block against a set of conditions with individual actions/severities by using the Condition Scope as Previously Matched Blocks to parse.
13. Raise single violations for condition violation by any block or multiple violations per block of violation with individual remediation actions defined.

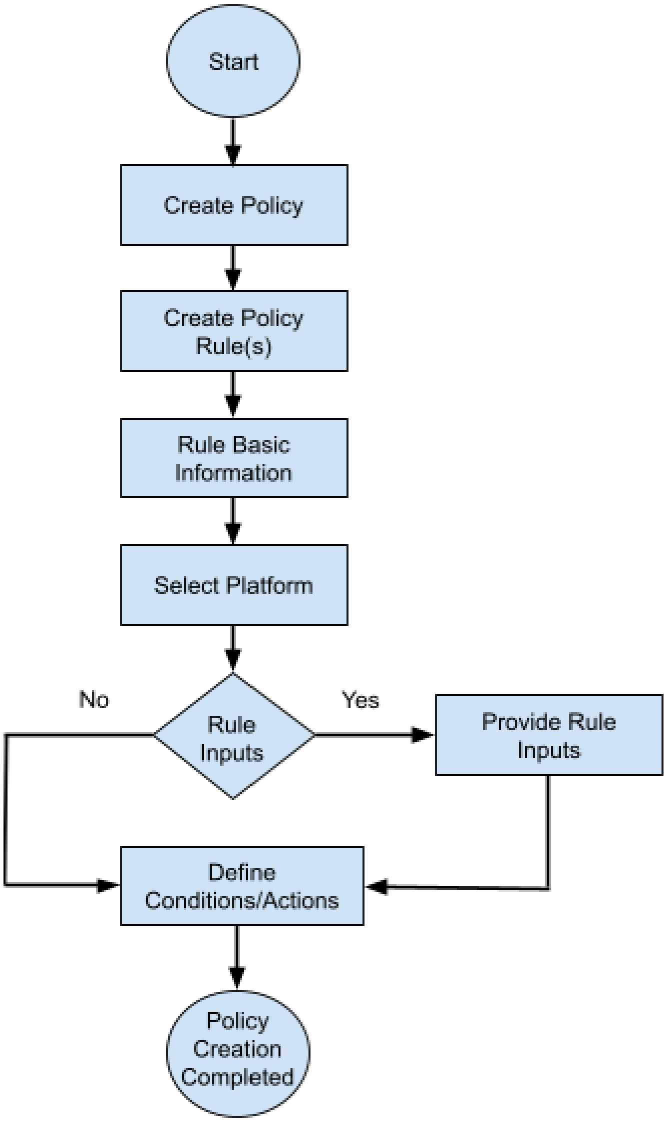
ATOM supports Configuration Compliance for the following Vendors:

- Cisco Systems
- Juniper Networks
- Fortinet
- Force10 Networks
- Brocade
- PaloAlto Networks
- Riverbed Technology
- F5 Networks

Policies

Compliance policy allows configuration standards to be defined in CLI format and YANG format(x-path or xml). Following provides a high level overview of a Policy:

- Policy is a collection of Rules
- A Rule contains one or more Conditions
- Condition describes
    - Expected Configuration. Configuration can be parameterized through Rule Variables.
    - Action to be taken on a condition evaluation includes CLI commands or Netconf XML RPC format to be used to remediate a violation.
- A Rule can be attached to one or More device platforms - Vendor, OS Type, Device Family, Device Type and OS Version


Start
Create Policy
Create Policy Rule(s)
Rule Basic Information
Select Platform
No
Rule Inputs
Yes
Provide Rule Inputs
Define Conditions/Actions
Policy Creation Completed

Use Cases

#	Configuration Standard Style	Example	Reference
1	Static Configuration	Example: All Devices in Target Network should Contain a specific Domain Name **Expected Configuration:** ip domain-name anutacorp.com **Fix Configuration:** <<If missing, configure the above command>>	Scenario1
	XPath Expression	**Xpath Expression:** Cisco-IOS-XR-native:native/ip/domain/name=`anutacorp.com’	Scenario6
	XML Template Payload	**Template Payload:** <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native"> <ip> <domain> <name>net.disney.com</name> </domain> </ip> </native>	Scenario11
2	Dynamic Configuration with User provided values	Example: Devices in Target Network should have a specific Loopback interface - Loopback0 or Loopback1 based on user input. **Expected Configuration:** interface {{ interface_name }} **Fix Configuration:** <<If missing, Configure the specific Loopback interfaces>>	Scenario3
	X-path	**Xpath Expression:**	Scenario9

	Expression	Cisco-IOS-XE-native:native/interface/Loopback/name='0' and Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ip/address/primary/address='{{ lo0_ipv4addr }}' and Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ip/address/primary/mask='255.255.255.255' and Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ipv6/address/prefix-list/prefix='{{ lo0_ipv6addr }}'	
	XML Template Payload	**Template Payload:** <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native"> <interface> <Loopback> <ip> <address> <primary> <address>10.100.99.98</address> <mask>255.255.255.255</mask> </primary> </address> </ip> <ipv6> <address> <prefix-list> <prefix>2605:30C0::3B/128</prefix> </prefix-list> </address> </ipv6> <name>0</name> </Loopback> </interface> </native>	Scenario13
3	Configuration with Patterns, Wildcards, etc.that require Regular expressions	Example: All the VTY lines should have specific exec-timeout and session-timeout configured. **Expected Configuration:** line vty (.*) session-timeout 10	Scenario4

		exec-timeout 10 0 **Fix Configuration:** <<If missing, Configure the timeouts under all matching VTY lines>>	
4	Configuration with sub-modes	Example: The physical Interface should not be shut down and show be in auto-negotiation mode **Expected Configuration:** interface {{ interface_name }} no shutdown negotiation auto **Fix Configuration:** <<If missing, Configure the above commands for one or more interfaces>>	Scenario3
5	Removing unwanted extra configuration	Example: Finding the Devices having extra ntp-server addresses configured and removing those other than expected server addresses. **Expected Configuration:** ntp-server 10.1.1.1 **Fix Configuration:** << Configure above ntp-server if not found. Remove any ntp server other than 10.1.1.1 >>	Scenario2
6	Advanced: Presence of an entity value from one block in another	Example: Finding the devices in the network which doesn’t contain the OSPF router-id configured as per loopback0 ip address. **Expected Configuration:** interface Loopback0 ip address 45.45.45.5 255.255.255.255 ! router ospf 100 router-id 45.45.45.5 **Fix Configuration:** router ospf 100	Scenario5

		router-id 45.45.45.5	

Scenario 1: IP Domain Name

Scenario: Network Devices must have domain name configured. In this example we are looking for the domain name as **anutacorp.com** across all devices in the lab.

Platform:

Cisco IOS-XE

Expected Configuration:

```
ip domain-name anutacorp.com
```

Fix-CLI Configuration:

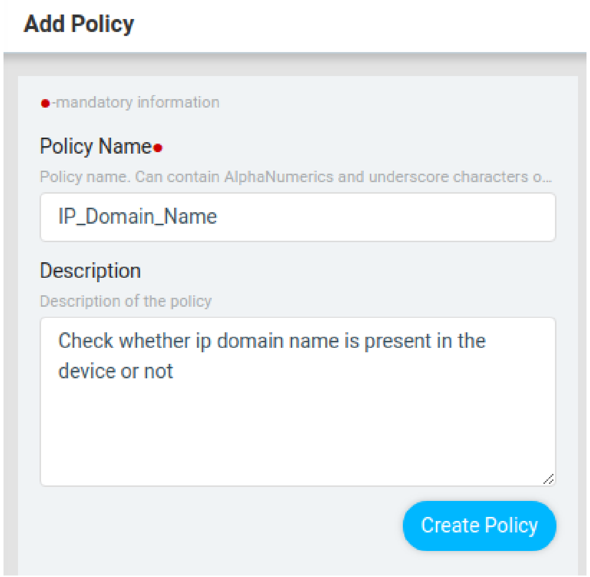
```
ip domain-name anutacorp.com
```

Follow the steps below to configure Compliance Policy for the above scenario.

1. Configure Policy

   Steps:

   - Navigate to Resource Manager > Config Compliance -> Policies
   - Click '+' to create new Policy and provide the following information
     - Policy Name
     - Description



Add Policy

●-mandatory information

Policy Name●

Policy name. Can contain AlphaNumerics and underscore characters o...

IP_Domain_Name

Description

Description of the policy

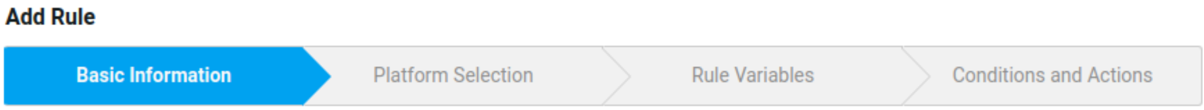
Check whether ip domain name is present in the device or not

2. Configure Rules

One or more rules can be configured to express configuration standards. Based on the complexity of the scenario, configuration standards can be broken up into more than one condition.

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies
- Create/Select a Policy
- Click '+' to create new Rule
- ATOM opens up new wizard as shown below



- Rule has four components
  - Basic Information
  - Platform Selection
  - Rule Variables
  - Conditions & Actions

Basic Information

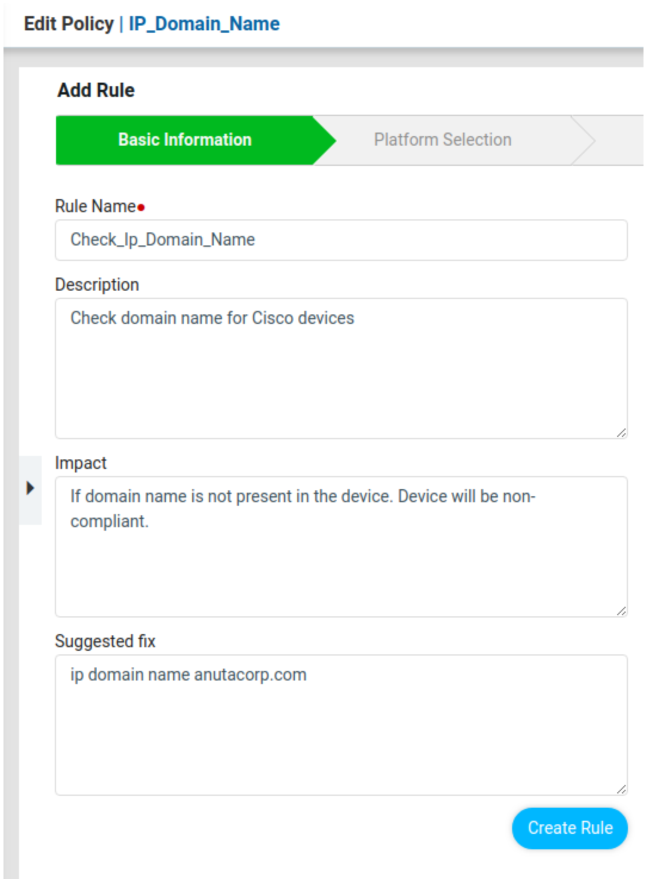
Provide basic information as described below. Information provided here is for documentation purposes only.

Rule Name: Provide any Name

Description: Brief explanation of the configuration evaluation that the rule is going to perform.

Impact: If the device configuration does not meet the rule or rules in the policy, type it in the Impact field.

Suggested Fix: Using which non-compliance can be corrected and device returns to a state of Compliance.



Rule Name●
Check_Ip_Domain_Name

Description
Check domain name for Cisco devices

Impact
If domain name is not present in the device. Device will be non-compliant.

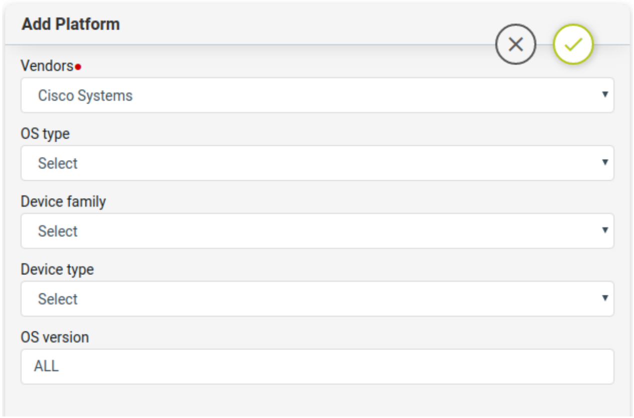
Suggested fix
ip domain name anutacorp.com

Platform Selection

Rules contain configuration standards expressed in CLI Configuration format. Configuration standard can be at Vendor level, Device Type, Device Platform, OS Type or OS Version.

Steps:

- Navigate to Config Manager > Config Compliance -> Policies -> Rules
- Create/Select a Rule & Provide the following information
  - Vendor
  - OS type
  - Device Family
  - Device Type
  - OS Version



Add Platform

Vendors• Cisco Systems

OS type Select

Device family Select

Device type Select

OS version ALL

Note: Platform Selection will be used during Policy execution. Devices that don't match the above criteria are skipped**.**

Note: It's not common to have more than one Platform

Rule Variables

Rule variables allow configuration to be parameterized.

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies -> Rules
- Create/Select a Rule Variables
  - Key - Provide unique name to identify rule variable
  - Description - Describe rule-input configuration
  - Default Value - Default value. Can be overridden during Policy execution time

Conditions and Actions

Expected configuration & actions to be taken when violations are detected are specified in the *Conditions & Actions* section.

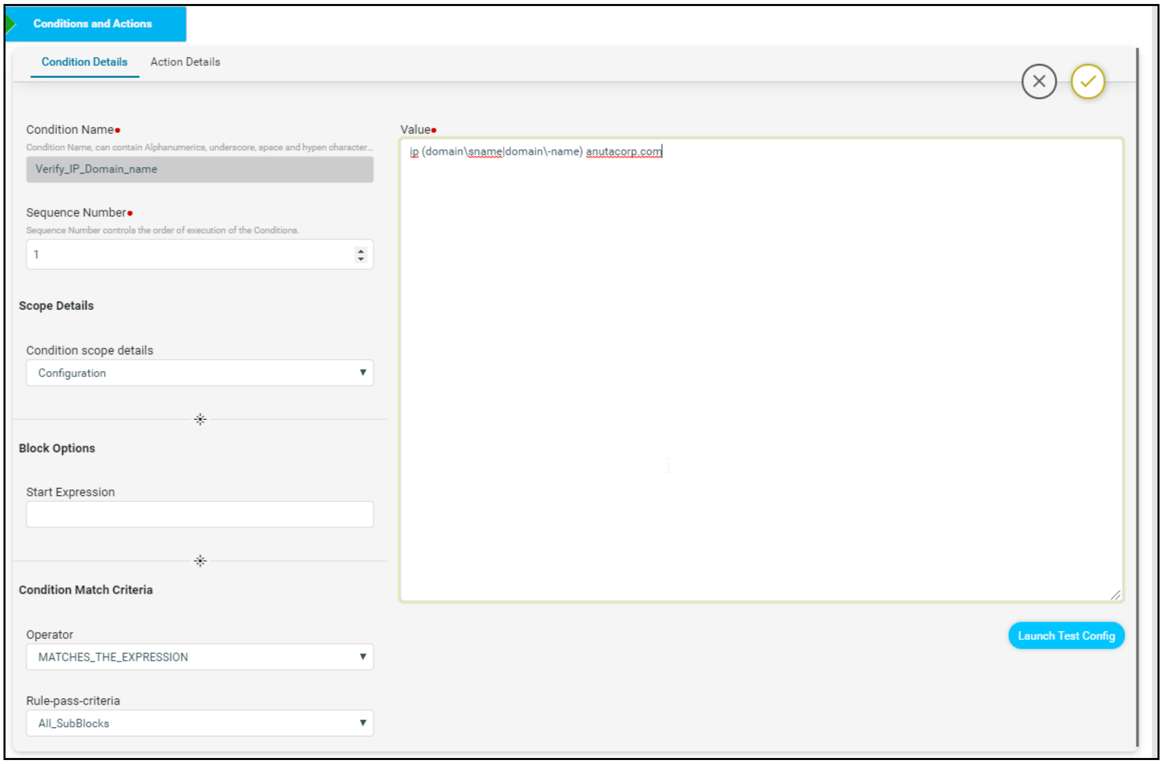
Based on the complexity of the scenario, configuration standards can be broken up into more than one condition.

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies -> Rules
- Create/Select Conditions & Actions
  - Condition Details - Described Below
  - Action Details - Described Below

Condition Details

Condition section provides users to specify the expected configuration and various options on how to match the expected configuration including option to identify sub mode configuration blocks.



Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen character...
Verify_IP_Domain_name

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details
Configuration

Block Options

Start Expression

Condition Match Criteria

Operator
MATCHES_THE_EXPRESSION

Rule-pass-criteria
All_SubBlocks

Value•
ip (domain\sname|domain\-name) anutacorp.com

Condition Name: Name of the Condition

Sequence Number : Order of the condition execution.

Scope Details

Condition scope details: Scope could be either full configuration copy or configuration matched in prior condition.

- *Configuration* - Full Configuration
- *Previously_Matched_Blocks* - Subset of configuration matched by prior condition

Block Options

Start Expression - Regular expression indicating the start of the sub-block.
End Expression - Regular expression indicating the end of the sub-block.

Condition Match Criteria

Operator:
MATCHES_THE_EXPRESSION - Checks whether the condition value exactly matches with device configuration or not.
DOESNOT_MATCHES_THE_EXPRESSION - Checks whether the condition value does not match with the device configuration or not.
CONTAINS_STRING - Checks whether the device configuration contains condition value config or not.

Rule-Pass-Criteria:
All_SubBlocks - Checks whether the condition value matches in all the blocks or not.
Any_SubBlock - Checks whether the condition value matches in any of the blocks or not.

Value: Value field accepts Configuration Standard as CLI Configuration. Following types of configuration can be provided:

- Static Configuration
- Dynamic/Parameterized Configuration
- Configuration with Regular Expressions
- Configuration coupled with Jinja2 Templating

Note: For some Vendor Configurations like Cisco IOS-Style, whitespace in command prefix is mandatory to identify commands at sub-mode level.

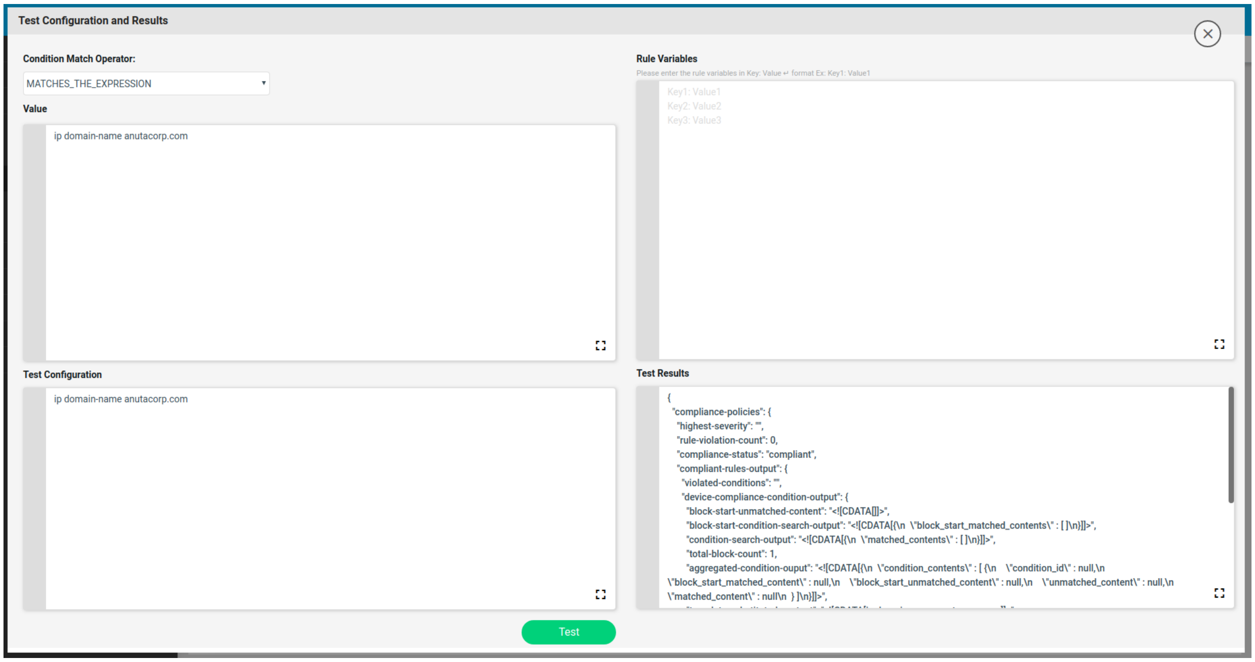
For Scenario 1 - Provide value as **ip domain-name anutacorp.com** to search for a given domain name in the running configuration.

Test Config

Based on the complexity of the configuration standard, Value may be complex and may need to build up iteratively. Test Config utility helps the CLI configuration condition to be validated against Test Configuration.

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies -> Rules ->
- Create/Select Conditions & Actions
- Click “Launch Test Config” will launch a form to Test Condition


Test Configuration and Results
Condition Match Operator:
MATCHES_THE_EXPRESSION
Value
Rule Variables
Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1
Key1: Value1
Key2: Value2
Key3: Value3
Test Configuration
Test Results
Test

Value:

```
ip domain-name anutacorp.com
```

Test Configuration:

```
ip domain-name anutacorp.com
```

Test Results:

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[{\n  \"block_start_matched_contents\" : [ ]\n}]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n
\"matched_content\" : null\n  } ]\n}]]>",
```

Condition Match Operator:

MATCHES_THE_EXPRESSION
DOESNOT_MATCHES_THE_EXPRESSION
CONTAINS_STRING

Value: Sample configuration to be tested. Value will be shown from the Condition Details. Value can be further refined

> **Note:** Any Edits to Value will reflect in the Condition Details -> Value and Vice-versa.

Test Configuration: Sample device configuration

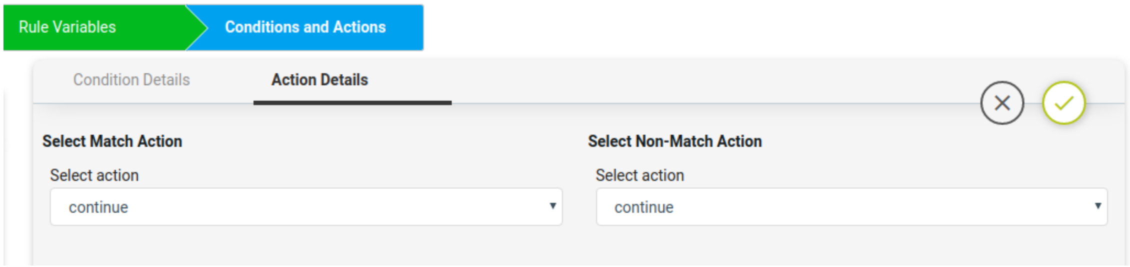
Rule Variables: The rule variables created in the rule will be shown here with default values. Values can be modified.

> **Note:** Any Edits to Values will not be reflected in the Rule Variable default values provided in Rule Variables Section.

Test Results: Based on Condition Match Operator test results will be shown on the right hand side

Action Details

Action can be taken after Condition evaluation. Condition can result in either a “Match” or “Non-Match”. Depending on the scenario one or both criteria may apply.



Select Match Action

Select action: continue

Select Non-Match Action

Select action: continue

Select Match Action - This option is applicable when Condition evaluates to a Match

Select action:

Continue - continue execution to next condition
Donot_raise_violation - skip execution and don't raise violation
Raise_violation_and_continue - raise violation and continue execution to next conditions
Raise_violation - raise violation and skip execution

For Scenario 1, no action needs to be taken during a match condition, so select **continue** as action.

Violation severity:

LOW
MEDIUM
HIGH
CRITICAL

Violation message type:

Default_violation_message
User_defined_violation_message

Derive fix cli commands:

Use_unmatched_block - unmatched config from the block
Use_matched_block - matched config from the block
Use_complete_block - total block config

Select Non-Match Action

Select action:

Continue
Don't raise violation
Raise violation and continue
Raise violation

For Scenario 1, Action is required when Condition is not matched. Select **Raise violation and continue**.

Violation severity:

LOW
MEDIUM

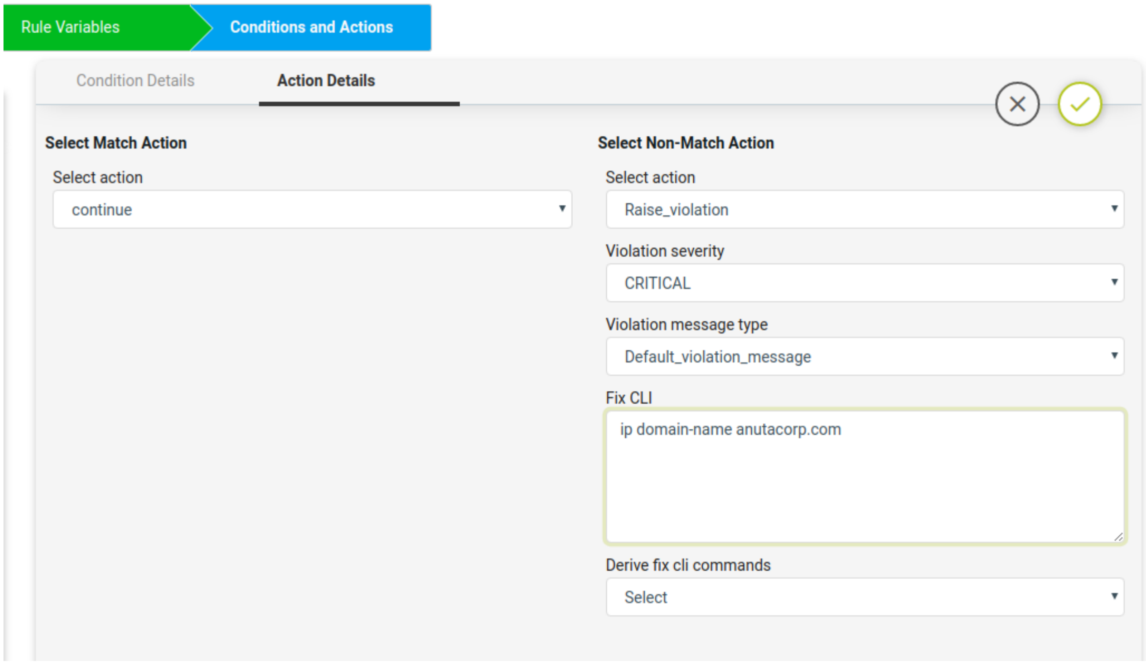
HIGH
CRITICAL

Violation message type:

Default_violation_message
User_defined_violation_message

Fix CLI: Provide the CLI Configuration to be used for remediation. Fix CLI can be either provided here or derived.

Option - 1 - Explicit Remediation / Fix CLI
For Scenario 1, Provide "ip domain-name anutacorp.com" in Fix CLI.



Select action: continue

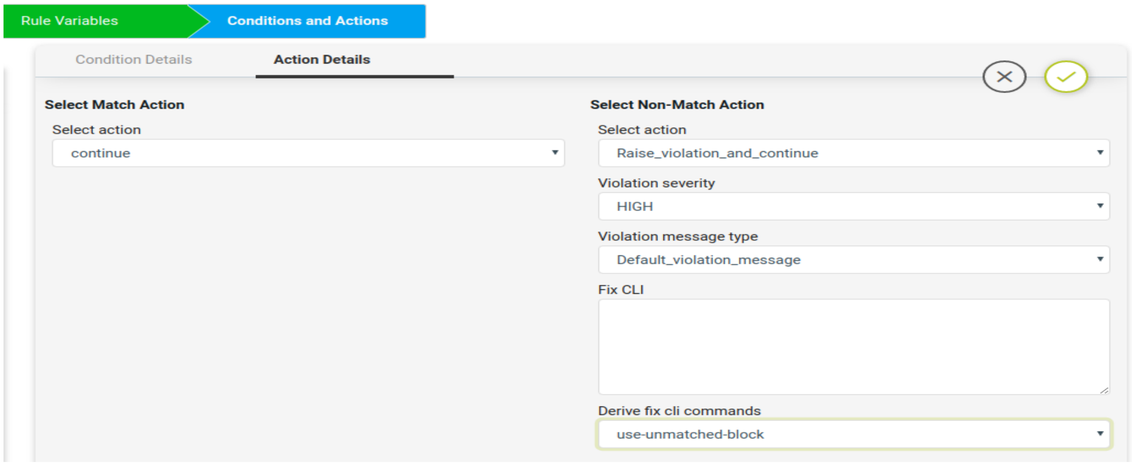
Select action: Raise_violation
Violation severity: CRITICAL
Violation message type: Default_violation_message
Fix CLI: ip domain-name anutacorp.com
Derive fix cli commands: Select

Option - 2 - Remediation Commands can be derived from Condition evaluation.

Derive fix cli commands:
Options below:

Use_unmatched_block
Use_matched_block
Use_complete_block

For Scenario 1, Select "Use_unmatched_block". Since this is non-match Action, unmatched_block will be Condition Details->Value and can be used as Fix CLI.



Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation_and_continue

Violation severity: HIGH

Violation message type: Default_violation_message

Fix CLI

Derive fix cli commands: use-unmatched-block

Scenario 2: NTP Server configuration check

Scenario:

1. All devices in the network should contain the designated ntp server.
2. Remove all other ntp servers
3. In this example
   a. Expected ntp-server = 10.0.0.1

Platform:

Cisco IOS-XE

Expected Configuration:

```
ntp server 10.0.0.1
```

Fix-CLI Configuration:

ntp server 10.0.0.1
<<Remove Any Other ntp server other than 10.0.0.1>>

This use case uses regular expressions and contains two conditions.

1. Condition-1 - Check for expected config & if not found remediate using Fix CLI.
   Fix-cli Configuration :
   ntp server 10.0.0.1

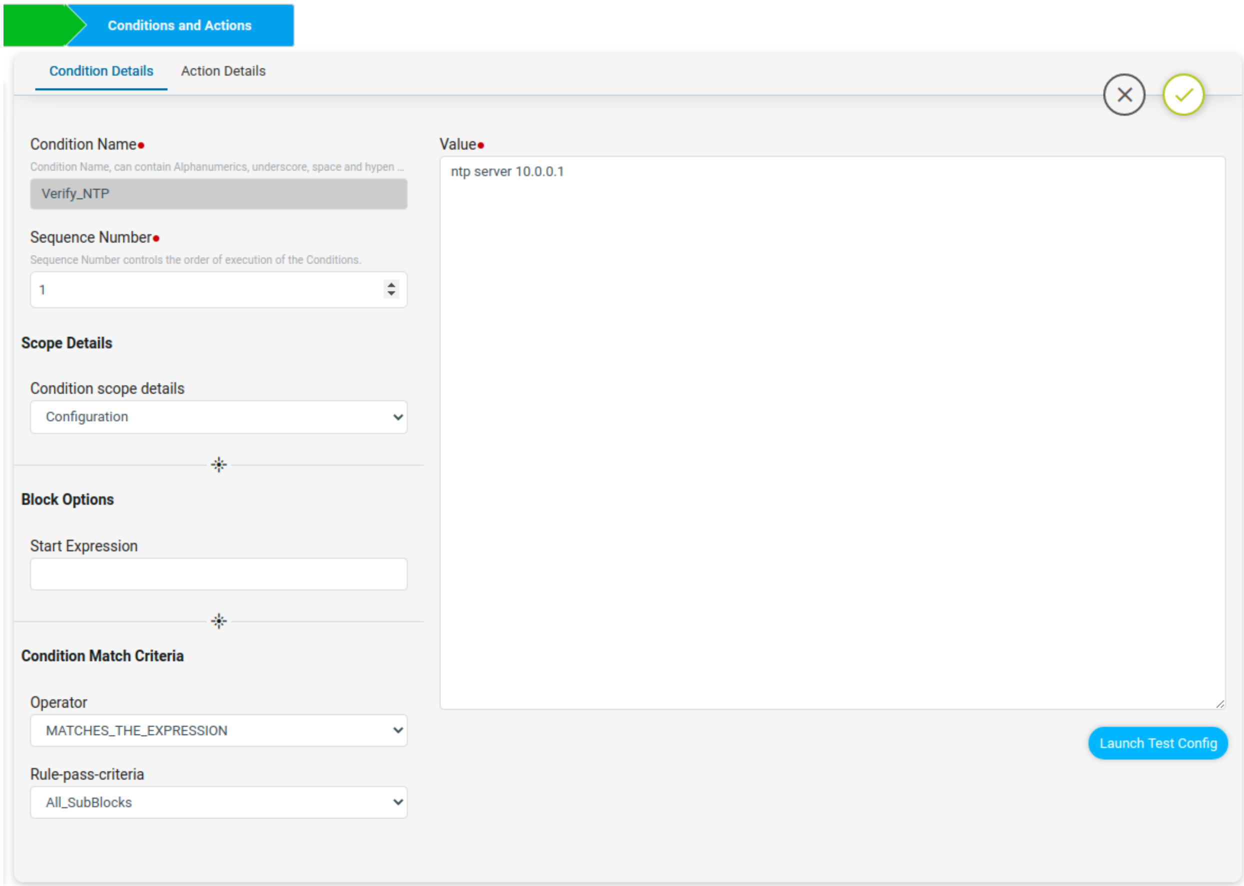
2. Condition 2- Check for unwanted ntp-servers and remove them.
   Fix-cli Configuration :
   no ntp server 10.0.0.2 //Derived
   no ntp server 10.0.0.3 //Derived

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies
- Click '+' to create new Policy and provide the following information
    - Policy Name - NTP_Common_Peer_Configuration
    - Description
- Select the Policy and Click '+' to create new Rule
    - Rule Name - Check_NTP_Common_Peer_Configuration
- Navigate to Config Manager > Config Compliance -> Policies -> Rules
- Select a Rule & Provide the following information
    - Vendor - Cisco Systems
    - OS type - IOSXE
    - Device Family - ALL
    - Device Type - ALL
    - OS Version - ALL
- Rule variables are not required for this scenario.
- Now fill the Conditions and Actions

Condition1

The Verify_NTP condition will check if the NTP server config is present in the device or not.



Condition Name●
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Verify_NTP

Sequence Number●
Sequence Number controls the order of execution of the Conditions.
1

Condition scope details
Configuration

Start Expression

Operator
MATCHES_THE_EXPRESSION

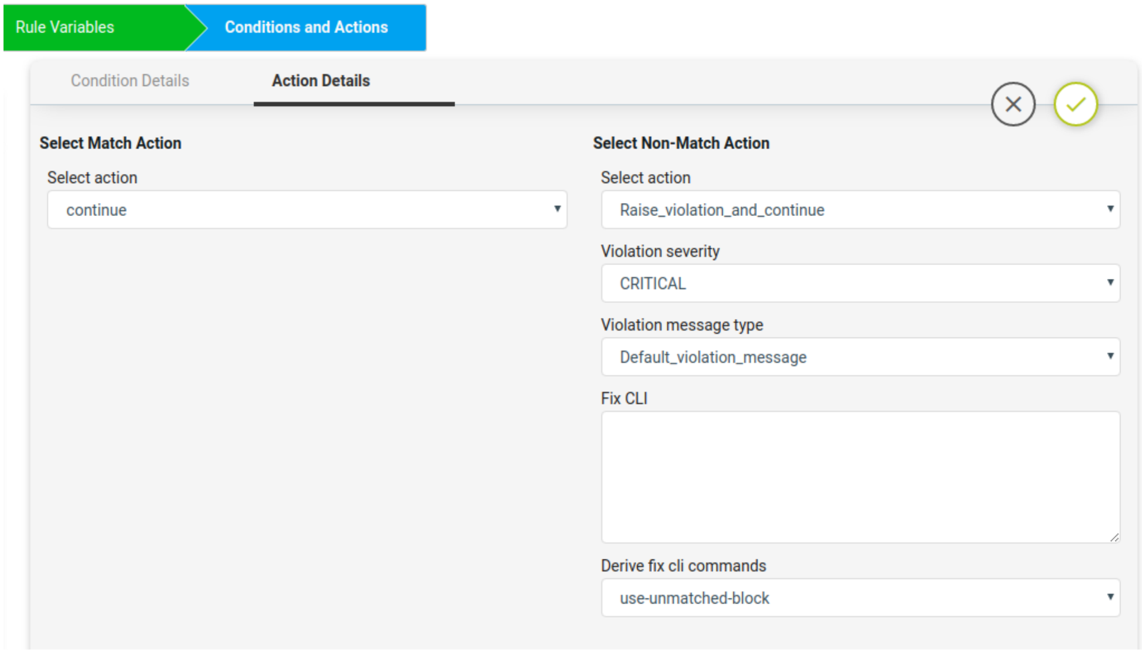
Rule-pass-criteria
All_SubBlocks

Value●

```
ntp server 10.0.0.1
```

Here Non-Match Action can be done either using the commands in Fix CLI or using the Derive fix cli commands.

- Using the Fix CLI user needs to provide the configuration commands manually.
- Using the Derive Fix CLI Commands user needs to select the use_unmatched_block as shown below.



Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation_and_continue

Violation severity: CRITICAL

Violation message type: Default_violation_message

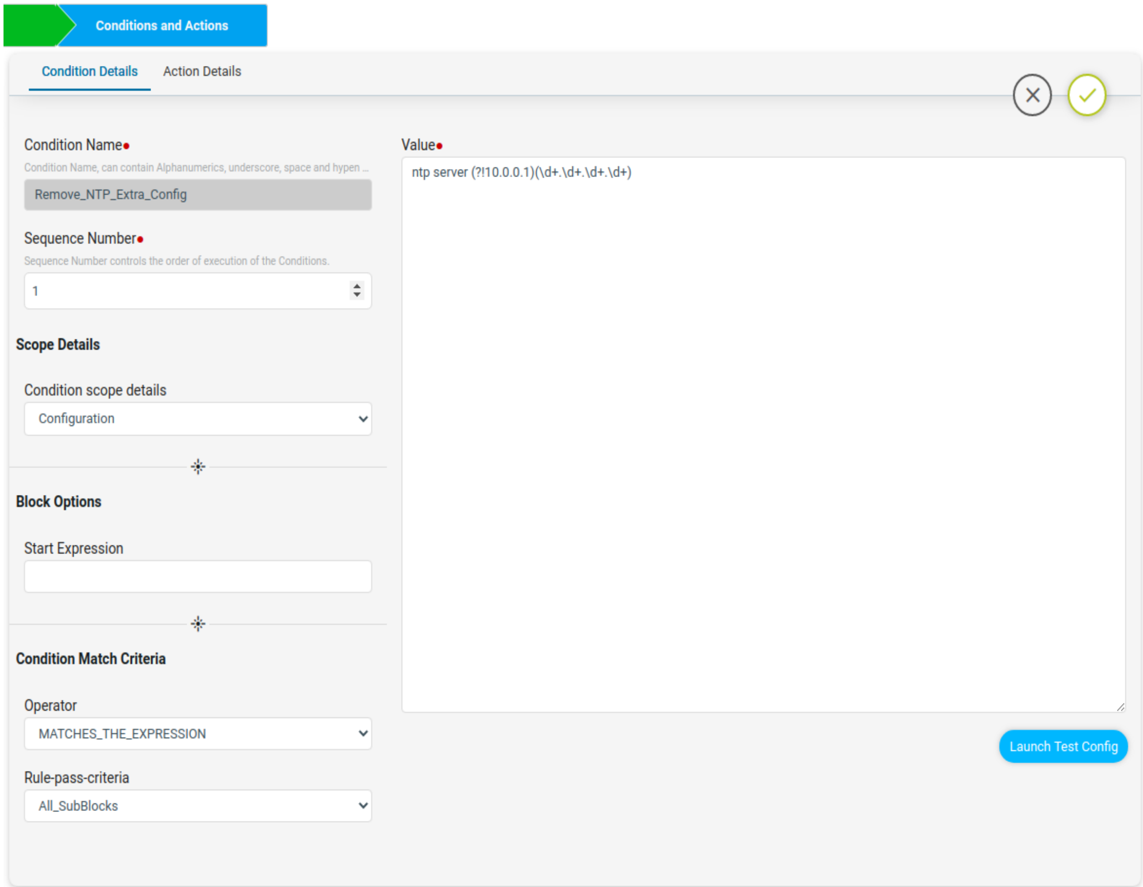
Fix CLI

Derive fix cli commands: use-unmatched-block

Here on Match Action it will Continue and on Non-Match Action the Derive fix cli commands uses the use-unmatched-block to remediate the device.

Condition2

Remove_NTP_Extra_Config condition will use the regex to match and capture the extra NTP server ip configured in the device other than the expected ip.



Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Remove_NTP_Extra_Config

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details
Configuration

Block Options

Start Expression

Condition Match Criteria

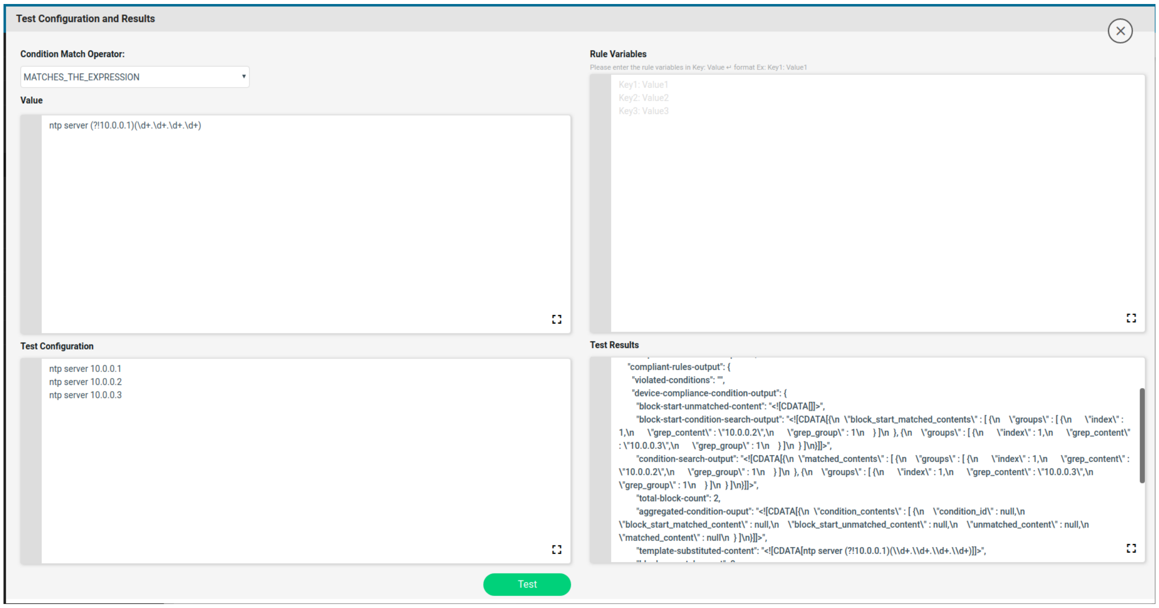
Operator
MATCHES_THE_EXPRESSION

Rule-pass-criteria
All_SubBlocks

Value•

```
ntp server (?!10.0.0.1)(\d+.\d+.\d+.\d+)
```

The extra NTP server ip captured will be stored in the backend data structure which is shown in the Test Results tab.



Condition Match Operator:
MATCHES_THE_EXPRESSION

Value

```
ntp server (?!10.0.0.1)(\d+.\d+.\d+.\d+)
```

Rule Variables
Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1

Key1: Value1
Key2: Value2
Key3: Value3

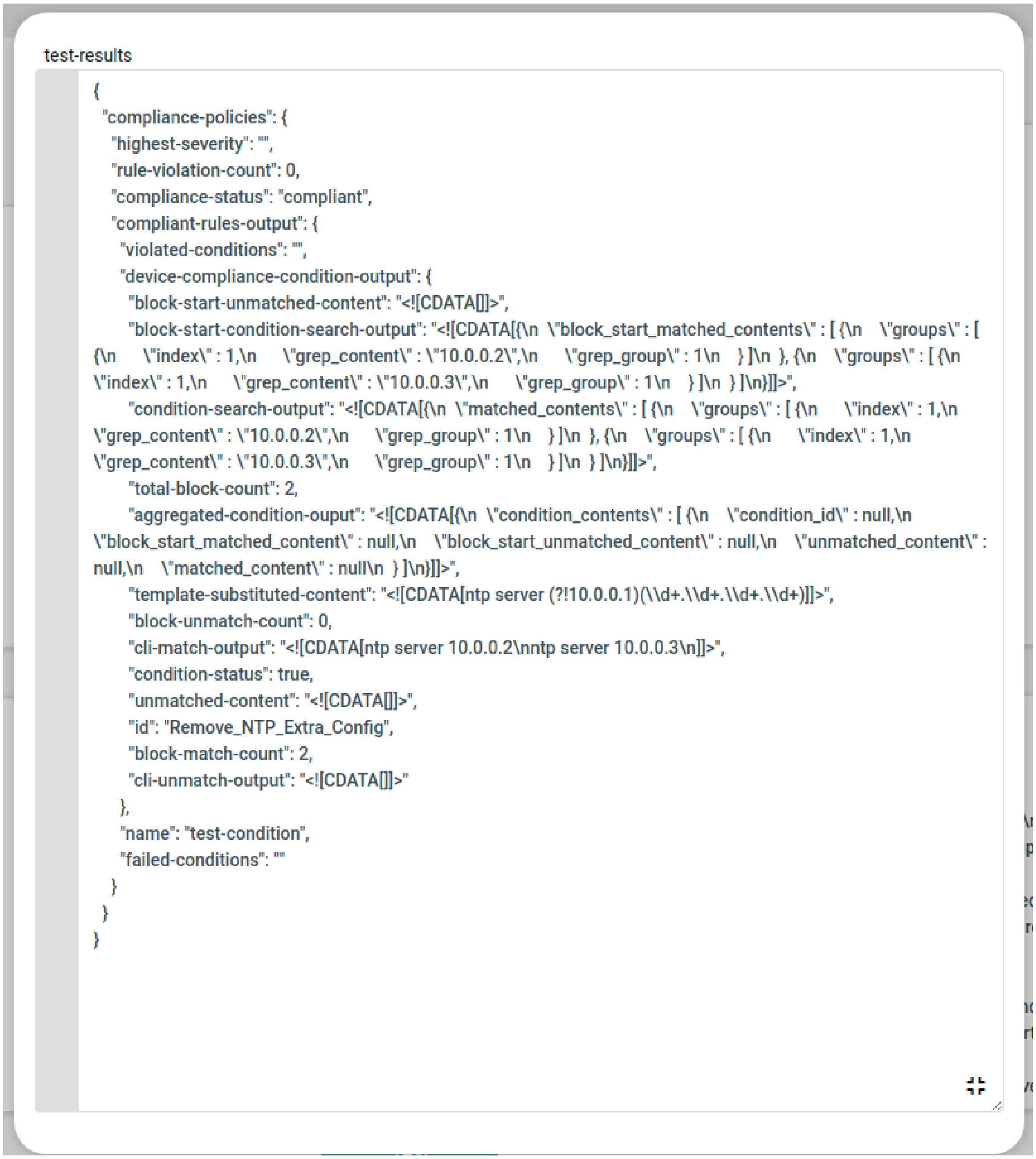
Test Configuration

```
ntp server 10.0.0.1
ntp server 10.0.0.2
ntp server 10.0.0.3
```

Test Results

```
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[{\n  \"block_start_matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" :
1,\n      \"grep_content\" : \"10.0.0.2\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\"
: \"10.0.0.3\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" :
\"10.0.0.2\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" : \"10.0.0.3\",\n
\"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
    "total-block-count": 2,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n
\"matched_content\" : null\n  } ]\n}]]>",
    "template-substituted-content": "<![CDATA[ntp server (?!10.0.0.1)(\\d+.\\d+.\\d+.\\d+)]]>",
```

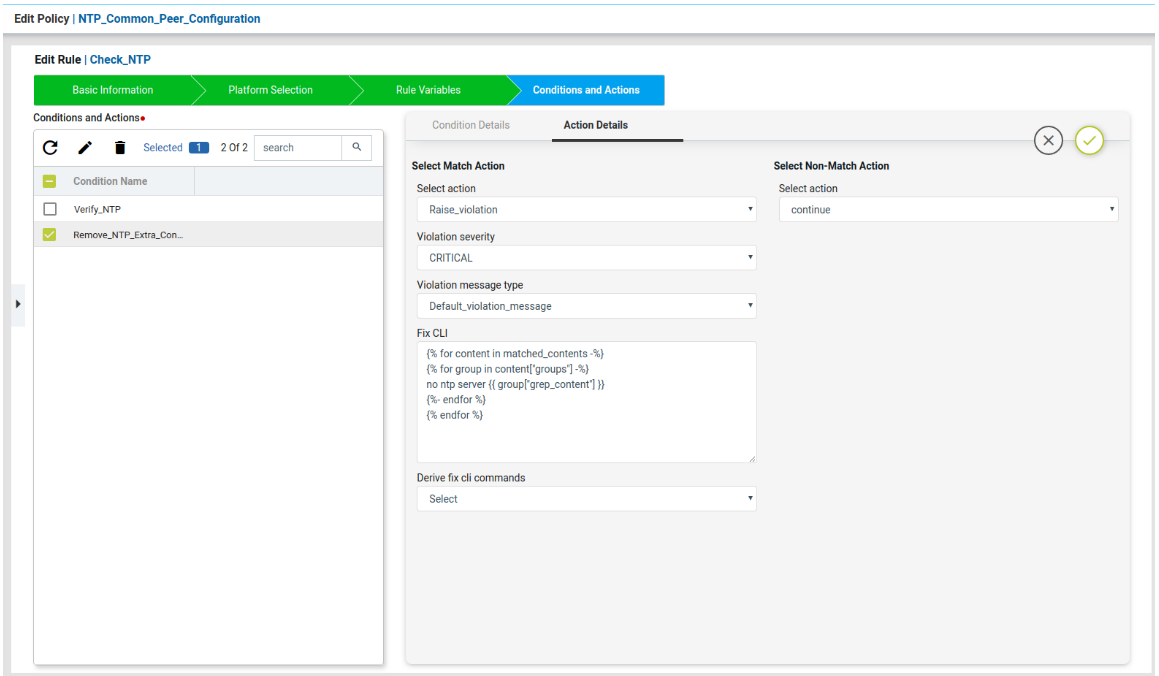
The captured data will be stored in the condition-search-output



test-results

```
{
 "compliance-policies": {
   "highest-severity": "",
   "rule-violation-count": 0,
   "compliance-status": "compliant",
   "compliant-rules-output": {
     "violated-conditions": "",
     "device-compliance-condition-output": {
       "block-start-unmatched-content": "<![CDATA[]]>",
       "block-start-condition-search-output": "<![CDATA[{\n  \"block_start_matched_contents\" : [ {\n    \"groups\" : [
{\n      \"index\" : 1,\n      \"grep_content\" : \"10.0.0.2\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n
\"index\" : 1,\n      \"grep_content\" : \"10.0.0.3\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
       "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n
\"grep_content\" : \"10.0.0.2\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n      \"index\" : 1,\n
\"grep_content\" : \"10.0.0.3\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
       "total-block-count": 2,
       "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" :
null,\n    \"matched_content\" : null\n  } ]\n}]]>",
       "template-substituted-content": "<![CDATA[ntp server (?!10.0.0.1)(\\d+.\\d+.\\d+.\\d+)]]>",
       "block-unmatch-count": 0,
       "cli-match-output": "<![CDATA[ntp server 10.0.0.2\nntp server 10.0.0.3\n]]>",
       "condition-status": true,
       "unmatched-content": "<![CDATA[]]>",
       "id": "Remove_NTP_Extra_Config",
       "block-match-count": 2,
       "cli-unmatch-output": "<![CDATA[]]>"
     },
     "name": "test-condition",
     "failed-conditions": ""
   }
 }
}
```

On Match Action write a jinja2 configuration template to remove the extra ip's captured using the above test-result data structure.



Edit Policy | NTP_Common_Peer_Configuration

Edit Rule | Check_NTP

Conditions and Actions•

☑	Condition Name
□	Verify_NTP
☑	Remove_NTP_Extra_Con...

Select Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix CLI

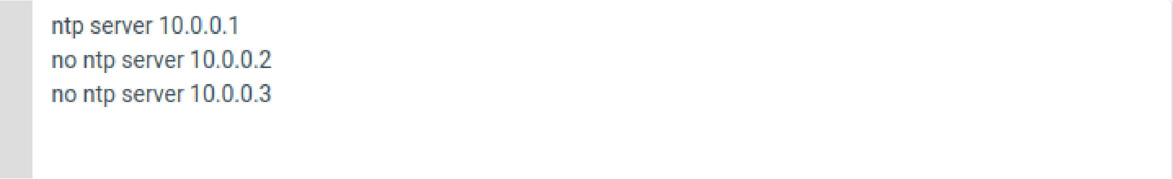
```
{% for content in matched_contents -%}
{% for group in content["groups"] -%}
no ntp server {{ group["grep_content"] }}
{%- endfor %}
{% endfor %}
```

Derive fix cli commands: Select

Select Non-Match Action

Select action: continue

Finally if different NTP servers are present on the device, for Non-Compliant device Fix CLI will show up as below



```
ntp server 10.0.0.1
no ntp server 10.0.0.2
no ntp server 10.0.0.3
```

Scenario 3: Interface configuration check

Scenario: All devices in the network should have a specific interface in no shutdown state with auto negotiation enabled. The interface block can have extra configuration commands under it but should be in no shutdown state and auto negotiation enabled.

Platform:

Cisco IOS-XE

Expected Configuration:

```
interface  {{ interface_name }}
  no shutdown
  negotiation auto
```

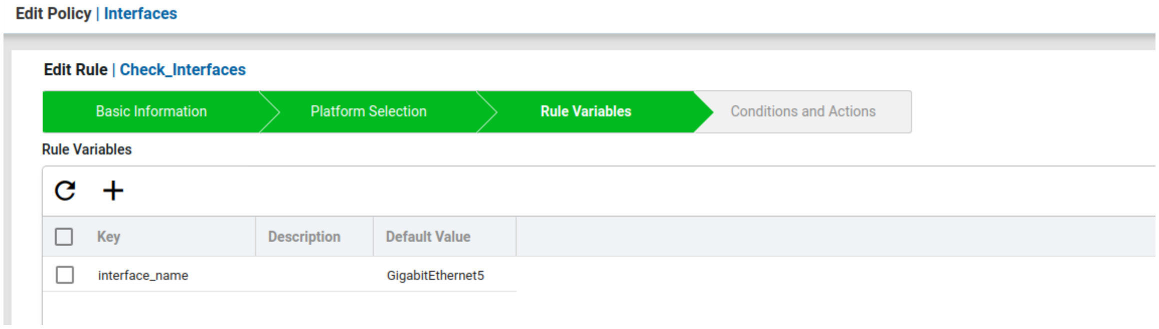
Fix-CLI Configuration:

```
interface {{ interface_name }}
 no shutdown
 negotiation auto
```

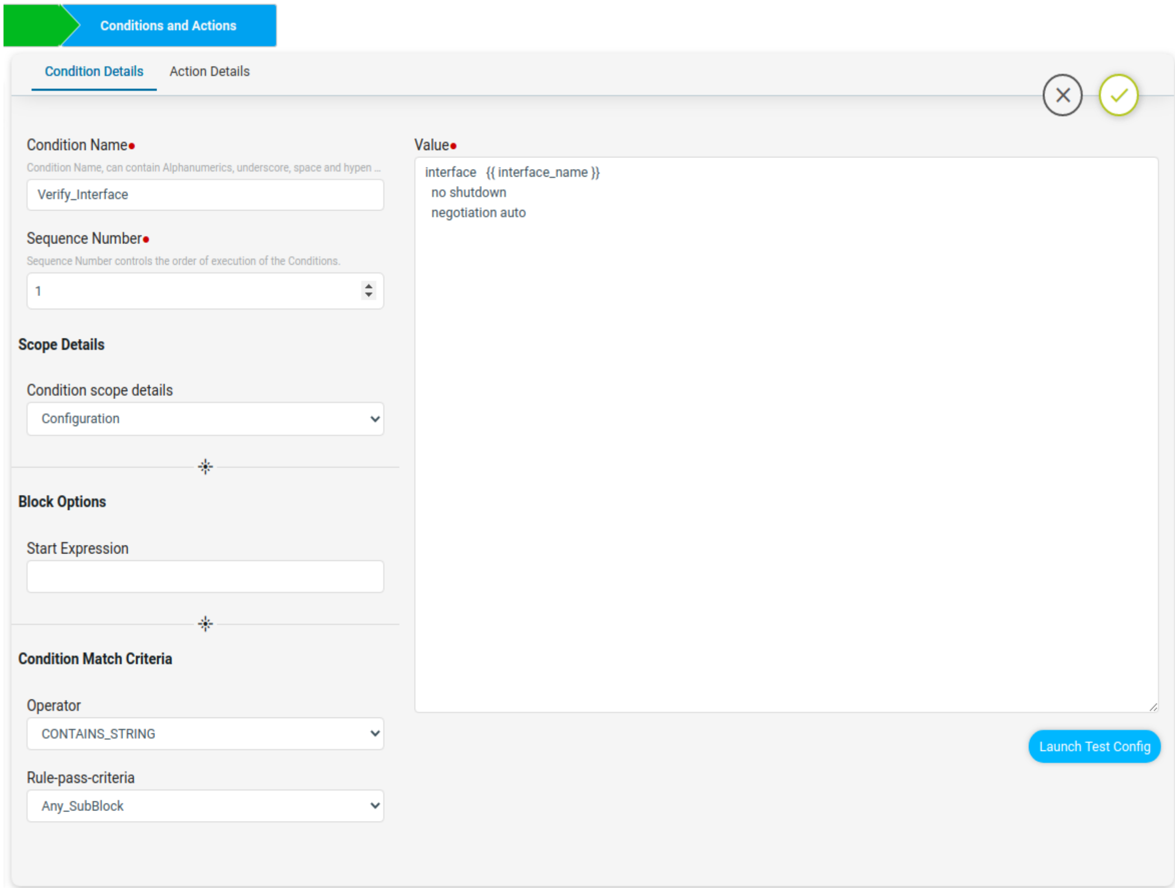
This use case is an interface block configuration having rule variables. In this use case as no shutdown is generally not visible on device running config, we will check whether the interface is in shutdown or not. If shutdown it will remediate to no shutdown.

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies
- Click '+' to create new Policy and provide the following information
  - Policy Name - Interfaces
  - Description
- Select the Policy and Click '+' to create new Rule
  - Rule Name - Check_Interfaces
- Navigate to Config Manager > Config Compliance -> Policies -> Rules
- Select a Rule & Provide the following information
  - Vendor - Cisco Systems
  - OS type - IOSXE
  - Device Family - ALL
  - Device Type - ALL
  - OS Version - ALL
- Now create the Rule variables for this scenario.



Key	Description	Default Value
interface_name		GigabitEthernet5



Condition Name•

Condition Name, can contain Alphanumerics, underscore, space and hypen ...

Verify_Interface

Sequence Number•

Sequence Number controls the order of execution of the Conditions.

1

Scope Details

Condition scope details: Configuration

Block Options

Start Expression

Condition Match Criteria

Operator: CONTAINS_STRING

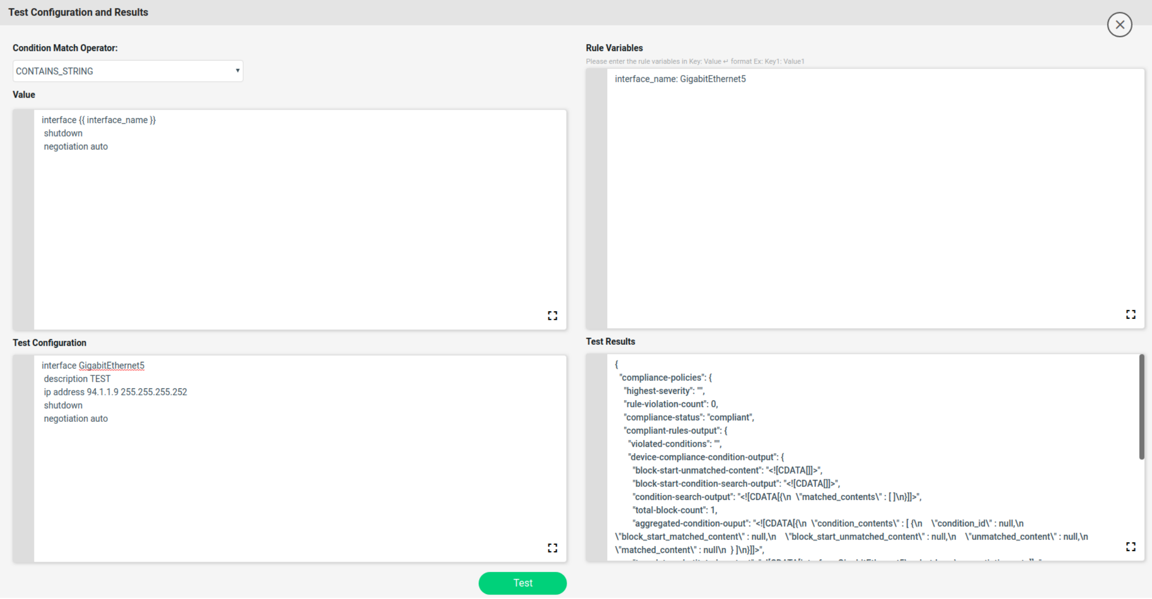
Rule-pass-criteria: Any_SubBlock

Value•

```
interface   {{ interface_name }}
  no shutdown
  negotiation auto
```

In the policy we will have a jinja rule variable interface_name. Here Verify_Interfaces condition will check if the interface block config is present in the device or not and under that interface if no shutdown and negotiation auto is present.

For Scenario3 Condition Match Operator as CONTAINS_STRING will check whether the device configuration contains condition value or not. If device configuration contains value, the result will be Compliant, else Non-Compliant.



Condition Match Operator: CONTAINS_STRING

Value

```
interface {{ interface_name }}
 shutdown
 negotiation auto
```

Rule Variables

Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1

```
interface_name: GigabitEthernet5
```

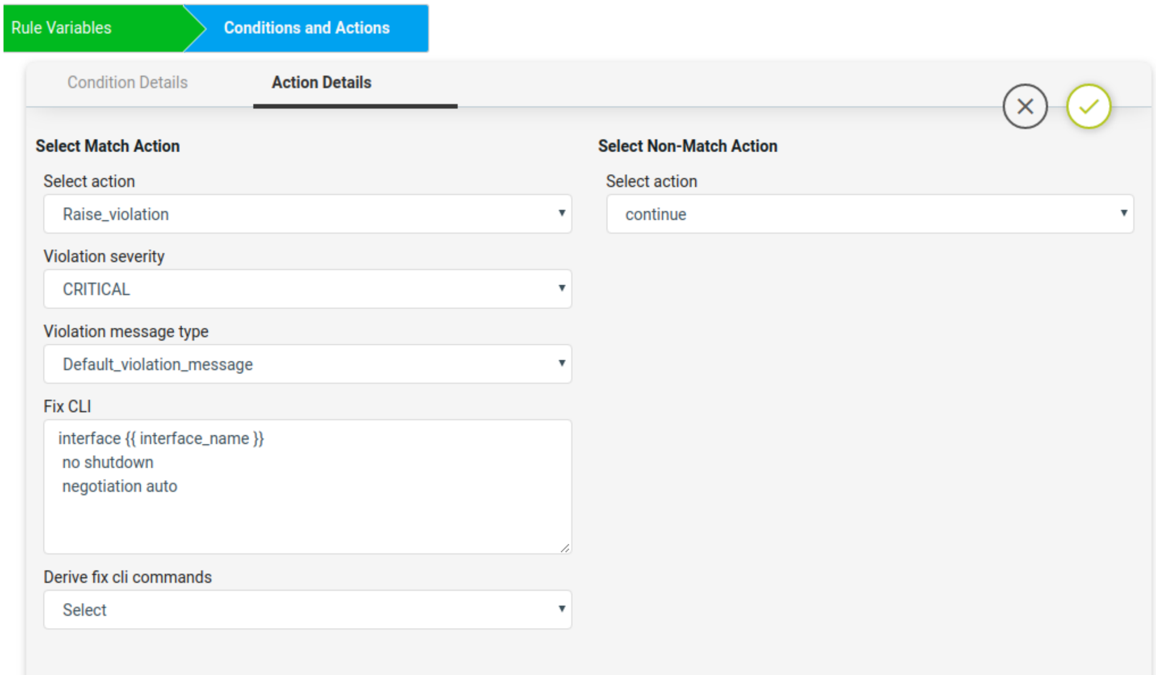
Test Configuration

```
interface GigabitEthernet5
 description TEST
 ip address 94.1.1.9 255.255.255.252
 shutdown
 negotiation auto
```

Test Results

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n
\"matched_content\" : null\n  } ]\n}]]>",
```

Here on Non-Match Action select Continue and on Match Action add Fix cli commands to remediate on the device



Select Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix CLI

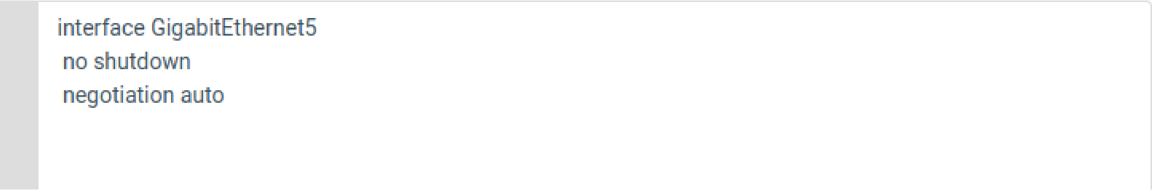
```
interface {{ interface_name }}
 no shutdown
 negotiation auto
```

Derive fix cli commands: Select

Select Non-Match Action

Select action: continue

For Non-Compliant devices Fix CLI will show up later-on as below.



```
interface GigabitEthernet5
 no shutdown
 negotiation auto
```

Scenario 4: Enforce VTY Session Timeouts

Scenario: All devices in the network should contain the network admin preferred VTY **session-timeout** and **exec-timeout** on all vty lines. If VTY session-timeout and exec-timeout is not configured on the device or mis-match with the network admin preferred timeouts, ATOM CLI compliance can configure the devices with the user preferred VTY timeouts on all the vty lines.

In this example we are considering the VTY session-timeout and exec-timeout as 10 sec.

Platform:

Cisco IOS-XE

Expected Configuration:

```
line vty (.*)
 session-timeout 10
 exec-timeout 10 10
```

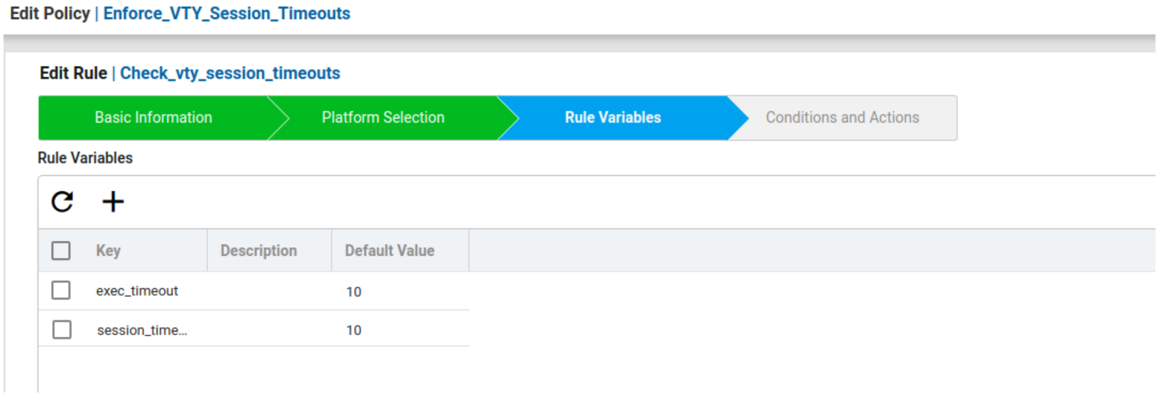
Fix-CLI Configuration:

```
line vty <>
 session-timeout 10
 exec-timeout 10 10
```

This use case is using the regex and rule variables and uses jinja2 template for fix-cli configuration.

Steps:

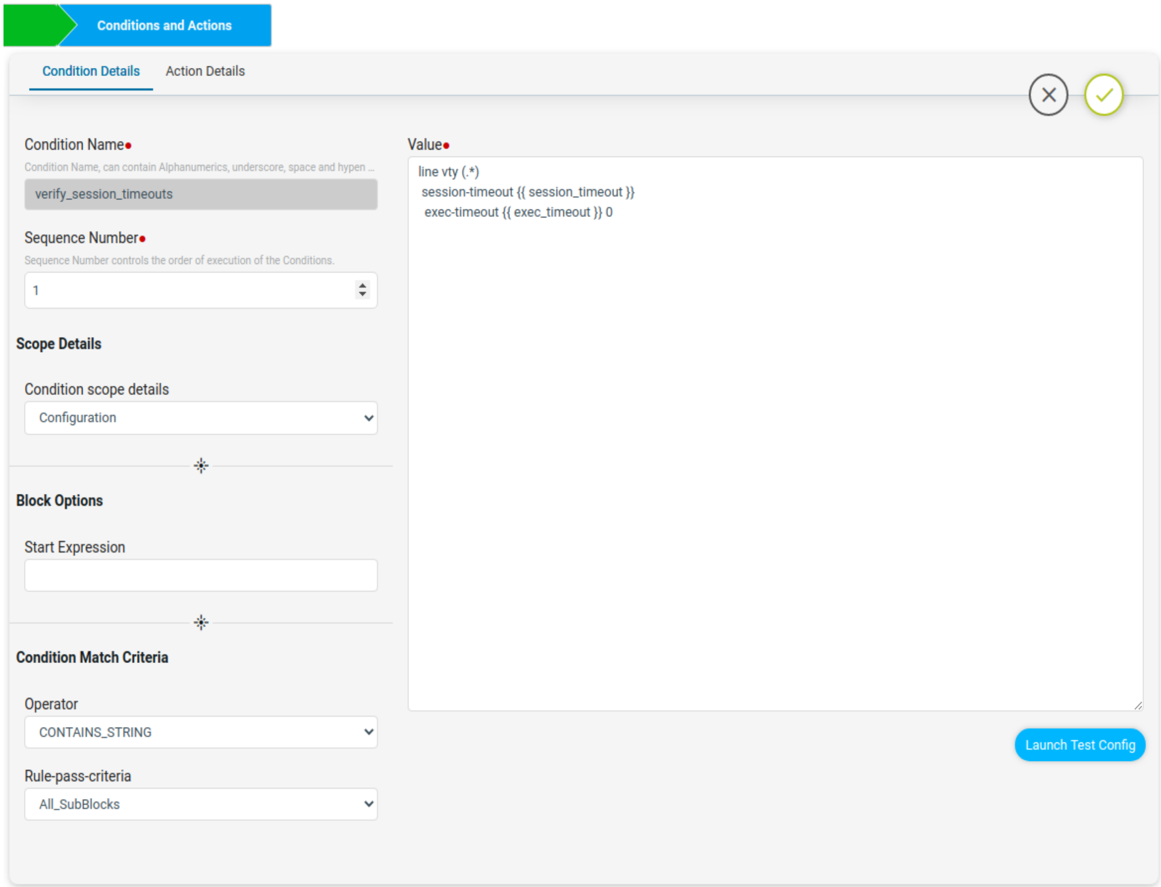
- Navigate to Resource Manager > Config Compliance -> Policies
- Click ‘+’ to create new Policy and provide the following information
  - Policy Name - Enforce_VTY_Session_Timeouts
  - Description
- Select the Policy and Click ‘+’ to create new Rule
  - Rule Name - Check_Enforce_VTY_Session_Timeouts
- Navigate to Resource Manager > Config Compliance -> Policies -> Rules
- Select a Rule & Provide the following information
  - Vendor - Cisco Systems
  - OS type - IOSXE
  - Device Family - ALL
  - Device Type - ALL
  - OS Version - ALL
- Now create the Rule variables for this scenario.



Key	Description	Default Value
exec_timeout		10
session_time...		10

Here created user defined rule variables **vty_exec_timeout** and **vty_session_timeout** with default timeout as 10. These rule variables will be used in the condition value.

The **verify_session_exec_timeouts** condition will check whether the device in the network is configured with user preferred VTY timeouts or not.



Condition Name●
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
verify_session_timeouts

Sequence Number●
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Configuration

Block Options

Start Expression:

Condition Match Criteria

Operator: CONTAINS_STRING

Rule-pass-criteria: All_SubBlocks

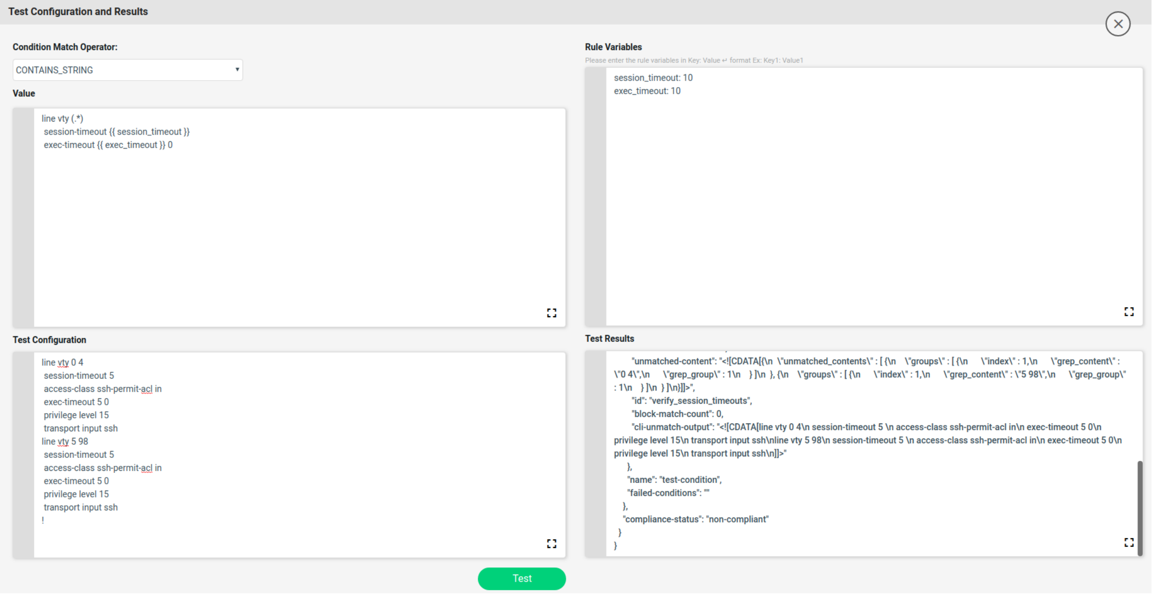
Value●

```
line vty (.*)
 session-timeout {{ session_timeout }}
  exec-timeout {{ exec_timeout }} 0
```

Here under Condition Match Criteria the Operator used was CONTAINS_STRING to check for session-timeout and exec-timeout in line vty config.

Here Rule-pass-criteria used All_SubBlocks to check the condition config in all line vty configurations of the device. If all the line vty is matching with the condition then compliant. If any of the line vty is not matching then non-compliant.

The launch Test Config will check values with the Test configuration and gives the Test Result whether compliant or not.



Test Configuration and Results

Condition Match Operator:

CONTAINS_STRING

Value

```
line vty (.*)
 session-timeout {{ session_timeout }}
 exec-timeout {{ exec_timeout }} 0
```

Rule Variables

Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1

```
session_timeout: 10
exec_timeout: 10
```

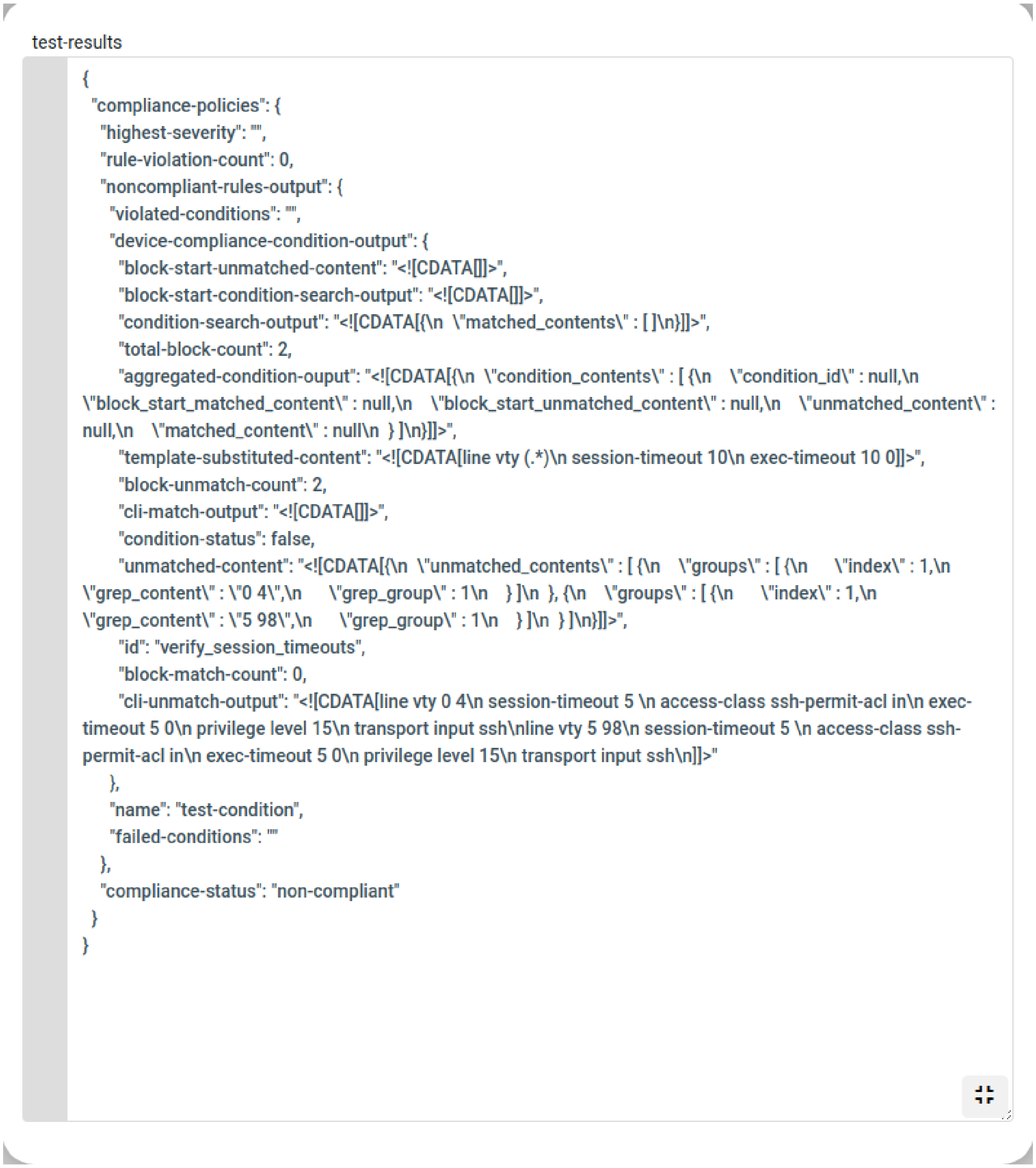
Test Configuration

```
line vty 0 4
 session-timeout 5
 access-class ssh-permit-acl in
 exec-timeout 5 0
 privilege level 15
 transport input ssh
line vty 5 98
 session-timeout 5
 access-class ssh-permit-acl in
 exec-timeout 5 0
 privilege level 15
 transport input ssh
!
```

Test Results

```
      "unmatched-content": "<![CDATA[{\n  \"unmatched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" : \"0 4\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" : \"5 98\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
      "id": "verify_session_timeouts",
      "block-match-count": 0,
      "cli-unmatch-output": "<![CDATA[line vty 0 4\n session-timeout 5 \n access-class ssh-permit-acl in\n exec-timeout 5 0\n privilege level 15\n transport input ssh\nline vty 5 98\n session-timeout 5 \n access-class ssh-permit-acl in\n exec-timeout 5 0\n privilege level 15\n transport input ssh\n]]>"
    },
    "name": "test-condition",
    "failed-conditions": ""
  },
  "compliance-status": "non-compliant"
 }
}
```

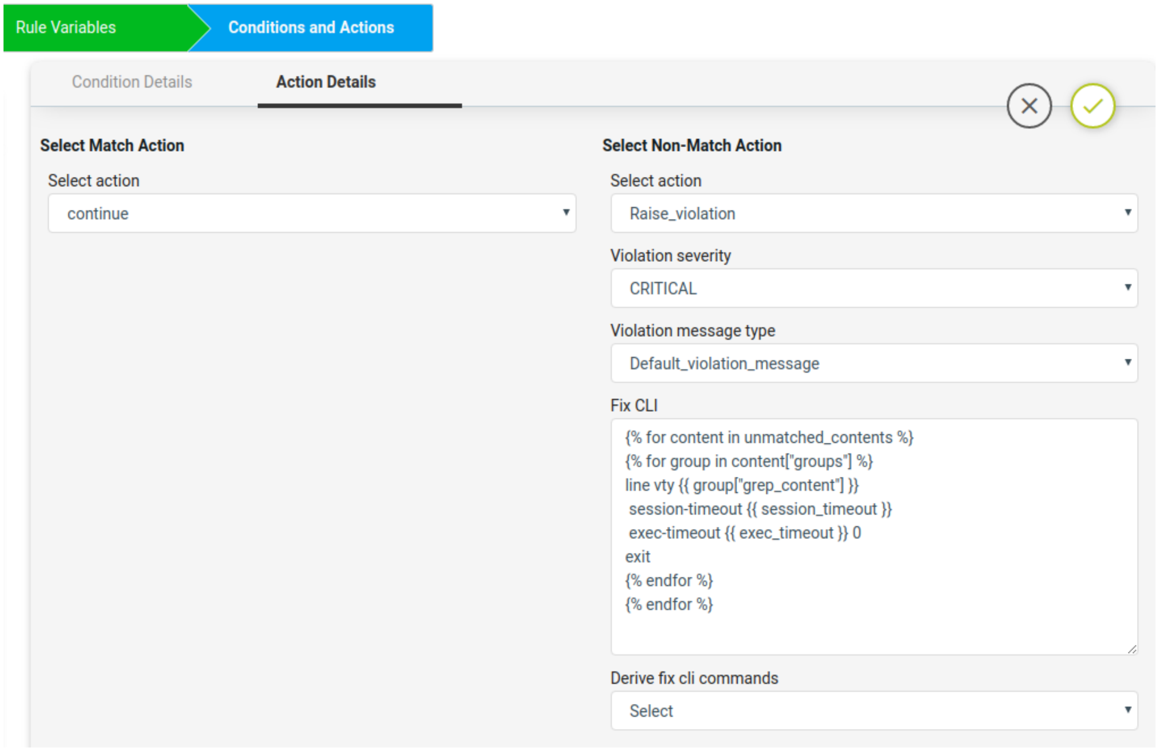
Here the unmatched line vty will be captured and stored in the backend data structure. The captured data structure maximizes the view shown below.



test-results

```
{
  "compliance-policies": {
    "highest-severity": "",
    "rule-violation-count": 0,
    "noncompliant-rules-output": {
      "violated-conditions": "",
      "device-compliance-condition-output": {
        "block-start-unmatched-content": "<![CDATA[]]>",
        "block-start-condition-search-output": "<![CDATA[]]>",
        "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ ]\n}]]>",
        "total-block-count": 2,
        "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n    \"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n    \"matched_content\" : null\n  } ]\n}]]>",
        "template-substituted-content": "<![CDATA[line vty (.*)\n session-timeout 10\n exec-timeout 10 0]]>",
        "block-unmatch-count": 2,
        "cli-match-output": "<![CDATA[]]>",
        "condition-status": false,
        "unmatched-content": "<![CDATA[{\n  \"unmatched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" : \"0 4\",\n      \"grep_group\" : 1\n    } ]\n  }, {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" : \"5 98\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
        "id": "verify_session_timeouts",
        "block-match-count": 0,
        "cli-unmatch-output": "<![CDATA[line vty 0 4\n session-timeout 5 \n access-class ssh-permit-acl in\n exec-timeout 5 0\n privilege level 15\n transport input ssh\nline vty 5 98\n session-timeout 5 \n access-class ssh-permit-acl in\n exec-timeout 5 0\n privilege level 15\n transport input ssh\n]]>"
      },
      "name": "test-condition",
      "failed-conditions": ""
    },
    "compliance-status": "non-compliant"
  }
}
```

On Match action will continue and on Non-Match Action fix-cli will use the jinja2 template configuration written based on the above captured data structure.



Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

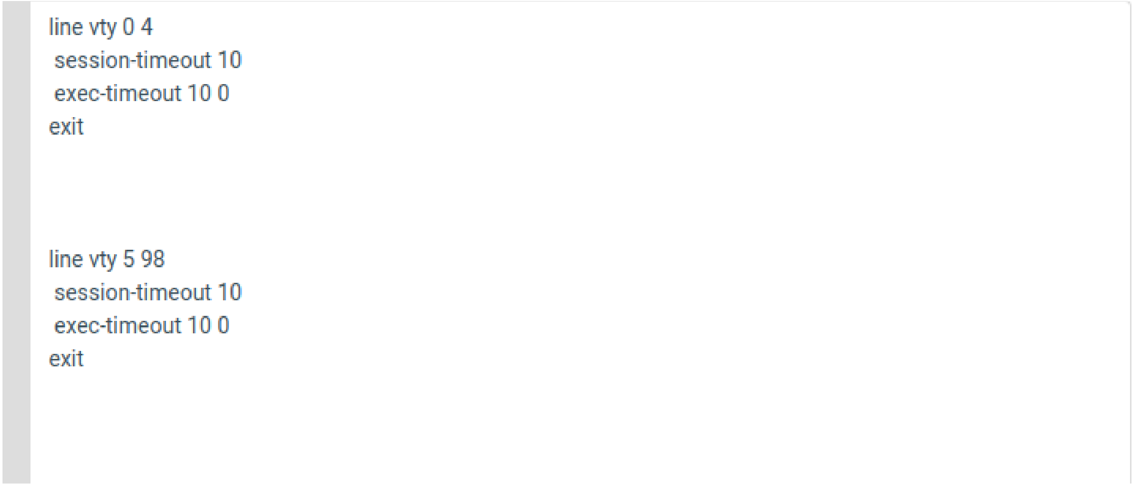
Violation message type: Default_violation_message

Fix CLI

```
{% for content in unmatched_contents %}
{% for group in content["groups"] %}
line vty {{ group["grep_content"] }}
 session-timeout {{ session_timeout }}
 exec-timeout {{ exec_timeout }} 0
exit
{% endfor %}
{% endfor %}
```

Derive fix cli commands: Select

The Non-compliant device fix-cli configurations derived from above jinja2 snippet will look like below.



```
line vty 0 4
 session-timeout 10
 exec-timeout 10 0
exit



line vty 5 98
 session-timeout 10
 exec-timeout 10 0
exit
```

Scenario 5: Enforce OSPF Router Id as Loopback0

Scenario: All devices in the network should contain the OSPF router-id configured with loopback0 ip address. If OSPF router-id is not configured on the device it will configure the OSPF router-id with the value of loopback0 ip address on the devices.

Platform:

Cisco IOS-XE

Expected Configuration:

```
interface Loopback0
  ip address 45.45.45.5 255.255.255.255
!
router ospf 100
  router-id 45.45.45.5
```

Fix-CLI Configuration:

```
router ospf 100
  router-id 45.45.45.5
```

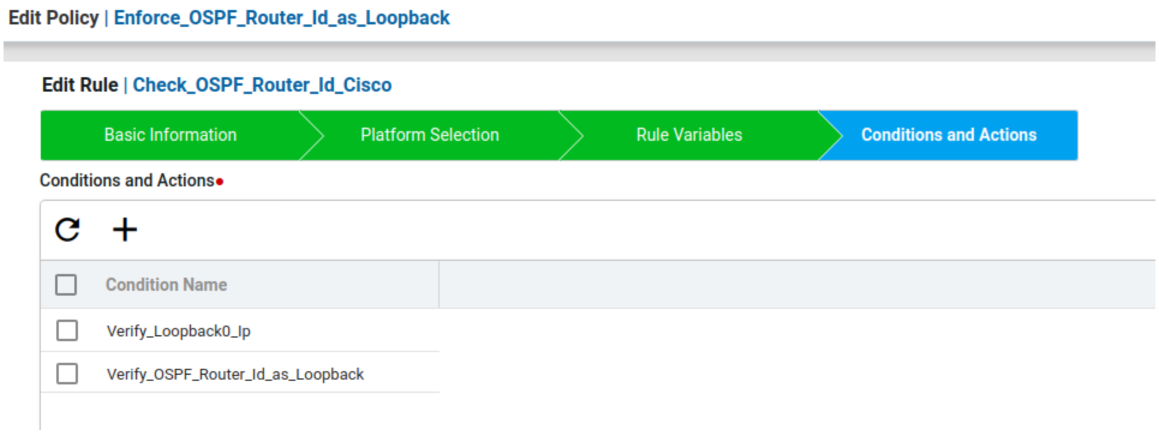
This use case is using the regex and contains two conditions.

1. First condition is to capture and store loopback0 ip address. It will not have a fix-cli configuration as the intention of the condition is to capture loopback0 ip address.
   Fix-cli Configuration :
   << no fix cli configuration >>

2. Second condition will check whether the OSPF router id is the same as the first condition's captured loopback0 ip address or not. if not matching then it will configure the OSPF router id with loopback0.
   Fix-cli Configuration :
   ```
   router ospf 100
      router-id 45.45.45.5
   ```

Steps:

- Navigate to Resource Manager > Config Compliance -> Policies
- Click '+' to create new Policy and provide the following information
  - Policy Name - Enforce_OSPF_Router_Id_as_Loopback
  - Description
- Select the Policy and Click '+' to create new Rule
  - Rule Name - Check_OSPF_Router_Id_Cisco
- Navigate to Resource Manager > Config Compliance -> Policies -> Rules
- Select a Rule & Provide the following information
  - Vendor - Cisco Systems
  - OS type - IOSXE
  - Device Family - ALL
  - Device Type - ALL
  - OS Version - ALL
- Rule variables are not required for this scenario.
- Now fill the Conditions and Actions



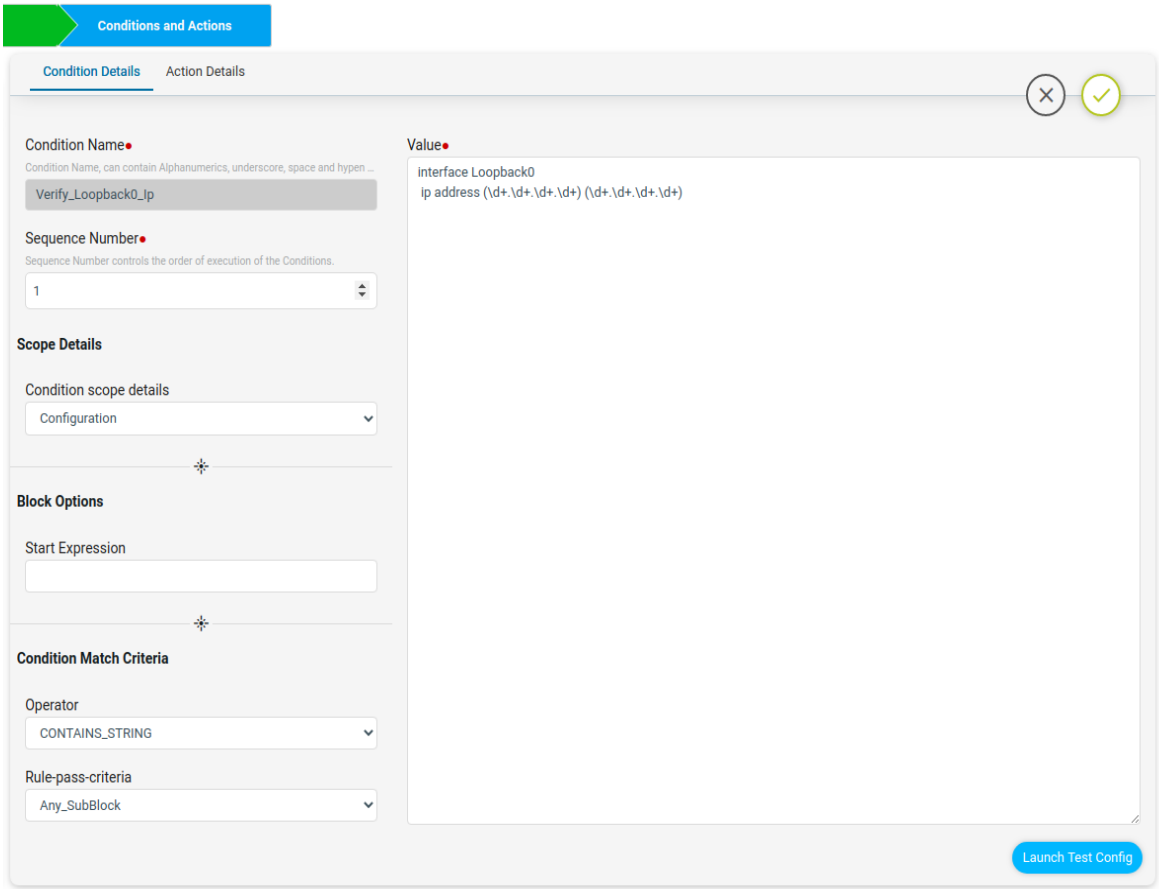
Edit Policy | Enforce_OSPF_Router_Id_as_Loopback

Edit Rule | Check_OSPF_Router_Id_Cisco

Conditions and Actions●

☐	Condition Name
☐	Verify_Loopback0_Ip
☐	Verify_OSPF_Router_Id_as_Loopback

Condition1



Condition Name●
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Verify_Loopback0_Ip

Sequence Number●
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Configuration

Block Options

Start Expression:

Condition Match Criteria

Operator: CONTAINS_STRING

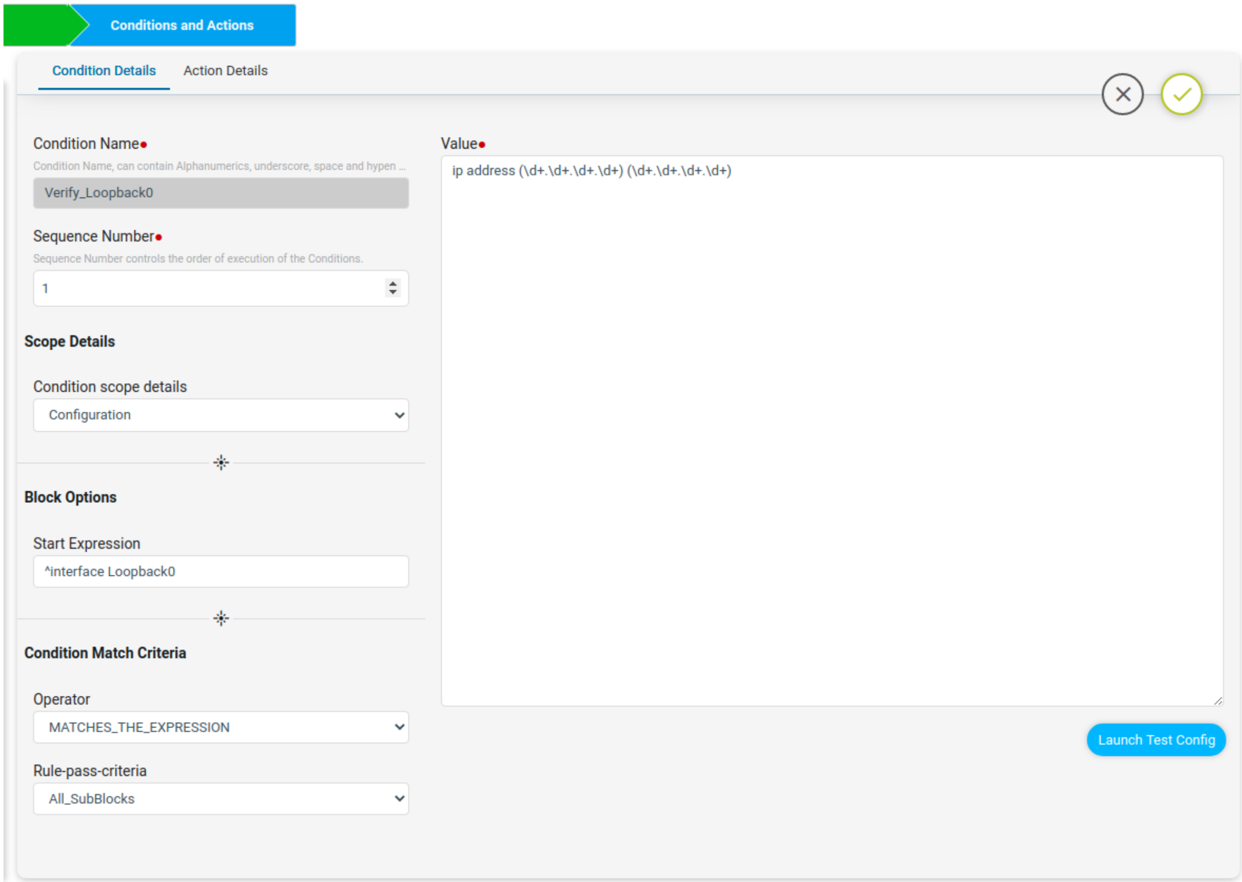
Rule-pass-criteria: Any_SubBlock

Value●

```
interface Loopback0
 ip address (\d+.\d+.\d+.\d+) (\d+.\d+.\d+.\d+)
```

Another way of writing the above block configuration using the **Block Options** Start Expression is shown below.

The first line “interface Loopback0” can be written in the start Expression with regex symbol ^ to indicate the block starts with interface Loopback0. The remaining configuration lines can be written in value.



Condition Name●

Condition Name, can contain Alphanumerics, underscore, space and hypen ...

Verify_Loopback0

Sequence Number●

Sequence Number controls the order of execution of the Conditions.

1

Scope Details

Condition scope details: Configuration

Block Options

Start Expression: ^interface Loopback0

Condition Match Criteria

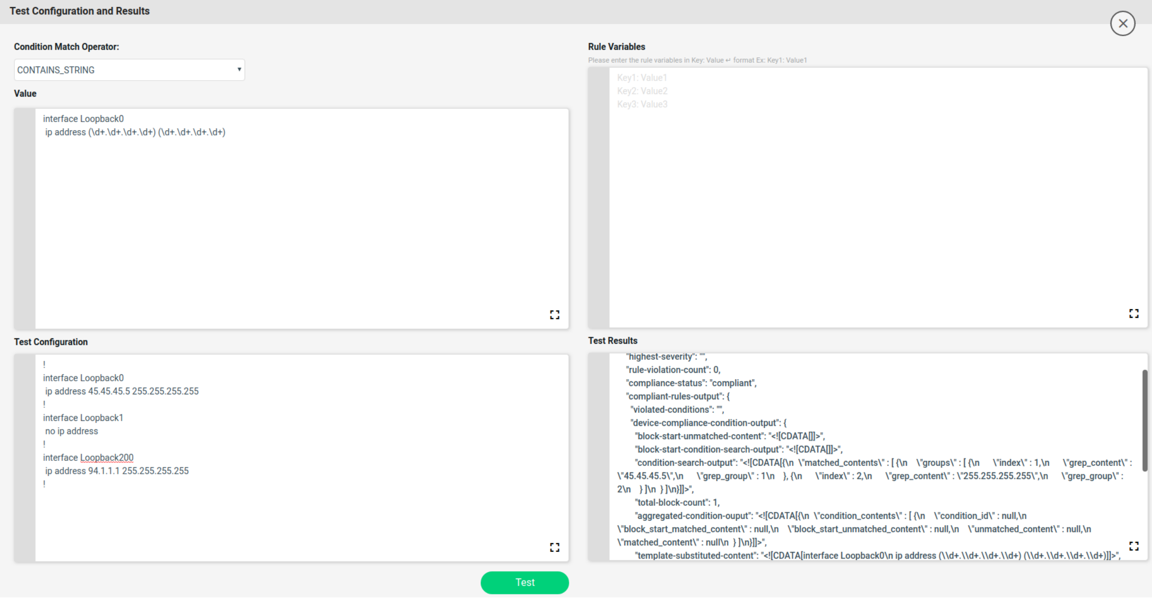
Operator: MATCHES_THE_EXPRESSION

Rule-pass-criteria: All_SubBlocks

Value●

```
ip address (\d+.\d+.\d+.\d+) (\d+.\d+.\d+.\d+)
```

The launch test config will check the condition value with the Test configuration and will give the Test Result. Here the captured loopback0 ip address will be stored in the backend data structure as shown below.


Test Configuration and Results
Rule Variables
Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1
Key1: Value1
Key2: Value2
Key3: Value3
Test

Condition Match Operator: CONTAINS_STRING

Value

```
interface Loopback0
 ip address (\d+.\d+.\d+.\d+) (\d+.\d+.\d+.\d+)
```

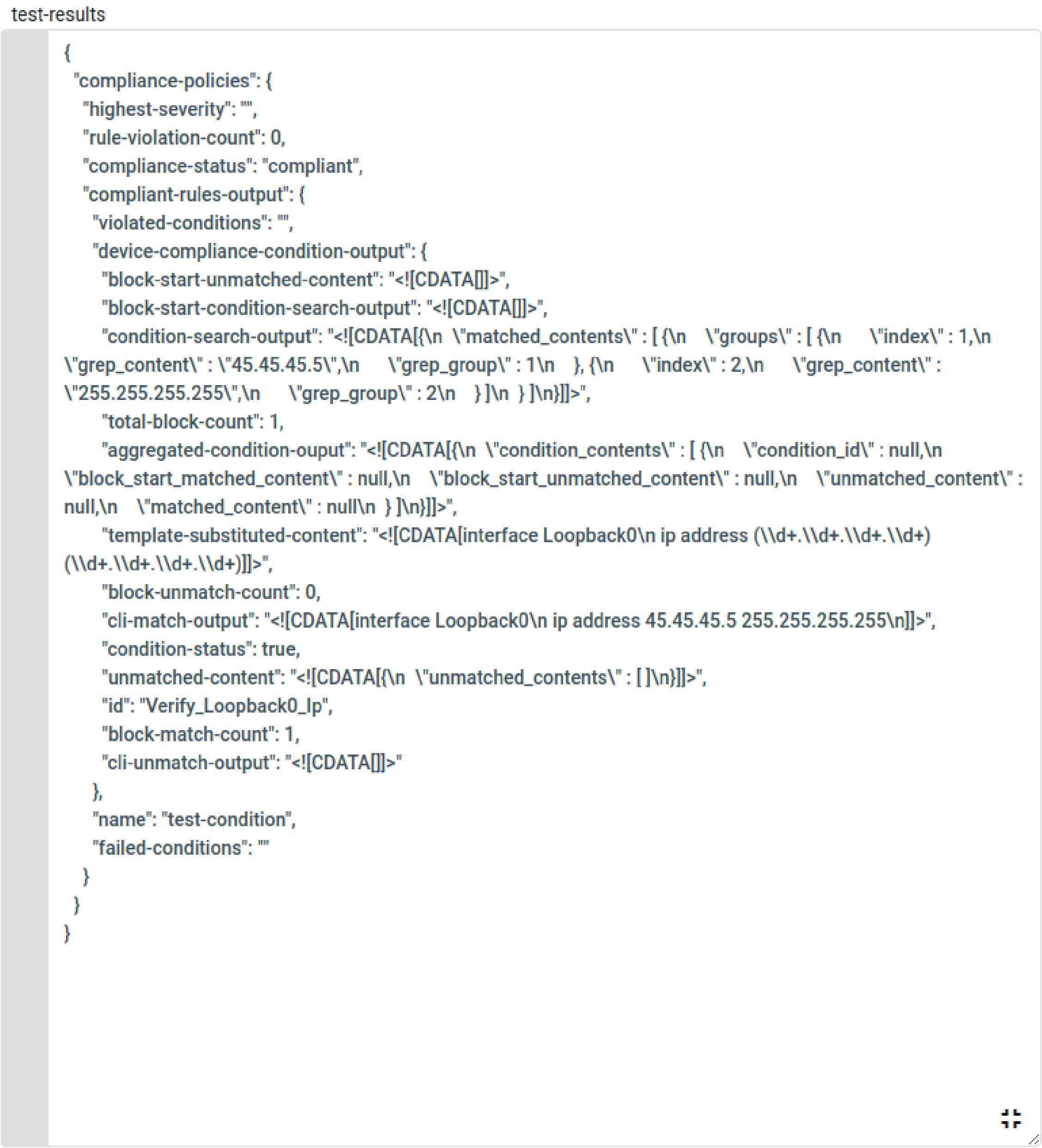
Test Configuration

```
!
interface Loopback0
 ip address 45.45.45.5 255.255.255.255
!
interface Loopback1
 no ip address
!
interface Loopback200
 ip address 94.1.1.1 255.255.255.255
!
```

Test Results

```
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n      \"grep_content\" :
\"45.45.45.5\",\n      \"grep_group\" : 1\n    }, {\n      \"index\" : 2,\n      \"grep_content\" : \"255.255.255.255\",\n      \"grep_group\" :
2\n    } ]\n  } ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n
\"matched_content\" : null\n  } ]\n}]]>",
    "template-substituted-content": "<![CDATA[interface Loopback0\n ip address (\\d+.\\d+.\\d+.\\d+) (\\d+.\\d+.\\d+.\\d+)]]>",
```

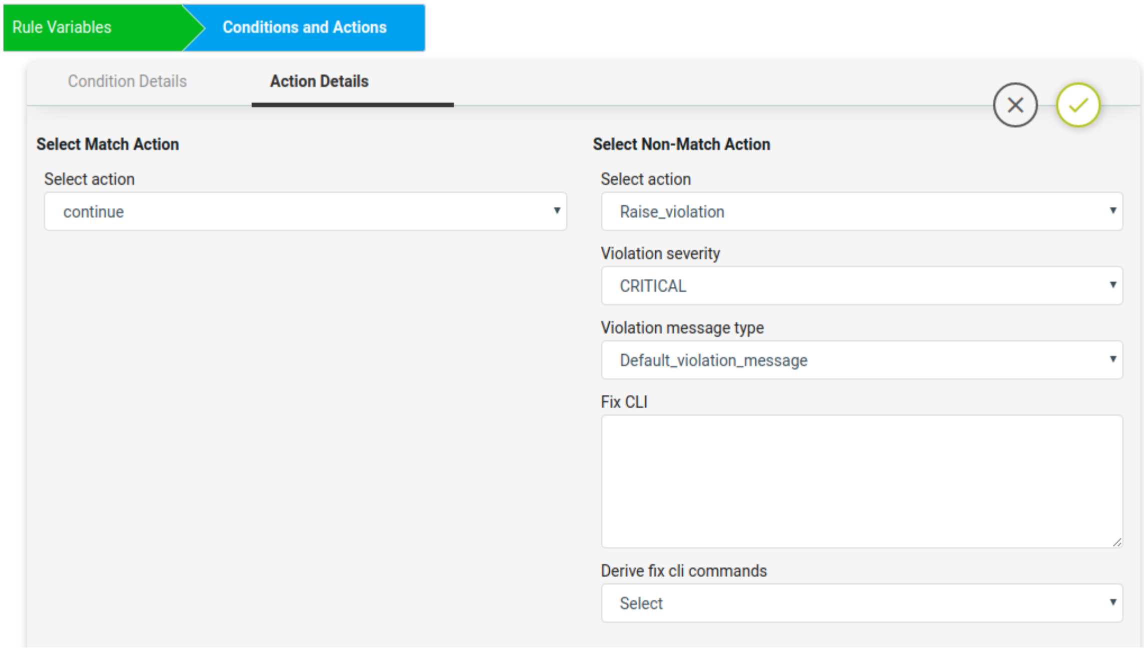
The Test result in maximize view is shown below. This output will be used in condition2.



test-results

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n
\"grep_content\" : \"45.45.45.5\",\n      \"grep_group\" : 1\n    }, {\n      \"index\" : 2,\n      \"grep_content\" :
\"255.255.255.255\",\n      \"grep_group\" : 2\n    } ]\n  } ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" :
null,\n    \"matched_content\" : null\n  } ]\n}]]>",
    "template-substituted-content": "<![CDATA[interface Loopback0\n ip address (\\d+.\\d+.\\d+.\\d+)
(\\d+.\\d+.\\d+.\\d+)]]>",
    "block-unmatch-count": 0,
    "cli-match-output": "<![CDATA[interface Loopback0\n ip address 45.45.45.5 255.255.255.255\n]]>",
    "condition-status": true,
    "unmatched-content": "<![CDATA[{\n  \"unmatched_contents\" : [ ]\n}]]>",
    "id": "Verify_Loopback0_Ip",
    "block-match-count": 1,
    "cli-unmatch-output": "<![CDATA[]]>"
   },
   "name": "test-condition",
   "failed-conditions": ""
  }
 }
}
```

For Non-Match Action violation is being raised and fix-cli is having no commands as this condition is to capture the loopback0 ip.



Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

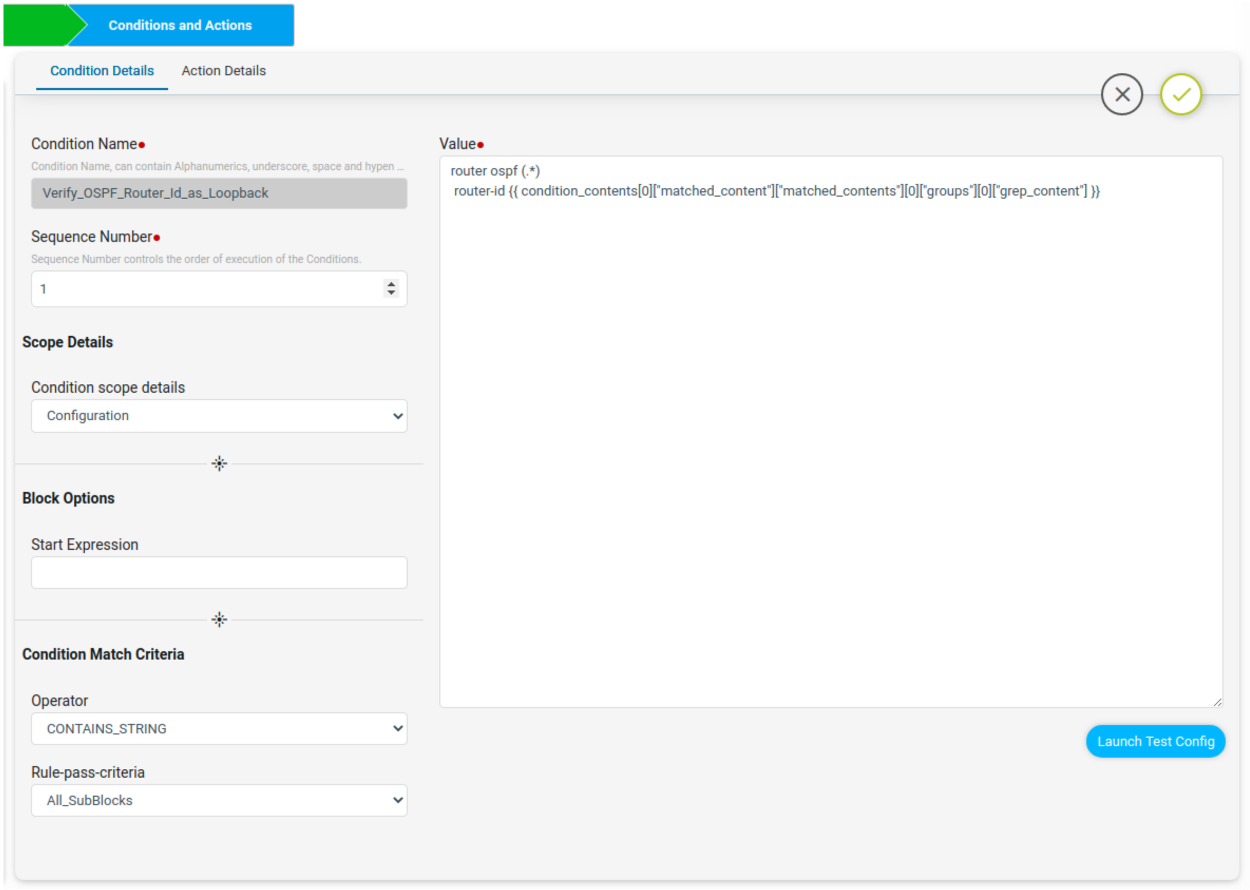
Violation message type: Default_violation_message

Fix CLI

Derive fix cli commands: Select

Condition2

The Verify_OSPF_Router_Id_as_Loopback condition will check whether the OSPF router id is the same as the first condtion's captured loopback0 ip address or not. if not matching then in fix-cli it will configure the OSPF router id with loopback0.



Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Verify_OSPF_Router_Id_as_Loopback

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details
Configuration

Block Options

Start Expression

Condition Match Criteria

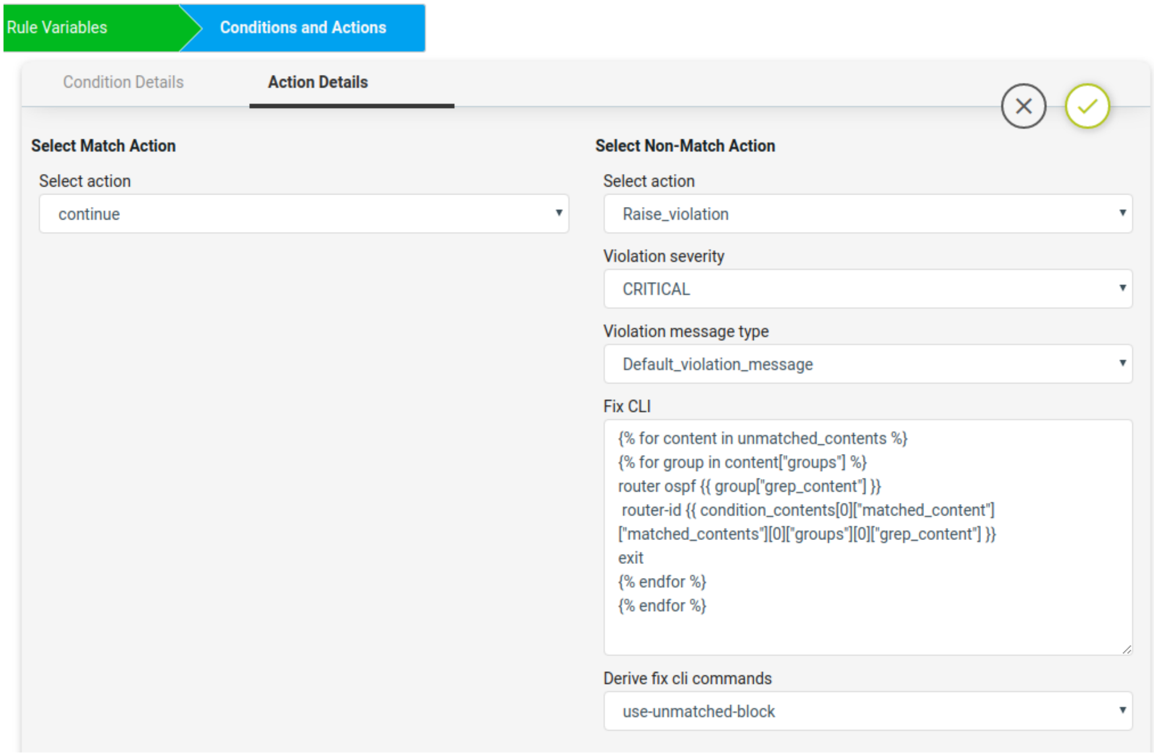
Operator
CONTAINS_STRING

Rule-pass-criteria
All_SubBlocks

Value•

```
router ospf (.*)
 router-id {{ condition_contents[0]["matched_content"]["matched_contents"][0]["groups"][0]["grep_content"] }}
```

On Match Action it will continue. On Non-Match Action it will use the jinja2 template configuration in fix-cli to configure the OSPF router id with loopback0 ip.



Select Match Action

Select action
continue

Select Non-Match Action

Select action
Raise_violation

Violation severity
CRITICAL

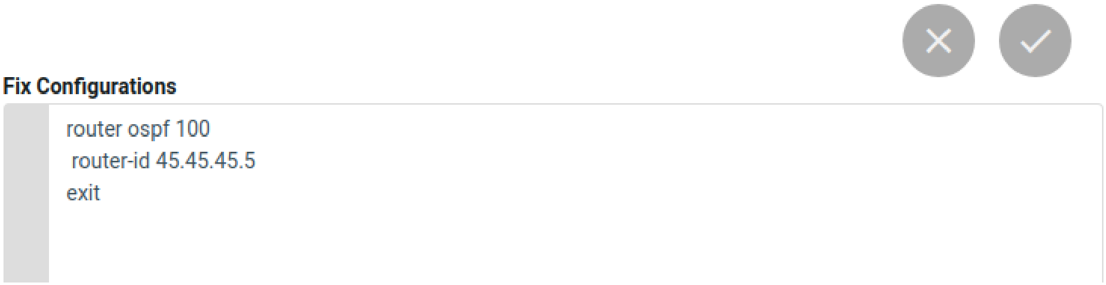
Violation message type
Default_violation_message

Fix CLI

```
{% for content in unmatched_contents %}
{% for group in content["groups"] %}
router ospf {{ group["grep_content"] }}
 router-id {{ condition_contents[0]["matched_content"]
["matched_contents"][0]["groups"][0]["grep_content"] }}
exit
{% endfor %}
{% endfor %}
```

Derive fix cli commands
use-unmatched-block

The Non-compliant device fix-cli configurations from the jinja2 template configuration is given below.



```
router ospf 100
 router-id 45.45.45.5
exit
```

Scenario 6: BGP TTL Hop-count

Scenario: All devices in the network should contain the network admin preferred BGP ttl-security hops. If hops is not configured on the device or mis-match with the network admin preferred ttl-security hops, ATOM CLI compliance can configure the devices with the user preferred hops.

In this example we are considering the ttl-security hops as 5.

Platform:

Cisco IOS-XE

Expected Configuration:

```
router bgp 65535
 bgp log-neighbor-changes
 neighbor 2.3.2.6 ttl-security hops 5
```

Fix-CLI Configuration:

```
router bgp 65535
 bgp log-neighbor-changes
 neighbor 2.3.2.6 ttl-security hops 5
```

This use case is using the regex and rule variables and contains two conditions.

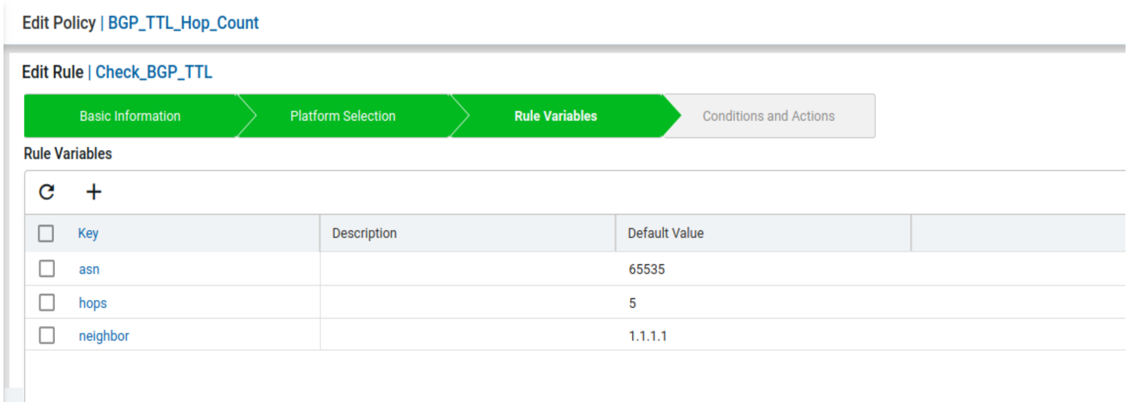
1. First condition is to match the block. It will not have a fix-cli configuration as the intention of the condition is to match the block.
   Fix-cli Configuration :
   << no fix cli configuration >>

2. Second condition will check whether the BGP ttl-security hops is in the first condition's matched block or not. if not matching in the block then it will configure the BGP hops.
   Fix-cli Configuration :

   ```
    router bgp 65535
      neighbor 2.3.2.6 ttl-security hops 5
   ```

Steps:

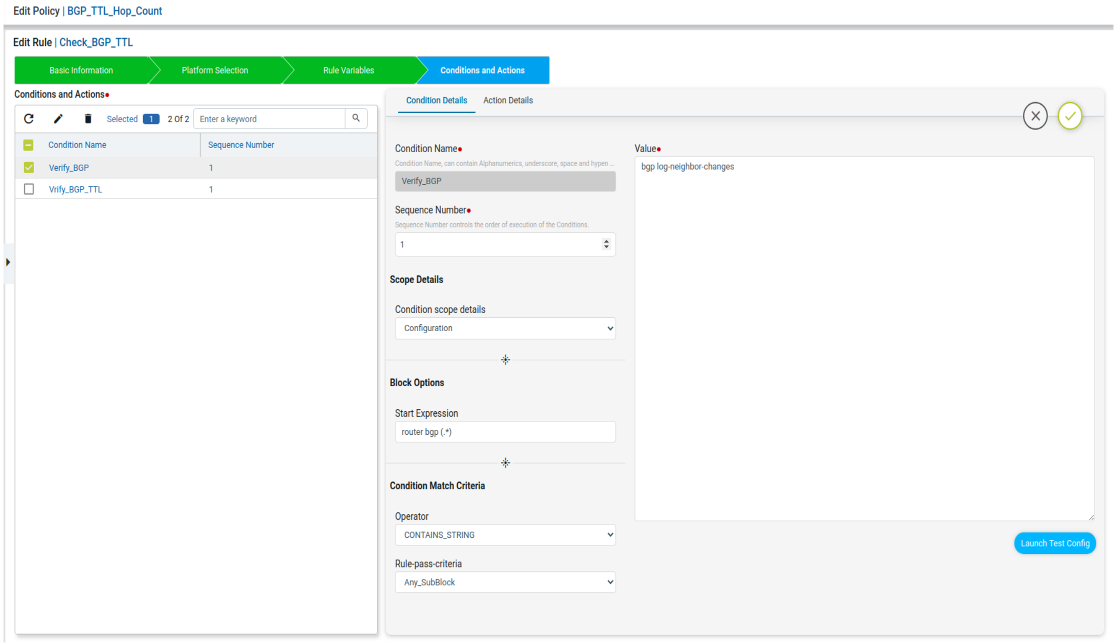
- Navigate to Resource Manager > Config Compliance -> Policies
- Click '+' to create new Policy and provide the following information
  - Policy Name - BGP_TTL_Hop_Count
  - Description
- Select the Policy and Click '+' to create new Rule
  - Rule Name - Check_BGP_TTL
- Navigate to Resource Manager > Config Compliance -> Policies -> Rules
- Select a Rule & Provide the following information
  - Vendor - Cisco Systems
  - OS type - IOSXE
  - Device Family - ALL
  - Device Type - ALL
  - OS Version - ALL
- Now create the Rule variables for this scenario.



	Key	Description	Default Value
□	asn		65535
□	hops		5
□	neighbor		1.1.1.1

Condition1

The first line "router bgp (.*)" to be written in the start Expression with regex to indicate the block starts with router bgp. The remaining configuration lines can be written in value.



Edit Policy | BGP_TTL_Hop_Count

Edit Rule | Check_BGP_TTL

Conditions and Actions

	Condition Name	Sequence Number
☑	Verify_BGP	1
□	Vrify_BGP_TTL	1

Condition Name: Verify_BGP (Condition Name, can contain Alphanumerics, underscore, space and hypen ...)

Sequence Number: 1 (Sequence Number controls the order of execution of the Conditions.)

Scope Details

Condition scope details: Configuration

Block Options

Start Expression: router bgp (.*)

Condition Match Criteria

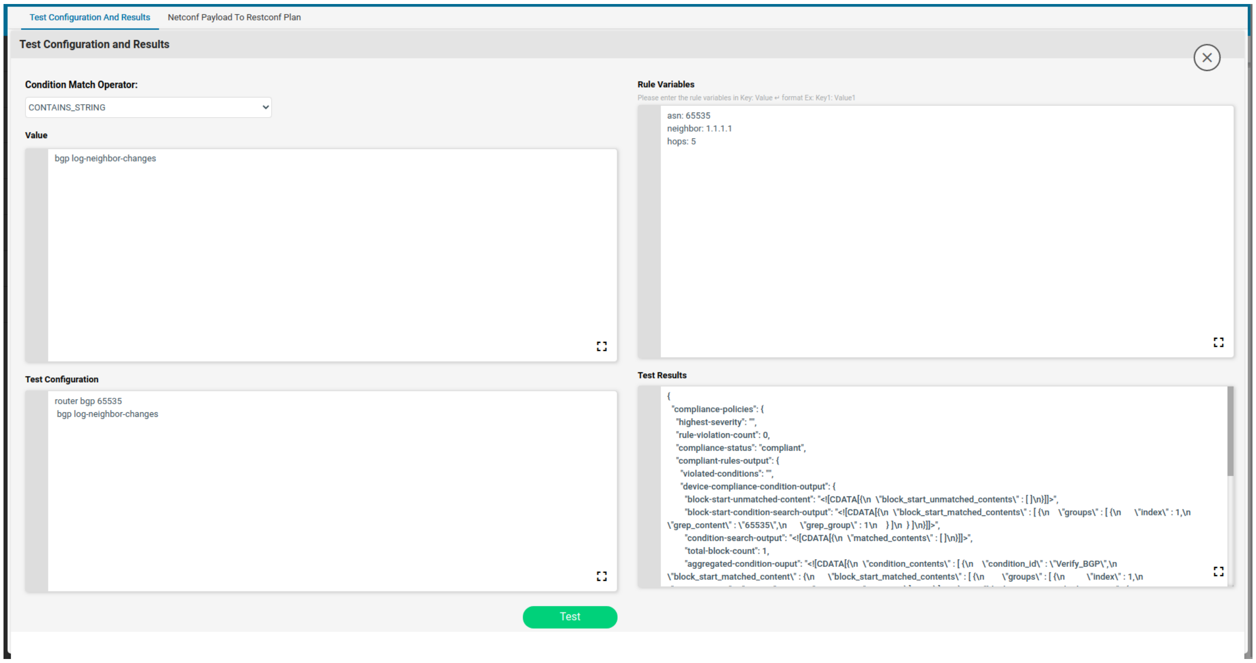
Operator: CONTAINS_STRING

Rule-pass-criteria: Any_SubBlock

Value: bgp log-neighbor-changes

On **Match Action** execution continues to the next condition. On **Non-Match Action** it will raise a violation and continue next condition. The "Fix-CLI" for the condition was written based on the test results obtained from "Launch Test Config".

When the start Expression is used the regex captured data will be stored in "condition_contents" of "aggregated-condition-ouput" in test results.



Test Configuration And Results
Netconf Payload To Restconf Plan

Test Configuration and Results

Condition Match Operator: CONTAINS_STRING

Value

```
bgp log-neighbor-changes
```

Rule Variables

Please enter the rule variables in Key: Value ↵ format Ex: Key1: Value1

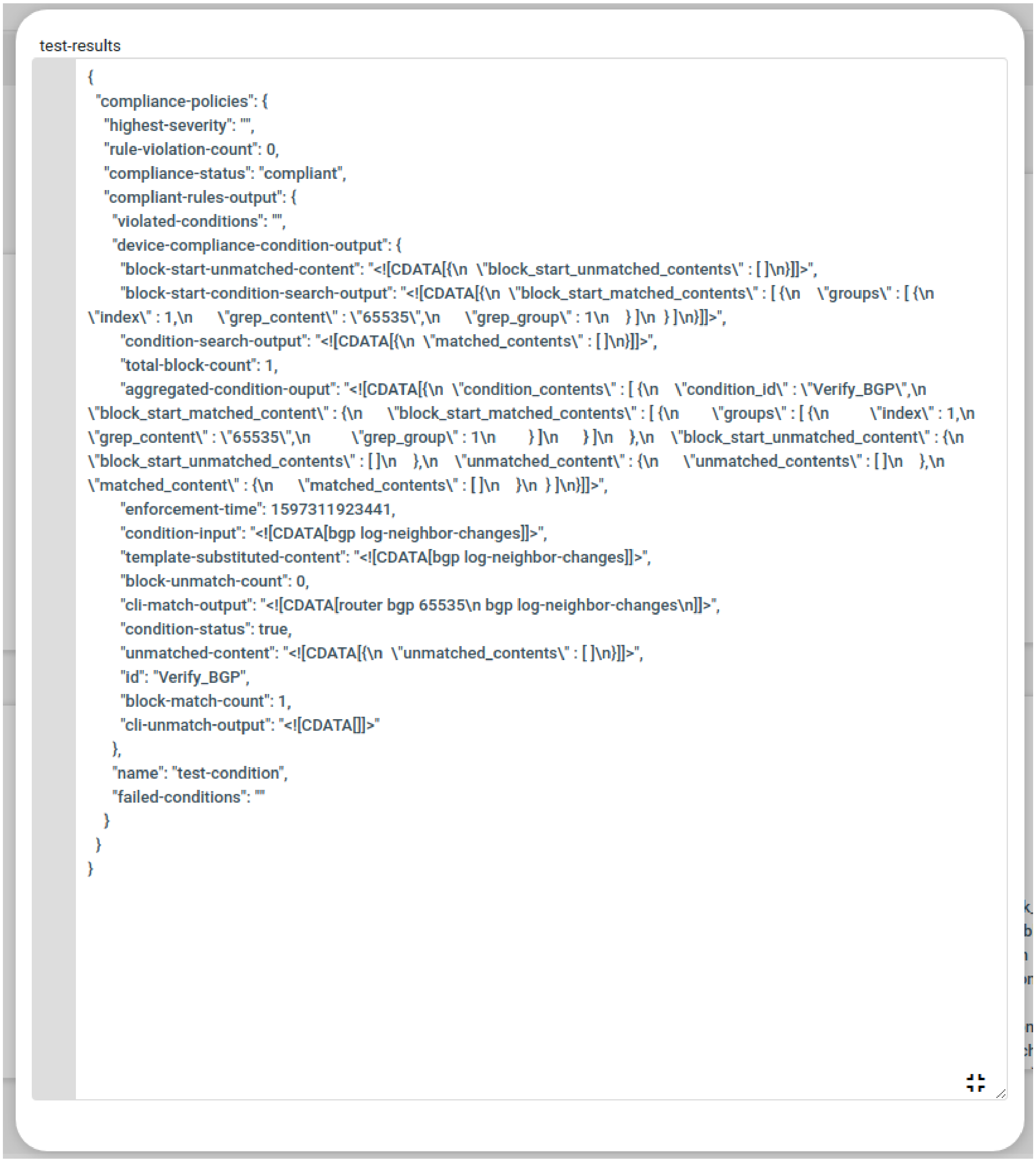
```
asn: 65535
neighbor: 1.1.1.1
hops: 5
```

Test Configuration

```
router bgp 65535
 bgp log-neighbor-changes
```

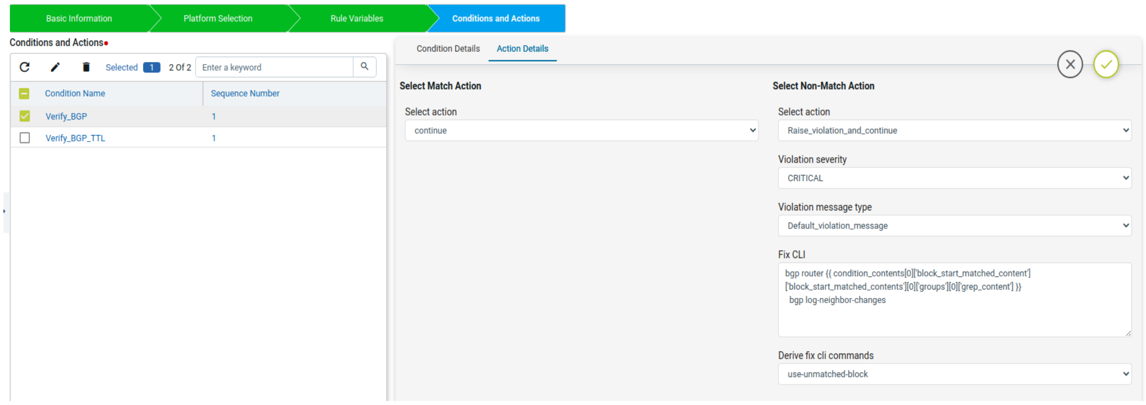
Test Results

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[{\n  \"block_start_unmatched_contents\" : [ ]\n}]]>",
    "block-start-condition-search-output": "<![CDATA[{\n  \"block_start_matched_contents\" : [ {\n    \"groups\" : [ {\n      \"index\" : 1,\n
\"grep_content\" : \"65535\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : \"Verify_BGP\",\n
\"block_start_matched_content\" : {\n      \"block_start_matched_contents\" : [ {\n        \"groups\" : [ {\n          \"index\" : 1,\n
```



test-results

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "compliance-status": "compliant",
  "compliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[{\n  \"block_start_unmatched_contents\" : [ ]\n}]]>",
    "block-start-condition-search-output": "<![CDATA[{\n  \"block_start_matched_contents\" : [ {\n    \"groups\" : [ {\n
\"index\" : 1,\n      \"grep_content\" : \"65535\",\n      \"grep_group\" : 1\n    } ]\n  } ]\n}]]>",
    "condition-search-output": "<![CDATA[{\n  \"matched_contents\" : [ ]\n}]]>",
    "total-block-count": 1,
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : \"Verify_BGP\",\n
\"block_start_matched_content\" : {\n      \"block_start_matched_contents\" : [ {\n        \"groups\" : [ {\n          \"index\" : 1,\n
\"grep_content\" : \"65535\",\n          \"grep_group\" : 1\n        } ]\n      } ]\n    },\n    \"block_start_unmatched_content\" : {\n
\"block_start_unmatched_contents\" : [ ]\n    },\n    \"unmatched_content\" : {\n      \"unmatched_contents\" : [ ]\n    },\n
\"matched_content\" : {\n      \"matched_contents\" : [ ]\n    }\n  } ]\n}]]>",
    "enforcement-time": 1597311923441,
    "condition-input": "<![CDATA[bgp log-neighbor-changes]]>",
    "template-substituted-content": "<![CDATA[bgp log-neighbor-changes]]>",
    "block-unmatch-count": 0,
    "cli-match-output": "<![CDATA[router bgp 65535\n bgp log-neighbor-changes\n]]>",
    "condition-status": true,
    "unmatched-content": "<![CDATA[{\n  \"unmatched_contents\" : [ ]\n}]]>",
    "id": "Verify_BGP",
    "block-match-count": 1,
    "cli-unmatch-output": "<![CDATA[]]>"
   },
   "name": "test-condition",
   "failed-conditions": ""
  }
 }
}
```



Conditions and Actions•

	Condition Name	Sequence Number
☑	Verify_BGP	1
□	Verify_BGP_TTL	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation_and_continue

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix CLI

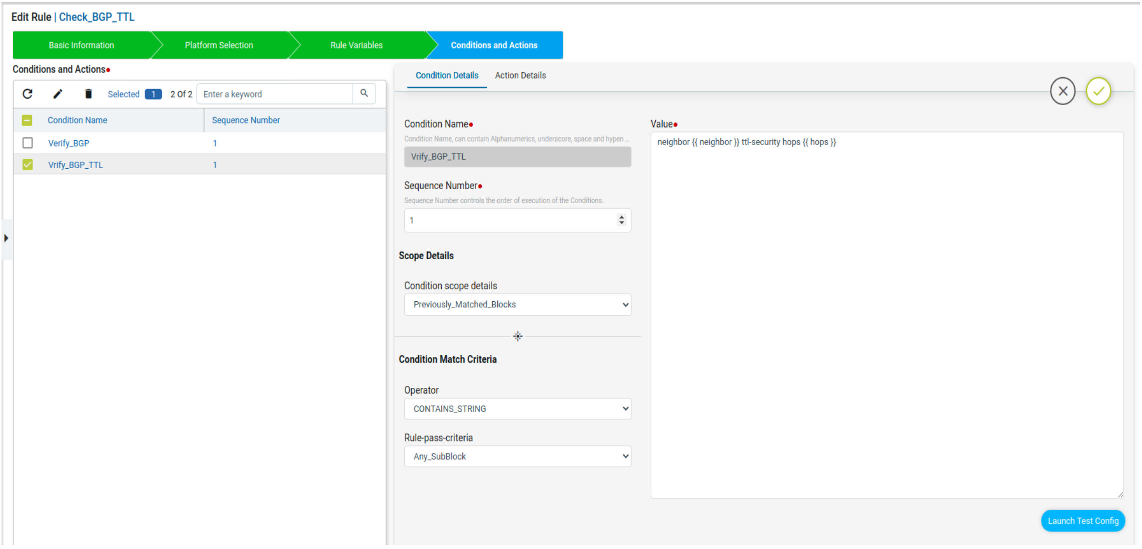
```
bgp router {{ condition_contents[0]['block_start_matched_content']
['block_start_matched_contents'][0]['groups'][0]['grep_content'] }}
 bgp log-neighbor-changes
```

Derive fix cli commands: use-unmatched-block

Condition2

The Verify_BGP_TTL condition will check whether the router bgp block config matched in the previous condition has the ttl-security hops or not. if not matching then in fix-cli it will configure the ttl-security hops.

This condition uses the **condition scope details** as **Previously_Matched_Blocks** to check on previous condition matched block.



Edit Rule | Check_BGP_TTL

Conditions and Actions•

	Condition Name	Sequence Number
□	Verify_BGP	1
☑	Vrify_BGP_TTL	1

Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Vrify_BGP_TTL

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Previously_Matched_Blocks

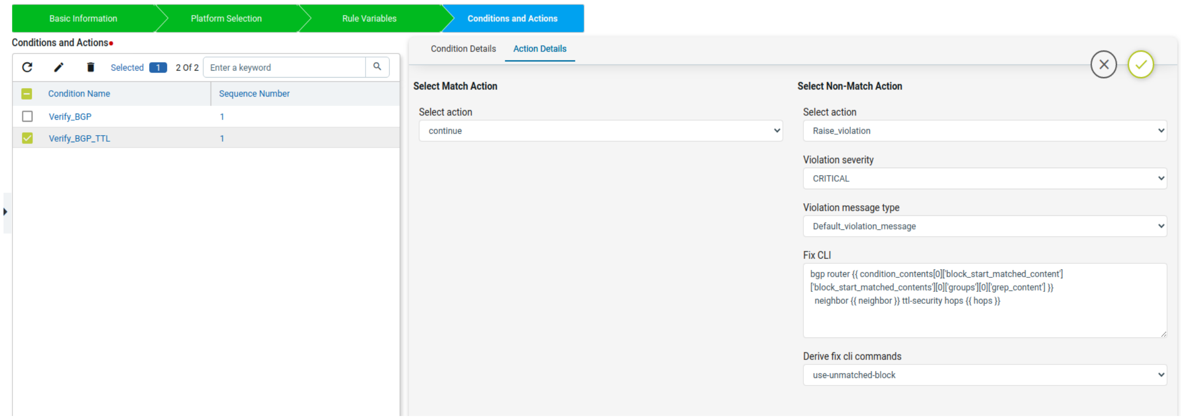
Condition Match Criteria

Operator: CONTAINS_STRING

Rule-pass-criteria: Any_SubBlock

Value•

```
neighbor {{ neighbor }} ttl-security hops {{ hops }}
```



☐	Condition Name	Sequence Number
☐	Verify_BGP	1
☑	Verify_BGP_TTL	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix CLI

```
bgp router {{ condition_contents[0]['block_start_matched_content']
['block_start_matched_contents'][0]['groups'][0]['grep_content'] }}
  neighbor {{ neighbor }} ttl-security hops {{ hops }}
```

Derive fix cli commands: use-unmatched-block

YANG Compliance

Note: In order to use Yang Compliance make sure that the config-snapshot is provided in the Credential profile, which lets ATOM to parse the configuration and store it. For more information on Credential profile please refer to credential profile section in ATOM User guide.

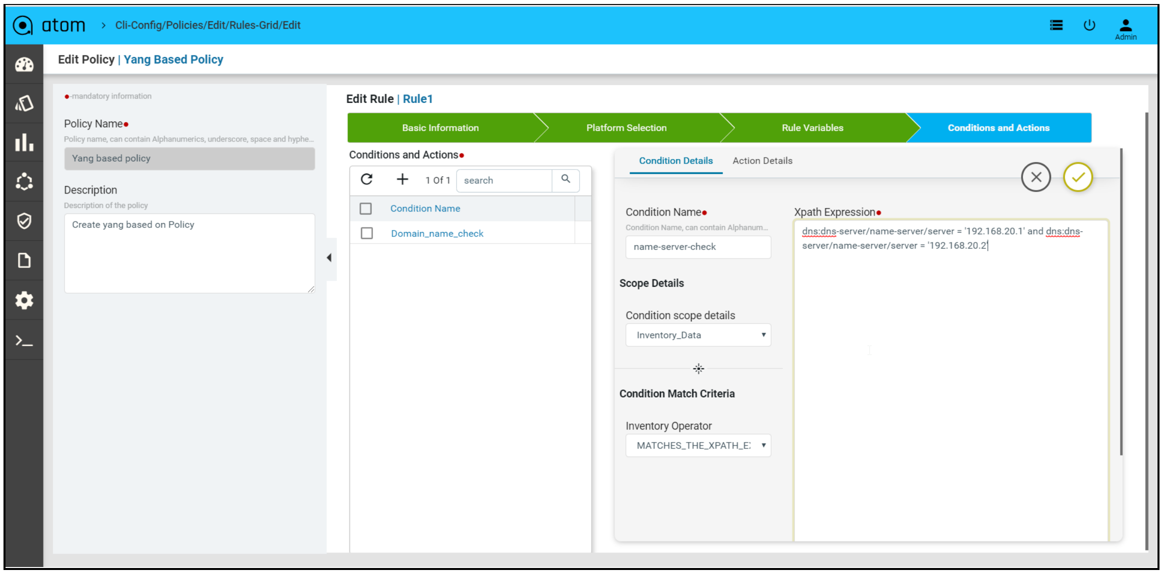
For Yang based Configuration Compliance, make sure to select the option of **Inventory_Data** for **Condition scope** during Compliance **Policy** creation. This gives two ways of defining the **Condition Match Criteria**

- Xpath Expressions
- XML Template Payload

Policy creation with Xpath Expressions

- Within **Condition Match Criteria** select “Matches_the_Xpath_Expression” /”Doesn’t_Matches_the_Xpath_Expression” option for **Inventory Operator** field
- The Fix Mutation Payload is in Netconf xml RPC format written using the XML template details for the yang parsed entities.

Navigate to Resource Manager > Config Compliance > Policy > + (Add Policies)



Edit Policy | Yang Based Policy

●-mandatory information

Policy Name●
Policy name, can contain Alphanumerics, underscore, space and hyphe...
Yang based policy

Description
Description of the policy
Create yang based on Policy

Edit Rule | Rule1

Conditions and Actions●

1 Of 1 search

	Condition Name
□	Domain_name_check

Condition Name●
Condition Name, can contain Alphanum...
name-server-check

Xpath Expression●
dns:dns-server/name-server/server = '192.168.20.1' and dns:dns-server/name-server/server = '192.168.20.2'

Scope Details

Condition scope details
Inventory_Data

Condition Match Criteria

Inventory Operator
MATCHES_THE_XPATH_E:

Few examples

Scenario 7: IP Domain Name

In this example we are looking for the domain name as **anutacorp.com** across all devices in the lab using X-path expression.

Xpath Expression:

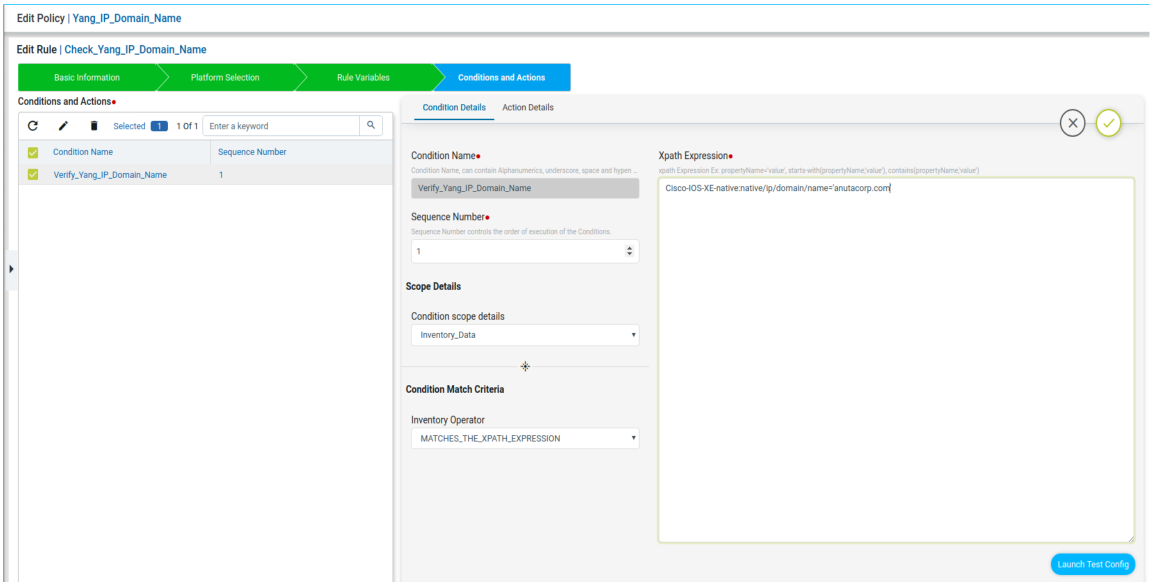
```
Cisco-IOS-XR-native:native/ip/domain/name=`anutacorp.com’
```

Fix Mutation Payload:

Note: we can use **ATOM_DEVICE_ID or inputDeviceId** for substituting the deviceId.

```
<config>
   <devices xmlns="http://anutanetworks.com/controller">
      <device>
          <id>{{ inputDeviceId }}</id>
          <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
             <ip>
                <domain nc:operation='create'>
                    <name>anutacorp.com</name>
                </domain>
             </ip>
          </native>
      </device>
   </devices>
</config>
```

Defining Xpath Expression



Edit Policy | Yang_IP_Domain_Name

Edit Rule | Check_Yang_IP_Domain_Name

Conditions and Actions•

Condition Name	Sequence Number
Verify_Yang_IP_Domain_Name	1

Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Verify_Yang_IP_Domain_Name

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Inventory_Data

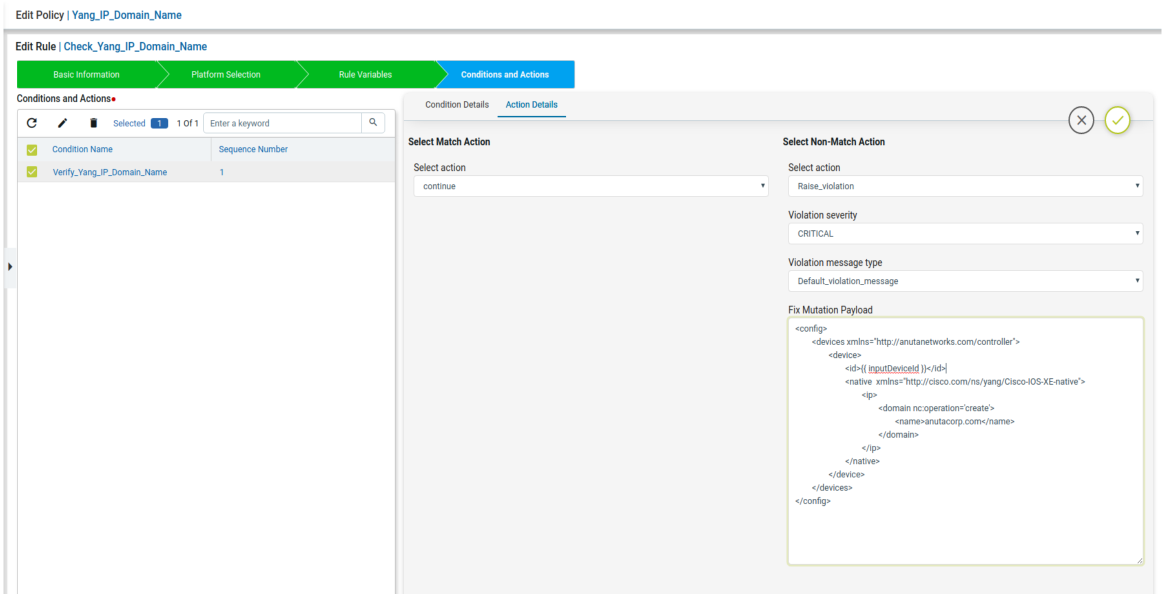
Condition Match Criteria

Inventory Operator: MATCHES_THE_XPATH_EXPRESSION

Xpath Expression•
xpath Expression Ex: propertyName='value', starts-with(propertyName,'value'), contains(propertyName,'value')

```
Cisco-IOS-XE-native:native/ip/domain/name='anutacorp.com'
```

Defining Fix Payload



Edit Policy | Yang_IP_Domain_Name

Edit Rule | Check_Yang_IP_Domain_Name

Conditions and Actions•

Condition Name	Sequence Number
Verify_Yang_IP_Domain_Name	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

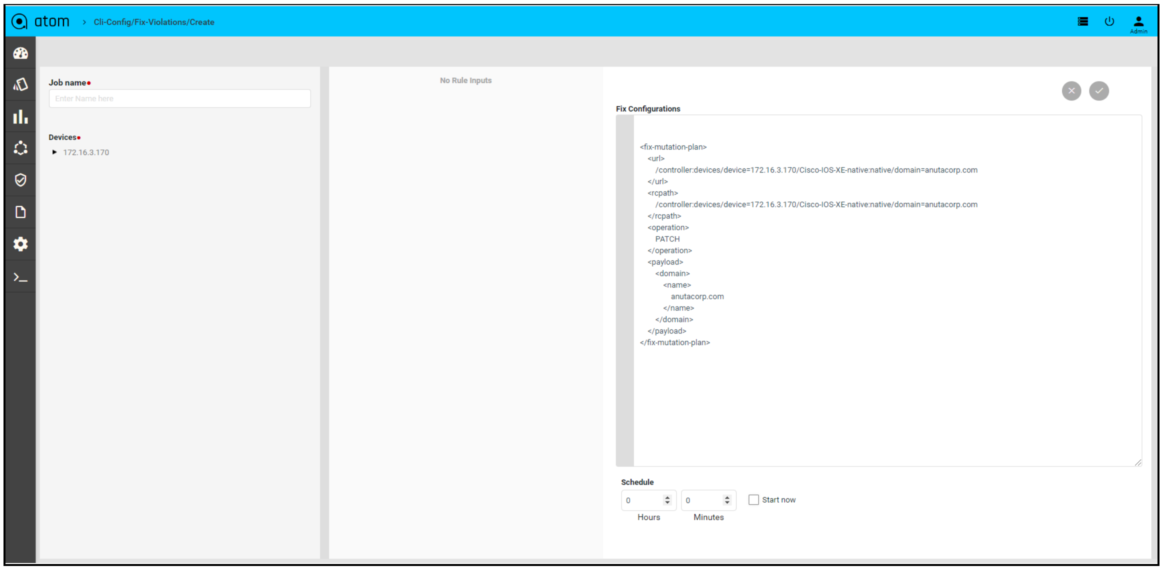
Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
    <devices xmlns="http://anutanetworks.com/controller">
        <device>
            <id>{{ inputDeviceId }}</id>
            <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <ip>
                    <domain nc:operation='create'>
                        <name>anutacorp.com</name>
                    </domain>
                </ip>
            </native>
        </device>
    </devices>
</config>
```

Fix Configuration Display in Remediation



```
<fix-mutation-plan>
  <url>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/domain=anutacorp.com
  </url>
  <rcpath>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/domain=anutacorp.com
  </rcpath>
  <operation>
    PATCH
  </operation>
  <payload>
    <domain>
      <name>
        anutacorp.com
      </name>
    </domain>
  </payload>
</fix-mutation-plan>
```

Schedule

Hours: 0

Minutes: 0

☐ Start now

Scenario 8: IP Name-server check

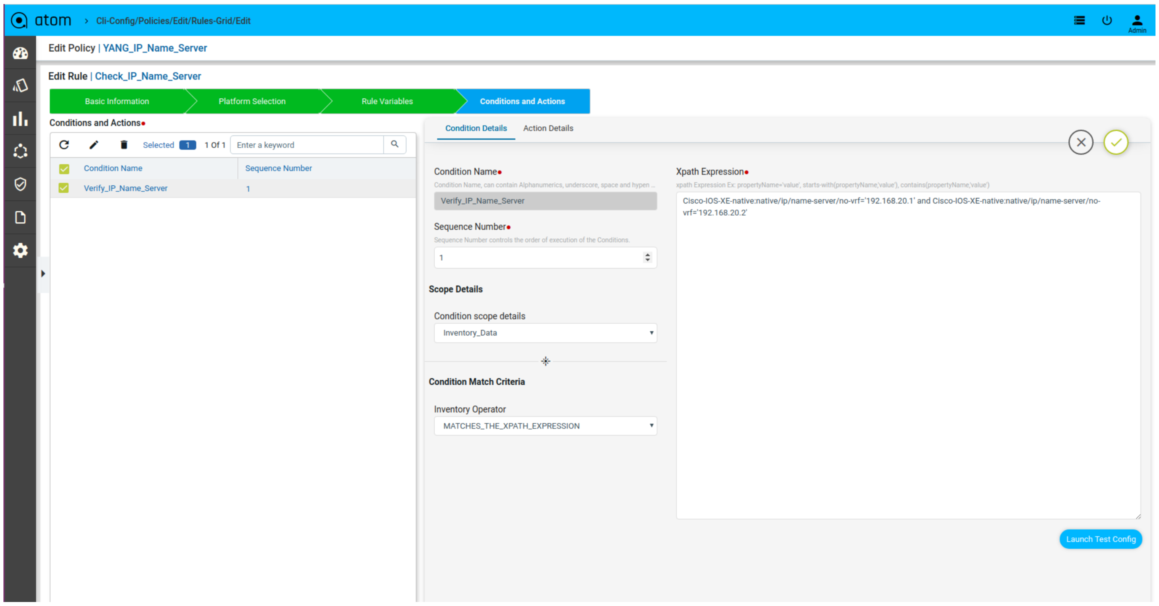
Xpath Expression:

```
Cisco-IOS-XE-native:native/ip/name-server/no-vrf='192.168.20.1' and
Cisco-IOS-XE-native:native/ip/name-server/no-vrf='192.168.20.2'
```

Fix Mutation Payload:

```
<config>
    <devices xmlns="http://anutanetworks.com/controller">
        <device>
            <id>{{ inputDeviceId }}</id>
            <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <ip>
                    <name-server nc:operation='create'>
                        <no-vrf>192.168.20.1</no-vrf>
                        <no-vrf>192.168.20.2</no-vrf>
                    </name-server>
                </ip>
            </native>
        </device>
    </devices>
</config>
```

Defining Xpath Expression



Edit Policy | YANG_IP_Name_Server

Edit Rule | Check_IP_Name_Server

Conditions and Actions

Condition Name	Sequence Number
Verify_IP_Name_Server	1

Condition Name: Verify_IP_Name_Server

Sequence Number: 1

Scope Details

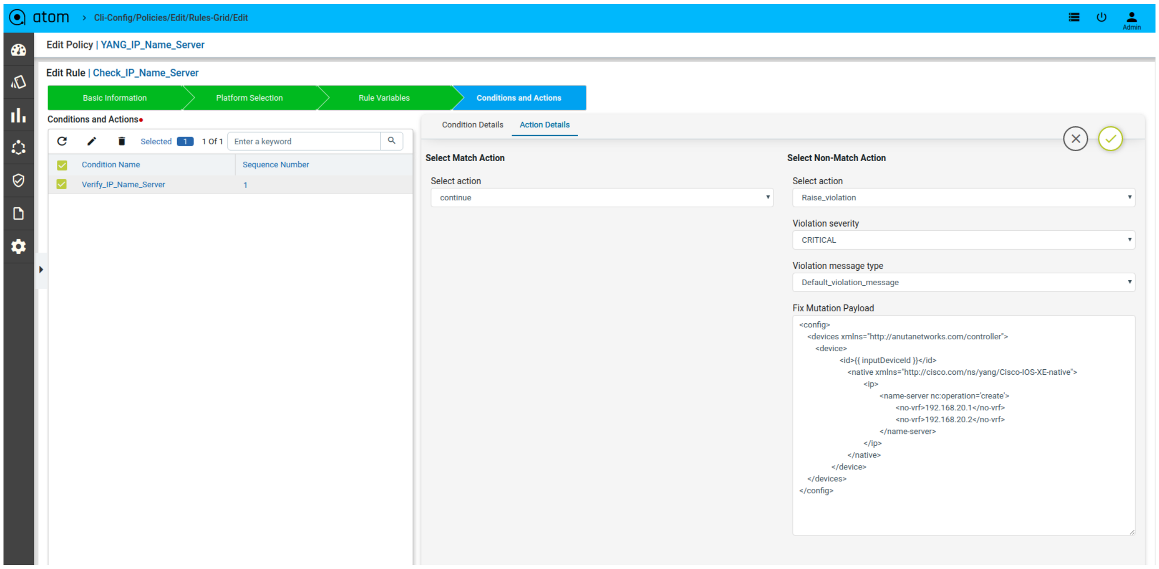
Condition scope details: Inventory_Data

Condition Match Criteria

Inventory Operator: MATCHES_THE_XPATH_EXPRESSION

Xpath Expression: Cisco-IOS-XE-native:native/ip/name-server/no-vrf='192.168.20.1' and Cisco-IOS-XE-native:native/ip/name-server/no-vrf='192.168.20.2'

Defining Fix Payload



Edit Policy | YANG_IP_Name_Server

Edit Rule | Check_IP_Name_Server

Conditions and Actions

Condition Name	Sequence Number
Verify_IP_Name_Server	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
   <devices xmlns="http://anutanetworks.com/controller">
      <device>
            <id>{{ inputDeviceId }}</id>
               <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                     <ip>
                           <name-server nc:operation='create'>
                                 <no-vrf>192.168.20.1</no-vrf>
                                 <no-vrf>192.168.20.2</no-vrf>
                           </name-server>
                     </ip>
               </native>
         </device>
   </devices>
</config>
```

Scenario 9 : NTP server Check

Xpath Expression:

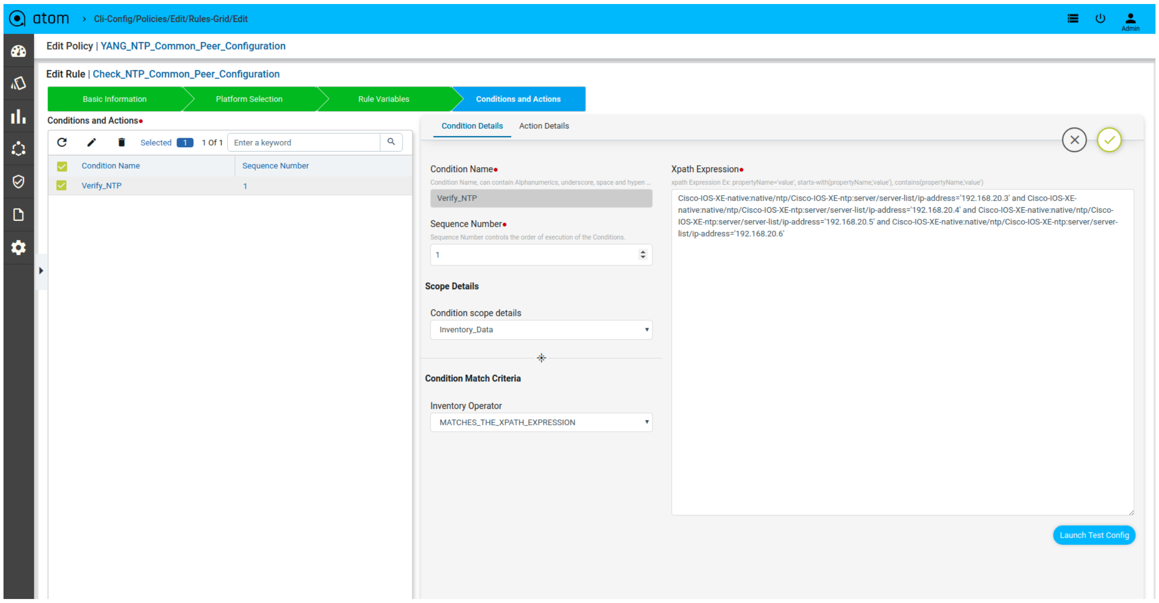
```
Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.3' and
Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.4' and
Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.5' and
```

```
Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.6'
```

Fix Mutation Payload:

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    <device>
      <id>{{ inputDeviceId }}</id>
        <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
          <ntp>
            <server nc:operation="create">
              <server-list>
                <ip-address>192.168.20.3</ip-address>
              </server-list>
              <server-list>
                <ip-address>192.168.20.4</ip-address>
              </server-list>
              <server-list>
                <ip-address>192.168.20.5</ip-address>
              </server-list>
              <server-list>
                <ip-address>192.168.20.6</ip-address>
              </server-list>
            </server>
          </ntp>
        </native>
    </device>
  </devices>
</config>
```

Defining Xpath Expression



Edit Policy | YANG_NTP_Common_Peer_Configuration

Edit Rule | Check_NTP_Common_Peer_Configuration

Conditions and Actions

Condition Name	Sequence Number
Verify_NTP	1

Condition Name: Verify_NTP

Sequence Number: 1

Scope Details

Condition scope details: Inventory_Data

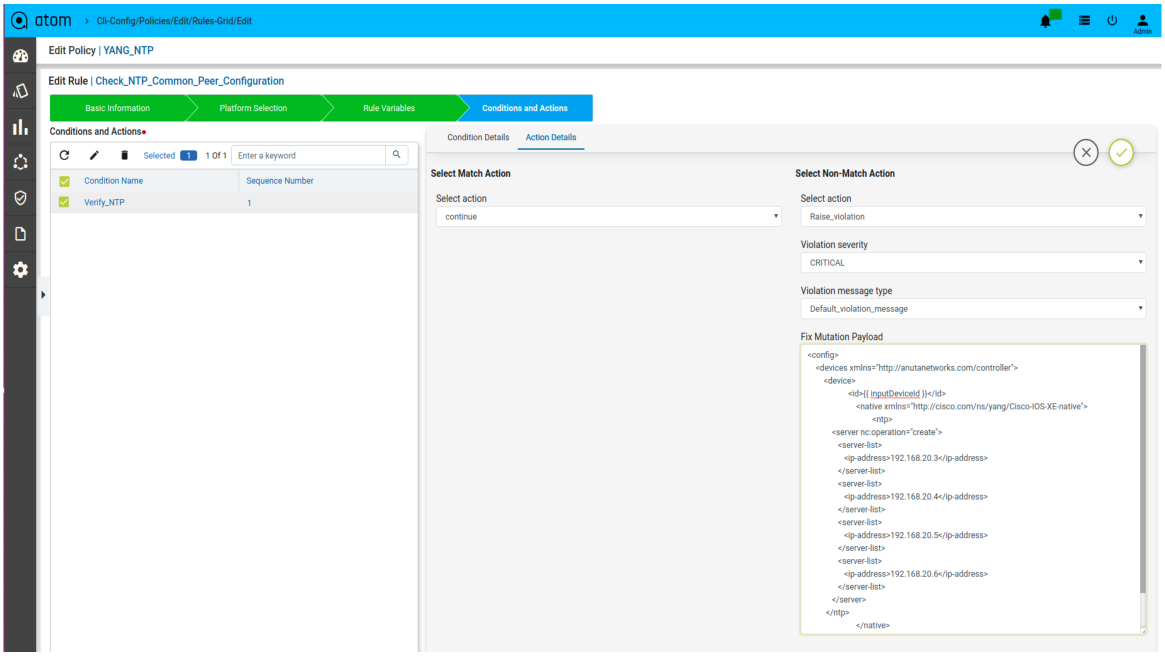
Condition Match Criteria

Inventory Operator: MATCHES_THE_XPATH_EXPRESSION

Xpath Expression:

```
Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.3' and Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.4' and Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.5' and Cisco-IOS-XE-native:native/ntp/Cisco-IOS-XE-ntp:server/server-list/ip-address='192.168.20.6'
```

Defining Fix Payload



Edit Policy | YANG_NTP

Edit Rule | Check_NTP_Common_Peer_Configuration

Conditions and Actions

Condition Name	Sequence Number
Verify_NTP	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    <device>
          <id>{{ inputDeviceId }}</id>
            <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <ntp>
      <server nc:operation="create">
        <server-list>
          <ip-address>192.168.20.3</ip-address>
        </server-list>
        <server-list>
          <ip-address>192.168.20.4</ip-address>
        </server-list>
        <server-list>
          <ip-address>192.168.20.5</ip-address>
        </server-list>
        <server-list>
          <ip-address>192.168.20.6</ip-address>
        </server-list>
      </server>
    </ntp>
            </native>
```

Scenario 10 : Interface Check with rule_variable

Xpath Expression:

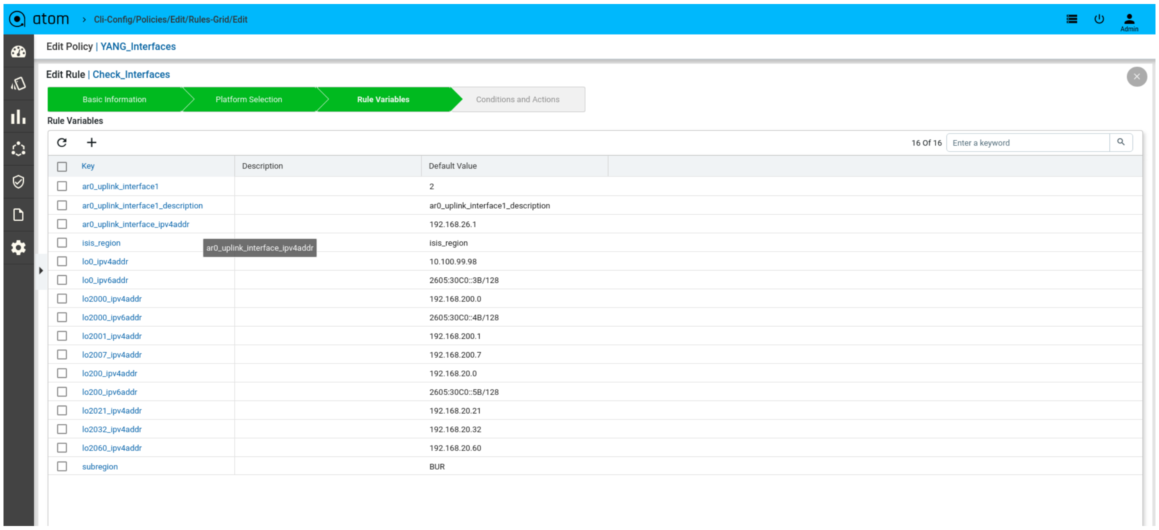
```
Cisco-IOS-XE-native:native/interface/Loopback/name='0' and
Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ip/address/primary/address=
'{{ lo0_ipv4addr }}' and
```

```
Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ip/address/primary/mask='255.255.255.255' and
Cisco-IOS-XE-native:native/interface/Loopback[name=0]/ipv6/address/prefix-list/prefix='{{ lo0_ipv6addr }}'
```

Fix Mutation Payload:

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    <device>
       <id>{{ inputDeviceId }}</id>
         <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
              <interface>
                <Loopback nc:operation="create">
                  <ip>
                    <address>
                      <primary>
                        <address>10.100.99.98</address>
                        <mask>255.255.255.255</mask>
                      </primary>
                    </address>
                  </ip>
                  <ipv6>
                    <address>
                      <prefix-list>
                        <prefix>2605:30C0::3B/128</prefix>
                      </prefix-list>
                    </address>
                  </ipv6>
                  <name>0</name>
                </Loopback>
             </interface>
          </native>
       </device>
  </devices>
</config>
```

Defining Rule Variables



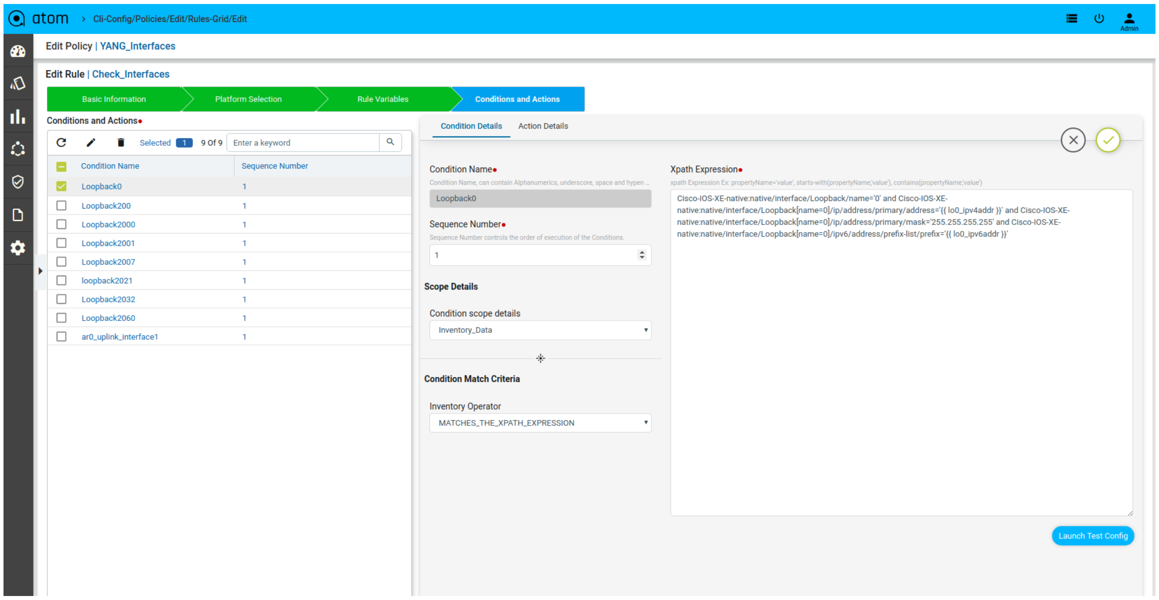
Edit Policy | YANG_Interfaces

Edit Rule | Check_Interfaces

Rule Variables

	Key	Description	Default Value
□	ar0_uplink_interface1		2
□	ar0_uplink_interface1_description		ar0_uplink_interface1_description
□	ar0_uplink_interface_ipv4addr		192.168.26.1
□	isis_region		isis_region
□	lo0_ipv4addr		10.100.99.98
□	lo0_ipv6addr		2605:30C0::3B/128
□	lo2000_ipv4addr		192.168.200.0
□	lo2000_ipv6addr		2605:30C0::4B/128
□	lo2001_ipv4addr		192.168.200.1
□	lo2007_ipv4addr		192.168.200.7
□	lo200_ipv4addr		192.168.20.0
□	lo200_ipv6addr		2605:30C0::5B/128
□	lo2021_ipv4addr		192.168.20.21
□	lo2032_ipv4addr		192.168.20.32
□	lo2060_ipv4addr		192.168.20.60
□	subregion		BUR

Defining Xpath Expression



Edit Policy | YANG_Interfaces

Edit Rule | Check_Interfaces

Conditions and Actions

	Condition Name	Sequence Number
☑	Loopback0	1
□	Loopback200	1
□	Loopback2000	1
□	Loopback2001	1
□	Loopback2007	1
□	loopback2021	1
□	Loopback2032	1
□	Loopback2060	1
□	ar0_uplink_interface1	1

Condition Name

Condition Name, can contain Alphanumerics, underscore, space and hypen ...

Loopback0

Sequence Number

Sequence Number controls the order of execution of the Conditions.

1

Scope Details

Condition scope details: Inventory_Data

Condition Match Criteria

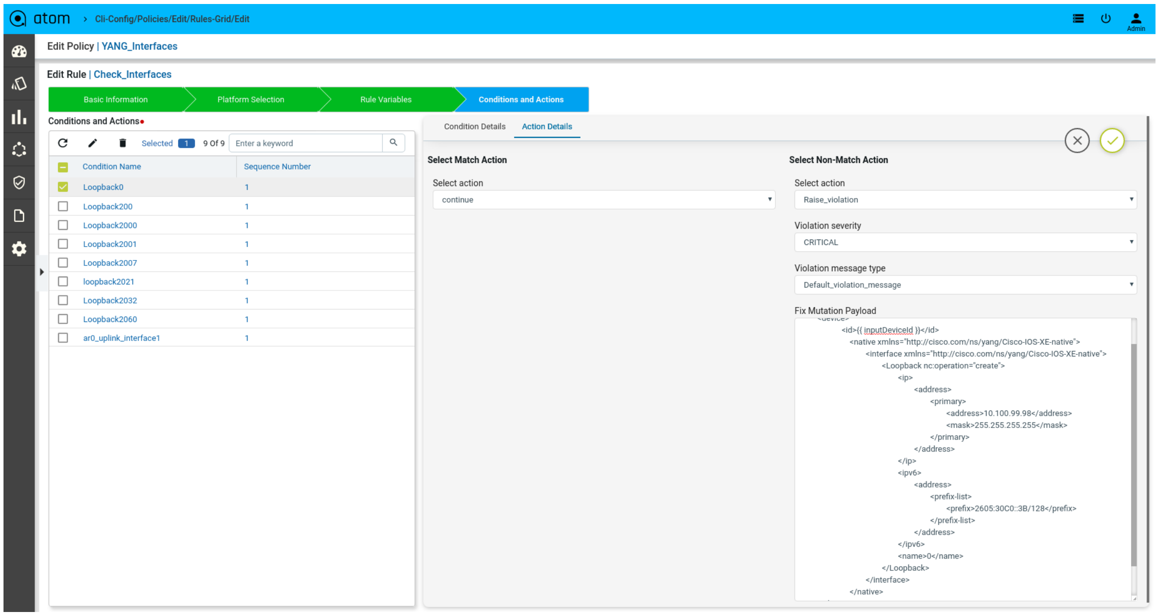
Inventory Operator: MATCHES_THE_XPATH_EXPRESSION

Xpath Expression

xpath Expression Ex: propertyName='value', starts-with(propertyName,'value'), contains(propertyName,'value')

```
Cisco-IOS-XE-native:native/interface/Loopback/name='0' and Cisco-IOS-XE-
native:native/interface/Loopback[name=0]/ip/address/primary/address='{{ lo0_ipv4addr }}' and Cisco-IOS-XE-
native:native/interface/Loopback[name=0]/ip/address/primary/mask='255.255.255.255' and Cisco-IOS-XE-
native:native/interface/Loopback[name=0]/ipv6/address/prefix-list/prefix='{{ lo0_ipv6addr }}'
```

Defining Fix Payload



Edit Policy | YANG_Interfaces

Edit Rule | Check_Interfaces

Conditions and Actions•

	Condition Name	Sequence Number
☑	Loopback0	1
□	Loopback200	1
□	Loopback2000	1
□	Loopback2001	1
□	Loopback2007	1
□	loopback2021	1
□	Loopback2032	1
□	Loopback2060	1
□	ar0_uplink_interface1	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
    <device>
        <id>{{ inputDeviceId }}</id>
         <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
            <interface xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <Loopback nc:operation="create">
                    <ip>
                        <address>
                            <primary>
                                <address>10.100.99.98</address>
                                <mask>255.255.255.255</mask>
                            </primary>
                        </address>
                    </ip>
                    <ipv6>
                        <address>
                            <prefix-list>
                                <prefix>2605:30C0::3B/128</prefix>
                            </prefix-list>
                        </address>
                    </ipv6>
                    <name>0</name>
                </Loopback>
            </interface>
         </native>
```

Scenario 11 : VRF Check with rule_variable

Xpath Expression:

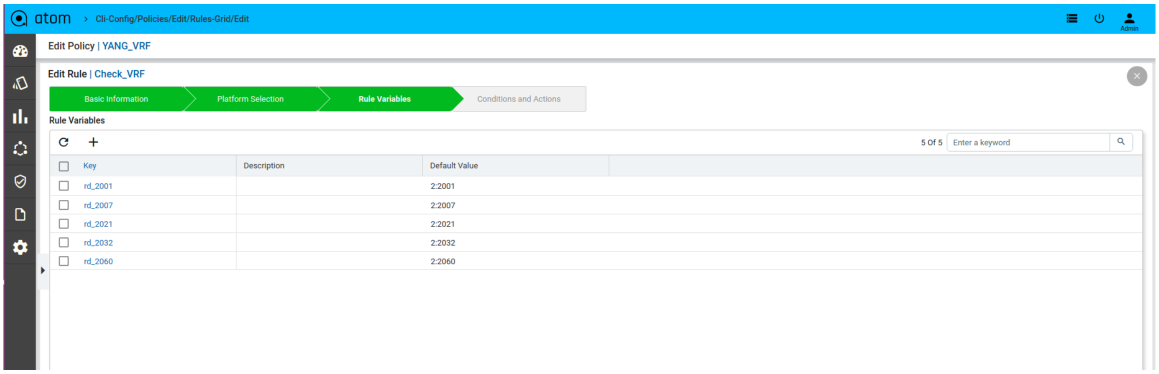
```
Cisco-IOS-XE-native:native/vrf/definition/name='LON2001' and
Cisco-IOS-XE-native:native/vrf/definition/rd='{{ rd_2001 }}' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/mdt/default/address=239.232.0.1' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/mdt/data/multicast/address='239.232.1.0' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/mdt/data/multicast/wildcard='0.0.0.255' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/route-target/export/asn-ip='2:2001' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/route-target/import/asn-ip='2:2001'
```

Fix Mutation Payload:

```
<config>
    <devices xmlns="http://anutanetworks.com/controller">
        <device>
            <id>{{ inputDeviceId }}</id>
            <native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <vrf>
                    <definition nc:operation="create">
```

```
          <rd>2:2001</rd>
          <name>LON2001</name>
          <address-family>
            <ipv4>
              <route-target>
                <export>
                  <asn-ip>2:2001</asn-ip>
                </export>
                <import>
                  <asn-ip>2:2001</asn-ip>
                </import>
              </route-target>
              <mdt>
                <default>
                  <address>239.232.0.1</address>
                </default>
                <data>
                  <multicast>
                    <address>239.232.1.0</address>
                    <wildcard>0.0.0.255</wildcard>
                  </multicast>
               </data>
             </mdt>
           </ipv4>
         </address-family>
       </definition>
     </vrf>
    </native>
    </device>
  </devices>
</config>
```

Defining Rule Variables



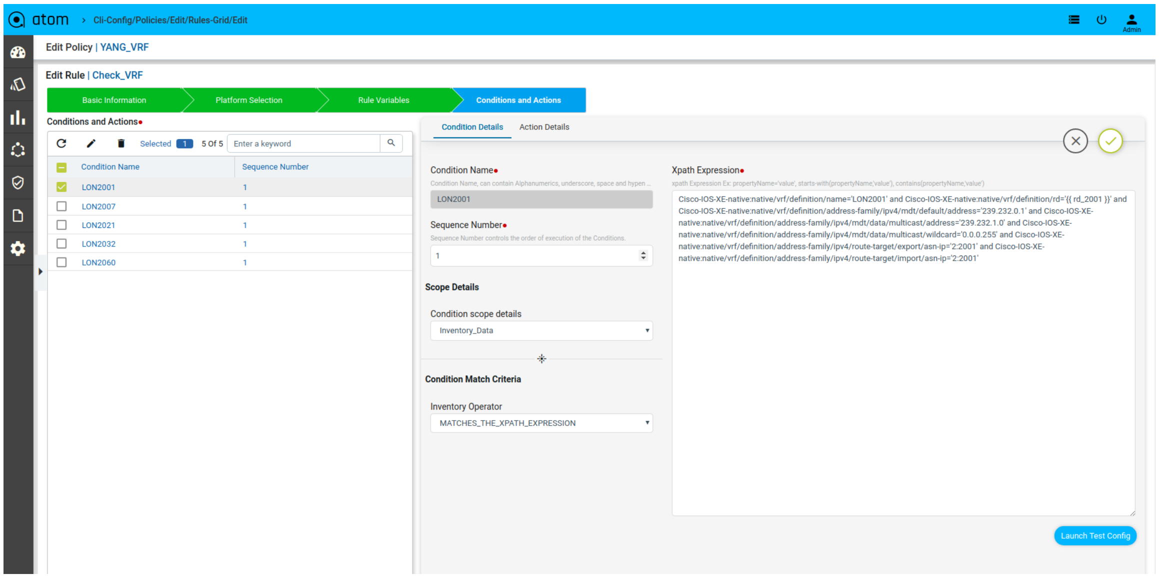
Edit Policy | YANG_VRF

Edit Rule | Check_VRF

Rule Variables

	Key	Description	Default Value
□	rd_2001		2:2001
□	rd_2007		2:2007
□	rd_2021		2:2021
□	rd_2032		2:2032
□	rd_2060		2:2060

Defining Xpath Expression



Edit Policy | YANG_VRF

Edit Rule | Check_VRF

Conditions and Actions•

	Condition Name	Sequence Number
☑	LON2001	1
□	LON2007	1
□	LON2021	1
□	LON2032	1
□	LON2060	1

Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
LON2001

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details
Inventory_Data

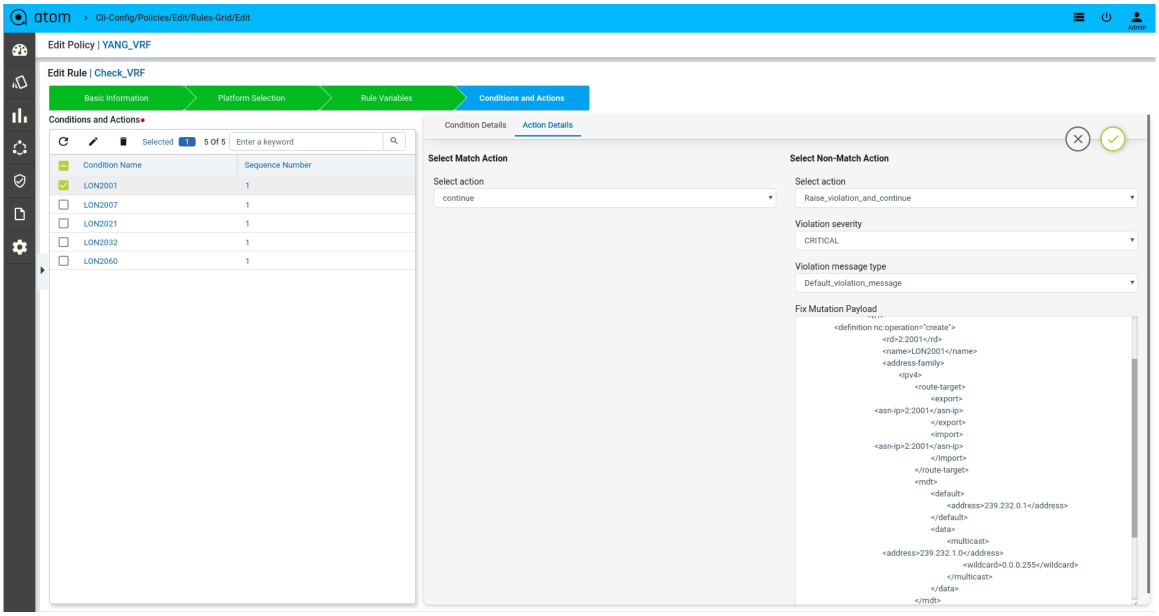
Condition Match Criteria

Inventory Operator
MATCHES_THE_XPATH_EXPRESSION

Xpath Expression•
xpath Expression Ex: propertyName='value', starts-with(propertyName,'value'), contains(propertyName,'value')

```
Cisco-IOS-XE-native:native/vrf/definition/name='LON2001' and Cisco-IOS-XE-native:native/vrf/definition/rd='{{ rd_2001 }}' and
Cisco-IOS-XE-native:native/vrf/definition/address-family/ipv4/mdt/default/address='239.232.0.1' and Cisco-IOS-XE-
native:native/vrf/definition/address-family/ipv4/mdt/data/multicast/address='239.232.1.0' and Cisco-IOS-XE-
native:native/vrf/definition/address-family/ipv4/mdt/data/multicast/wildcard='0.0.0.255' and Cisco-IOS-XE-
native:native/vrf/definition/address-family/ipv4/route-target/export/asn-ip='2:2001' and Cisco-IOS-XE-
native:native/vrf/definition/address-family/ipv4/route-target/import/asn-ip='2:2001'
```

Defining Fix Payload



Edit Policy | YANG_VRF

Edit Rule | Check_VRF

Conditions and Actions•

	Condition Name	Sequence Number
☑	LON2001	1
□	LON2007	1
□	LON2021	1
□	LON2032	1
□	LON2060	1

Select Match Action

Select action
continue

Select Non-Match Action

Select action
Raise_violation_and_continue

Violation severity
CRITICAL

Violation message type
Default_violation_message

Fix Mutation Payload

```
    <definition nc:operation="create">
            <rd>2:2001</rd>
            <name>LON2001</name>
            <address-family>
               <ipv4>
                  <route-target>
                     <export>
          <asn-ip>2:2001</asn-ip>
                     </export>
                     <import>
          <asn-ip>2:2001</asn-ip>
                     </import>
                  </route-target>
                  <mdt>
                     <default>
                        <address>239.232.0.1</address>
                     </default>
                     <data>
                        <multicast>
            <address>239.232.1.0</address>
                           <wildcard>0.0.0.255</wildcard>
                        </multicast>
                     </data>
                  </mdt>
```

- **Snmp-string with rule_variable :** basicDeviceConfigs:snmp/snmp-community-list/snmp-string = "{{ community }}"
- **Logical A|B :** starts-with(vendor-string,'Cisco') or contains(device-family-string,'Cisco 800')
- **Logical A&B :** starts-with(vendor-string,'Cisco') and contains(device-family-string,'Cisco 800')
- **Logical A&(B|C)** : contains(vendor-string,'Cisco Systems') and (contains(device-family-string,'Cisco 800') or contains(device-family-string,'Cisco CSR 1000V'))
- **Logical A&(B|(C&D))** : contains(interface:interfaces/interface/if-name,'GigabitEthernet1') and (contains(os-version,'15.6(1)S') or (contains(vendor-string,'Cisco Systems') and contains(device-family-string,'Cisco CSR 1000V')))
- **Logical not(A&B)** : not(contains(basicDeviceConfigs:local-credentials/local-credential/name , 'admin') and contains(basicDeviceConfigs:local-credentials/local-credential/name , 'cisco'))

How to derive the X-path expressions

There can be two ways by which you can derive the X-path expressions

- Navigate to the Device profile page to get the X-path Expression Details for the yang parsed entities

  Resource Manager → Devices → Select a Device → Configuration → Config Data → Entities → Select Entity

  For Example: If we want to write xpath expression for VRF name to match as “**anuta**”, then below is how condition needs to be written

  l3features:vrfs/vrf/name = ‘anuta’

  l3features:vrfs/vrf : **This is x-path derived based on model under device**

  name : **Attribute of vrf name**.
- Navigate to **Schema Browser** to see all yang models under path /controller:devices/device

Policy creation with XML Template Payload

- Within **Condition Match Criteria** select “Matches_the_template_payload” /”Doesn’t_matches_the_template_payload” option for **Inventory Operator** field

- The Fix Mutation Payload is a Jinja2 template configuration in Netconf xml RPC format written using the unmatched content from the test results tab.

Navigate to Resource Manager > Config Compliance > Policy > + (Add Policies)

Few examples

Scenario 12 : IP Domain name check

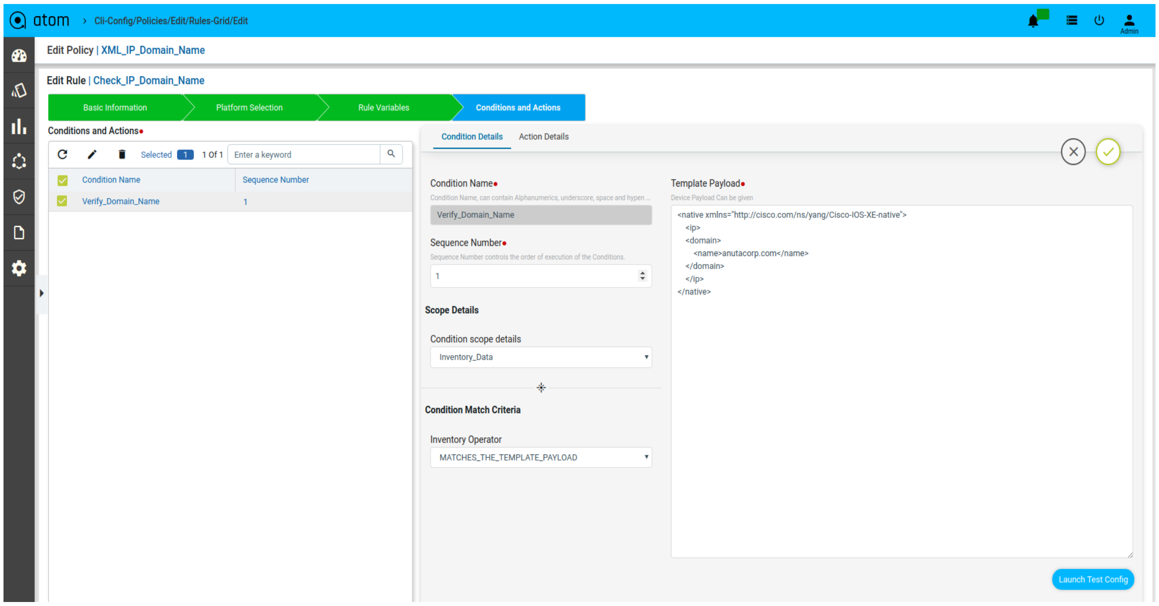
Template Payload:

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <ip>
    <domain>
       <name>net.disney.com</name>
    </domain>
  </ip>
</native>
```

Fix Mutation Payload :

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    {% for content in unmatched -%}
    {% for device in content["controller:devices"]["device"] -%}
    <device>
      <id>{{ device["id"] }}</id>
      <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
        <ip>
          <domain nc:operation='create'>
            <name>{{ device['Cisco-IOS-XE-native:native']['ip']['domain']['name']
       }}</name>
          </domain>
        </ip>
      </native>
    </device>
    {%- endfor %}
    {%- endfor %}
  </devices>
</config>
```

Defining Template Payload



Edit Policy | XML_IP_Domain_Name

Edit Rule | Check_IP_Domain_Name

Conditions and Actions•

☑ Condition Name	Sequence Number
☑ Verify_Domain_Name	1

Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
Verify_Domain_Name

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Inventory_Data

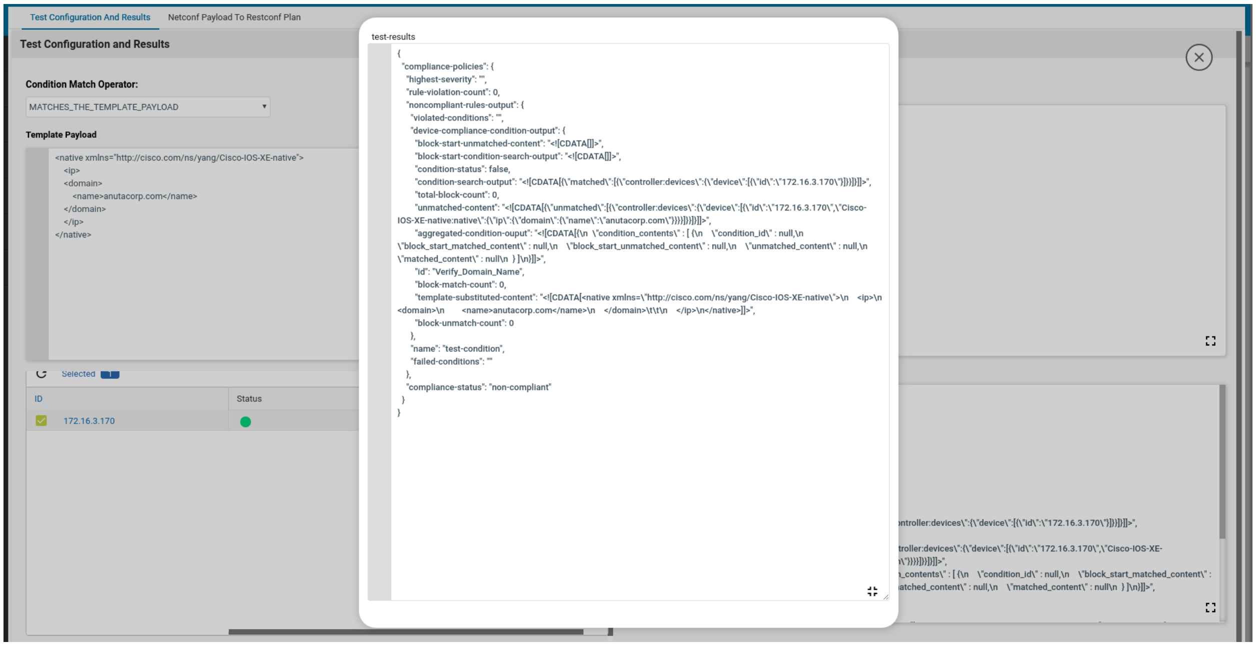
Condition Match Criteria

Inventory Operator: MATCHES_THE_TEMPLATE_PAYLOAD

Template Payload•
Device Payload Can be given

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <ip>
  <domain>
    <name>anutacorp.com</name>
  </domain>
  </ip>
</native>
```

Here the matched and unmatched data will be stored in the backend data structure which is shown in the Test Results tab. The matched data will be stored in the condition-search-output. The unmatched data will be stored in unmatched-content.


Test Configuration And Results
Netconf Payload To Restconf Plan
Selected 1

Test Configuration and Results

Condition Match Operator: MATCHES_THE_TEMPLATE_PAYLOAD

Template Payload

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <ip>
  <domain>
    <name>anutacorp.com</name>
  </domain>
  </ip>
</native>
```

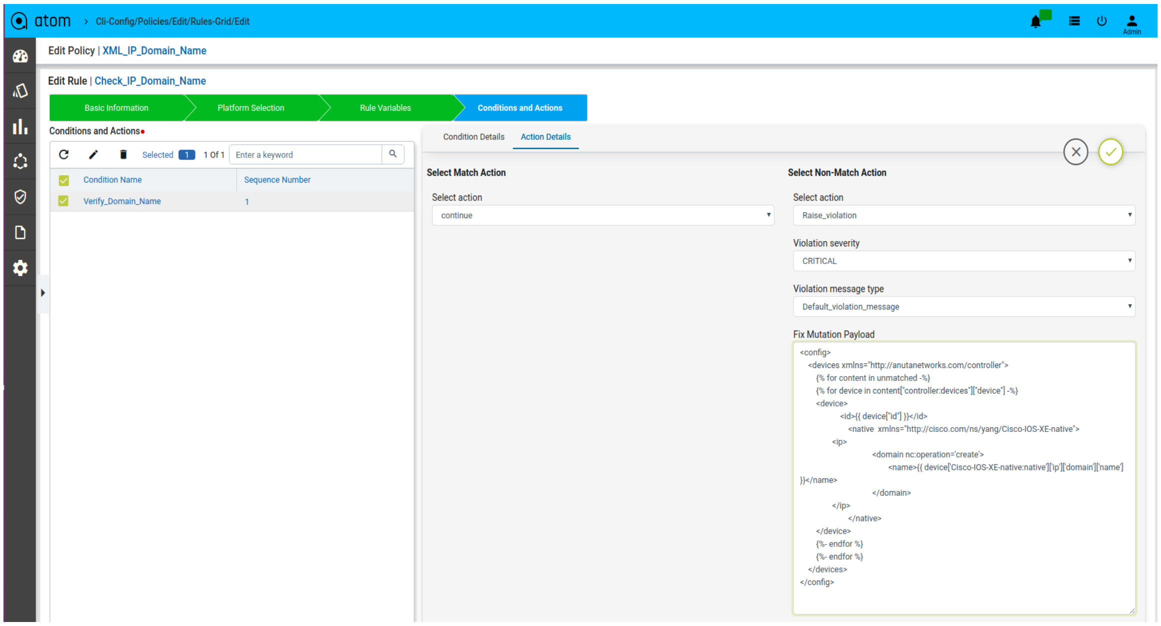
ID	Status
☑ 172.16.3.170	●

test-results

```
{
 "compliance-policies": {
  "highest-severity": "",
  "rule-violation-count": 0,
  "noncompliant-rules-output": {
   "violated-conditions": "",
   "device-compliance-condition-output": {
    "block-start-unmatched-content": "<![CDATA[]]>",
    "block-start-condition-search-output": "<![CDATA[]]>",
    "condition-status": false,
    "condition-search-output": "<![CDATA[{\"matched\":[{\"controller:devices\":{\"device\":[{\"id\":\"172.16.3.170\"}]}}]}]]>",
    "total-block-count": 0,
    "unmatched-content": "<![CDATA[{\"unmatched\":[{\"controller:devices\":{\"device\":[{\"id\":\"172.16.3.170\",\"Cisco-
IOS-XE-native:native\":{\"ip\":{\"domain\":{\"name\":\"anutacorp.com\"}}}}]}}]}]]>",
    "aggregated-condition-ouput": "<![CDATA[{\n  \"condition_contents\" : [ {\n    \"condition_id\" : null,\n
\"block_start_matched_content\" : null,\n    \"block_start_unmatched_content\" : null,\n    \"unmatched_content\" : null,\n
\"matched_content\" : null\n  } ]\n}]]>",
    "id": "Verify_Domain_Name",
    "block-match-count": 0,
    "template-substituted-content": "<![CDATA[<native xmlns=\"http://cisco.com/ns/yang/Cisco-IOS-XE-native\">\n    <ip>\n
<domain>\n        <name>anutacorp.com</name>\n    </domain>\t\t\n    </ip>\n</native>]]>",
    "block-unmatch-count": 0
   },
   "name": "test-condition",
   "failed-conditions": ""
  },
  "compliance-status": "non-compliant"
 }
}
```

The Fix Mutation Payload is a Jinja2 template configuration in Netconf xml RPC format written using the unmatched content from the test results tab.

Defining Fix Payload



Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

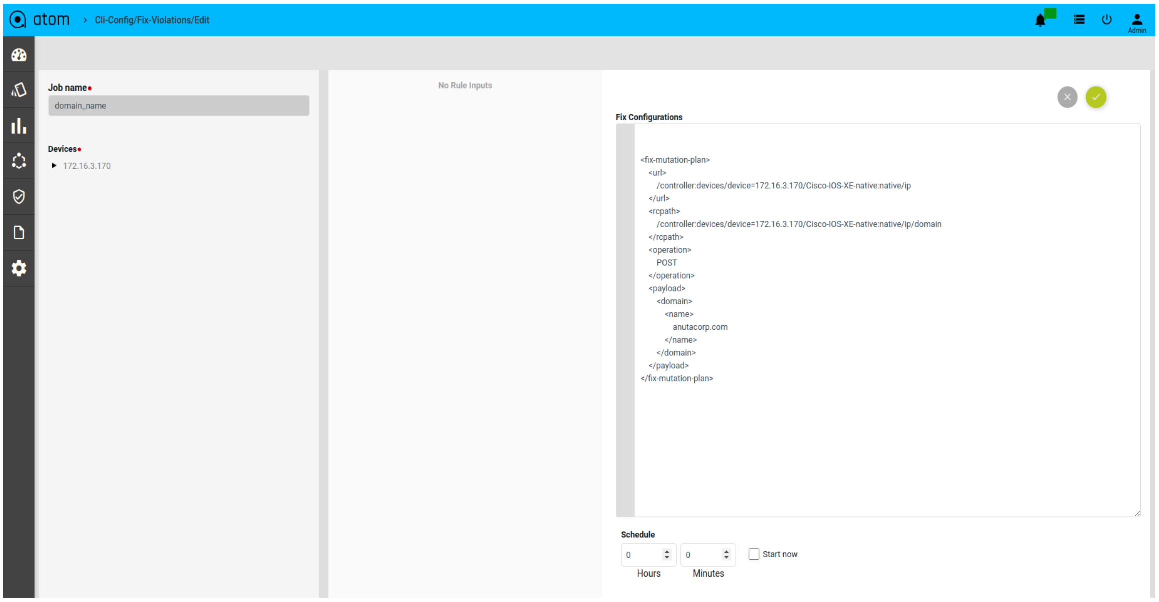
Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    {% for content in unmatched -%}
    {% for device in content["controller:devices"]["device"] -%}
    <device>
          <id>{{ device["id"] }}</id>
            <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
        <ip>
                  <domain nc:operation='create'>
                      <name>{{ device['Cisco-IOS-XE-native:native']['ip']['domain']['name']
}}</name>
                  </domain>
        </ip>
            </native>
    </device>
    {%- endfor %}
    {%- endfor %}
  </devices>
</config>
```

Fix Configuration Display in Remediation



Job name: domain_name

Devices: 172.16.3.170

Fix Configurations

```
<fix-mutation-plan>
  <url>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/ip
  </url>
  <rcpath>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/ip/domain
  </rcpath>
  <operation>
    POST
  </operation>
  <payload>
    <domain>
      <name>
        anutacorp.com
      </name>
    </domain>
  </payload>
</fix-mutation-plan>
```

Schedule: 0 Hours, 0 Minutes

Scenario 13 : IP Name Server check

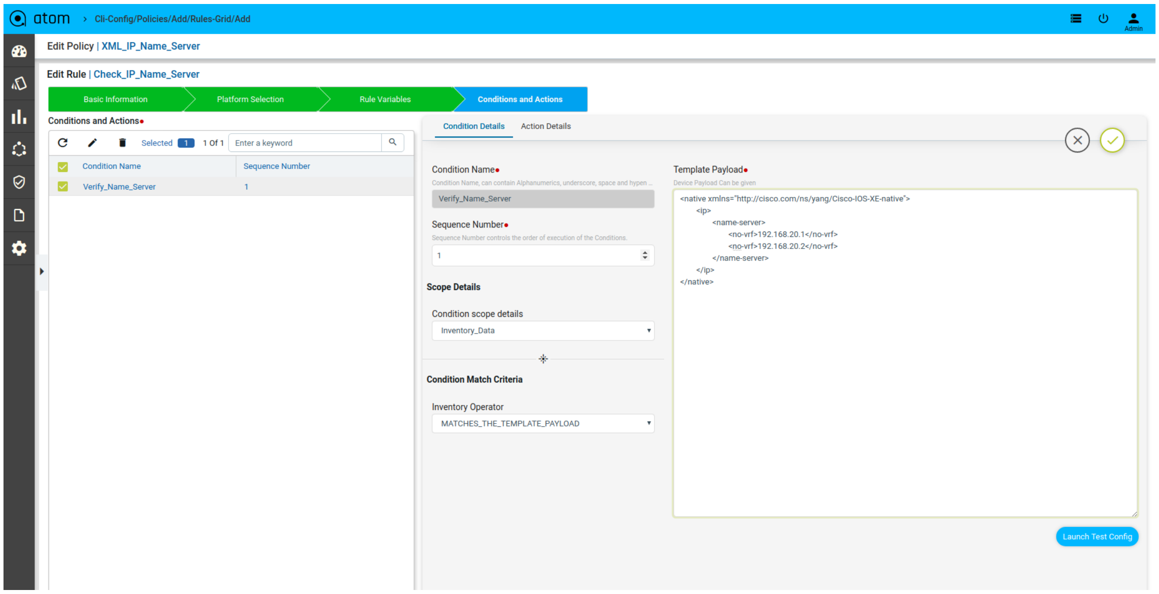
Template Payload:

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <ip>
    <name-server>
```

```
       <no-vrf>192.168.20.1</no-vrf>
       <no-vrf>192.168.20.2</no-vrf>
    </name-server>
  </ip>
</native>
```

Fix Mutation Payload :

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
  {% for content in unmatched -%}
  {% for device in content["controller:devices"]["device"] -%}
    <device>
      <id>{{ device["id"] }}</id>
       <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
         <ip>
           <name-server nc:operation='create'>
             {% for name_server in
device['Cisco-IOS-XE-native:native']['ip']['name-server']['no-vrf'] -%}
             <no-vrf>{{ name_server }}</no-vrf>
             {%- endfor %}
           </name-server>
         </ip>
       </native>
    </device>
  {%- endfor %}
  {%- endfor %}
  </devices>
</config>
```



Edit Policy | XML_IP_Name_Server

Edit Rule | Check_IP_Name_Server

Conditions and Actions

Condition Name	Sequence Number
Verify_Name_Server	1

Condition Name: Verify_Name_Server
Condition Name, can contain Alphanumerics, underscore, space and hypen ...

Sequence Number: 1
Sequence Number controls the order of execution of the Conditions.

Scope Details

Condition scope details: Inventory_Data

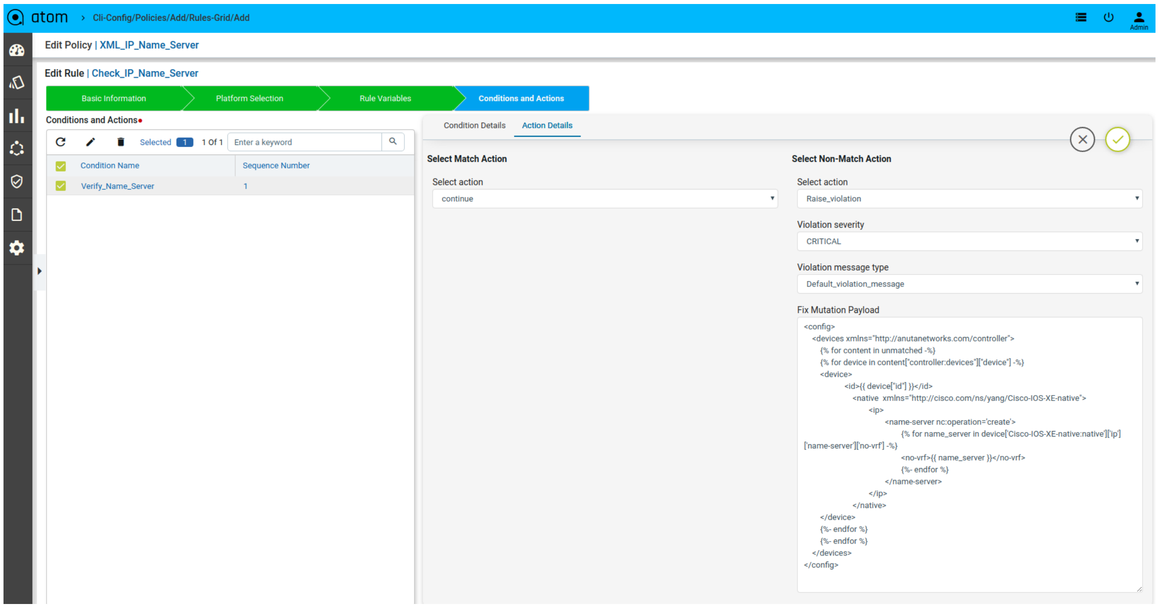
Condition Match Criteria

Inventory Operator: MATCHES_THE_TEMPLATE_PAYLOAD

Template Payload
Device Payload Can be given

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
    <ip>
        <name-server>
            <no-vrf>192.168.20.1</no-vrf>
            <no-vrf>192.168.20.2</no-vrf>
        </name-server>
    </ip>
</native>
```

Defining Fix Payload



Edit Policy | XML_IP_Name_Server

Edit Rule | Check_IP_Name_Server

Conditions and Actions

Condition Name	Sequence Number
Verify_Name_Server	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation

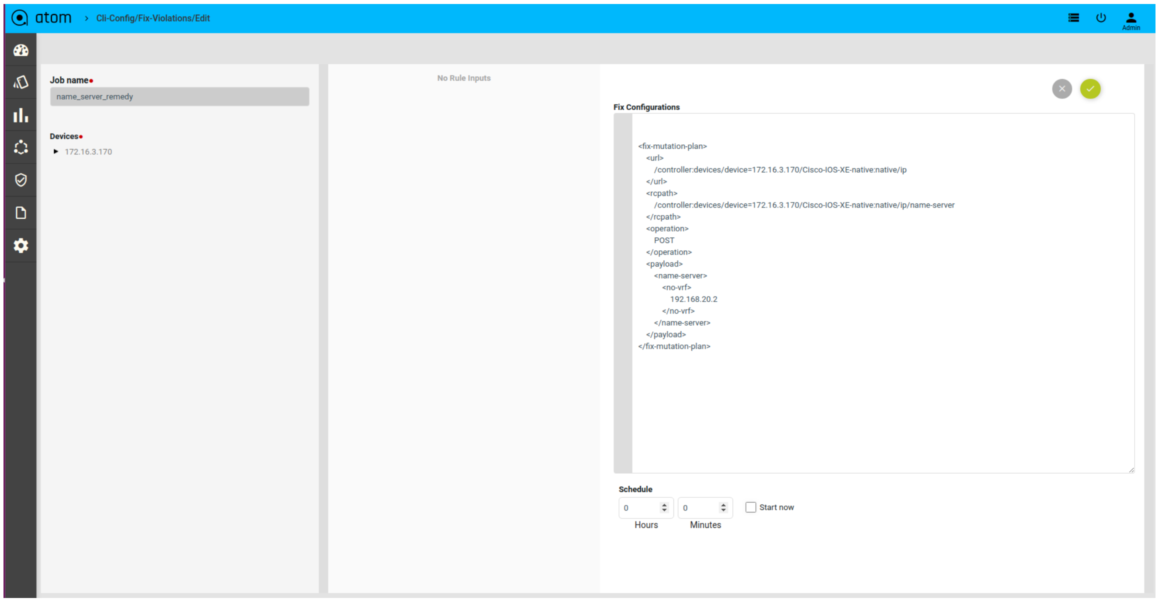
Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    {% for content in unmatched -%}
    {% for device in content["controller:devices"]["device"] -%}
    <device>
          <id>{{ device["id"] }}</id>
            <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <ip>
                    <name-server nc:operation='create'>
                        {% for name_server in device['Cisco-IOS-XE-native:native']['ip']
['name-server']['no-vrf'] -%}
                        <no-vrf>{{ name_server }}</no-vrf>
                        {%- endfor %}
                    </name-server>
                </ip>
            </native>
    </device>
    {%- endfor %}
    {%- endfor %}
  </devices>
</config>
```

Fix Configuration Display in Remediation



Job name
name_server_remedy

Devices
▸ 172.16.3.170

No Rule Inputs

Fix Configurations

```
<fix-mutation-plan>
  <url>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/ip
  </url>
  <rcpath>
    /controller:devices/device=172.16.3.170/Cisco-IOS-XE-native:native/ip/name-server
  </rcpath>
  <operation>
    POST
  </operation>
  <payload>
    <name-server>
      <no-vrf>
        192.168.20.2
      </no-vrf>
    </name-server>
  </payload>
</fix-mutation-plan>
```

Schedule
0 Hours 0 Minutes □ Start now

Scenario 14 : Interface check

Template Payload:

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <interface>
        <Loopback>
          <ip>
            <address>
              <primary>
                <address>10.100.99.98</address>
                <mask>255.255.255.255</mask>
              </primary>
            </address>
          </ip>
          <ipv6>
            <address>
              <prefix-list>
                <prefix>2605:30C0::3B/128</prefix>
              </prefix-list>
            </address>
          </ipv6>
          <name>0</name>
        </Loopback>
  </interface>
```

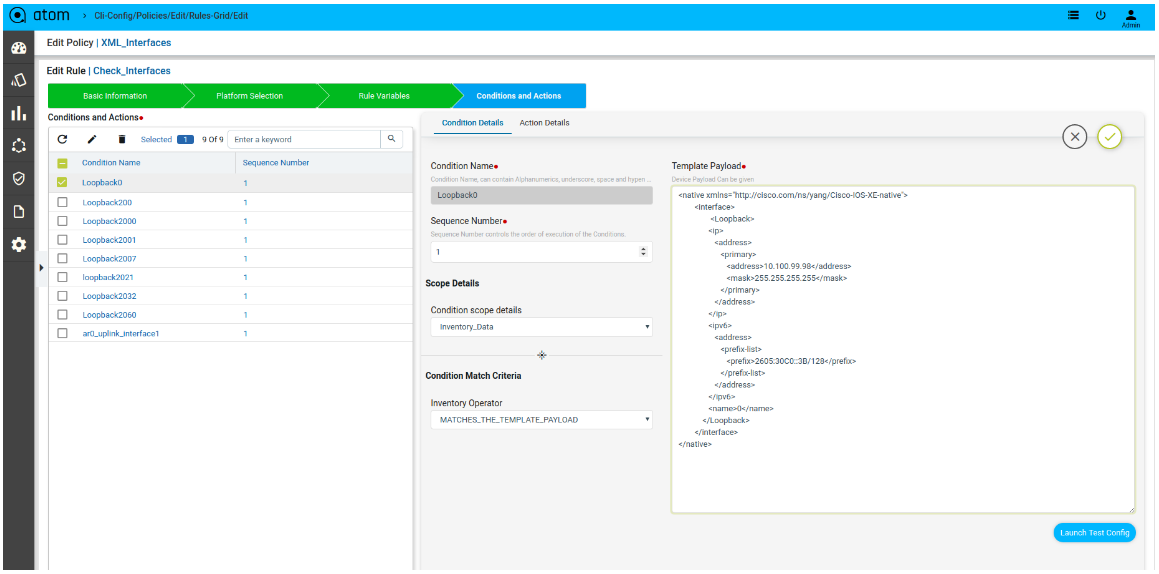
```
</native>
```

Fix Mutation Payload :

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
        {% for content in unmatched -%}
        {% for device in content["controller:devices"]["device"] -%}
        <device>
        <id>{{ device["id"] }}</id>
        <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
        <interface>
        {% for loopback in
device['Cisco-IOS-XE-native:native']['interface']['Loopback'] -%}
        <Loopback nc:operation="create">
        {% if loopback['ip'] -%}
        <ip>
        <address>
                <primary>
                <address>{{ loopback['ip']['address']['primary']['address']
}}</address>
                <mask>{{ loopback['ip']['address']['primary']['mask'] }}</mask>
                </primary>
        </address>
        </ip>
        {%- endif %}
        {% if loopback['ipv6'] -%}
        <ipv6>
        <address>
                <prefix-list>
                {% for prefix in loopback['ipv6']['address']['prefix-list'] -%}
                <prefix>{{ prefix['prefix'] }}</prefix>
                {%- endfor %}
                </prefix-list>
        </address>
        </ipv6>
        {%- endif %}
        <name>{{ loopback['name'] }}</name>
        </Loopback>
        {%- endfor %}
        </interface>
        </native>
```

```
                </device>
                {%- endfor %}
                {%- endfor %}
        </devices>
    </config>
```

Defining Template Payload



Cli-Config/Policies/Edit/Rules-Grid/Edit

Edit Policy | XML_Interfaces

Edit Rule | Check_Interfaces

Conditions and Actions

Selected 1   9 Of 9   Enter a keyword

	Condition Name	Sequence Number
☑	Loopback0	1
□	Loopback200	1
□	Loopback2000	1
□	Loopback2001	1
□	Loopback2007	1
□	loopback2021	1
□	Loopback2032	1
□	Loopback2060	1
□	ar0_uplink_interface1	1

Condition Details | Action Details

Condition Name: Loopback0
(Condition Name, can contain Alphanumerics, underscore, space and hypen ...)

Sequence Number: 1
(Sequence Number controls the order of execution of the Conditions.)

Scope Details

Condition scope details: Inventory_Data

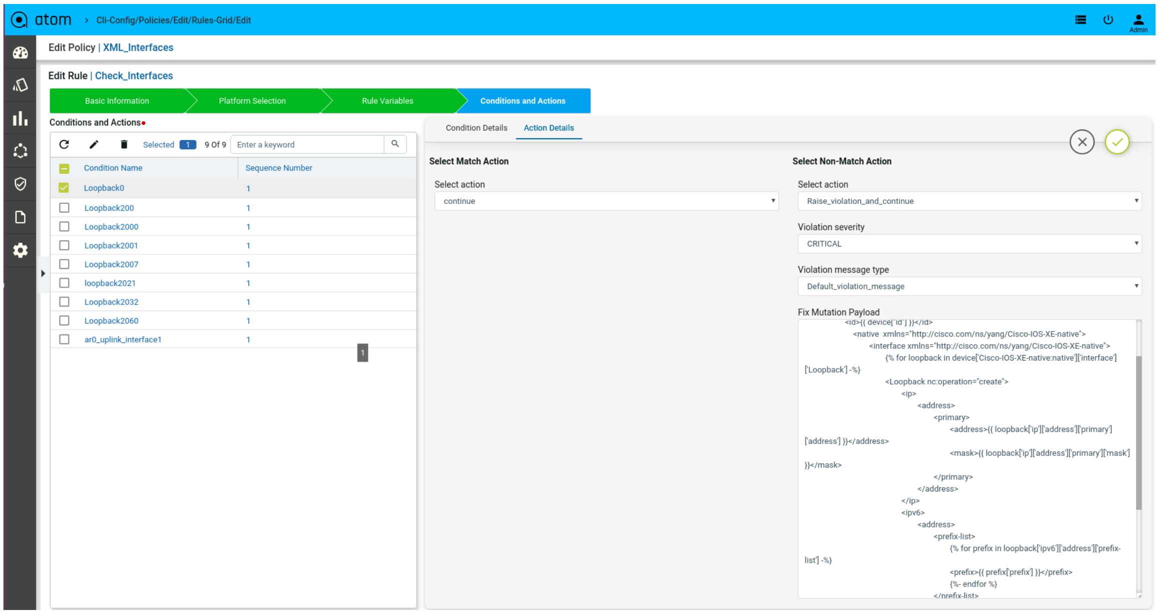
Condition Match Criteria

Inventory Operator: MATCHES_THE_TEMPLATE_PAYLOAD

Template Payload (Device Payload Can be given)

```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
    <interface>
        <Loopback>
        <ip>
          <address>
            <primary>
              <address>10.100.99.98</address>
              <mask>255.255.255.255</mask>
            </primary>
          </address>
        </ip>
        <ipv6>
          <address>
            <prefix-list>
              <prefix>2605:30C0::3B/128</prefix>
            </prefix-list>
          </address>
        </ipv6>
        <name>0</name>
      </Loopback>
    </interface>
</native>
```

Defining Template Payload



Cli-Config/Policies/Edit/Rules-Grid/Edit

Edit Policy | XML_Interfaces

Edit Rule | Check_Interfaces

Conditions and Actions

Selected 1   9 Of 9   Enter a keyword

	Condition Name	Sequence Number
☑	Loopback0	1
□	Loopback200	1
□	Loopback2000	1
□	Loopback2001	1
□	Loopback2007	1
□	loopback2021	1
□	Loopback2032	1
□	Loopback2060	1
□	ar0_uplink_interface1	1

Condition Details | Action Details

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation_and_continue

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
            <id>{{ device['id'] }}</id>
              <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                    <interface xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                            {% for loopback in device['Cisco-IOS-XE-native:native']['interface']
['Loopback'] -%}
                            <Loopback nc:operation="create">
                                    <ip>
                                            <address>
                                                    <primary>
                                                            <address>{{ loopback['ip']['address']['primary']
['address'] }}</address>
                                                            <mask>{{ loopback['ip']['address']['primary']['mask']
}}</mask>
                                                    </primary>
                                            </address>
                                    </ip>
                                    <ipv6>
                                            <address>
                                                    <prefix-list>
                                                            {% for prefix in loopback['ipv6']['address']['prefix-
list'] -%}
                                                            <prefix>{{ prefix['prefix'] }}</prefix>
                                                            {%- endfor %}
                                                    </prefix-list>
```

Scenario 15 : VRF check

Template Payload:

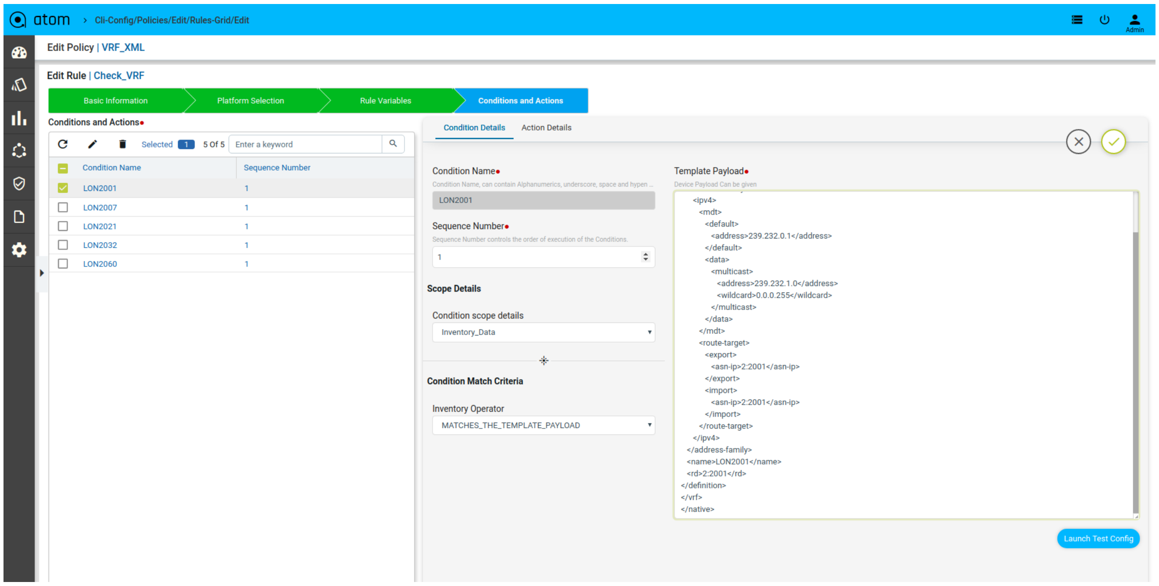
```
<native xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
  <vrf>
    <definition>
      <address-family>
        <ipv4>
          <mdt>
            <default>
              <address>239.232.0.1</address>
            </default>
            <data>
              <multicast>
                <address>239.232.1.0</address>
                <wildcard>0.0.0.255</wildcard>
              </multicast>
           </data>
          </mdt>
          <route-target>
             <export>
               <asn-ip>2:2001</asn-ip>
             </export>
             <import>
               <asn-ip>2:2001</asn-ip>
             </import>
          </route-target>
         </ipv4>
        </address-family>
        <name>LON2001</name>
        <rd>2:2001</rd>
       </definition>
  </vrf>
</native>
```

Fix Mutation Payload :

```
<config>
 <devices xmlns="http://anutanetworks.com/controller">
       {% for content in unmatched -%}
       {% for device in content["controller:devices"]["device"] -%}
       <device>
       <id>{{ device["id"] }}</id>
       <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
        <vrf>
        {% for vrf_def in device['Cisco-IOS-XE-native:native']['vrf']['definition']
-%}
        {% if vrf_def['name'] == 'LON2001' -%}
        <definition nc:operation="create">
            {% if vrf_def['rd'] -%}
            <rd>{{ rd_2001 }}</rd>
            {%- endif %}
            <name>{{ vrf_def['name'] }}</name>
            {% if vrf_def['address-family'] -%}
            <address-family>
             <ipv4>
                {% if vrf_def['address-family']['ipv4']['route-target'] -%}
                <route-target>
                    {% for export in
vrf_def['address-family']['ipv4']['route-target']['export'] -%}
                    <export>
                     <asn-ip>{{ export['asn-ip'] }}</asn-ip>
                    </export>
                    {%- endfor %}
                    {% for import in
vrf_def['address-family']['ipv4']['route-target']['import'] -%}
                    <import>
                     <asn-ip>{{ import['asn-ip'] }}</asn-ip>
                    </import>
                    {%- endfor %}
                </route-target>
                {%- endif %}
                {% if vrf_def['address-family']['ipv4']['import'] -%}
                <import>
                    <map>{{
vrf_def['address-family']['ipv4']['import']['map'] }}</map>
                </import>
                {%- endif %}
                {% if vrf_def['address-family']['ipv4']['mdt'] -%}
                <mdt>
                    {% if
vrf_def['address-family']['ipv4']['mdt']['default'] -%}
                    <default>
                     <address>{{
vrf_def['address-family']['ipv4']['mdt']['default']['address'] }}</address>
```

```
                                                              </default>
                                                              {%- endif %}
                                                              {% if vrf_def['address-family']['ipv4']['mdt']['data']
-%}
                                                              <data>
                                                               {% for multicast in
vrf_def['address-family']['ipv4']['mdt']['data']['multicast'] -%}
                                                               <multicast>
                                                                           <address>{{ multicast['address']
}}</address>
                                                                           <wildcard>{{ multicast['wildcard']
}}</wildcard>
                                                               </multicast>
                                                               {%- endfor %}
                                                              </data>
                                                              {%- endif %}
                                                  </mdt>
                                                  {%- endif %}
                                        </ipv4>
                                      </address-family>
                                      {%- endif %}
                          </definition>
                          {%- endif %}
                         {%- endfor %}
               </vrf>
             </native>
            </device>
            {%- endfor %}
            {%- endfor %}
  </devices>
</config>
```

Defining Template Payload



Edit Policy | VRF_XML

Edit Rule | Check_VRF

Conditions and Actions•

Selected 1 5 Of 5 Enter a keyword

	Condition Name	Sequence Number
☑	LON2001	1
□	LON2007	1
□	LON2021	1
□	LON2032	1
□	LON2060	1

Condition Name•
Condition Name, can contain Alphanumerics, underscore, space and hypen ...
LON2001

Sequence Number•
Sequence Number controls the order of execution of the Conditions.
1

Scope Details

Condition scope details: Inventory_Data

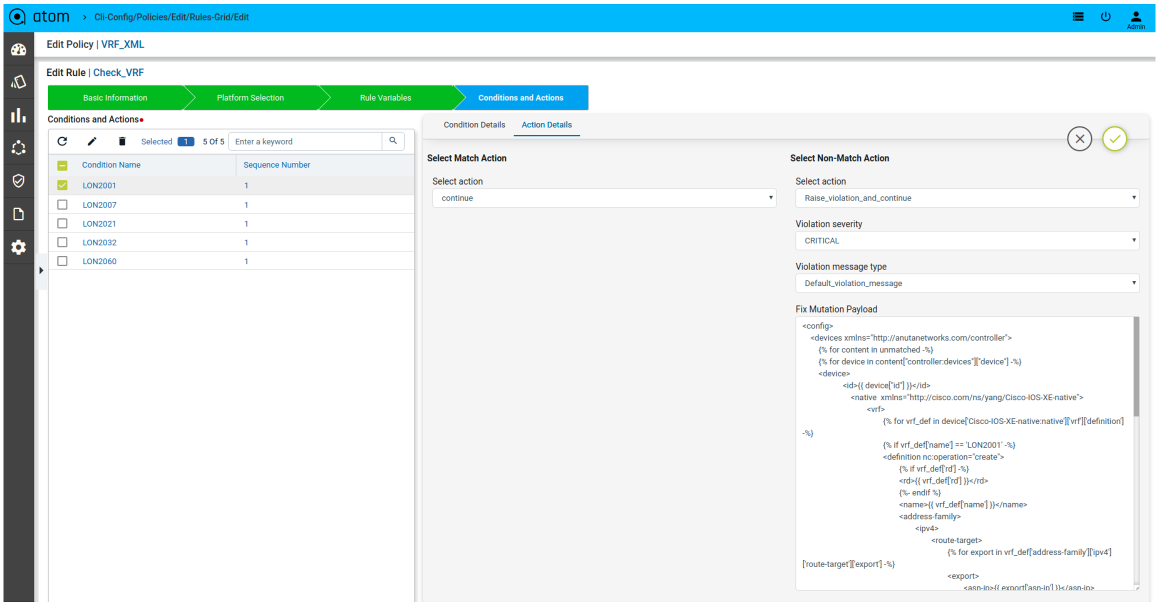
Condition Match Criteria

Inventory Operator: MATCHES_THE_TEMPLATE_PAYLOAD

Template Payload•
Device Payload Can be given

```
    <ipv4>
      <mdt>
        <default>
          <address>239.232.0.1</address>
        </default>
        <data>
          <multicast>
            <address>239.232.1.0</address>
            <wildcard>0.0.0.255</wildcard>
          </multicast>
        </data>
      </mdt>
      <route-target>
        <export>
          <asn-ip>2:2001</asn-ip>
        </export>
        <import>
          <asn-ip>2:2001</asn-ip>
        </import>
      </route-target>
    </ipv4>
  </address-family>
  <name>LON2001</name>
  <rd>2:2001</rd>
</definition>
</vrf>
</native>
```

Defining Fix Payload



Edit Policy | VRF_XML

Edit Rule | Check_VRF

Conditions and Actions•

Selected 1 5 Of 5 Enter a keyword

	Condition Name	Sequence Number
☑	LON2001	1
□	LON2007	1
□	LON2021	1
□	LON2032	1
□	LON2060	1

Select Match Action

Select action: continue

Select Non-Match Action

Select action: Raise_violation_and_continue

Violation severity: CRITICAL

Violation message type: Default_violation_message

Fix Mutation Payload

```
<config>
  <devices xmlns="http://anutanetworks.com/controller">
    {% for content in unmatched -%}
    {% for device in content["controller:devices"]["device"] -%}
    <device>
          <id>{{ device["id"] }}</id>
            <native  xmlns="http://cisco.com/ns/yang/Cisco-IOS-XE-native">
                <vrf>
                    {% for vrf_def in device['Cisco-IOS-XE-native:native']['vrf']['definition']
-%}
                    {% if vrf_def['name'] == 'LON2001' -%}
                    <definition nc:operation="create">
                        {% if vrf_def['rd'] -%}
                        <rd>{{ vrf_def['rd'] }}</rd>
                        {%- endif %}
                        <name>{{ vrf_def['name'] }}</name>
                        <address-family>
                            <ipv4>
                                <route-target>
                                    {% for export in vrf_def['address-family']['ipv4']
['route-target']['export'] -%}
                                    <export>
                                        <asn-ip>{{ export['asn-ip'] }}</asn-ip>
```

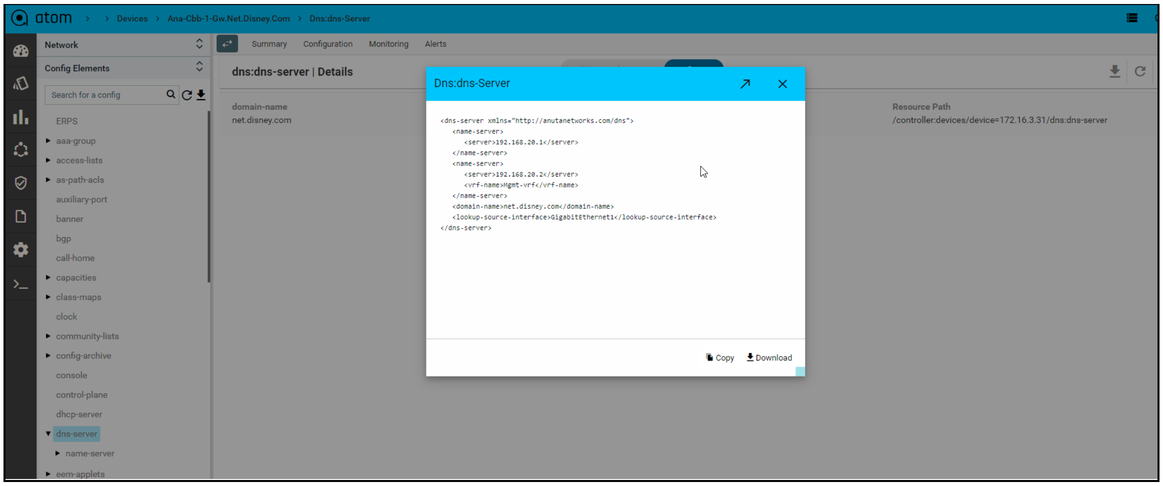
How to derive the XML Template payload

- Navigate to the Device profile page and export the XML template details for the yang parsed entities

  Resource Manager ⟶ Devices ⟶ Select a Device ⟶ Configuration ⟶Config Data ⟶ Entities ⟶ Select Abstract entity ⟶ Use Download button to export/copy the XML payload

  Example : Let's derive domain-name XML Template payload

  Navigate to **Devices** ⟶ **select a device**⟶ **configuration -> Config Data** ⟶ **Entities** ⟶ **dns-server** ⟶ **Export XML** payload using download button.



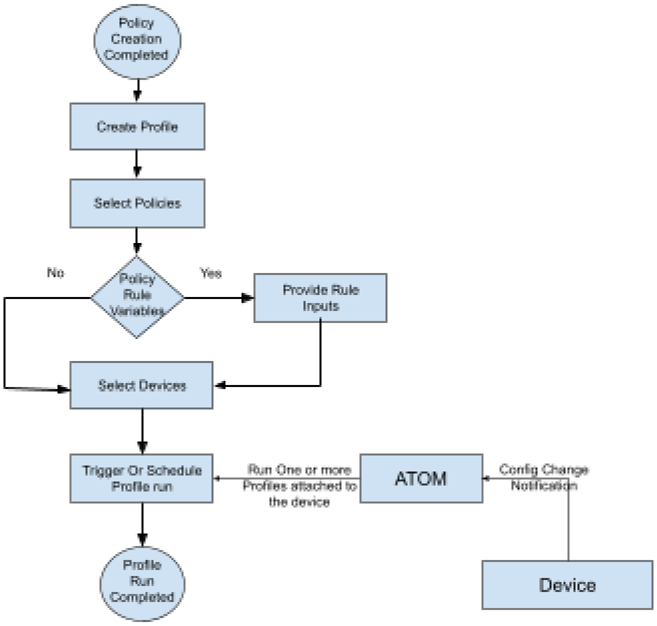
domain-name
net.disney.com

Resource Path
/controller:devices/device=172.16.3.31/dns:dns-server

```
<dns-server xmlns="http://anutanetworks.com/dns">
   <name-server>
      <server>192.168.20.1</server>
   </name-server>
   <name-server>
      <server>192.168.20.2</server>
      <vrf-name>Mgmt-vrf</vrf-name>
   </name-server>
   <domain-name>net.disney.com</domain-name>
   <lookup-source-interface>GigabitEthernet1</lookup-source-interface>
</dns-server>
```

Profiles

A profile allows one or more Policies to be grouped and executed on one or more devices either on-demand or as per Schedule. Profile execution results in a per-device compliance report included in the execution.


Policy Creation Completed
Create Profile
Select Policies
No
Policy Rule Variables
Yes
Provide Rule Inputs
Select Devices
Trigger Or Schedule Profile run
Run One or more Profiles attached to the device
ATOM
Config Change Notification
Device
Profile Run Completed

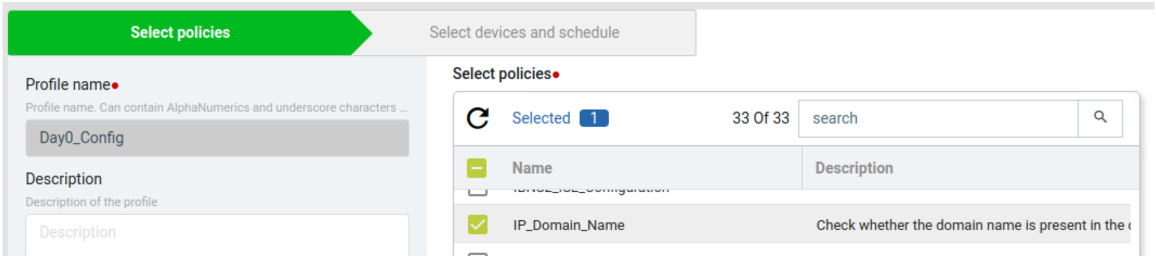
Steps:

a. Navigate to Resource Manager > Config Compliance -> Profiles

- Select “+” to Create a Profile
- ATOM opens up a new wizard and displays 2 sections.
    - Policies - Select one/more policies
    - Devices & Schedule - Select one/more devices or Device groups

b. Create profile by providing name, description and select policy which was created previously

IP_Domain_Name.



Select policies | Select devices and schedule

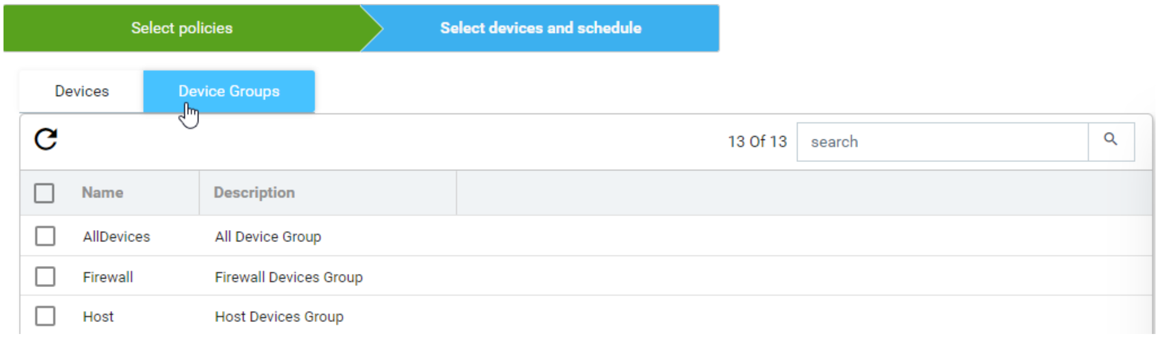
Profile name•
Profile name. Can contain AlphaNumerics and underscore characters ...
Day0_Config

Description
Description of the profile
Description

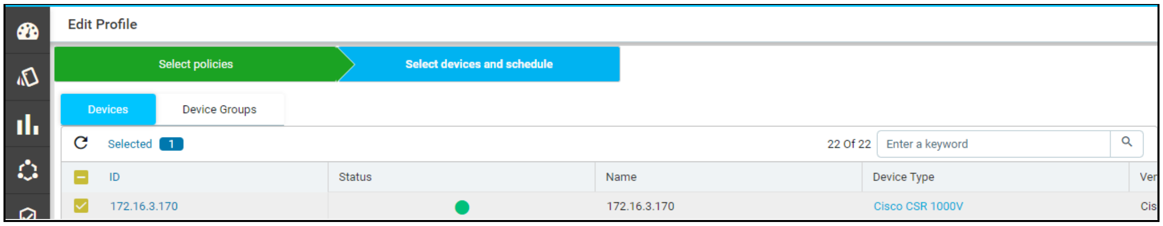
Select policies•
Selected 1 33 Of 33 search

	Name	Description
☑	IP_Domain_Name	Check whether the domain name is present in the c

c. Navigate to the next tab, Select devices and schedule. We can select either device(s) from *Devices* or *Device Groups* tab



☐	Name	Description
☐	AllDevices	All Device Group
☐	Firewall	Firewall Devices Group
☐	Host	Host Devices Group



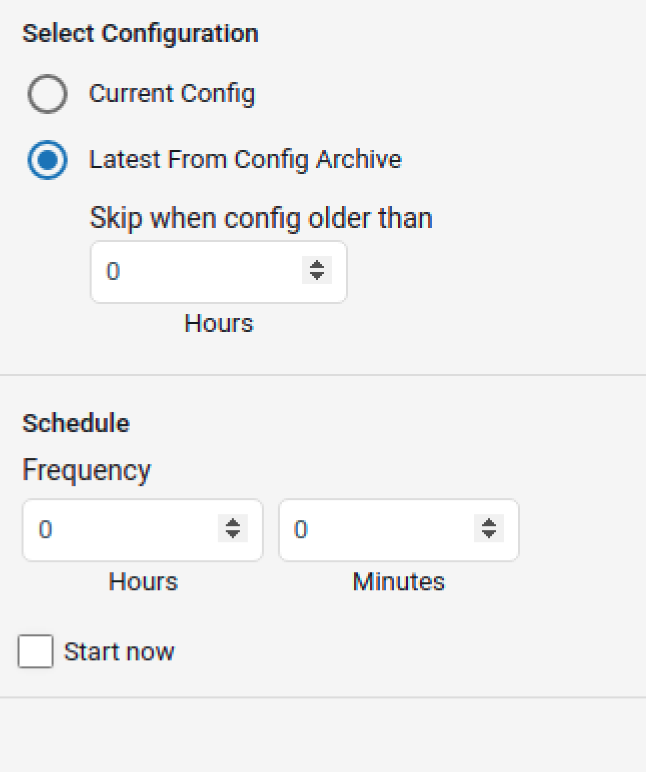
☐	ID	Status	Name	Device Type	Ver
☑	172.16.3.170	●	172.16.3.170	Cisco CSR 1000V	Cis

d. After device(s) are selected, choose if the compliance checks need to be run against an archived config or current running-configuration of the device. By default Latest From Config Archive is selected.

Schedule: The profile job can be scheduled in Hours or Minutes. Alternatively, a job can be started right away by enabling *Start now* option.

Configuration:

- Current Config: This will pull the current device configuration and evaluate against the polices.
- Latest From Config Archive: This will use the latest configuration that is stored in the ATOM. Optionally you can add a check to skip the compliance check when the configuration is older than **n** hrs



Select Configuration

○ Current Config

● Latest From Config Archive

Skip when config older than

0 Hours

Schedule

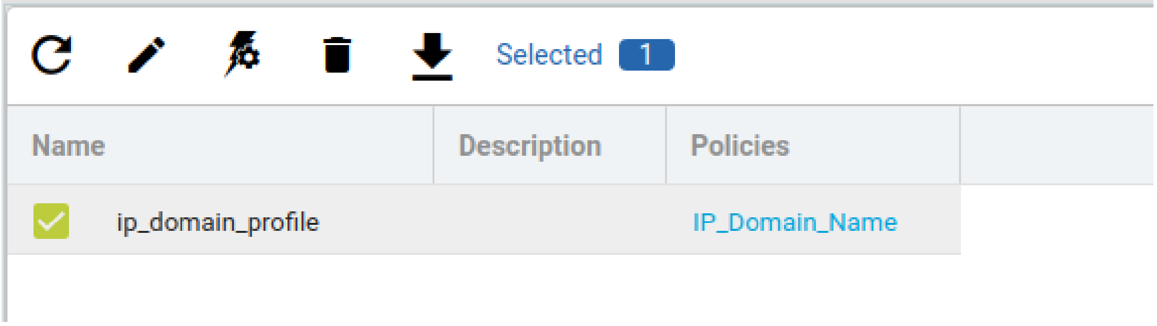
Frequency

0 Hours

0 Minutes

□ Start now

Or the profile job can triggered at a later point of time using run job icon on the profiles view



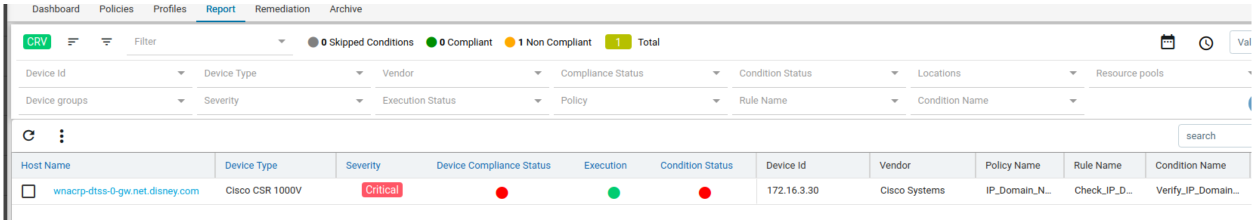
	Name	Description	Policies
✓	ip_domain_profile		IP_Domain_Name

Report

Navigate to Resource Manager > Config Compliance -> reports

Compliance report is generated upon completion of Profile run. For each device, the report lists the compliant and non-compliant policies, rules and conditions .

After profile job is run, audit details can be viewed in Report View

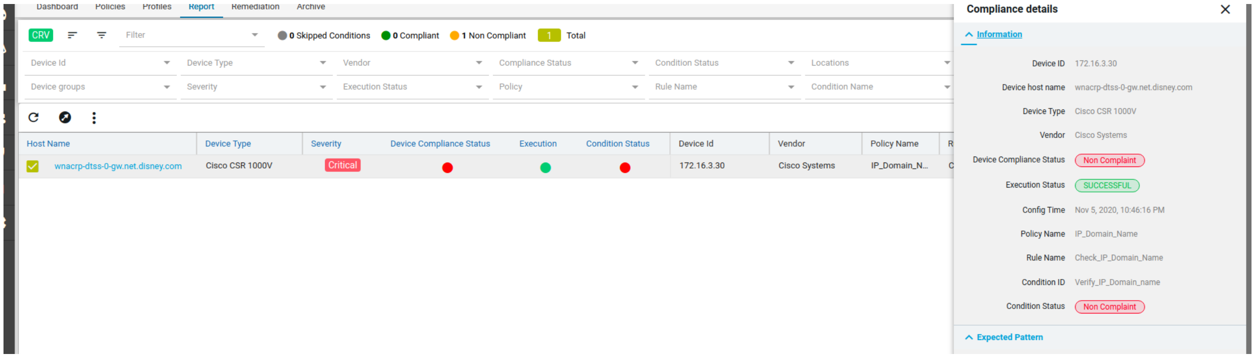


	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name
□	wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.3.30	Cisco Systems	IP_Domain_N...	Check_IP_D...	Verify_IP_Domain...

Since *IP_Domain_Name policy* has a condition named Verify_IP_Domain_name, where it didn’t meet the required criteria. The condition is marked as Non_compliant.

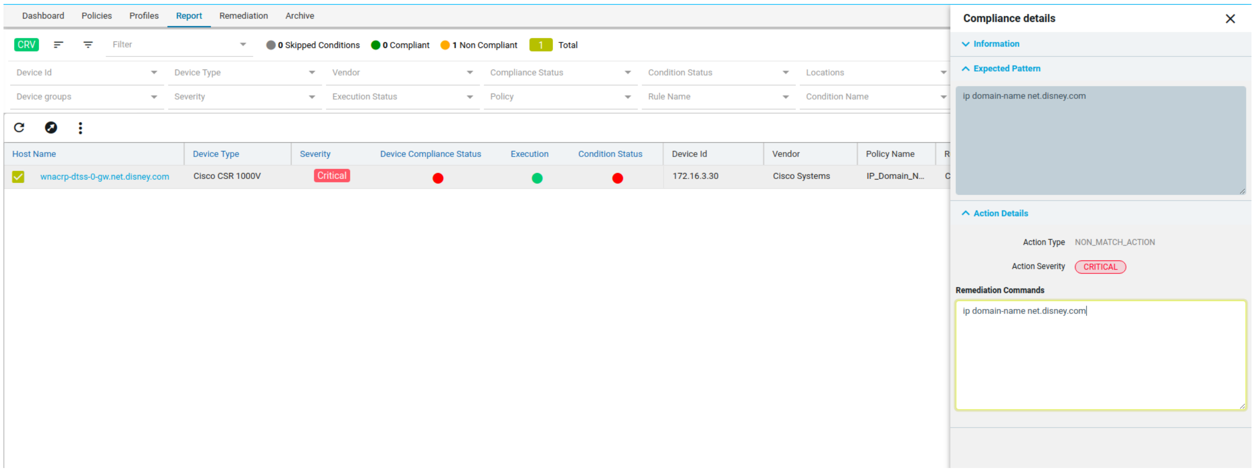
Severity: Severity the condition where the condition Match Action or Non Match Action is of type *Raise_violation* or *Raise_violation_and_continue*.

Upon checking the row you can see the expected and the fix commands for that condition along with action-severity, action-type and other metadata related to device & condition.



	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
☑	wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.3.30	Cisco Systems	IP_Domain_N...

Device ID	172.16.3.30
Device host name	wnacrp-dtss-0-gw.net.disney.com
Device Type	Cisco CSR 1000V
Vendor	Cisco Systems
Device Compliance Status	Non Complaint
Execution Status	SUCCESSFUL
Config Time	Nov 5, 2020, 10:46:16 PM
Policy Name	IP_Domain_Name
Rule Name	Check_IP_Domain_Name
Condition ID	Verify_IP_Domain_name
Condition Status	Non Complaint



	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
☑	wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.3.30	Cisco Systems	IP_Domain_N...

Expected Pattern

```
ip domain-name net.disney.com
```

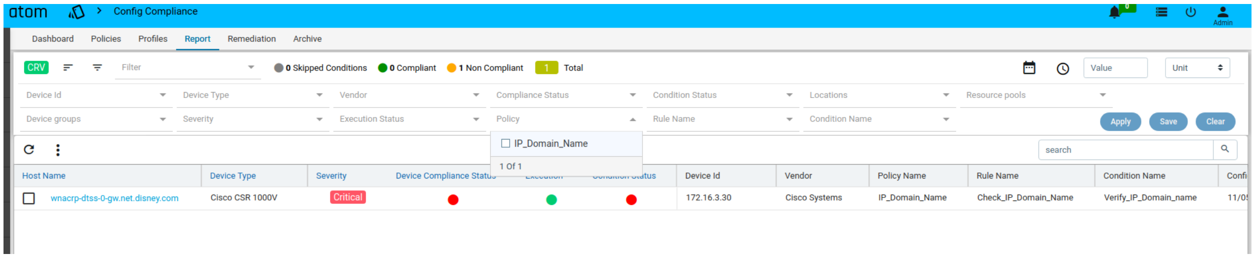
Action Type	NON_MATCH_ACTION
Action Severity	CRITICAL

Remediation Commands

```
ip domain-name net.disney.com
```

The reports section also facilitates users to filter the results of what user is interested in. The dropdown will display all the possible values for the filters. Users can try out any combination and see the results. By clicking on the **apply** button.

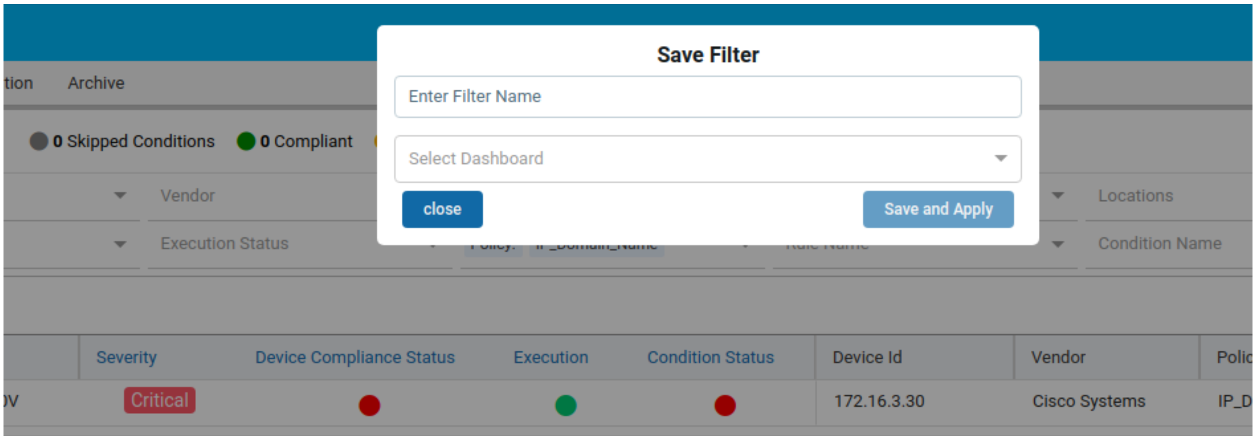
Inorder to revert the filter that are applied you can click on the **clear** button.



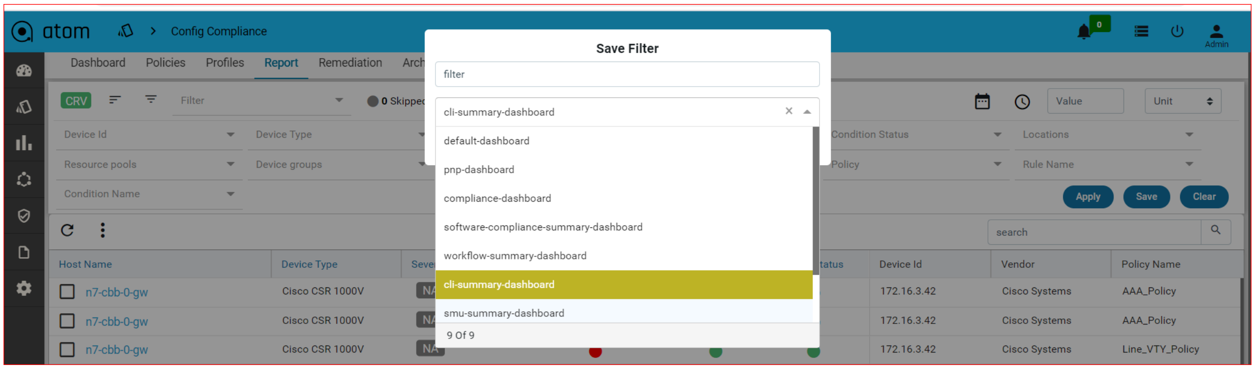
	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name	Confi
□	wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	Critical	●	●	●	172.16.3.30	Cisco Systems	IP_Domain_Name	Check_IP_Domain_Name	Verify_IP_Domain_name	11/0

Tired of filtering the results every time for more frequent data. We got you covered ATOM provides an option to save the filter that you applied again with a single click.

- Select filters that you are interested in and click on the **save** button
- This will show a new pop-up box prompting for the   filter name and the dashboard where the user wants to pin it.
- Click on the **save and apply** button will save this filter and the resulting data will be populated.



Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Polic
Critical	●	●	●	172.16.3.30	Cisco Systems	IP_D



Save Filter

filter

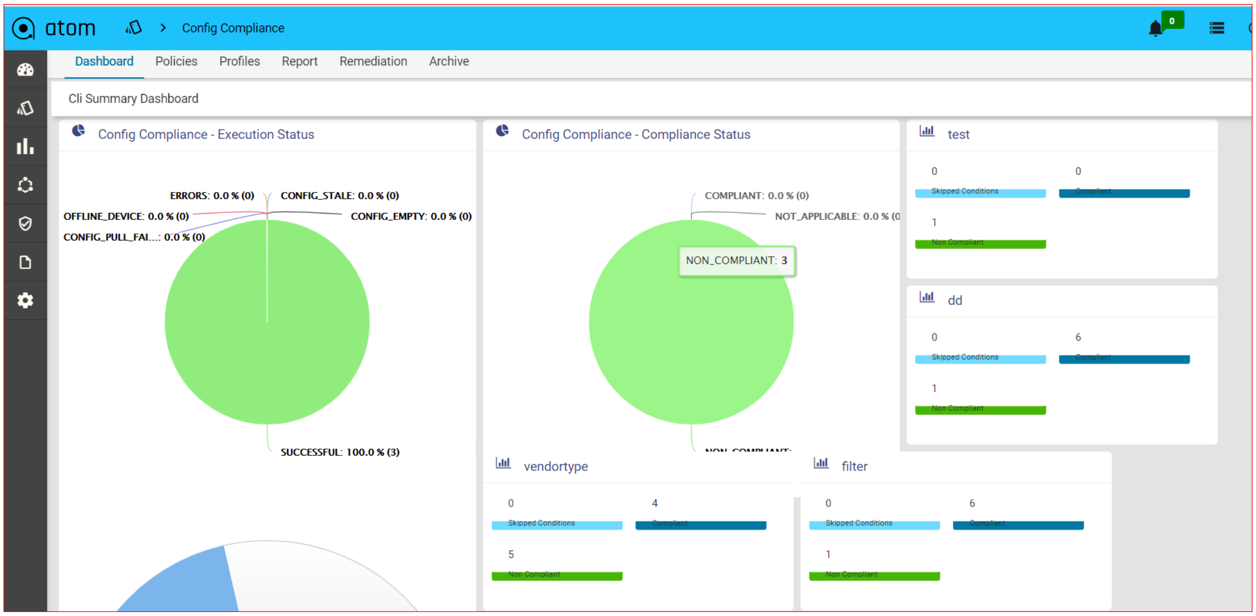
cli-summary-dashboard

- default-dashboard
- pnp-dashboard
- compliance-dashboard
- software-compliance-summary-dashboard
- workflow-summary-dashboard
- cli-summary-dashboard
- smu-summary-dashboard

9 Of 9

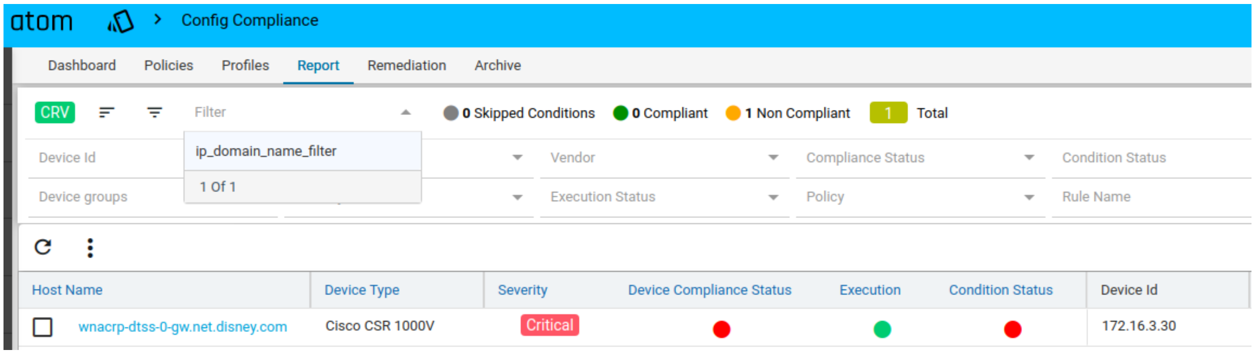
Host Name	Device Type	Seve	tatus	Device Id	Vendor	Policy Name
□ n7-cbb-0-gw	Cisco CSR 1000V	NA		172.16.3.42	Cisco Systems	AAA_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA		172.16.3.42	Cisco Systems	AAA_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA		172.16.3.42	Cisco Systems	Line_VTY_Policy

We can pin to the dashboard, upon saving the filter using dropdown.we are able to see the filter under the dashboard.



From where I can access these saved filters?

- They are easily accessible. All the filters that are saved are listed under the dropdown on the top.
- Click on the interested filter and you see the data getting filtered.

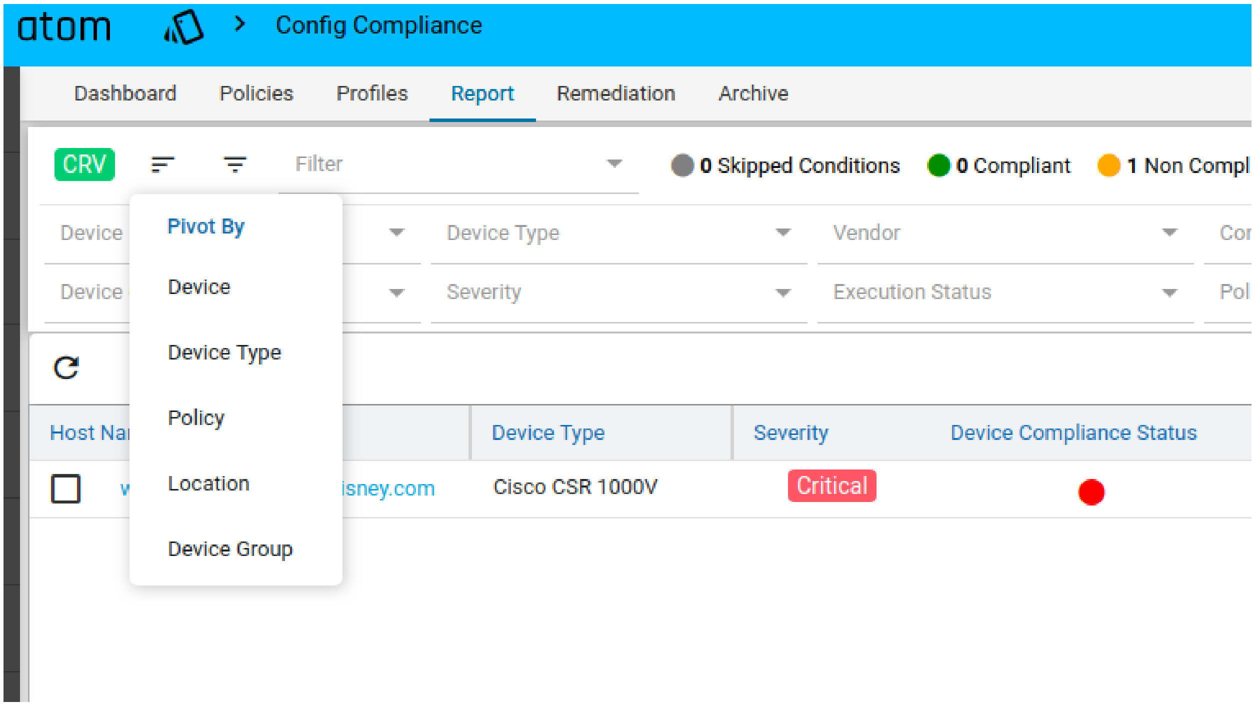


ip_domain_name_filter

1 Of 1

Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id
□ wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.3.30

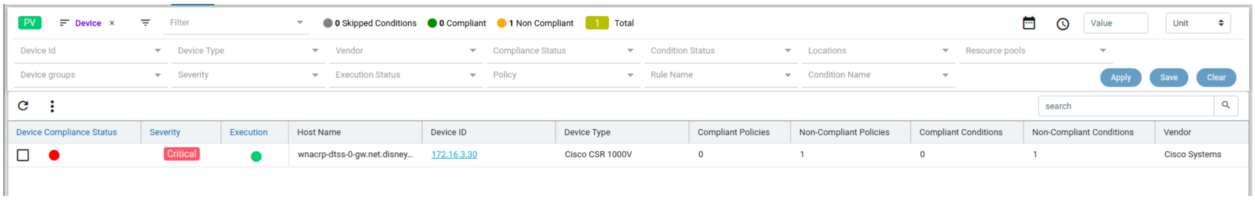
ATOM also provides an option to view the statistics based on Pivot by Device, Device Type, Policy, Location and Device Group.



Host Na		Device Type	Severity	Device Compliance Status
□	w isney.com	Cisco CSR 1000V	Critical	●

Users can opt for any view that they are interested in.

Pivot by device

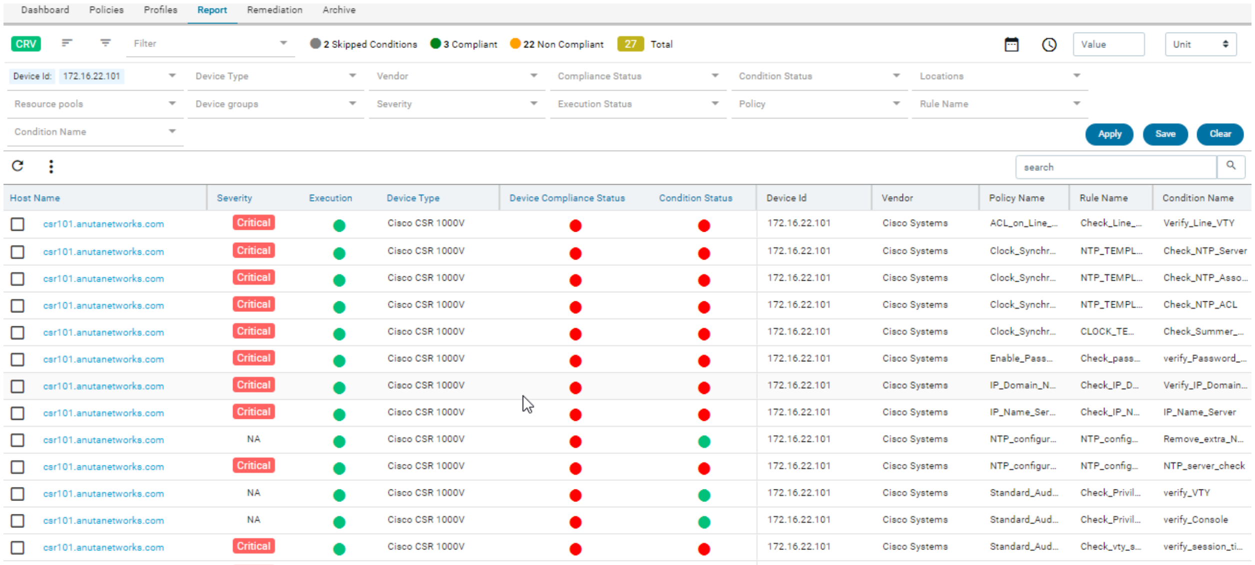


Device Compliance Status	Severity	Execution	Host Name	Device ID	Device Type	Compliant Policies	Non-Compliant Policies	Compliant Conditions	Non-Compliant Conditions	Vendor
□ ●	Critical	●	wnacrp-dtss-0-gw.net.disney...	172.16.3.30	Cisco CSR 1000V	0	1	0	1	Cisco Systems

Severity: The aggregated severity of that particular device.
Compliant Policies: The number of policies that are compliant against the device.
Non-Compliant Policies: The number of policies that are non-compliant against the device.

Compliant Conditions: The number of Conditions that are complaint against the device
Non-Compliant Conditions: The number of Condition that are non-compliant against the device
Device ID: Displays all Device Ids for which compliance has run. This is the context column for pivot by device.
Execution status: Based on execution on device it is updated as Successful, errors,stale config, empty config, config pull failed, offline device.
Hostname: Hostname of a device is displayed here.
Device compliance status: Based on compliance run, for a device it is updated as Compliant, non-compliant, Not applicable.
Device Type: The device type of a device is displayed(like cisco csr 1000v , cisco 891).
Vendor: vendors of device are displayed here (like cisco, juniper)

On clicking on the Device ID, Device ID filter gets applied and the user will be navigated to CRV.

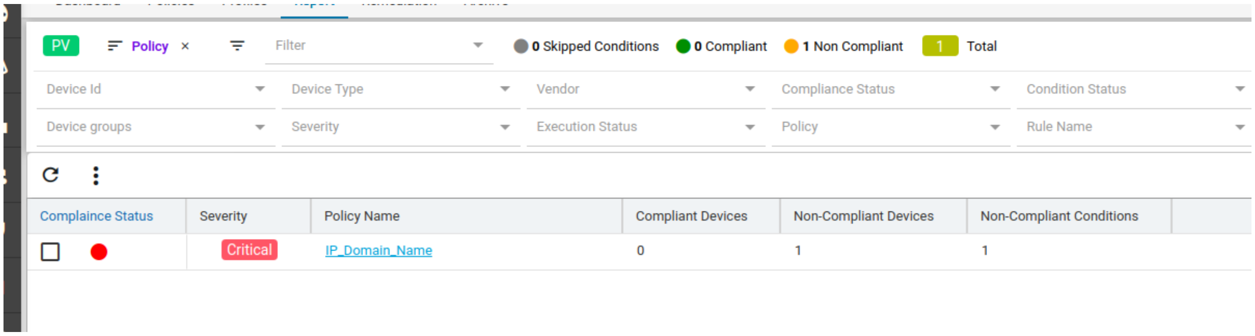


● 2 Skipped Conditions ● 3 Compliant ● 22 Non Compliant 27 Total

Device Id: 172.16.22.101

	Host Name	Severity	Execution	Device Type	Device Compliance Status	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Clock_Synchr...	NTP_TEMPL...	Check_NTP_Server
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Clock_Synchr...	NTP_TEMPL...	Check_NTP_Asso...
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Clock_Synchr...	NTP_TEMPL...	Check_NTP_ACL
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Clock_Synchr...	CLOCK_TE...	Check_Summer_...
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Enable_Pass...	Check_pass...	verify_Password_...
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	IP_Domain_N...	Check_IP_D...	Verify_IP_Domain...
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	IP_Name_Ser...	Check_IP_N...	IP_Name_Server
□	csr101.anutanetworks.com	NA	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	NTP_configur...	NTP_config...	Remove_extra_N...
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	NTP_configur...	NTP_config...	NTP_server_check
□	csr101.anutanetworks.com	NA	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Standard_Aud...	Check_Privil...	verify_VTY
□	csr101.anutanetworks.com	NA	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Standard_Aud...	Check_Privil...	verify_Console
□	csr101.anutanetworks.com	Critical	●	Cisco CSR 1000V	●	●	172.16.22.101	Cisco Systems	Standard_Aud...	Check_vty_s...	verify_session_ti...

Pivot By Policy



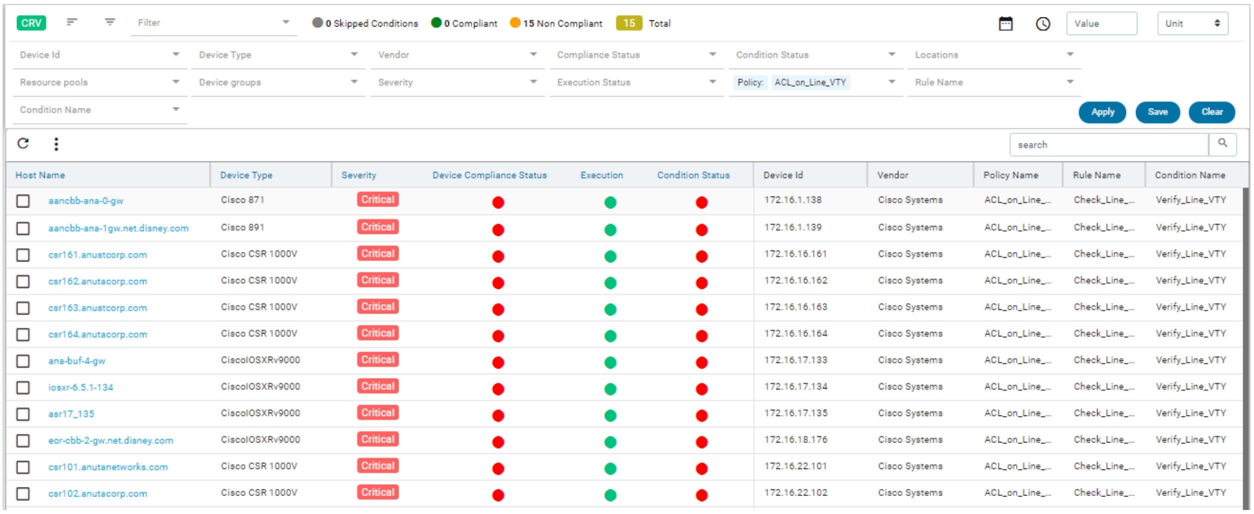
● 0 Skipped Conditions ● 0 Compliant ● 1 Non Compliant 1 Total

	Complaince Status	Severity	Policy Name	Compliant Devices	Non-Compliant Devices	Non-Compliant Conditions
□	●	Critical	IP_Domain_Name	0	1	1

Severity: The aggregated severity of that particular policy.
Compliant Devices: The number of devices that are compliant against the policy.
Non-Compliant Devices: The number of devices that are non-compliant against the policy.

Non-Compliant Conditions: The number of conditions that are non-compliant against the policy.
Policy Name: Displays all policies for which compliance is run**.** This is the context column for pivot by policy.
Compliance status: Based on policy, it is updated as compliant or non-compliant.

On clicking on the policy, the policy filter gets applied and the user will be navigated to CRV.



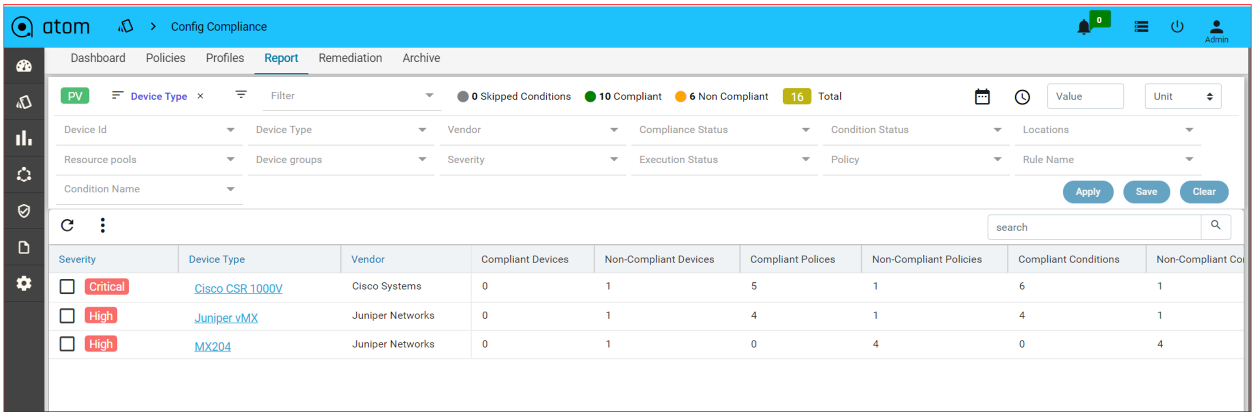
	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name
□	aancbb-ana-0-gw	Cisco 871	Critical	🔴	🟢	🔴	172.16.1.138	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	aancbb-ana-1gw.net.disney.com	Cisco 891	Critical	🔴	🟢	🔴	172.16.1.139	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr161.anustcorp.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.16.161	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr162.anutacorp.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.16.162	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr163.anustcorp.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.16.163	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr164.anutacorp.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.16.164	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	ana-buf-4-gw	CiscoIOSXRv9000	Critical	🔴	🟢	🔴	172.16.17.133	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	iosxr-6.5.1-134	CiscoIOSXRv9000	Critical	🔴	🟢	🔴	172.16.17.134	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	asr17_135	CiscoIOSXRv9000	Critical	🔴	🟢	🔴	172.16.17.135	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	eor-cbb-2-gw.net.disney.com	CiscoIOSXRv9000	Critical	🔴	🟢	🔴	172.16.18.176	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr101.anutanetworks.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.22.101	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY
□	csr102.anutacorp.com	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.22.102	Cisco Systems	ACL_on_Line_...	Check_Line_...	Verify_Line_VTY

Pivot By Device Type:

Severity: The aggregated severity of that particular device type
Device type: Displays all device types available in compliance. This is the context column for pivot by device type.
Vendor: Displays the vendors available in compliance .
Compliant Device: The number of devices that are compliant against the device type
Non-compliant device: The number of devices that are non-compliant against the device type.

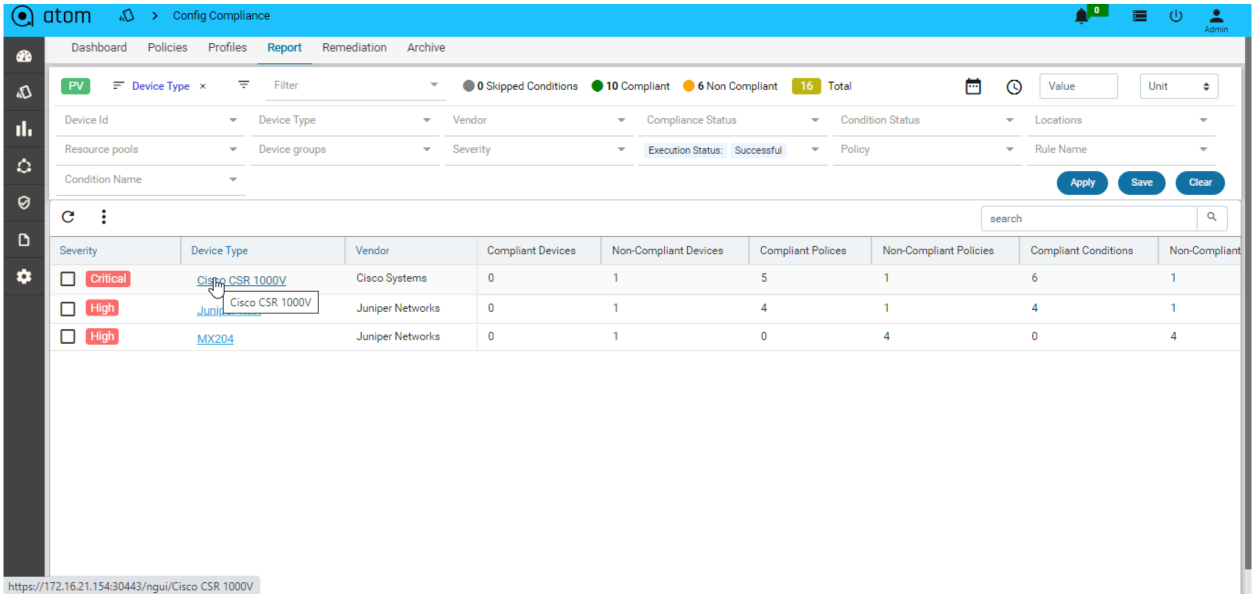
Compliant policies: The number of policies that are compliant against the device type
Non-Compliant policies: The number of policies that are non-compliant against the device type
Compliant Condition: The number of conditions that are compliant against the device type.

Non-compliant Condition: The number of conditions that are non-compliant against the device type.



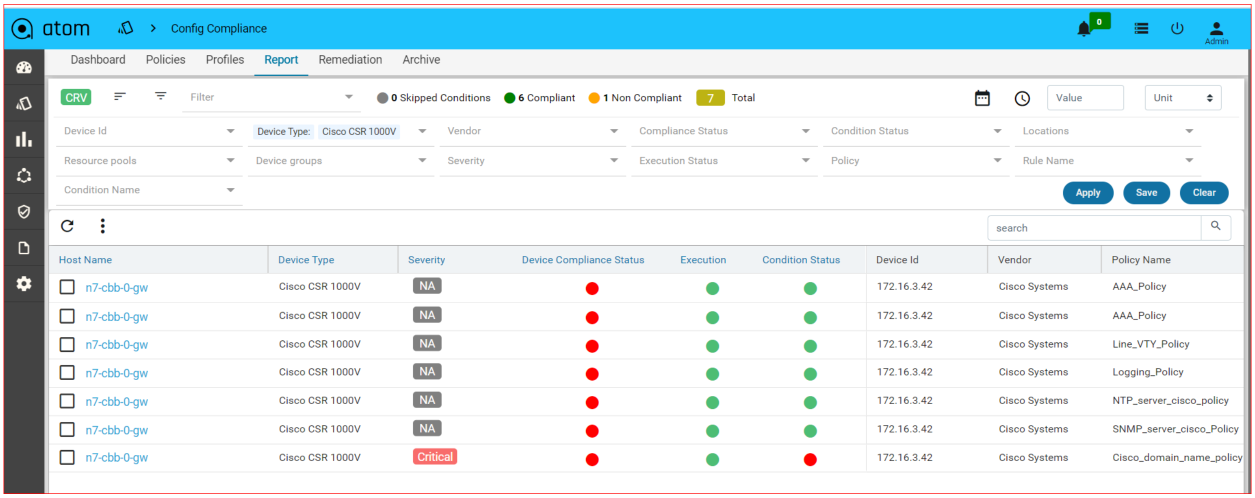
Severity	Device Type	Vendor	Compliant Devices	Non-Compliant Devices	Compliant Polices	Non-Compliant Policies	Compliant Conditions	Non-Compliant Co
□ Critical	Cisco CSR 1000V	Cisco Systems	0	1	5	1	6	1
□ High	Juniper vMX	Juniper Networks	0	1	4	1	4	1
□ High	MX204	Juniper Networks	0	1	0	4	0	4

Click on device type> Cisco CSR 1000v here



Severity	Device Type	Vendor	Compliant Devices	Non-Compliant Devices	Compliant Polices	Non-Compliant Policies	Compliant Conditions	Non-Compliant
□ Critical	Cisco CSR 1000V	Cisco Systems	0	1	5	1	6	1
□ High	Juni	Juniper Networks	0	1	4	1	4	1
□ High	MX204	Juniper Networks	0	1	0	4	0	4

On clicking on the Device Type, Device Type filter gets applied and the user will be navigated to CRV.

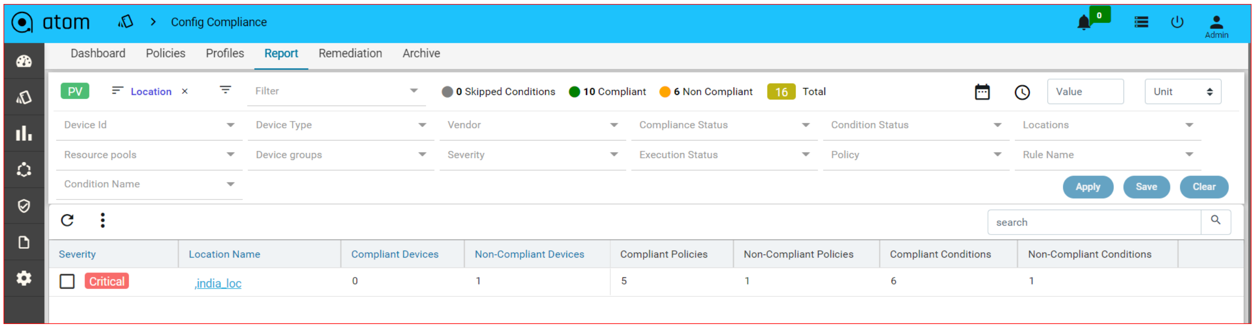


Device Type: Cisco CSR 1000V

0 Skipped Conditions 6 Compliant 1 Non Compliant 7 Total

Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	AAA_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	AAA_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	Line_VTY_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	Logging_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	NTP_server_cisco_policy
□ n7-cbb-0-gw	Cisco CSR 1000V	NA	🔴	🟢	🟢	172.16.3.42	Cisco Systems	SNMP_server_cisco_Policy
□ n7-cbb-0-gw	Cisco CSR 1000V	Critical	🔴	🟢	🔴	172.16.3.42	Cisco Systems	Cisco_domain_name_policy

Pivot By Location:



Location ×

0 Skipped Conditions 10 Compliant 6 Non Compliant 16 Total

Severity	Location Name	Compliant Devices	Non-Compliant Devices	Compliant Policies	Non-Compliant Policies	Compliant Conditions	Non-Compliant Conditions
□ Critical	india_loc	0	1	5	1	6	1

Severity: The aggregated severity of that particular locations

Location Name: Displays all available locations over which compliance is run.This is the context column for pivot by location.

Compliant Devices: The number of devices that are compliant against locations

Non-Compliant Devices: The number of devices that are non-compliant against locations

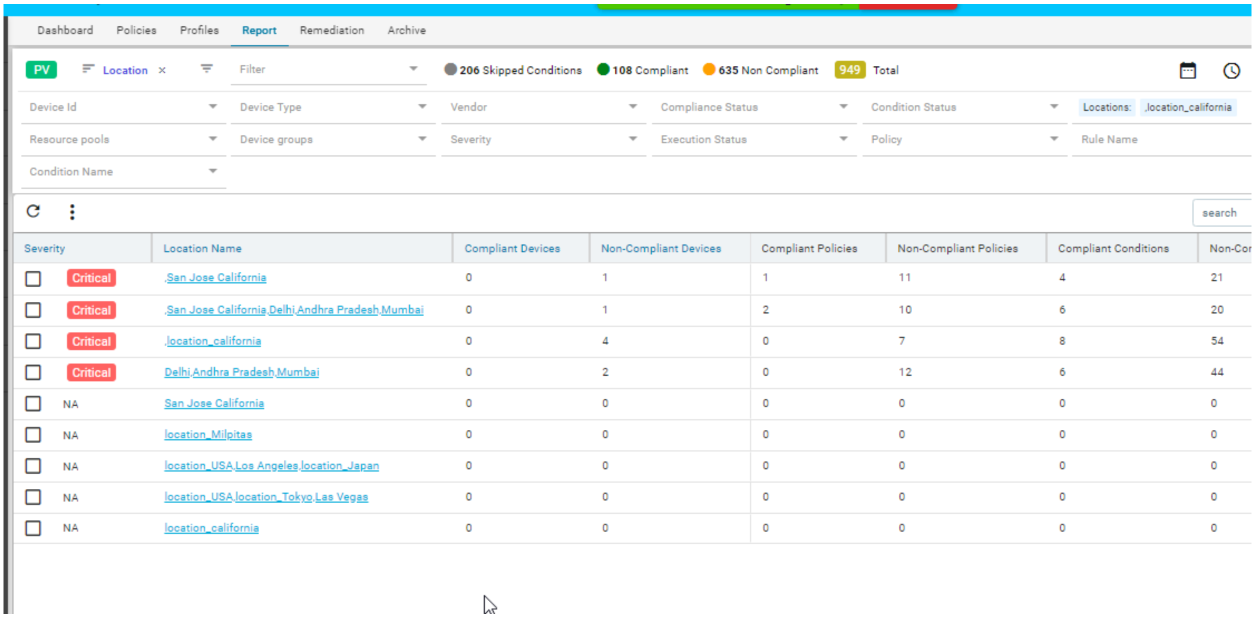
Compliant Policies: The number of policies that are compliant against locations

Non-compliant Policies: The number of policies that are non-compliant against locations

Compliant Condition: The number of conditions that are compliant against locations

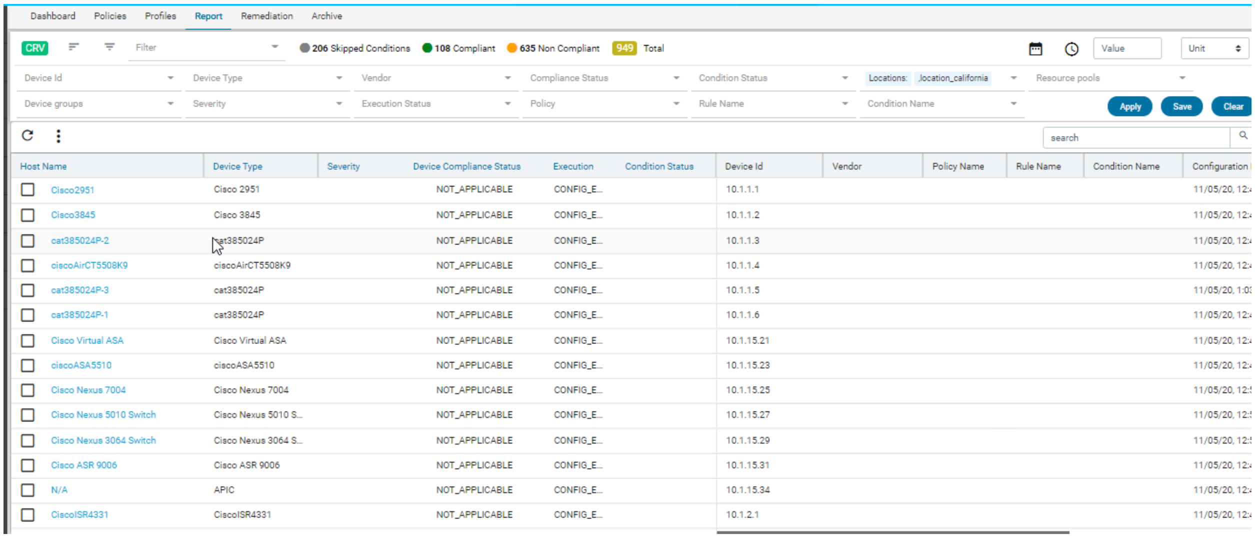
Non-Compliant Condition: The number of conditions that are non- compliant against locations

Click on any of location name



Severity	Location Name	Compliant Devices	Non-Compliant Devices	Compliant Policies	Non-Compliant Policies	Compliant Conditions	Non-Cor
□ Critical	,San Jose California	0	1	1	11	4	21
□ Critical	,San Jose California,Delhi,Andhra Pradesh,Mumbai	0	1	2	10	6	20
□ Critical	,location_california	0	4	0	7	8	54
□ Critical	Delhi,Andhra Pradesh,Mumbai	0	2	0	12	6	44
□ NA	San Jose California	0	0	0	0	0	0
□ NA	location_Milpitas	0	0	0	0	0	0
□ NA	location_USA,Los Angeles,location_Japan	0	0	0	0	0	0
□ NA	location_USA,location_Tokyo,Las Vegas	0	0	0	0	0	0
□ NA	location_california	0	0	0	0	0	0

on clicking on the location name, the location filter gets applied and the user will be navigated to CRV.

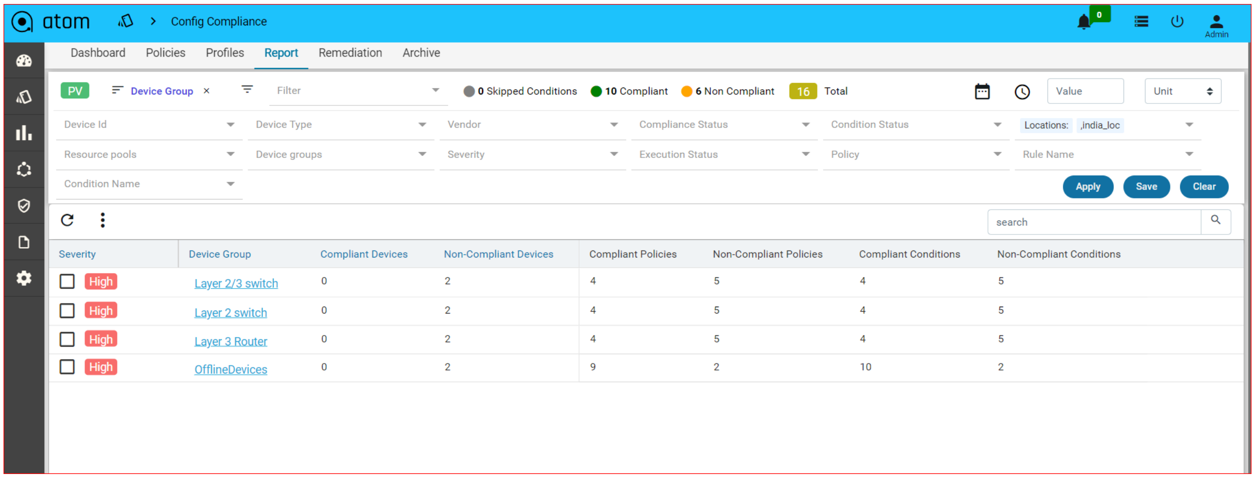


Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name	Configuration
□ Cisco2951	Cisco 2951		NOT_APPLICABLE	CONFIG_E...		10.1.1.1					11/05/20, 12:
□ Cisco3845	Cisco 3845		NOT_APPLICABLE	CONFIG_E...		10.1.1.2					11/05/20, 12:
□ cat385024P-2	cat385024P		NOT_APPLICABLE	CONFIG_E...		10.1.1.3					11/05/20, 12:
□ ciscoAirCT5508K9	ciscoAirCT5508K9		NOT_APPLICABLE	CONFIG_E...		10.1.1.4					11/05/20, 12:
□ cat385024P-3	cat385024P		NOT_APPLICABLE	CONFIG_E...		10.1.1.5					11/05/20, 1:0
□ cat385024P-1	cat385024P		NOT_APPLICABLE	CONFIG_E...		10.1.1.6					11/05/20, 12:
□ Cisco Virtual ASA	Cisco Virtual ASA		NOT_APPLICABLE	CONFIG_E...		10.1.15.21					11/05/20, 12:
□ ciscoASA5510	ciscoASA5510		NOT_APPLICABLE	CONFIG_E...		10.1.15.23					11/05/20, 12:
□ Cisco Nexus 7004	Cisco Nexus 7004		NOT_APPLICABLE	CONFIG_E...		10.1.15.25					11/05/20, 12:
□ Cisco Nexus 5010 Switch	Cisco Nexus 5010 S...		NOT_APPLICABLE	CONFIG_E...		10.1.15.27					11/05/20, 12:
□ Cisco Nexus 3064 Switch	Cisco Nexus 3064 S...		NOT_APPLICABLE	CONFIG_E...		10.1.15.29					11/05/20, 12:
□ Cisco ASR 9006	Cisco ASR 9006		NOT_APPLICABLE	CONFIG_E...		10.1.15.31					11/05/20, 12:
□ N/A	APIC		NOT_APPLICABLE	CONFIG_E...		10.1.15.34					11/05/20, 12:
□ CiscoISR4331	CiscoISR4331		NOT_APPLICABLE	CONFIG_E...		10.1.2.1					11/05/20, 12:

Adding the same device in multiple resource pools and each RP associated with a different location, all locations will be listed in pivot views.

Adding the same device in two resource pools and associate one RP with location and another RP with no location, only location associated with RP will be listed.

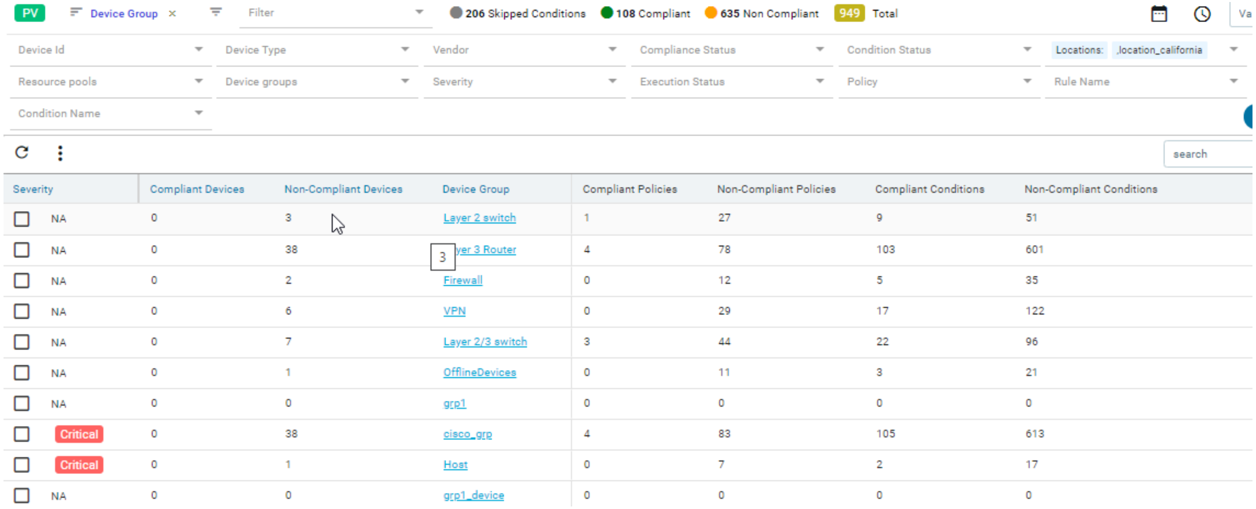
Pivot By Device Group:



Severity	Device Group	Compliant Devices	Non-Compliant Devices	Compliant Policies	Non-Compliant Policies	Compliant Conditions	Non-Compliant Conditions
□ High	Layer 2/3 switch	0	2	4	5	4	5
□ High	Layer 2 switch	0	2	4	5	4	5
□ High	Layer 3 Router	0	2	4	5	4	5
□ High	OfflineDevices	0	2	9	2	10	2

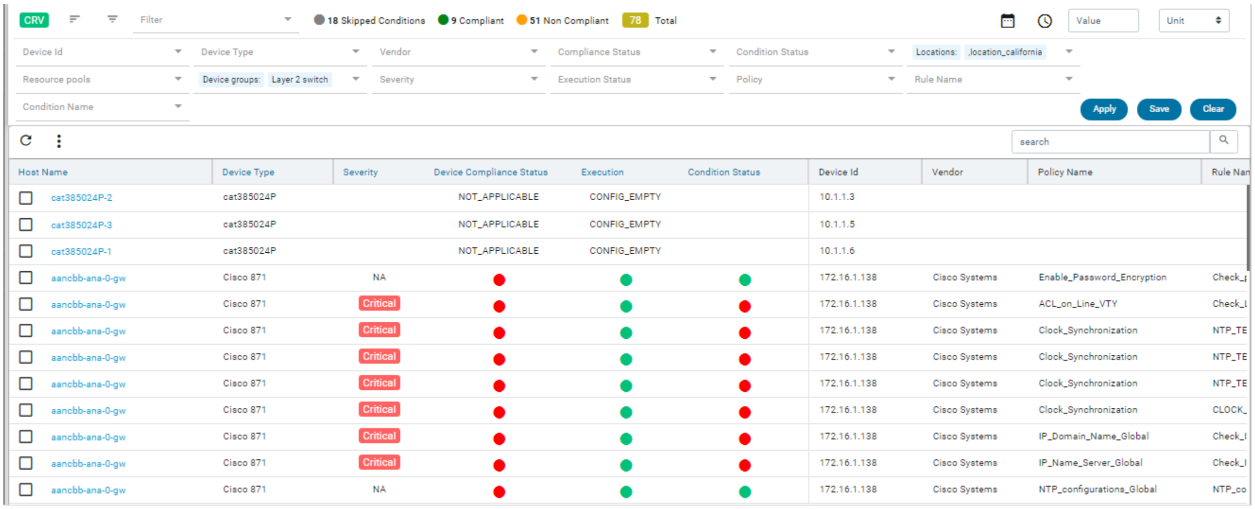
Severity: The aggregated severity of that particular Device group
Device Group: Displays all available device groups over which compliance is run. This is the context column for pivot by device group.
Devices in group: This gives the number of devices in a group
Compliant Devices: The number of devices that are compliant against device groups
Non-Compliant Devices: The number of devices that are non-compliant against device groups
Compliant Policies: The number of policies that are compliant against device groups
Non-compliant Policies: The number of policies that are non-compliant against device groups
Compliant Condition: The number of conditions that are compliant against device groups
Non-Compliant Condition: The number of conditions that are non- compliant against device groups.

Click on any of device groups



Severity	Compliant Devices	Non-Compliant Devices	Device Group	Compliant Policies	Non-Compliant Policies	Compliant Conditions	Non-Compliant Conditions
□ NA	0	3	Layer 2 switch	1	27	9	51
□ NA	0	38	yer 3 Router	4	78	103	601
□ NA	0	2	Firewall	0	12	5	35
□ NA	0	6	VPN	0	29	17	122
□ NA	0	7	Layer 2/3 switch	3	44	22	96
□ NA	0	1	OfflineDevices	0	11	3	21
□ NA	0	0	grp1	0	0	0	0
□ Critical	0	38	cisco_grp	4	83	105	613
□ Critical	0	1	Host	0	7	2	17
□ NA	0	0	grp1_device	0	0	0	0

On clicking on the device group, the device group filter gets applied and the user will be navigated to CRV.



18 Skipped Conditions 9 Compliant 51 Non Compliant 78 Total

Locations: ,location_california

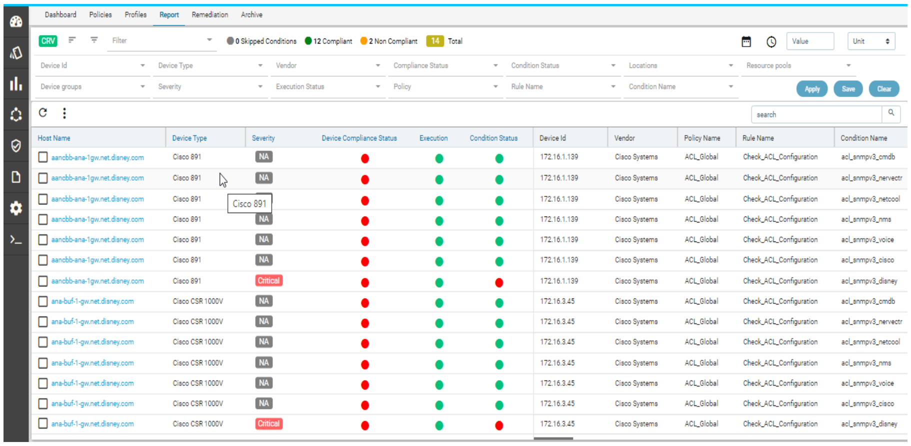
Device groups: Layer 2 switch

	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Nan
□	cat385024P-2	cat385024P		NOT_APPLICABLE	CONFIG_EMPTY		10.1.1.3			
□	cat385024P-3	cat385024P		NOT_APPLICABLE	CONFIG_EMPTY		10.1.1.5			
□	cat385024P-1	cat385024P		NOT_APPLICABLE	CONFIG_EMPTY		10.1.1.6			
□	aancbb-ana-0-gw	Cisco 871	NA	●	●	●	172.16.1.138	Cisco Systems	Enable_Password_Encryption	Check_
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	ACL_on_Line_VTY	Check_
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	Clock_Synchronization	NTP_TE
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	Clock_Synchronization	NTP_TE
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	Clock_Synchronization	NTP_TE
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	Clock_Synchronization	CLOCK_
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	IP_Domain_Name_Global	Check_I
□	aancbb-ana-0-gw	Cisco 871	Critical	●	●	●	172.16.1.138	Cisco Systems	IP_Name_Server_Global	Check_I
□	aancbb-ana-0-gw	Cisco 871	NA	●	●	●	172.16.1.138	Cisco Systems	NTP_configurations_Global	NTP_co

pivot view :

- Single pivot view can be selected.(no multi pivot view selection)
- Upon selecting a pivot view, further filters like device id, device type, vendor, compliance status,condition status,location,resource pool, device groups,severity,execution status,policy, rule name, condition name can be applied.
- Just with the pivot views, a filter can't be saved, Based on further filters applied, a filter can be saved. The saved filter can be deleted.
- Bulk delete is not supported in pivot views
- Remediation is not supported
- Sorting is not supported on any column in pivot view.
- Searching is not supported in pivot view.
- The counts on top are related to the non- pivot views and labels are from condition status
- Export: based on pivot views, the records can be exported.

CRV(conditional report view) :



0 Skipped Conditions 12 Compliant 2 Non Compliant 14 Total

	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Condition Name
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_cmdb
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_nervectr
□	aancbb-ana-1gw.net.disney.com	Cisco 891		●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_netcool
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_nms
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_voice
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_cisco
□	aancbb-ana-1gw.net.disney.com	Cisco 891	Critical	●	●	●	172.16.1.139	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_disney
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_cmdb
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_nervectr
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_netcool
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_nms
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_voice
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_cisco
□	ana-buf-1-gw.net.disney.com	Cisco CSR 1000V	Critical	●	●	●	172.16.3.45	Cisco Systems	ACL_Global	Check_ACL_Configuration	acl_snmpv3_disney

- The available columns are: Hostname, Severity, Execution, Device Type, Device compliance status, condition status, Device id, Vendor, Policy name, Rulename, Condition name, Configuration retrieved at, Expected pattern, Enforcement time.
- The data can be filtered by applying filters on device id, device type, vendor, compliance status,condition-status,location,resourcepool, device groups,severity,execution status,policy, rule name and condition name.
- Time based filtering : For timing based, user can use value and units(Days,weeks,months, hours, minutes) fields.

  Date wise filter: User can choose the date from the calendar symbol and click on 'apply' in the calendar.
- Count band - Represents counts for skipped, compliant, and non compliant conditions

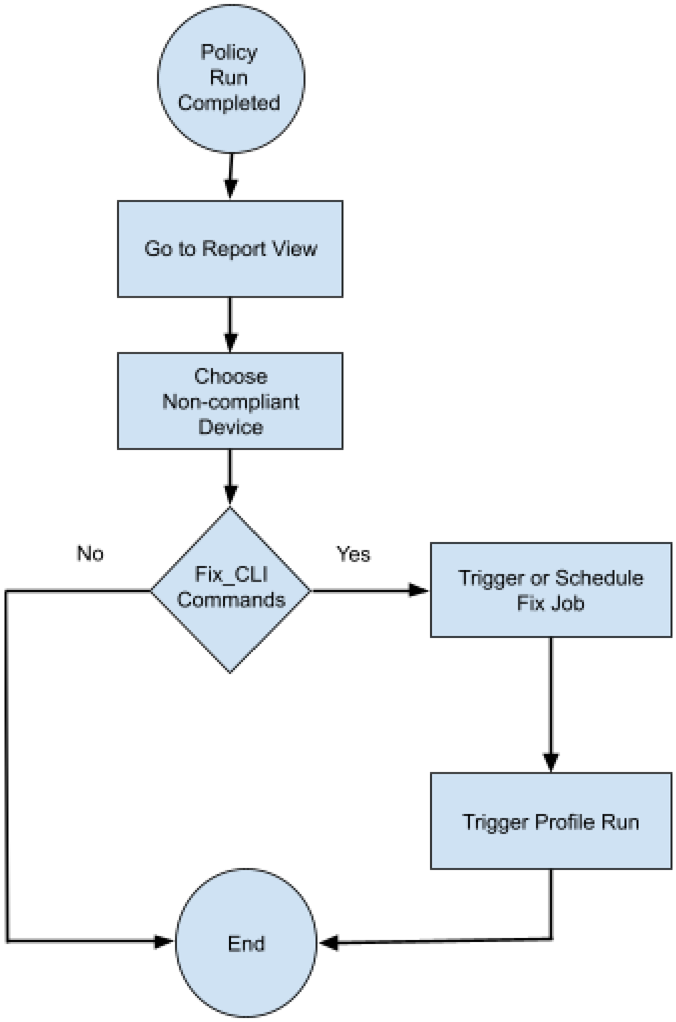
    - Skipped conditions - Platform mismatch and Execution Status (Stale Config, Empty Config, Erros, Config Pull Failed, Offline Device) fall into this category.
    - Complaint conditions - Based on conditions meeting the criteria
    - Non- compliant conditions -Based on conditions meeting the criteria and violations chosen

- Multi-selection on filters is supported - More than one entry for a given filter can be selected.
- Sorting is enabled on all columns.
- Searching is enabled for all columns.
- The record details are listed when the checkbox for a given entry is selected. Device ID, Device host name, Device type, Vendor, Device compliance status, Execution status, Config time, Policy name, Rule name, Condition ID, Condition status, Expected pattern, Action Details, Remediation commands(if it's non-compliant) are shown as part of details.

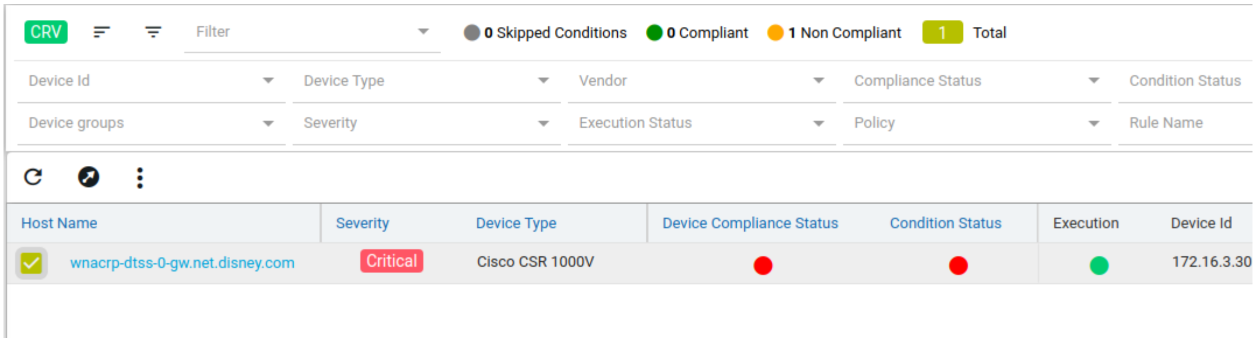
Remediation :

Navigate to Resource Manager > Config Compliance -> Remediation

Fix CLI Action will generate the remediation CLI to be applied for each non-compliant device. Users can schedule remediation on one or more devices or execute it right away. For each device selected, ATOM will push remediation CLI to the device.

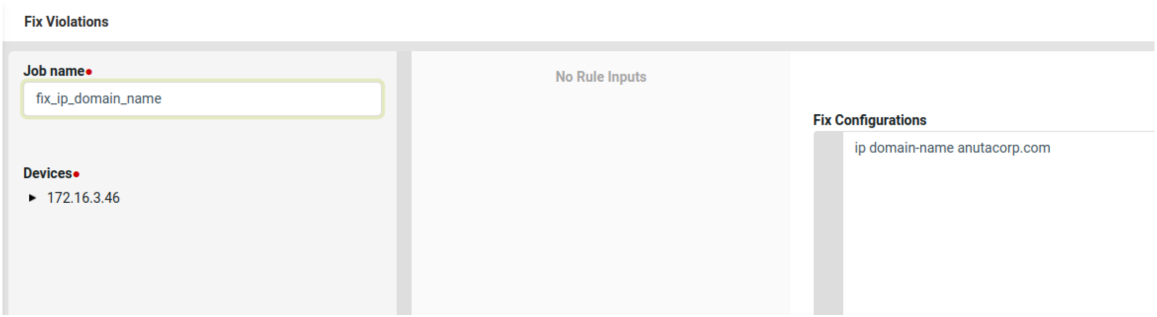


a. Select a Report and click on the highlighted arrow for navigating to the Remediation screen.
Only if it is non- compliant, user will be taken to the remediation screen.



Host Name	Severity	Device Type	Device Compliance Status	Condition Status	Execution	Device Id
☑ wnacrp-dtss-0-gw.net.disney.com	Critical	Cisco CSR 1000V	●	●	●	172.16.3.30

b. Fix Violations by providing a Job name and verify rule-input values and fix CLI commands under *Fix Configurations*. Click on the tick button to complete fix-job.



Fix Violations

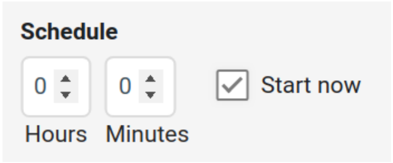
Job name• fix_ip_domain_name

Devices•
▸ 172.16.3.46

No Rule Inputs

Fix Configurations
ip domain-name anutacorp.com

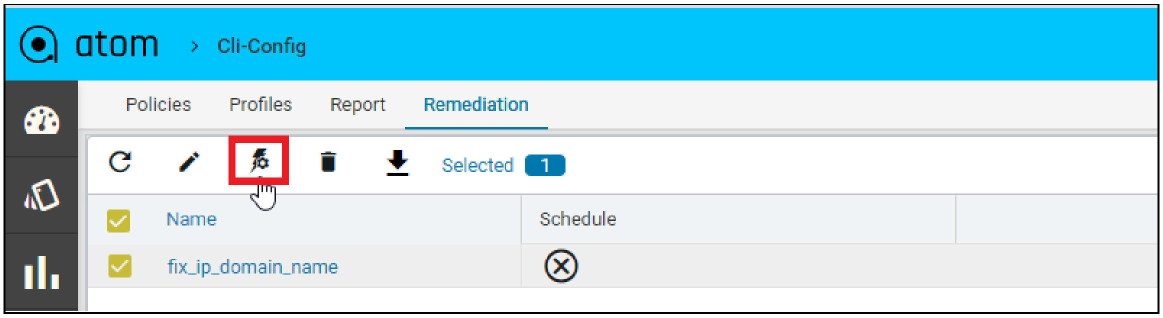
c. Fix Job can be scheduled using the Schedule option or can be initiated immediately by enabling Start now. And click on the Tick button to initiate a fix-job.



Schedule

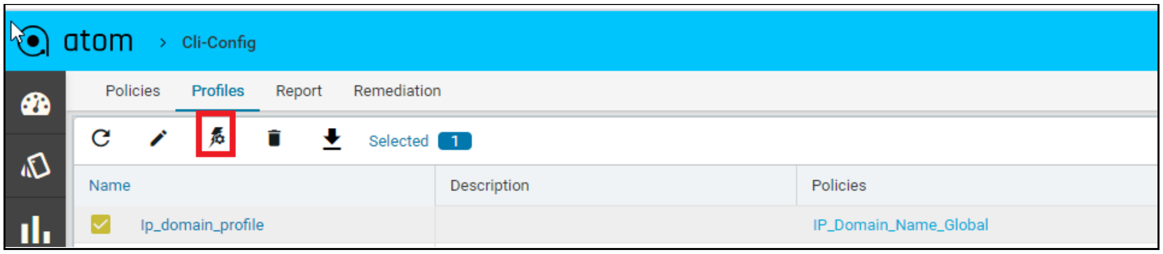
0 Hours 0 Minutes ☑ Start now

1. Fix job can be initiated from the Remediation tab as well at a later point of time.



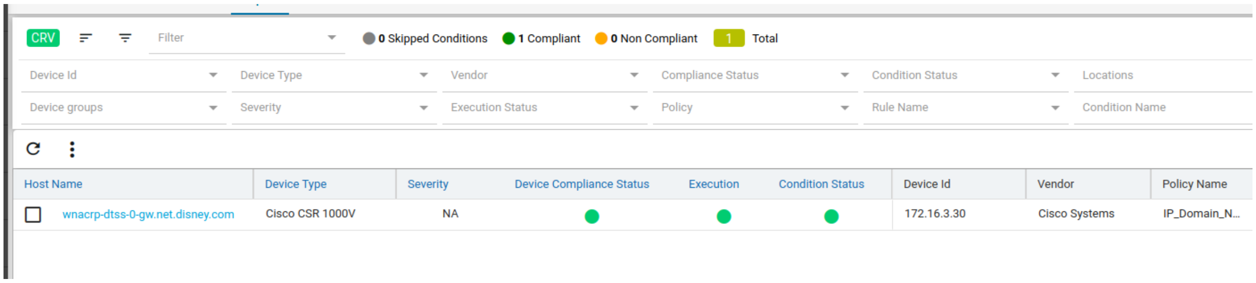
☑	Name	Schedule
☑	fix_ip_domain_name	⊗

d. After remediation, trigger profile job and validate the report to see if the device came back as a complaint.



Name	Description	Policies
☑ Ip_domain_profile		IP_Domain_Name_Global

e. Below we can see the device is now back to complaint after fixing violations.



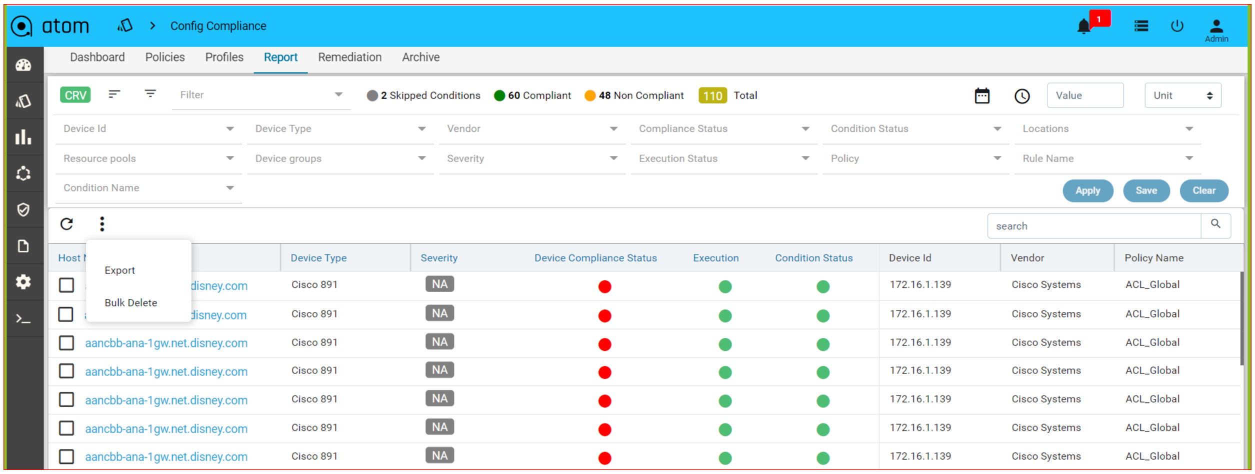
CRV Filter ● 0 Skipped Conditions ● 1 Compliant ● 0 Non Compliant 1 Total

	Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
□	wnacrp-dtss-0-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.30	Cisco Systems	IP_Domain_N...

Remediation is not supported when the user is in pivot view.

Bulk delete:

Navigate to Resource Manager > Config Compliance -> reports(CRV)



CRV Filter ● 2 Skipped Conditions ● 60 Compliant ● 48 Non Compliant 110 Total

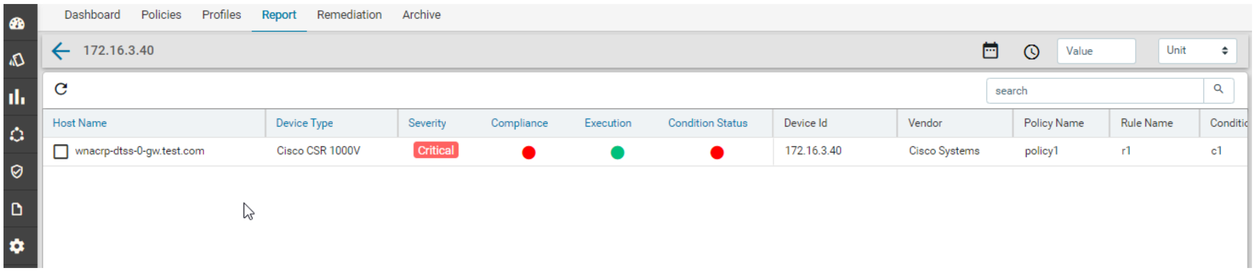
	Host N...	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
□	disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□	aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global

In order to delete the records at shot bulk delete is used.
Based on filters applied, records can be deleted

- If the filter is on Device(device id/ device group/ device Type) And invoke Bulk delete, all the records related to devices are deleted.
- If the filter is on Policy and Bulk delete is invoked,all the records Related to policies across all devices are deleted.(columns like Policy, rule, condition, expected pattern, enforcement time- empty)
- If the filter is on device + policy and bulk delete is invoked, all the records related to policies across all devices are deleted but Device is not deleted.(columns like Policy, rule, condition, expected pattern, enforcement time- empty)
- If the filter is policy+rule+condition, where there are many rules or many conditions, records are deleted at policy level only.(records having the selected policies are deleted irrespective of rule or condition)

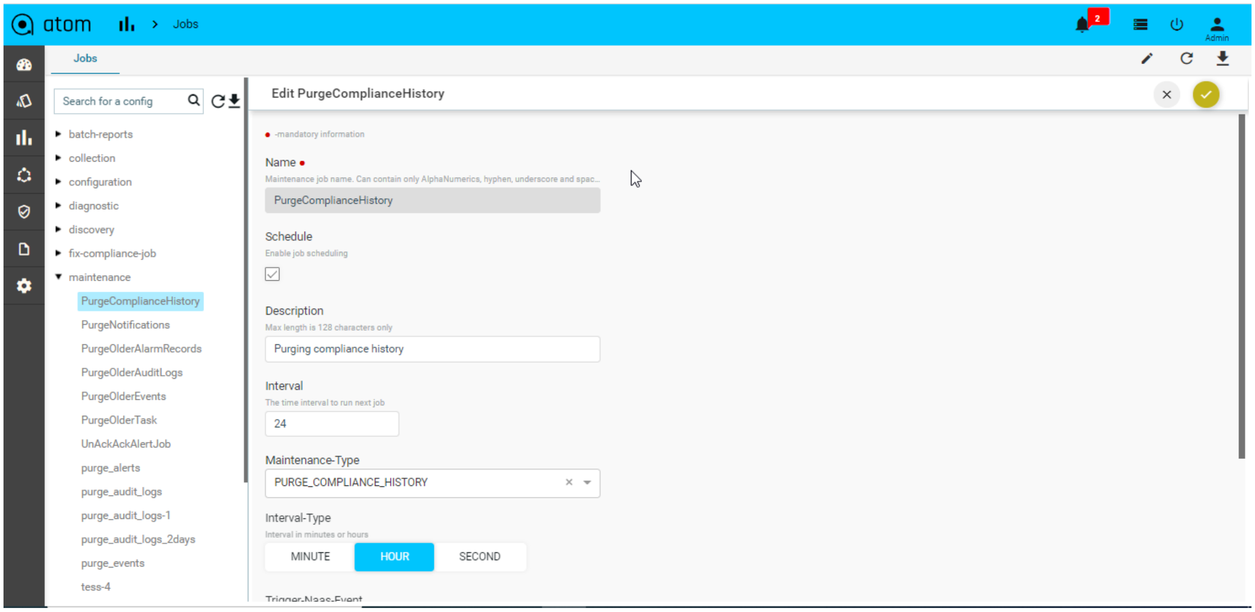
Purge compliance history:

In order to delete history details, we can use purge compliance history under Monitoring--> jobs⟶ Maintenance⟶ purge compliance history..



172.16.3.40

Host Name	Device Type	Severity	Compliance	Execution	Condition Status	Device Id	Vendor	Policy Name	Rule Name	Conditic
□ wnacrp-dtss-0-gw.test.com	Cisco CSR 1000V	Critical	●	●	●	172.16.3.40	Cisco Systems	policy1	r1	c1



Edit PurgeComplianceHistory

● -mandatory information

Name ●
Maintenance job name. Can contain only AlphaNumerics, hyphen, underscore and spac...
PurgeComplianceHistory

Schedule
Enable job scheduling
☑

Description
Max length is 128 characters only
Purging compliance history

Interval
The time interval to run next job
24

Maintenance-Type
PURGE_COMPLIANCE_HISTORY

Interval-Type
Interval in minutes or hours
MINUTE [✓ HOUR] SECOND

Trigger-Naas-Event

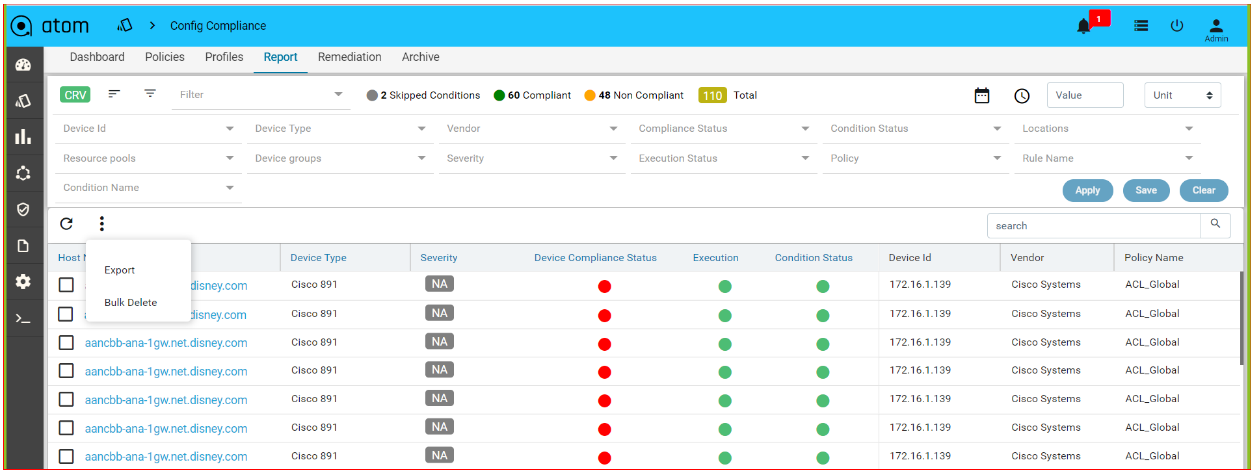
Say, the threshold is 60 and it is set for days. When this job is run, it deletes all the record history details that are older than 60 days.

It can be set in hours too.

Export:

Navigate to Resource Manager > Config Compliance -> reports(CRV/Pivot)

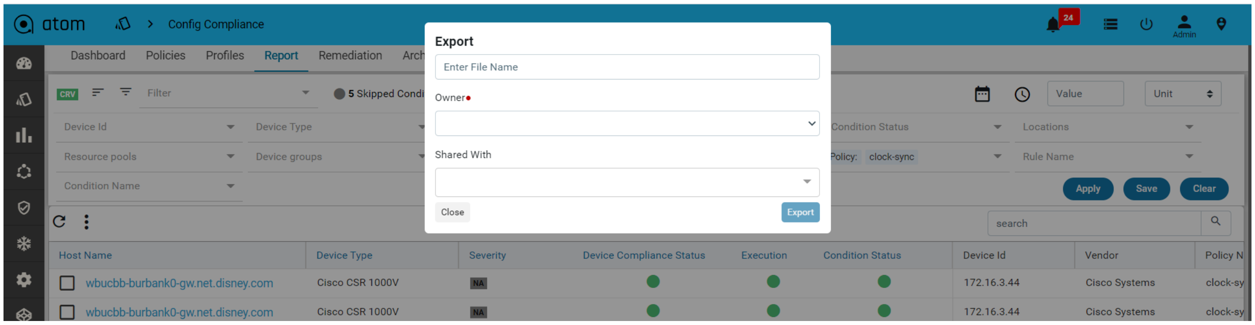
Using export will get report for all the records at one shot



Host N	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy Name
□ disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global
□ aancbb-ana-1gw.net.disney.com	Cisco 891	NA	●	●	●	172.16.1.139	Cisco Systems	ACL_Global

Upon applying filters and the user does export, then the user can get only those records. Without applying filters, if the user does export, all records are exported.

Provide a name to export file to be saved



Export

Enter File Name

Owner•

Shared With

Close

Export

Host Name	Device Type	Severity	Device Compliance Status	Execution	Condition Status	Device Id	Vendor	Policy N
□ wbucbb-burbank0-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.44	Cisco Systems	clock-sy
□ wbucbb-burbank0-gw.net.disney.com	Cisco CSR 1000V	NA	●	●	●	172.16.3.44	Cisco Systems	clock-sy

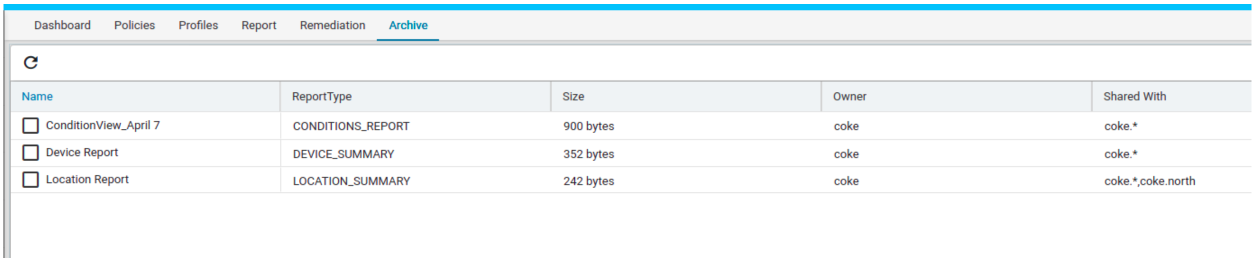
Export file will be saved in the archive tab.

Archive:

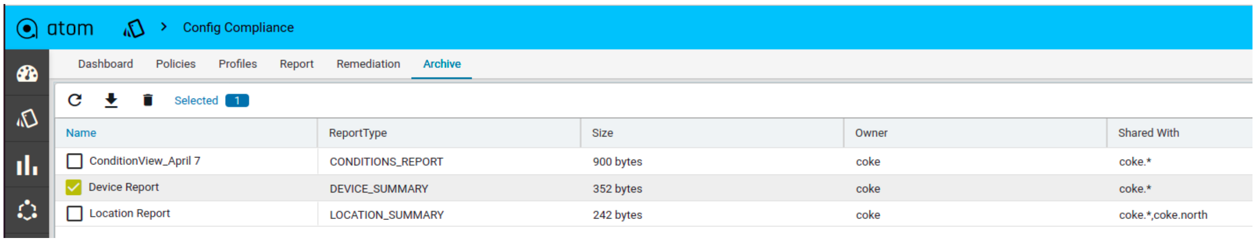
Navigate to Resource Manager > Config Compliance -> Archive

From here we can download the report and delete as well. File download format is CSV.

The headers of the downloaded csv report are according to the filter applied.
If pivot views are applied, the headers are according to it.



Name	ReportType	Size	Owner	Shared With
□ ConditionView_April 7	CONDITIONS_REPORT	900 bytes	coke	coke.*
□ Device Report	DEVICE_SUMMARY	352 bytes	coke	coke.*
□ Location Report	LOCATION_SUMMARY	242 bytes	coke	coke.*,coke.north

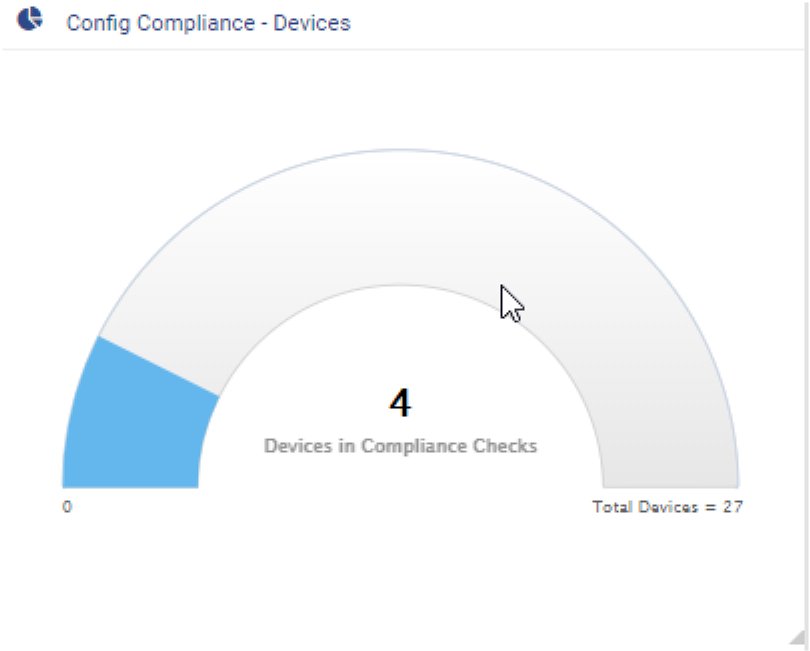


Name	ReportType	Size	Owner	Shared With
□ ConditionView_April 7	CONDITIONS_REPORT	900 bytes	coke	coke.*
☑ Device Report	DEVICE_SUMMARY	352 bytes	coke	coke.*
□ Location Report	LOCATION_SUMMARY	242 bytes	coke	coke.*,coke.north

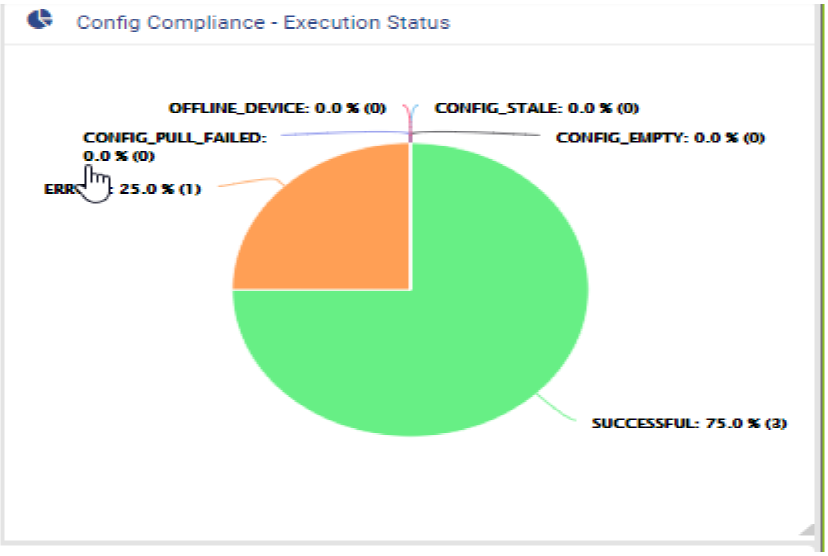
Dashboard

There are 5 Dashboards which gives a quick information about compliance status

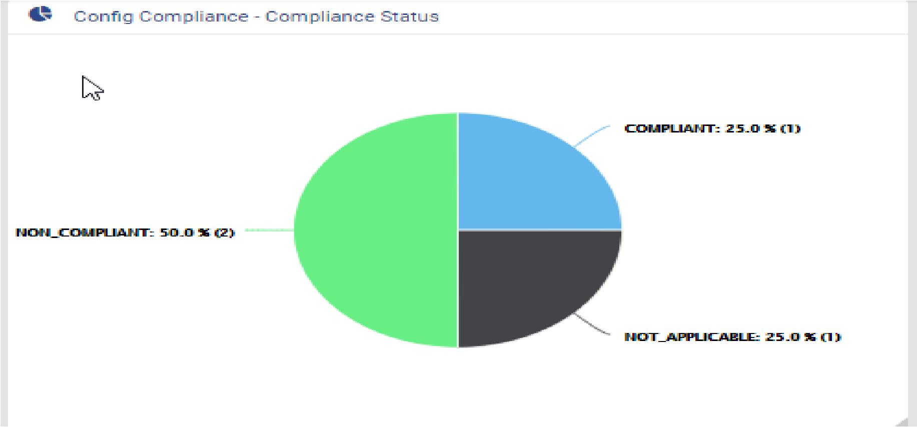
- Config compliance -devices: Representing the number of devices participated in compliance v/s all the available devices in ATOM.



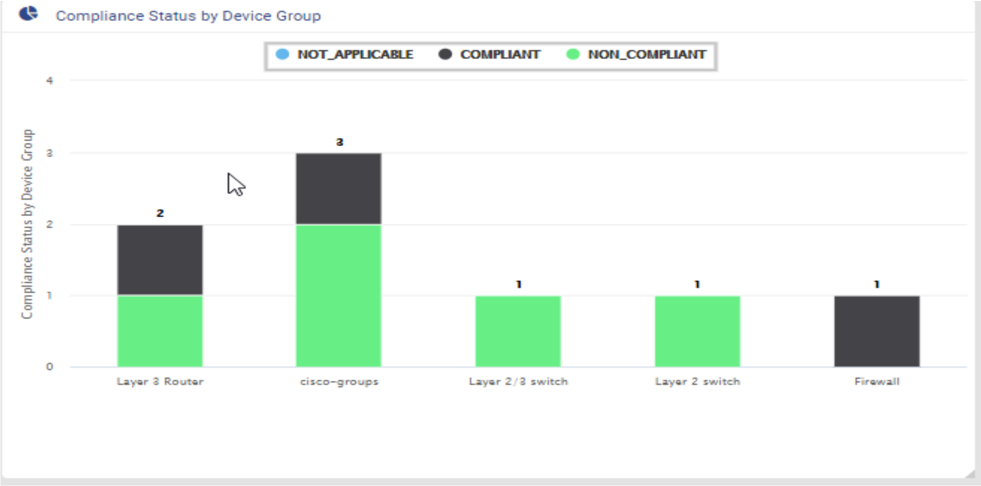
- Config compliance- execution status: A pie chart representing the percentage of execution status in terms of successful, config_empty, config_stale, errors, config_pull_failed, offline_device.


Config Compliance - Execution Status
OFFLINE_DEVICE: 0.0 % (0)
CONFIG_STALE: 0.0 % (0)
CONFIG_PULL_FAILED: 0.0 % (0)
CONFIG_EMPTY: 0.0 % (0)
ERR : 25.0 % (1)
SUCCESSFUL: 75.0 % (3)

- Config compliance- compliance status: A pie chart representing the percentage of compliance in terms of Complaint, Non- compliant, Not_applicable.

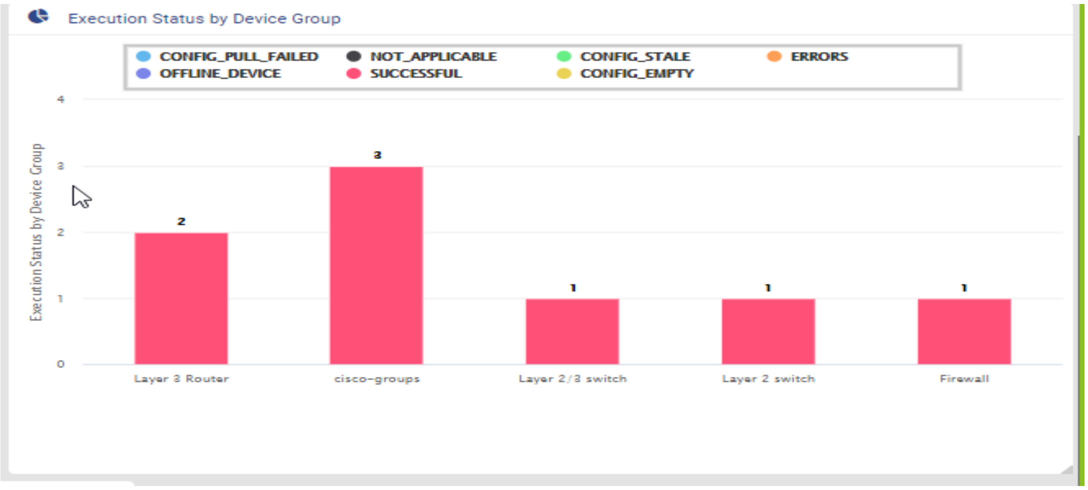


- Compliance status by group: A bar graph representing compliance status such as complaint, non-compliant, not_applicable for each and every device group on which compliance profile jobs are run.



- Execution status by device group: A bar graph representing execution status such as config pull failed, not applicable, config_stale, errors, offline device, successful, config_empty for each and every device group on which compliance profile jobs are run.

  Upon clicking on any of the dashboards, the user is navigated to CRV.



Upon clicking on any of the dashboards, the user is navigated to CRV.

FAQ’s

- We have a multi-vendor network, can ATOM help ensure compliance in my environment?

  ATOM supports compliance management for Cisco, Juniper and Fortigate at this point in time.

- We want to standardize the network configs even before introducing automation, can ATOM help?

  The standard configurations can be defined explicitly in ATOM's compliance framework. ATOM will perform compliance checks against the network and perform remediation in case of non-compliance to standardize the network configurations.

- We already have a platform which checks for compliance, but the remediation is manual, can ATOM help ?

  Yes, ATOM is capable of performing remediation on non-compliant devices. The Fix-CLI or derived CLIs can be scheduled or executed immediately to fix all non-compliance issues in the network.

- Can we schedule compliance checks periodically using ATOM ?

  Yes, the profiling section in ATOM's compliance framework supports scheduling of compliance checks against a device or a group of devices

- Can ATOM's compliance help in achieving regulatory compliance ?

  Yes, based on the policies that regulatory authorities specify, ATOM's compliance management framework can be configured to meet these requirements.

- We have multiple checks that need to be run on the network, can ATOM help handle this scenario ?

  ATOM’s profiling section supports grouping of multiple policies

Appendix

- ## Writing Jinja template configurations based on Test Result output

Below is a sample output from the test result obtained in Launching Test Config. This helps writing jinja2 templates as required in use case requirements.

```
{
 "compliance-policies": {
        "highest-severity": "",
        "rule-violation-count": 0,
        "compliance-status": "compliant",
        "compliant-rules-output": {
        "violated-conditions": "",
        "device-compliance-condition-output": {
        "block-start-unmatched-content": "<![CDATA[]]>",
        "block-start-condition-search-output": "<![CDATA[{
                "block_start_matched_contents" : []
        }]]>",
        "condition-search-output": "<![CDATA[{
             "matched_contents" : [ {
                "groups" : [ {
                "index" : 1,
                "grep_content" : "1.1.1.1",
                "grep_group" : 1
                } ]
             }, {
                "groups" : [ {
                "index" : 1,
                "grep_content" : "2.2.2.2",
                "grep_group" : 1
                } ]
             } ]
         }]]>",
        "total-block-count": 2,
        "aggregated-condition-ouput": "<![CDATA[{
        "condition_contents" : [ {
                "condition_id" : null,
                "block_start_matched_content" : null,
                "block_start_unmatched_content" : null,
                "unmatched_content" : null,
                "matched_content" : null
        } ]
        }]]>",
        "template-substituted-content": "<![CDATA[ntp server (?!10.0.0.1)(\d+.\d+.\d+.\d+)]]>",
        "block-unmatch-count": 0,
        "cli-match-output": "<![CDATA[ntp server 1.1.1.1
                ntp server 2.2.2.2
        ]]>",
        "condition-status": true,
        "unmatched-content": "<![CDATA[]]>",
        "id": "Remove_NTP_Extra_Config",
        "block-match-count": 2,
        "cli-unmatch-output": "<![CDATA[]]>"
        },
        "name": "test-condition",
        "failed-conditions": ""
        }
 }
}
```

Keys	Condition value	Jinja2 template

matched_contents - when matched with regex in the condition value with the test configuration.	ntp server (?!10.0.0.1)(\d+.\d+.\d+.\d+)	{% for content in matched_contents -%}
		{% for group in content["groups"] -%}
		no ntp server {{ group["grep_content"] }}
		{%- endfor %}
		{% endfor %}

unmatched_contents - when matches with the regex and does not match with the block config in the condition value with the test configuration.	line vty (.*) session-timeout {{ session_timeout }} exec-timeout {{ exec_timeout }} 0	{% for content in unmatched_contents %} {% for group in content["groups"] %} line vty {{ group["grep_content"] }} session-timeout {{ session_timeout }} exec-timeout {{ exec_timeout }} 0

		exit {% endfor %} {% endfor %}

condition_contents - condition1 captured data will be accessible to condition2 using condition_contents.	**condition1**:
	interface Loopback0
	ip address (\d+.\d+.\d+.\d+) (\d+.\d+.\d+.\d+)
	
	condition2:
	router ospf (.*)
	router-id {{ condition_contents[0]["matched_content"]["matched_contents"][0]["groups"][0]["grep_content"] }}
		{% for content in unmatched_contents %}
		{% for group in content["groups"] %}
		router ospf {{ group["grep_content"] }}
		router-id {{ condition_contents[0]["matched_content"]["matched_contents"][0]["groups"][0]["grep_content"] }}
		exit
		{% endfor %}
		{% endfor %}

Collections in ATOM

ATOM collects network operational & performance data from multiple data sources such as SNMP, Streaming Telemetry, SNMP Traps and Syslog.

Appropriate data source and data stream can be chosen based on device capabilities, and throughput and latency requirements. Model-Driven Telemetry uses a push model and provides near real-time access to operational & performance statistics.

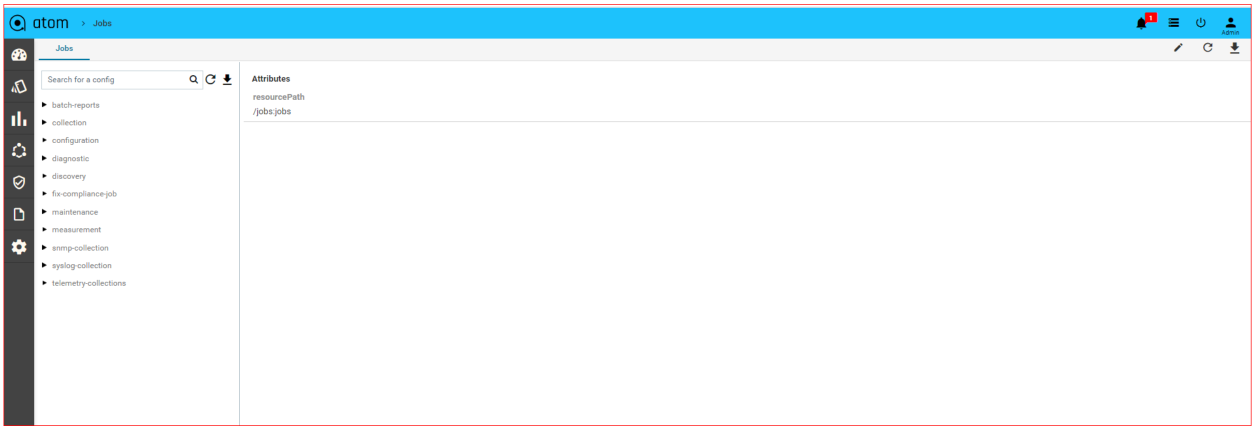
The collected Operational and Performance data can be visualized using Grafana (available as part of ATOM package) or in ATOM UI (by using various built-in reports available in Report section or under the device view). Users can build additional dashboards customized to their interests. (See ATOM Platform Guide to know more on how to create custom dashboards).

Jobs

A Job is the configurable task on a device that can be managed by ATOM. A job thus created can be a piece of work that can be created, executed and tracked in ATOM. Depending on the need, the administrator can schedule and manually run various Jobs to collect data about the device state.

Jobs are classified into the following types:

- Collection Job
- Configuration Job
- Diagnostics Job
- Discovery Job
- Inventory Job
- Maintenance Job
- Batch-reports Job
- SNMP-collections Job
- Syslog-collection Job
- Telemetry-Collections Job
- Telemetry-measurement Job



Attributes

resourcePath
/jobs:jobs

Collection Job

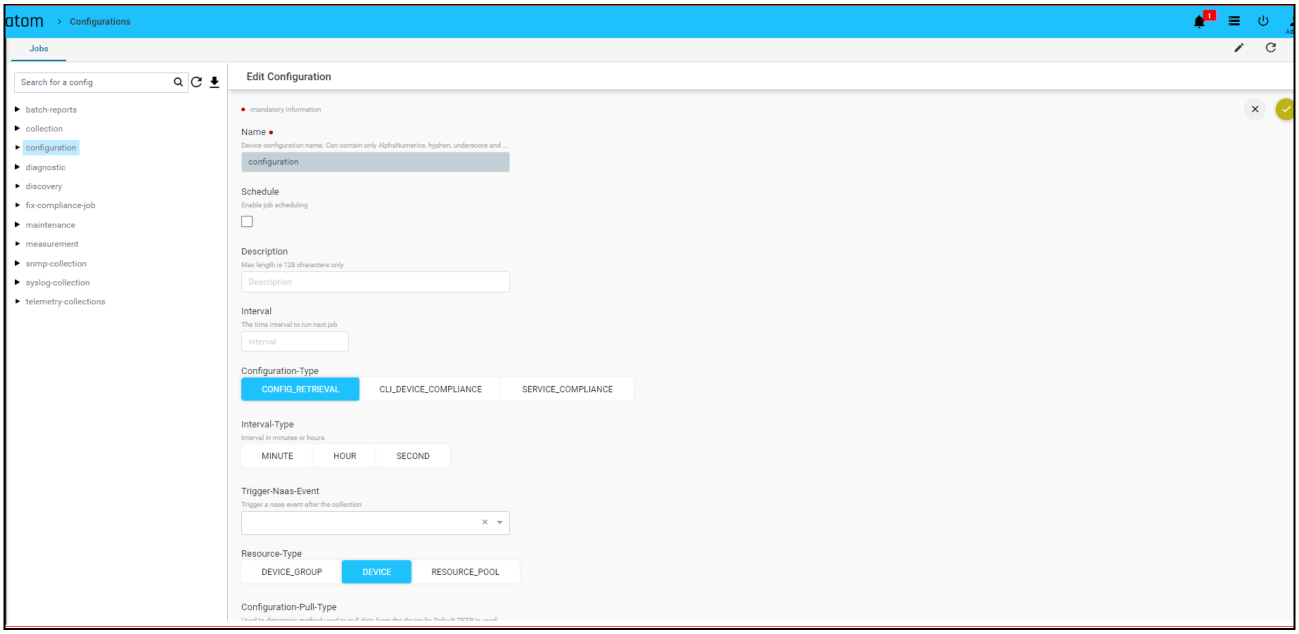
ATOM collects or retrieves the status of the device (OFFLINE or ONLINE) . By default, this job is scheduled to run every 6 hours. Starting with 6.0 release, you can model the collection job to collect information about the device using the SNMP OIDs. For more information, refer section, “Modelling of Collection Job” in the “*ATOM Platform Guide*.”

Configuration Job

Configuration job retrieves the running configurations from the device, or is triggered in the event of configuration discrepancies (either at the device or the service level) between the device and ATOM.

Creating a Configuration Job

1. Navigate to **Monitoring** > **Jobs** > **Configuration**
2. Select the Configuration folder > **Add Configuration**
3. In the **Create configuration** screen, enter the values in the following fields:



Edit Configuration

● -mandatory information

Name ●
Device configuration name. Can contain only AlphaNumerics, hyphen, underscore and ...
configuration

Schedule
Enable job scheduling
□

Description
Max length is 128 characters only
Description

Interval
The time interval to run next job
interval

Configuration-Type
[✓ CONFIG_RETRIEVAL] CLI_DEVICE_COMPLIANCE SERVICE_COMPLIANCE

Interval-Type
Interval in minutes or hours
MINUTE HOUR SECOND

Trigger-Naas-Event
Trigger a naas event after the collection

Resource-Type
DEVICE_GROUP [✓ DEVICE] RESOURCE_POOL

Configuration-Pull-Type

- **Name**: Enter the name of the Job
- **Description**: Enter an appropriate description for the Job
- **Configuration Type**: Select the type of Configuration Job from the menu:
    - **CONFIG_RETRIEVAL** - Retrieves the basic device configuration. This option is the default value.

  - **DEVICE_COMPLIANCE** - The device compliance job is triggered when there is a violation of policy configured on the device or a set of devices. For information about the Device Compliance Policies, refer "Creating Compliance Templates"
  - **SERVICE_COMPLIANCE** - The service compliance job is triggered when there is a discrepancy in the service configurations available on ATOM and the device.

  By default, 'ServiceInventory' Job of type Service Compliance is triggered every 5 minutes.

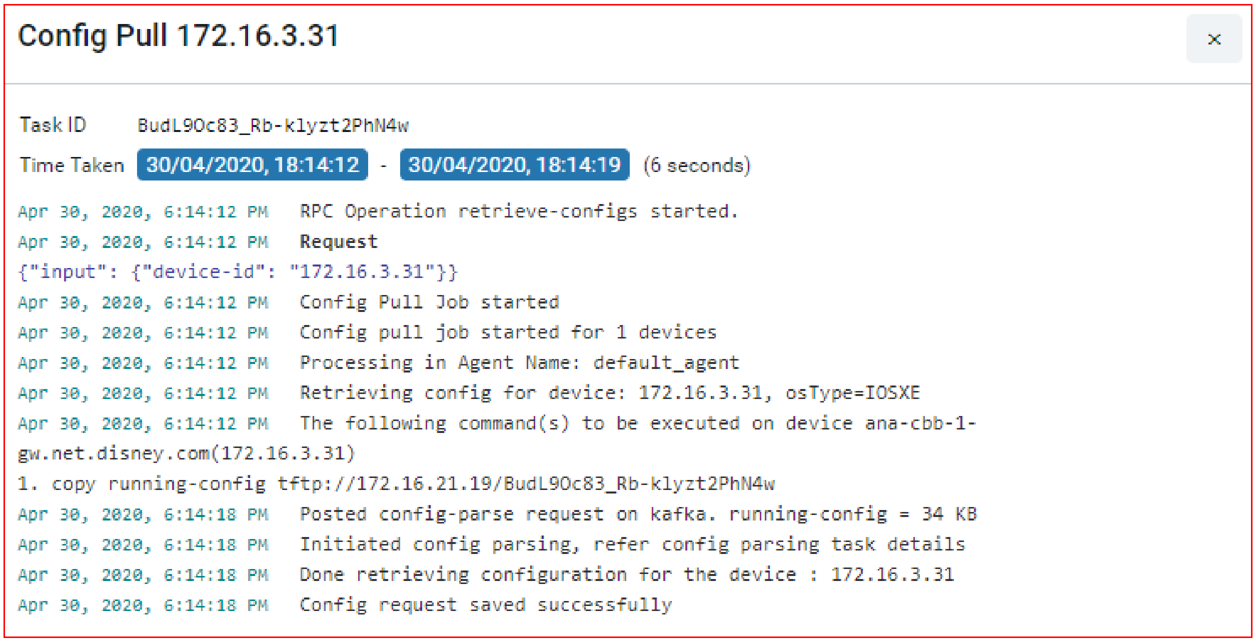
- **Resource Type**: Select one of the following resource entities where the job should be triggered:
  - **DEVICE**: If the selected resource type is a Device, click **Add** to enter the IP address of the device for ATOM to communicate with it.
  - **DEVICE GROUP**: If the selected resource type is Device Group, click **Add** to enter the device group for which the configuration jobs should be triggered.
  - **RESOURCE POOL**: Click **Add** to select from the available resource pools where the job should be run.
- **Config Pull type**: If the selected configuration type is Config Retrieval, you can opt for one of the following methods to be used while retrieving the configurations from the device:
  - TFTP_EXPORT - Select this option when ATOM should retrieve configs from the TFTP server
  - SHOW_COMMAND - Select this option if ATOM should retrieve configs from the running configuration of the device. This will be useful when in some customer environments where the TFTP port is disabled.
- **Parse Config**: Select this option if the parsing of the configurations should be enabled on the device/devices after the successful run of the config retrieval job.

> **Note:** Use this option if you want to override the value set in the global parameters of ATOM. By default, at the global level config parsing is enabled for all devices However, using this option you can disable config parsing at the device level.

- **Schedule**: Select the checkbox and schedule the job to be run at intervals
- **Interval**: Enter the time period for which the job should be scheduled
- **Interval Type**: Select the units of time when the job should be scheduled (HOUR or MINUTE)

  Click the Task viewer to check for the status of the executed job.

Option 1: A successful run of the Config Retrieval job, where **'TFTP Export'** enabled, fetches the following details from the device:



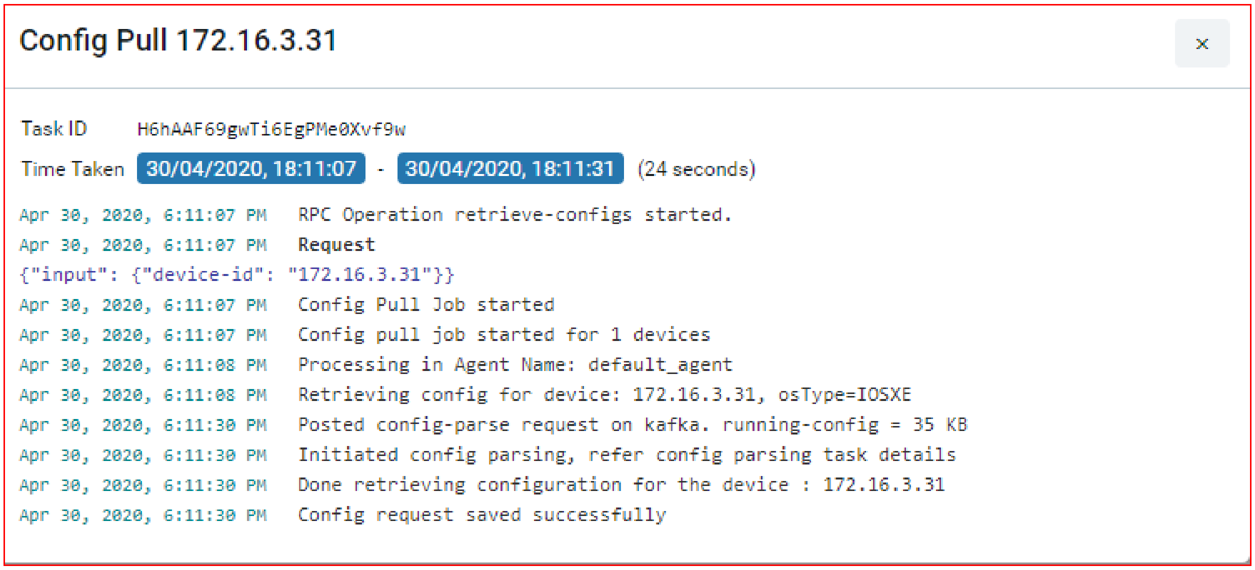
Config Pull 172.16.3.31

Task ID BudL9Oc83_Rb-klyzt2PhN4w

Time Taken 30/04/2020, 18:14:12 - 30/04/2020, 18:14:19 (6 seconds)

```
Apr 30, 2020, 6:14:12 PM   RPC Operation retrieve-configs started.
Apr 30, 2020, 6:14:12 PM   Request
{"input": {"device-id": "172.16.3.31"}}
Apr 30, 2020, 6:14:12 PM   Config Pull Job started
Apr 30, 2020, 6:14:12 PM   Config pull job started for 1 devices
Apr 30, 2020, 6:14:12 PM   Processing in Agent Name: default_agent
Apr 30, 2020, 6:14:12 PM   Retrieving config for device: 172.16.3.31, osType=IOSXE
Apr 30, 2020, 6:14:12 PM   The following command(s) to be executed on device ana-cbb-1-
gw.net.disney.com(172.16.3.31)
1. copy running-config tftp://172.16.21.19/BudL9Oc83_Rb-klyzt2PhN4w
Apr 30, 2020, 6:14:18 PM   Posted config-parse request on kafka. running-config = 34 KB
Apr 30, 2020, 6:14:18 PM   Initiated config parsing, refer config parsing task details
Apr 30, 2020, 6:14:18 PM   Done retrieving configuration for the device : 172.16.3.31
Apr 30, 2020, 6:14:18 PM   Config request saved successfully
```

Case 2: A successful run of the Config Retrieval Job, with '**show run config**', is shown as below:



Config Pull 172.16.3.31

Task ID H6hAAF69gwTi6EgPMe0Xvf9w

Time Taken 30/04/2020, 18:11:07 - 30/04/2020, 18:11:31 (24 seconds)

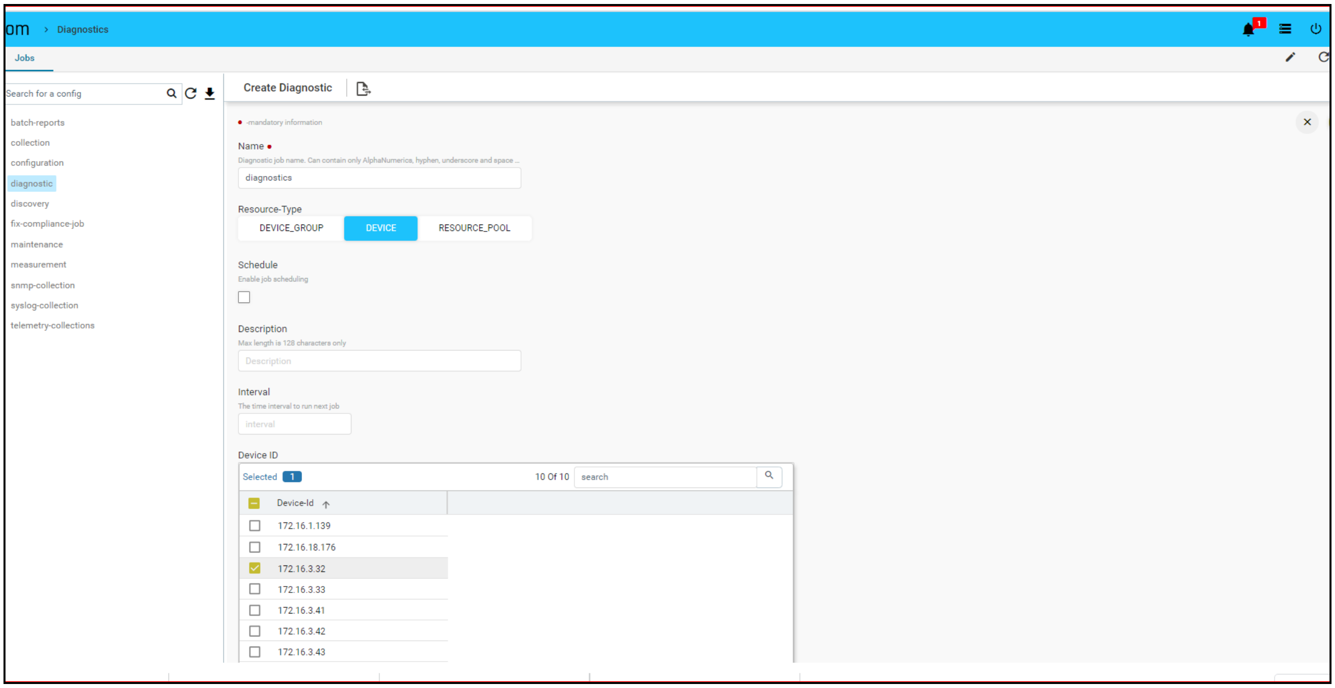
```
Apr 30, 2020, 6:11:07 PM   RPC Operation retrieve-configs started.
Apr 30, 2020, 6:11:07 PM   Request
{"input": {"device-id": "172.16.3.31"}}
Apr 30, 2020, 6:11:07 PM   Config Pull Job started
Apr 30, 2020, 6:11:07 PM   Config pull job started for 1 devices
Apr 30, 2020, 6:11:08 PM   Processing in Agent Name: default_agent
Apr 30, 2020, 6:11:08 PM   Retrieving config for device: 172.16.3.31, osType=IOSXE
Apr 30, 2020, 6:11:30 PM   Posted config-parse request on kafka. running-config = 35 KB
Apr 30, 2020, 6:11:30 PM   Initiated config parsing, refer config parsing task details
Apr 30, 2020, 6:11:30 PM   Done retrieving configuration for the device : 172.16.3.31
Apr 30, 2020, 6:11:30 PM   Config request saved successfully
```

Diagnostics Job

Diagnostics job collects various CPU, memory utilization and interface performance data that is used to provision the service. By creating a Diagnostics Job, you can run the basic device Telnet or SNMP connections to the device and also perform module- level diagnostics.

Creating a Diagnostics Job

1. Navigate to **Monitoring** > **Jobs** > **Diagnostic**



● -mandatory information

Name ●
Diagnostic job name. Can contain only AlphaNumerics, hyphen, underscore and space ...
diagnostics

Resource-Type
DEVICE_GROUP | DEVICE | RESOURCE_POOL

Schedule
Enable job scheduling
□

Description
Max length is 128 characters only
Description

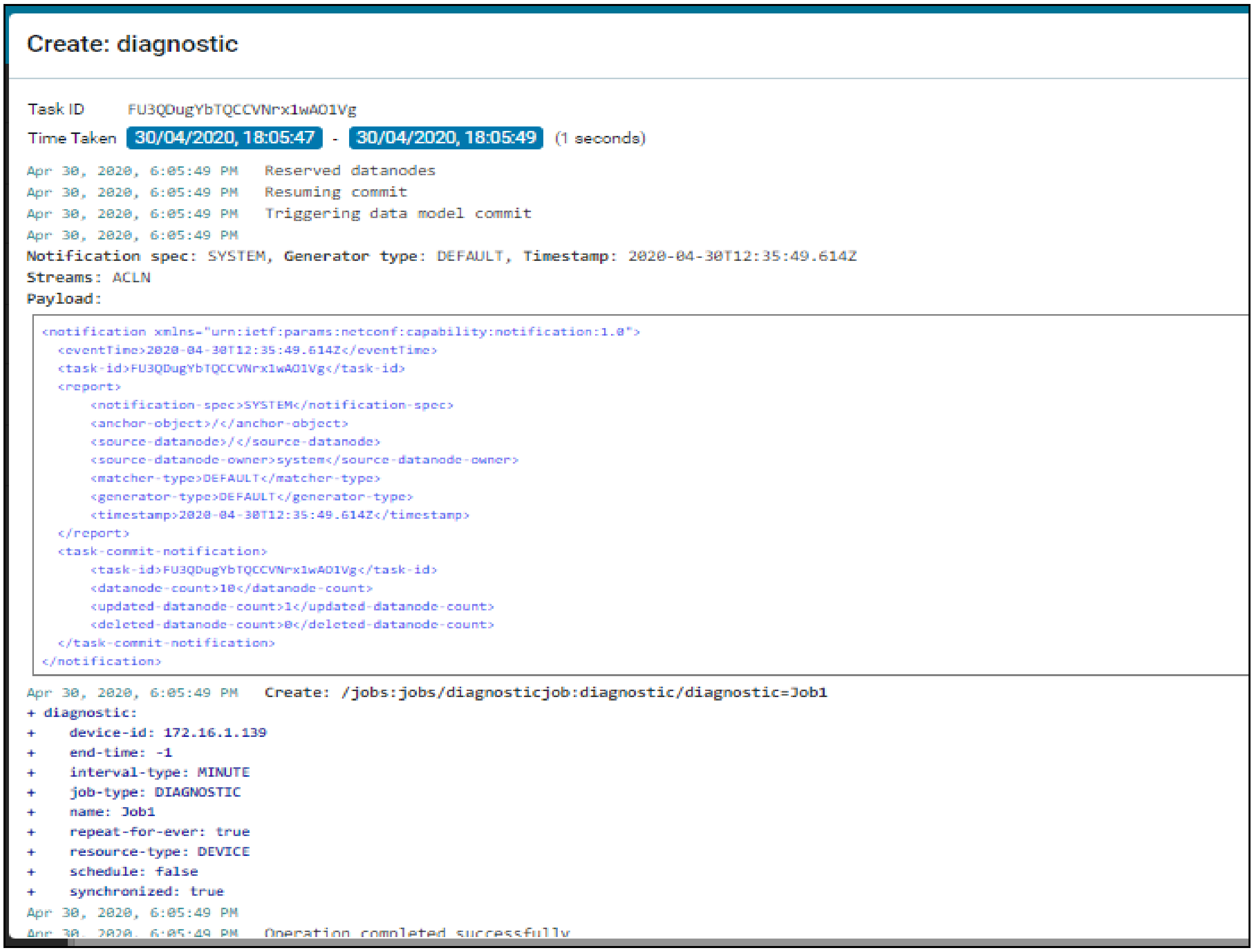
Interval
The time interval to run next job
interval

Device ID
Selected 1 — 10 Of 10 — search

▣	Device-Id ↑
□	172.16.1.139
□	172.16.18.176
☑	172.16.3.32
□	172.16.3.33
□	172.16.3.41
□	172.16.3.42
□	172.16.3.43

2. Select **Diagnostic** and click **Actions** > **Add Job**
3. In the **Add Diagnostic** screen, enter values in the following fields:
   - **Name**: Enter a name not exceeding 64 characters
   - **Description**: Type an appropriate description for the job.
   - **Resource Type**: Select one of the entities where the job should be run
     - **Device**: Enter the IP address of the device
     - **Device Group**: Select a device group from the drop-down list.
     - **Resource Pool**: Select the resource pool from the available resource pools in ATOM.
   - **Schedule**: Select this option to run the job in specific intervals of time
     - **Interval**: Enter a number representing a span of time.
     - **Interval Type**: Select the units of time (minute or hour)

Click the Task Viewer pane and search for the Diagnostics job. A successful run of the Diagnostic Job displays the following information in the task details:



Create: diagnostic

Task ID FU3QDugYbTQCCVNrx1wAO1Vg

Time Taken 30/04/2020, 18:05:47 - 30/04/2020, 18:05:49 (1 seconds)

```
Apr 30, 2020, 6:05:49 PM   Reserved datanodes
Apr 30, 2020, 6:05:49 PM   Resuming commit
Apr 30, 2020, 6:05:49 PM   Triggering data model commit
Apr 30, 2020, 6:05:49 PM
Notification spec: SYSTEM, Generator type: DEFAULT, Timestamp: 2020-04-30T12:35:49.614Z
Streams: ACLN
Payload:
```

```
<notification xmlns="urn:ietf:params:netconf:capability:notification:1.0">
  <eventTime>2020-04-30T12:35:49.614Z</eventTime>
  <task-id>FU3QDugYbTQCCVNrx1wAO1Vg</task-id>
  <report>
      <notification-spec>SYSTEM</notification-spec>
      <anchor-object>/</anchor-object>
      <source-datanode>/</source-datanode>
      <source-datanode-owner>system</source-datanode-owner>
      <matcher-type>DEFAULT</matcher-type>
      <generator-type>DEFAULT</generator-type>
      <timestamp>2020-04-30T12:35:49.614Z</timestamp>
  </report>
  <task-commit-notification>
      <task-id>FU3QDugYbTQCCVNrx1wAO1Vg</task-id>
      <datanode-count>10</datanode-count>
      <updated-datanode-count>1</updated-datanode-count>
      <deleted-datanode-count>0</deleted-datanode-count>
  </task-commit-notification>
</notification>
```

```
Apr 30, 2020, 6:05:49 PM   Create: /jobs:jobs/diagnosticjob:diagnostic/diagnostic=Job1
+ diagnostic:
+    device-id: 172.16.1.139
+    end-time: -1
+    interval-type: MINUTE
+    job-type: DIAGNOSTIC
+    name: Job1
+    repeat-for-ever: true
+    resource-type: DEVICE
+    schedule: false
+    synchronized: true
Apr 30, 2020, 6:05:49 PM
Apr 30, 2020, 6:05:49 PM   Operation completed successfully
```

Discovery Job

Discovery job is used in discovery of the devices falling within a range of IP addresses.

The first step in provisioning a network is discovering the devices in the network. ATOM discovers the devices in the pod using either CDP or LLDP. Based on this discovery, ATOM automatically draws a network topology diagram.

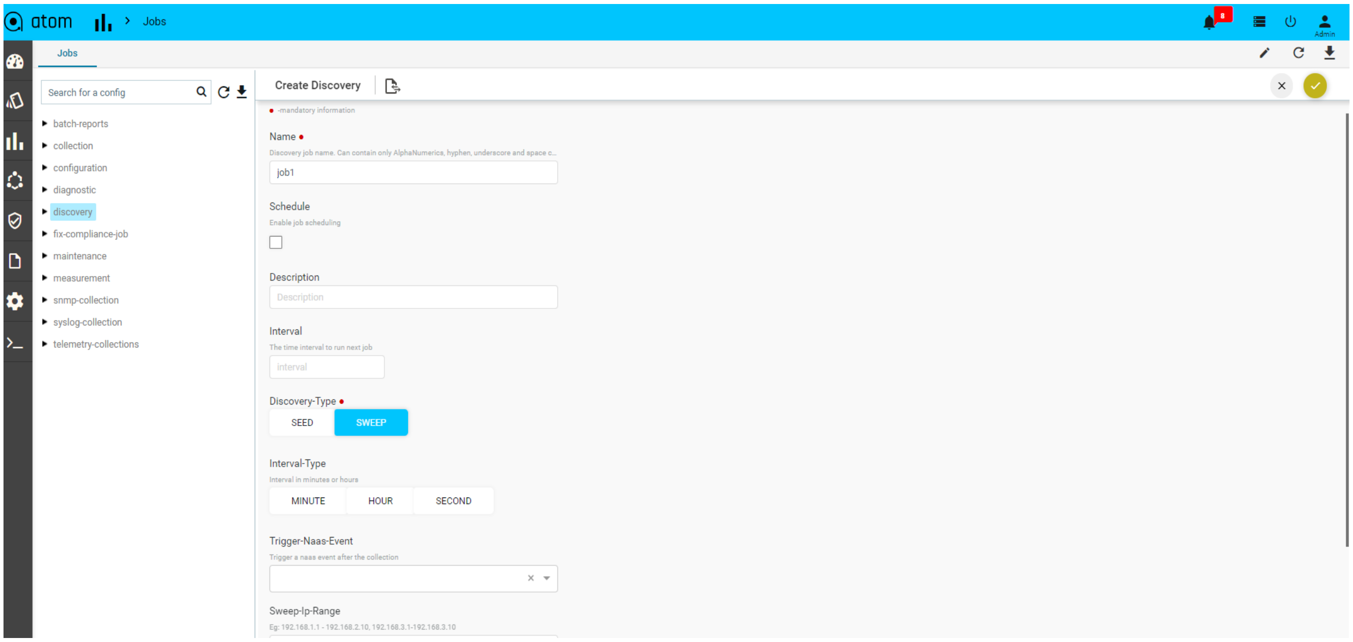
If only SNMP is enabled, the topology diagram cannot be drawn as SNMP does just the sweep, which is not a methodical way of discovering device hierarchy. Therefore, it should be ensured that either CDP or LLDP is enabled on all the devices managed by ATOM.

A SEED device is the starting point from which ATOM discovers the network and its peers or neighbor devices. SEED discovery type should be selected when devices in a smaller range are required in the topology. This method of discovery is quicker, but fewer number of devices are discovered.

If the selected discovery type is SWEEP, the devices within a range of IP addresses are discovered.

Creating a Discovery Job

1. Navigate to **Monitoring** > **Jobs** > **Discovery** > **Add Discovery**
2. In the **Create Discovery** screen, enter values for the mandatory fields:



● -mandatory information

Name ●
Discovery job name. Can contain only AlphaNumerics, hyphen, underscore and space c...
job1

Schedule
Enable job scheduling
□

Description
Description

Interval
The time interval to run next job
interval

Discovery-Type ●
SEED | SWEEP

Interval-Type
Interval in minutes or hours
MINUTE | HOUR | SECOND

Trigger-Naas-Event
Trigger a naas event after the collection

Sweep-Ip-Range
Eg: 192.168.1.1 - 192.168.2.10, 192.168.3.1-192.168.3.10

- **Name**: Enter an alphanumeric string to identify the created discovery job
- **Description**: Enter some text that describes the Job
- **Discovery Type**: Select one of the discovery protocols that used for discovering devices:
- SEED - By default, the discovery type is SEED.
- SWEEP - Change the value to SWEEP, if you want more devices to be discovered.
- **Seed Type**: Select the type of the seed protocol, either CDP or LLDP. In case the Discovery type is selected as SWEEP, enter the SWEEP IP range in the field.

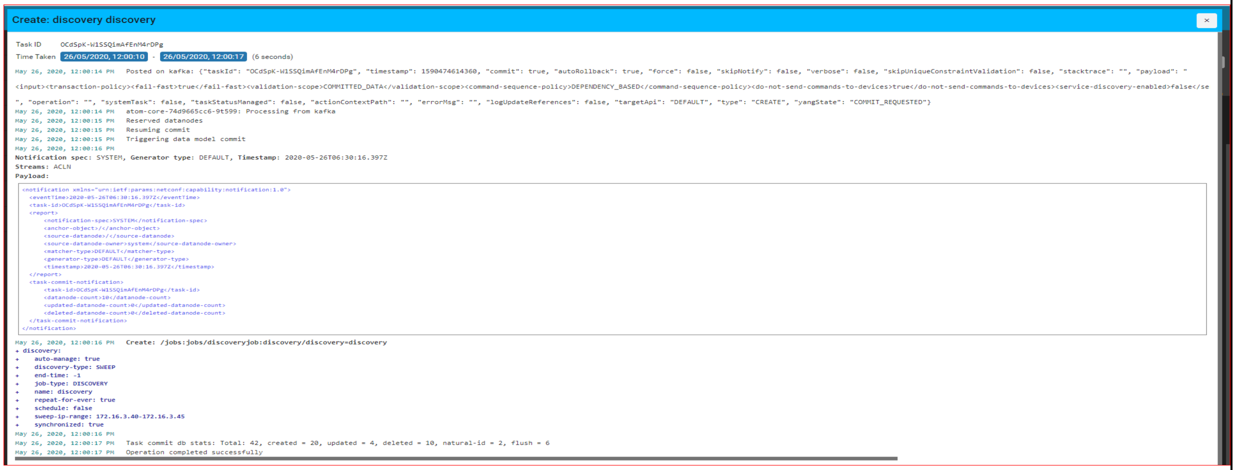
> **NOTE**: This IP range should be the same or a subset of the range of IP addresses defined in the Credential Map. IP addresses can be expressed in CIDR notation as well.

- **Hop Count**: Enter the number of hops (devices)that ATOM should discover from the seed device while using CDP.
- **Seed IP Address**: Enter the IP Address of the seed device from which the discovery of the neighbouring devices should be initiated.
- **Auto manage**: Select this option to add the discovered devices to ATOM automatically.

If this option is selected, a Managed Task is generated after the successful run of the discovery job.

- **Schedule**: Select this option if this job should be scheduled at prescribed time intervals.
    - Interval: Enter the period of time within which the job should be scheduled
    - Interval Type: Enter the units of time (HOUR or MINUTE)

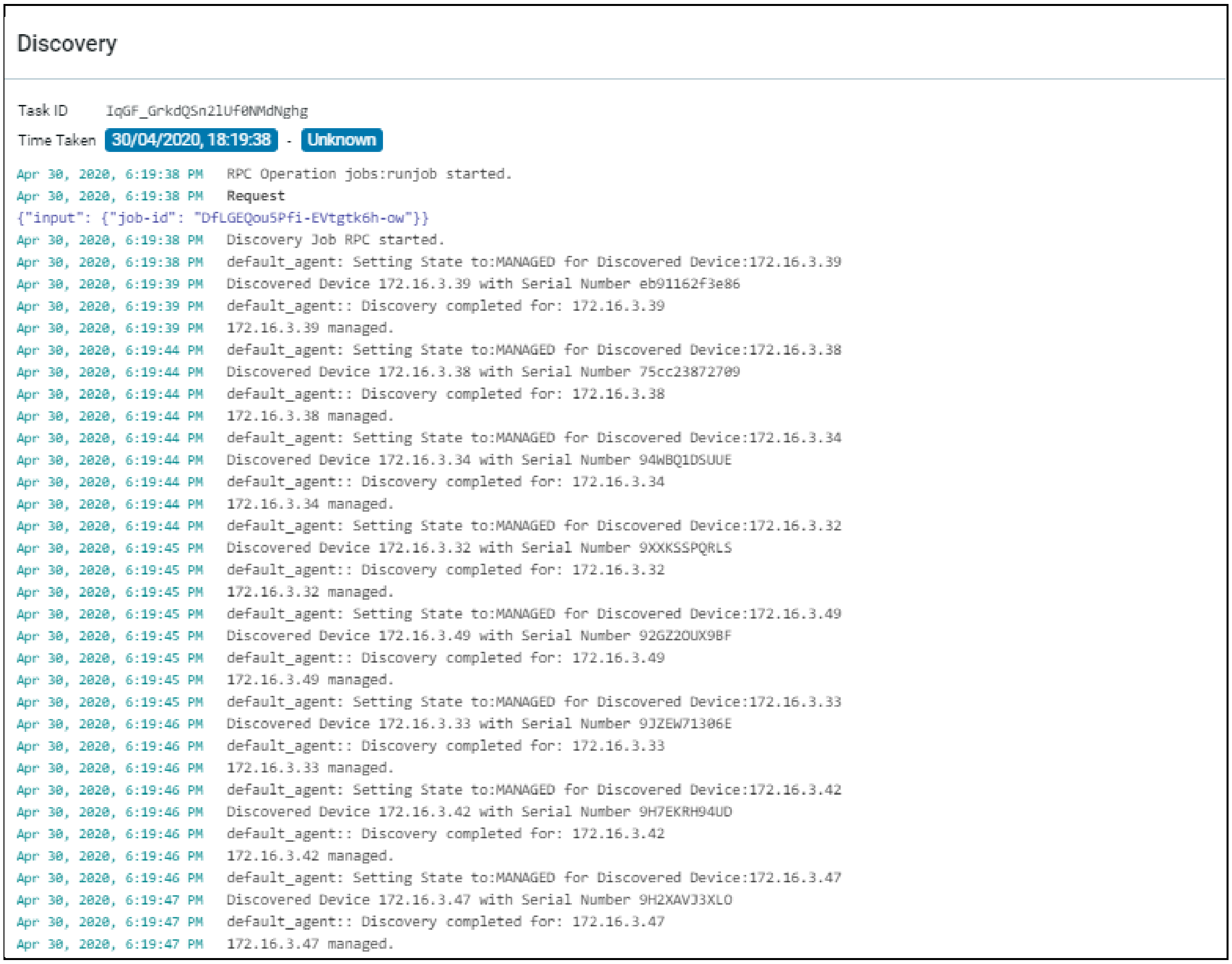
A successful run of the Discovery Job with the SWEEP protocol is as shown as below:



Create: discovery discovery

```
Task ID      OCdSpK-W1SSQimAfEnM4rDPg
Time Taken   26/05/2020, 12:00:10 - 26/05/2020, 12:00:17 (6 seconds)
May 26, 2020, 12:00:14 PM   Posted on kafka: {"taskId": "OCdSpK-W1SSQimAfEnM4rDPg", "timestamp": 1590474614360, "commit": true, "autoRollback": true, "force": false, "skipNotify": false, "verbose": false, "skipUniqueConstraintValidation": false, "stacktrace": "", "payload": "
<input><transaction-policy><fail-fast>true</fail-fast><validation-scope>COMMITTED_DATA</validation-scope><command-sequence-policy>DEPENDENCY_BASED</command-sequence-policy><do-not-send-commands-to-devices>true</do-not-send-commands-to-devices><service-discovery-enabled>false</se
", "operation": "", "systemTask": false, "taskStatusManaged": false, "actionContextPath": "", "errorMsg": "", "logUpdateReferences": false, "targetApi": "DEFAULT", "type": "CREATE", "yangState": "COMMIT_REQUESTED"}
May 26, 2020, 12:00:14 PM   atom-core-74d9665cc6-9t599: Processing from kafka
May 26, 2020, 12:00:15 PM   Reserved datanodes
May 26, 2020, 12:00:15 PM   Resuming commit
May 26, 2020, 12:00:15 PM   Triggering data model commit
May 26, 2020, 12:00:16 PM
Notification spec: SYSTEM, Generator type: DEFAULT, Timestamp: 2020-05-26T06:30:16.397Z
Streams: ACLN
Payload:
<notification xmlns="urn:ietf:params:netconf:capability:notification:1.0">
  <eventTime>2020-05-26T06:30:16.397Z</eventTime>
  <task-id>OCdSpK-W1SSQimAfEnM4rDPg</task-id>
  <report>
      <notification-spec>SYSTEM</notification-spec>
      <anchor-object>/</anchor-object>
      <source-datanode>/</source-datanode>
      <source-datanode-owner>system</source-datanode-owner>
      <matcher-type>DEFAULT</matcher-type>
      <generator-type>DEFAULT</generator-type>
      <timestamp>2020-05-26T06:30:16.397Z</timestamp>
  </report>
  <task-commit-notification>
      <task-id>OCdSpK-W1SSQimAfEnM4rDPg</task-id>
      <datanode-count>10</datanode-count>
      <updated-datanode-count>0</updated-datanode-count>
      <deleted-datanode-count>0</deleted-datanode-count>
  </task-commit-notification>
</notification>
May 26, 2020, 12:00:16 PM   Create: /jobs:jobs/discoveryjob:discovery/discovery=discovery
+ discovery:
+    auto-manage: true
+    discovery-type: SWEEP
+    end-time: -1
+    job-type: DISCOVERY
+    name: discovery
+    repeat-for-ever: true
+    schedule: false
+    sweep-ip-range: 172.16.3.40-172.16.3.45
+    synchronized: true
May 26, 2020, 12:00:16 PM
May 26, 2020, 12:00:17 PM   Task commit db stats: Total: 42, created = 20, updated = 4, deleted = 10, natural-id = 2, flush = 6
May 26, 2020, 12:00:17 PM   Operation completed successfully
```

Details of the Executed Job along with the devices that are discovered by ATOM in this job are displayed as follows:

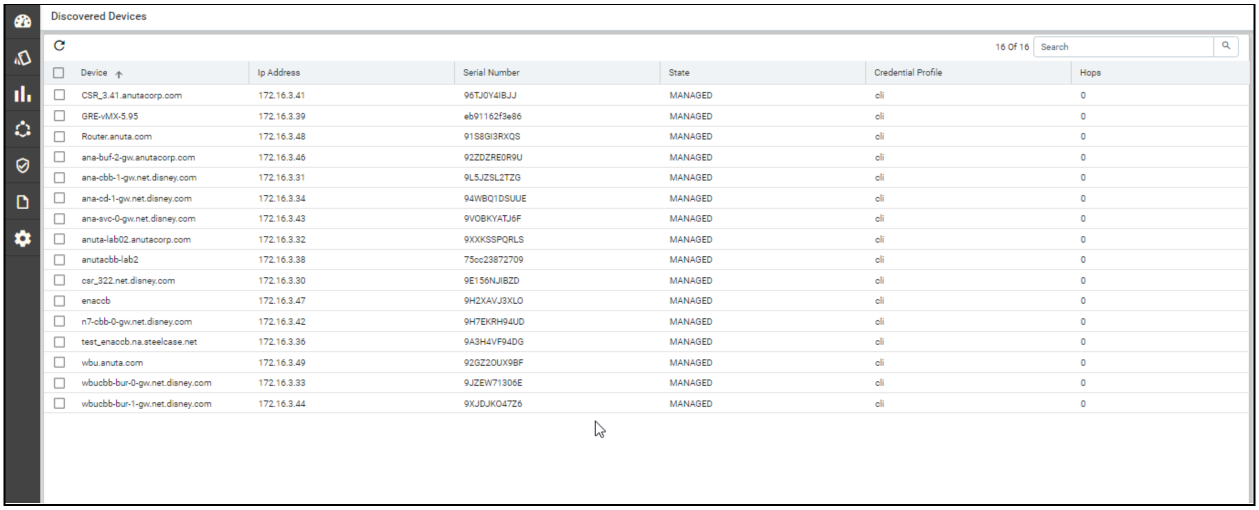


Discovery

Task ID IqGF_GrkdQSn2lUf0NMdNghg

Time Taken 30/04/2020, 18:19:38 - Unknown

```
Apr 30, 2020, 6:19:38 PM   RPC Operation jobs:runjob started.
Apr 30, 2020, 6:19:38 PM   Request
{"input": {"job-id": "DfLGEQou5Pfi-EVtgtk6h-ow"}}
Apr 30, 2020, 6:19:38 PM   Discovery Job RPC started.
Apr 30, 2020, 6:19:38 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.39
Apr 30, 2020, 6:19:39 PM   Discovered Device 172.16.3.39 with Serial Number eb91162f3e86
Apr 30, 2020, 6:19:39 PM   default_agent:: Discovery completed for: 172.16.3.39
Apr 30, 2020, 6:19:39 PM   172.16.3.39 managed.
Apr 30, 2020, 6:19:44 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.38
Apr 30, 2020, 6:19:44 PM   Discovered Device 172.16.3.38 with Serial Number 75cc23872709
Apr 30, 2020, 6:19:44 PM   default_agent:: Discovery completed for: 172.16.3.38
Apr 30, 2020, 6:19:44 PM   172.16.3.38 managed.
Apr 30, 2020, 6:19:44 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.34
Apr 30, 2020, 6:19:44 PM   Discovered Device 172.16.3.34 with Serial Number 94WBQ1DSUUE
Apr 30, 2020, 6:19:44 PM   default_agent:: Discovery completed for: 172.16.3.34
Apr 30, 2020, 6:19:44 PM   172.16.3.34 managed.
Apr 30, 2020, 6:19:44 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.32
Apr 30, 2020, 6:19:45 PM   Discovered Device 172.16.3.32 with Serial Number 9XXKSSPQRLS
Apr 30, 2020, 6:19:45 PM   default_agent:: Discovery completed for: 172.16.3.32
Apr 30, 2020, 6:19:45 PM   172.16.3.32 managed.
Apr 30, 2020, 6:19:45 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.49
Apr 30, 2020, 6:19:45 PM   Discovered Device 172.16.3.49 with Serial Number 92GZ2OUX9BF
Apr 30, 2020, 6:19:45 PM   default_agent:: Discovery completed for: 172.16.3.49
Apr 30, 2020, 6:19:45 PM   172.16.3.49 managed.
Apr 30, 2020, 6:19:45 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.33
Apr 30, 2020, 6:19:46 PM   Discovered Device 172.16.3.33 with Serial Number 9JZEW71306E
Apr 30, 2020, 6:19:46 PM   default_agent:: Discovery completed for: 172.16.3.33
Apr 30, 2020, 6:19:46 PM   172.16.3.33 managed.
Apr 30, 2020, 6:19:46 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.42
Apr 30, 2020, 6:19:46 PM   Discovered Device 172.16.3.42 with Serial Number 9H7EKRH94UD
Apr 30, 2020, 6:19:46 PM   default_agent:: Discovery completed for: 172.16.3.42
Apr 30, 2020, 6:19:46 PM   172.16.3.42 managed.
Apr 30, 2020, 6:19:46 PM   default_agent: Setting State to:MANAGED for Discovered Device:172.16.3.47
Apr 30, 2020, 6:19:47 PM   Discovered Device 172.16.3.47 with Serial Number 9H2XAVJ3XLO
Apr 30, 2020, 6:19:47 PM   default_agent:: Discovery completed for: 172.16.3.47
Apr 30, 2020, 6:19:47 PM   172.16.3.47 managed.
```



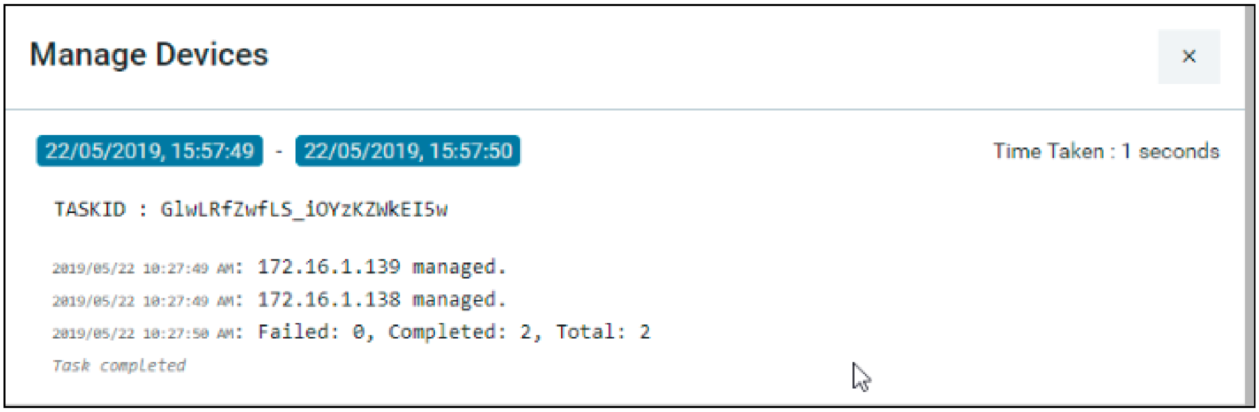
Discovered Devices

16 Of 16 Search

□	Device ↑	Ip Address	Serial Number	State	Credential Profile	Hops
□	CSR_3.41.anutacorp.com	172.16.3.41	96TJ0Y4IBJJ	MANAGED	cli	0
□	GRE-vMX-5.95	172.16.3.39	eb91162f3e86	MANAGED	cli	0
□	Router.anuta.com	172.16.3.48	91S8GI3RXQS	MANAGED	cli	0
□	ana-buf-2-gw.anutacorp.com	172.16.3.46	92ZDZRE0R9U	MANAGED	cli	0
□	ana-cbb-1-gw.net.disney.com	172.16.3.31	9L5JZSL2TZG	MANAGED	cli	0
□	ana-cd-1-gw.net.disney.com	172.16.3.34	94WBQ1DSUUE	MANAGED	cli	0
□	ana-svc-0-gw.net.disney.com	172.16.3.43	9VOBKYATJ6F	MANAGED	cli	0
□	anuta-lab02.anutacorp.com	172.16.3.32	9XXKSSPQRLS	MANAGED	cli	0
□	anutacbb-lab2	172.16.3.38	75cc23872709	MANAGED	cli	0
□	csr_322.net.disney.com	172.16.3.30	9E156NJIBZD	MANAGED	cli	0
□	enaccb	172.16.3.47	9H2XAVJ3XLO	MANAGED	cli	0
□	n7-cbb-0-gw.net.disney.com	172.16.3.42	9H7EKRH94UD	MANAGED	cli	0
□	test_enaccb.na.steelcase.net	172.16.3.36	9A3H4VF94DG	MANAGED	cli	0
□	wbu.anuta.com	172.16.3.49	92GZ2OUX9BF	MANAGED	cli	0
□	wbucbb-bur-0-gw.net.disney.com	172.16.3.33	9JZEW71306E	MANAGED	cli	0
□	wbucbb-bur-1-gw.net.disney.com	172.16.3.44	9XJDJKO47Z6	MANAGED	cli	0

Managed Task

This task will be triggered in ATOM after the successful run of the discovery job. All the discovered devices are added to the device table maintained in the ATOM inventory are marked as “Managed” devices



Manage Devices

22/05/2019, 15:57:49 - 22/05/2019, 15:57:50

Time Taken : 1 seconds

```
TASKID : GlwLRfZwfLS_iOYzKZWkEI5w

2019/05/22 10:27:49 AM: 172.16.1.139 managed.
2019/05/22 10:27:49 AM: 172.16.1.138 managed.
2019/05/22 10:27:50 AM: Failed: 0, Completed: 2, Total: 2
Task completed
```

Inventory Job

Inventory job is used for detecting and adding device Interfaces, interface capabilities, and interface addresses.

Extended Inventory: Retrieves the lost network connections, establishes the new network connections between the devices, retrieves the configurations from the device, By default, this job is scheduled to run every 12 hours.

Maintenance Job

You can configure the maintenance jobs to remove unwanted records of the tasks or the alarms in ATOM. The maintenance jobs can be scheduled on a one-time basis or run periodically.

Purge Older Alarm Records (You can remove unwanted, older records of the Alarms generated in ATOM.)

Creating a Purge Older Alarm Records Job

1. Navigate to **Resource Manager** > **Jobs**
2. In the left pane, navigate to the **MAINTENANCE** folder
3. Click the **MAINTENANCE** folder > **Actions** > **Add Job**
4. In the **Create MAINTENANCE** screen, enter the values for each field described below:
    - **Maintenance Job Name**: Enter a name for the maintenance job to be created.
    - **Description**: Enter a suitable description for the job
    - **Maintenance Type**: Select the type as " **PURGE_OLDER_ALARM_RECORDS**" to create a job to clean all the old Alarms from ATOM
    - **Threshold (in days)**: Enter a number of days, of which the records for which history should be maintained. All the records before the prescribed days will be deleted.

- **Schedule**: In order to schedule the job to run periodically at specified intervals of time, select the Schedule option.
- **Interval**: Enter the number for the interval
- **Interval Type**: Select either Hour or Minute as units of time.

Example:

If 30, 24, and HOUR are entered as values in the fields - Threshold, Interval, and Interval Type respectively, a maintenance job is executed every 24 hours that will remove all the Alarm records older than 30 days. That is, all the records of the previous month before the 30th day will be deleted..

Purge Older Task Details Records

You can schedule a maintenance job that can be run to remove all the details of the tasks run before a specified period in time.

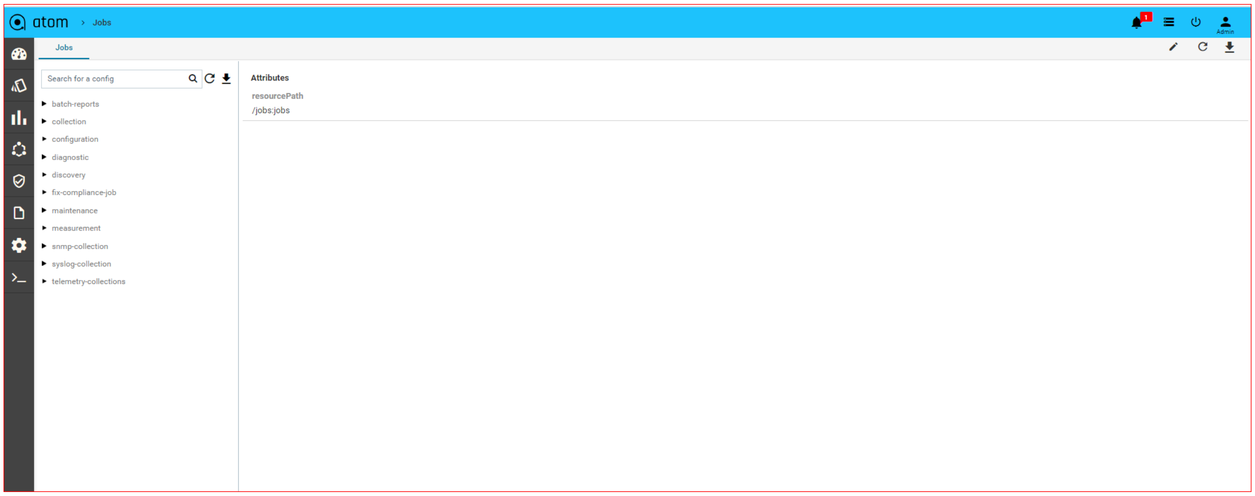
Creating a Purge Older Task Details Records

1. Navigate to **Monitoring**> **Jobs**
2. In the left pane, navigate to the maintenance folder
3. Click the maintenance folder > **Actions** > **Add Job**
4. In the **Create** maintenance screen, enter the values for each field described below:

- **Maintenance Job Name**: Enter a name for the maintenance job to be created.
- **Description**: Enter a suitable description for the job
- **Maintenance Type**: Select the type as " **PURGE_OLDER_TASK_RECORDS**" to create a job to clean all the details of the tasks
- **Threshold (in days)**: Enter a number of days, of which the records for which history should be maintained. All the records before the prescribed days will be deleted.
- **Schedule**: In order to schedule the job to run periodically at specified intervals of time, select the Schedule option.
- **Interval**: Enter the number for the interval
- **Interval Type**: Select either Hour or Minute as units of time.

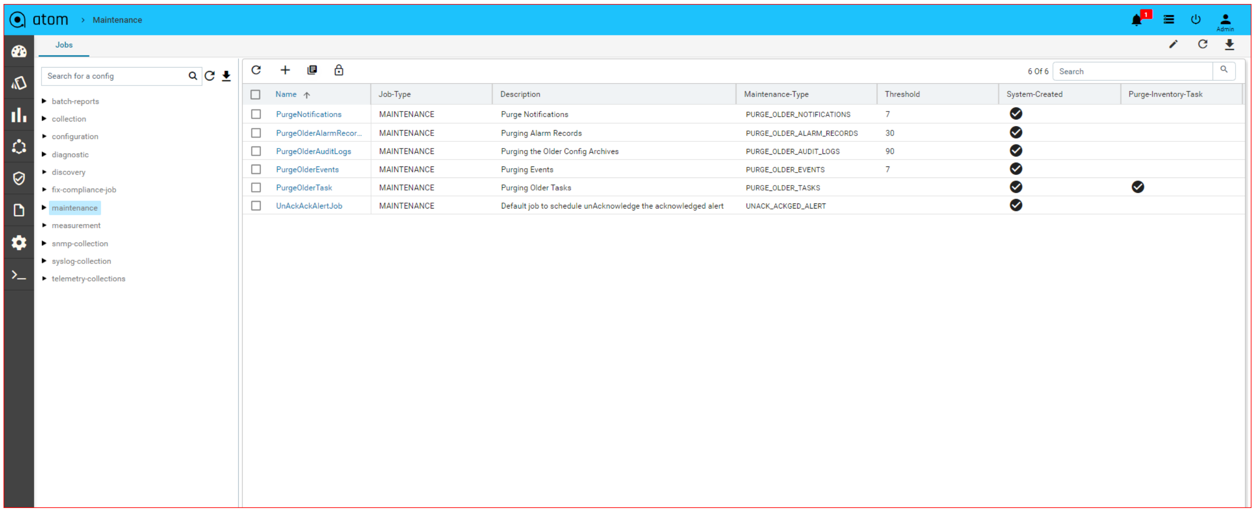
Example

If 30, 24, and HOUR are entered as values in the fields - Threshold, Interval, and Interval Type respectively, a maintenance job is executed every 24 hours that will remove all the details of the tasks older than 30 days. That is, all those task details of the previous month before the 30th day will be deleted.



Attributes

resourcePath
/jobs:jobs

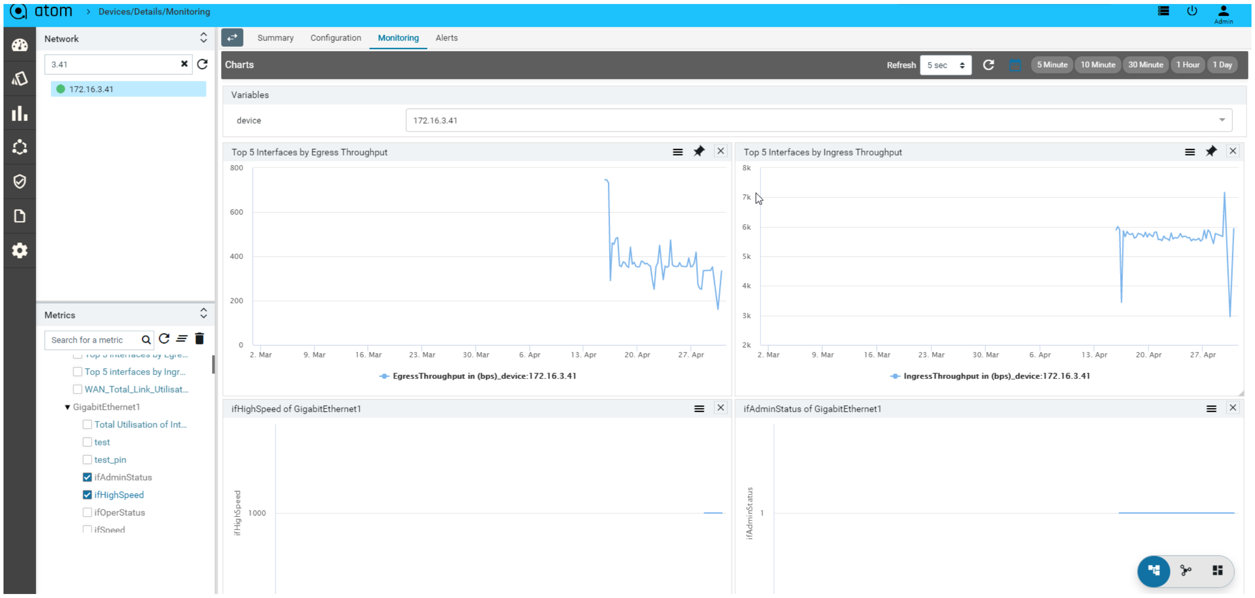


□	Name	Job-Type	Description	Maintenance-Type	Threshold	System-Created	Purge-Inventory-Task
□	PurgeNotifications	MAINTENANCE	Purge Notifications	PURGE_OLDER_NOTIFICATIONS	7	✓	
□	PurgeOlderAlarmRecor...	MAINTENANCE	Purging Alarm Records	PURGE_OLDER_ALARM_RECORDS	30	✓	
□	PurgeOlderAuditLogs	MAINTENANCE	Purging the Older Config Archives	PURGE_OLDER_AUDIT_LOGS	90	✓	
□	PurgeOlderEvents	MAINTENANCE	Purging Events	PURGE_OLDER_EVENTS	7	✓	
□	PurgeOlderTask	MAINTENANCE	Purging Older Tasks	PURGE_OLDER_TASKS		✓	✓
□	UnAckAckAlertJob	MAINTENANCE	Default job to schedule unAcknowledge the acknowledged alert	UNACK_ACKGED_ALERT		✓	

Device Inventory (SNMP)

All Device inventory collected through SNMP Collection jobs is shown in the Entities view. Following provides guidance on

1. To view Device Configuration - Navigate to **Devices** > select a device
2. Click on the “**Monitoring**” Tab
3. Collected data will be shown under MIB-name



Monitoring

[[[ATOM enables you to create Assurance profiles to facilitate 24x7 uptime of your network. Closed loop automation (CLA) framework allows you to define policies and remediation actions in violation of those policies.

ATOM collects operational & performance metrics from multiple data sources such as SNMP, SNMP traps, Syslog and Streaming Telemetry and stores them in a time-series database.

Following are the different activities on the metrics:

- Visualize Data Using Charts & Reports
- Alerts against thresholds defined on the Metrics
- Alert Dashboards - Collection of Predefined & User Defined Dashlets
- Alert Routing to Email, Slack etc.,
- Actions on Alerts
- Closed Loop Automation Actions on the Alerts

Please refer to “ATOM User Guide - Performance Management & Alerting” for further details.]]]

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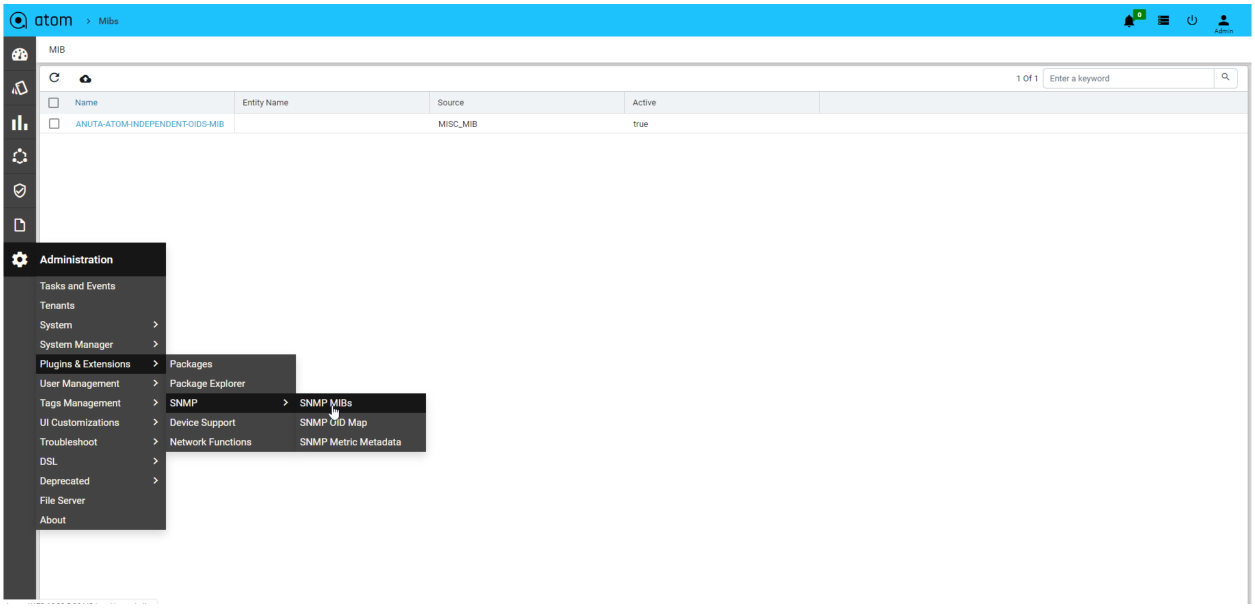
Import SNMP MIBs

ATOM allows users to import any SNMP MIBs. To use the Object identifiers (OID’s) which are part of the uploaded MIB need to be compiled by activating them.

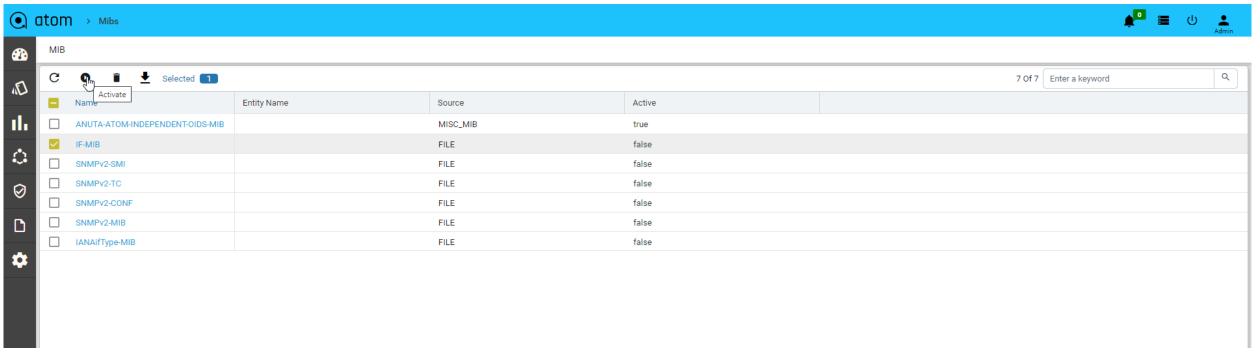
During activation, it compiles all the dependent MIBs automatically if they are already available on the system. Otherwise, the user has to upload the dependent MIBs to compile properly.

Navigate to Administration -> Plugins and Extensions -> SNMP -> SNMP MIBs and upload a mib file



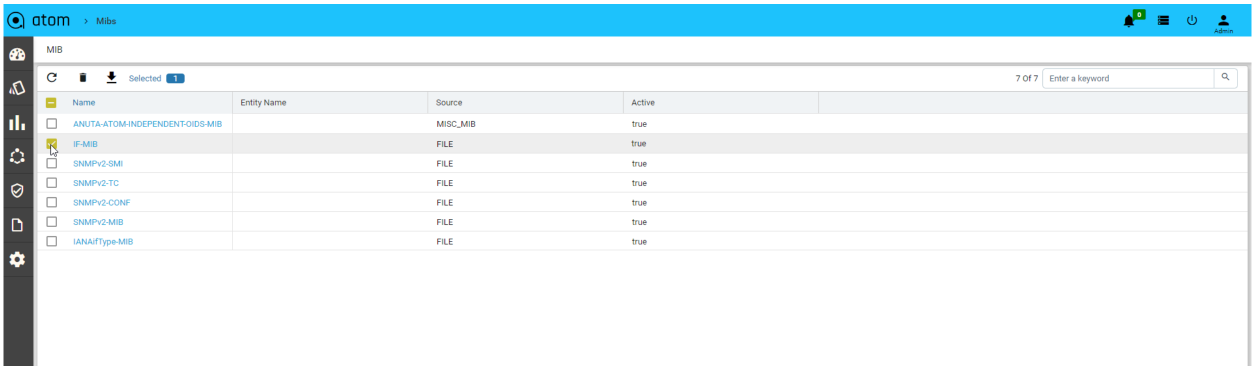
Name	Entity Name	Source	Active
ANUTA-ATOM-INDEPENDENT-OIDS-MIB		MISC_MIB	true

Below snapshot shows IFMIB along with its dependencies after uploading. All of them are still inactive. To activate a MIB, select a MIB entry and click on the activate button.



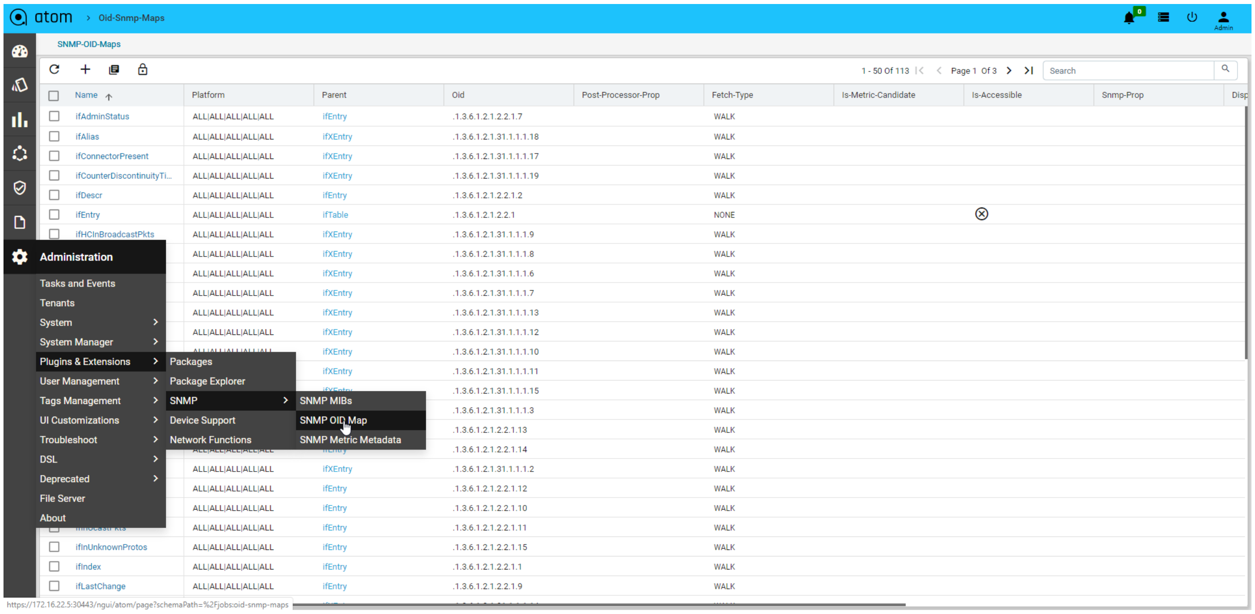
Name	Entity Name	Source	Active
ANUTA-ATOM-INDEPENDENT-OIDS-MIB		MISC_MIB	true
IF-MIB		FILE	false
SNMPv2-SMI		FILE	false
SNMPv2-TC		FILE	false
SNMPv2-CONF		FILE	false
SNMPv2-MIB		FILE	false
IANAifType-MIB		FILE	false

Once the MIB is activated, automatically its dependencies get activated as shown in the snapshot below.



	Name	Entity Name	Source	Active
□	ANUTA-ATOM-INDEPENDENT-OIDS-MIB		MISC_MIB	true
☑	IF-MIB		FILE	true
□	SNMPv2-SMI		FILE	true
□	SNMPv2-TC		FILE	true
□	SNMPv2-CONF		FILE	true
□	SNMPv2-MIB		FILE	true
□	IANAifType-MIB		FILE	true

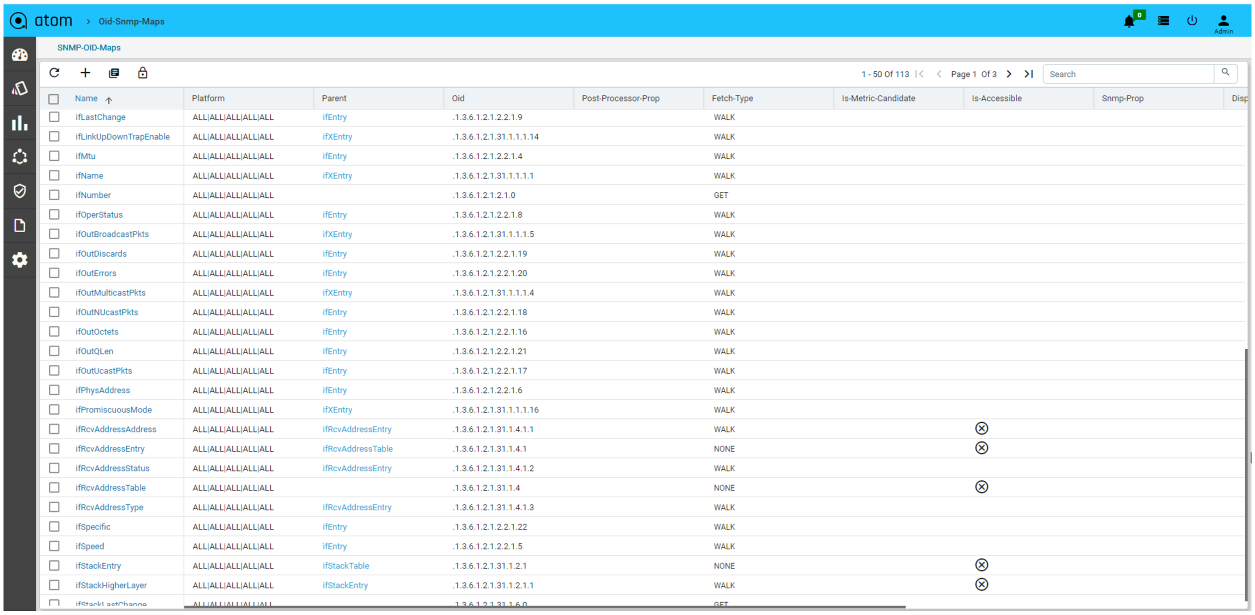
After compilation (activation), it will extract all the OIDs from each MIB and can be seen on Administration -> Plugins and Extensions -> SNMP -> SNMP OID Map.



	Name	Platform	Parent	Oid	Post-Processor-Prop	Fetch-Type	Is-Metric-Candidate	Is-Accessible	Snmp-Prop	Disp
□	ifAdminStatus	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.7		WALK				
□	ifAlias	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.18		WALK				
□	ifConnectorPresent	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.17		WALK				
□	ifCounterDiscontinuityTi...	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.19		WALK				
□	ifDescr	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.2		WALK				
□	ifEntry	ALL|ALL|ALL|ALL|ALL	ifTable	.1.3.6.1.2.1.2.2.1		NONE		⊗		
□	ifHCInBroadcastPkts	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.9		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.8		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.6		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.7		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.13		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.12		WALK				
			ifXEntry	.1.3.6.1.2.1.31.1.1.1.10		WALK				
			ifXEntry	.1.3.6.1.2.1.31.1.1.1.11		WALK				
				.1.3.6.1.2.1.31.1.1.1.15		WALK				
				.1.3.6.1.2.1.31.1.1.1.3		WALK				
				.1.3.6.1.2.1.2.2.1.13		WALK				
				.1.3.6.1.2.1.2.2.1.14		WALK				
		ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.2		WALK				
		ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.12		WALK				
		ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.10		WALK				
		ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.11		WALK				
□	ifInUnknownProtos	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.15		WALK				
□	ifIndex	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.1		WALK				
□	ifLastChange	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.9		WALK				

For each OID, it will extract the following properties:

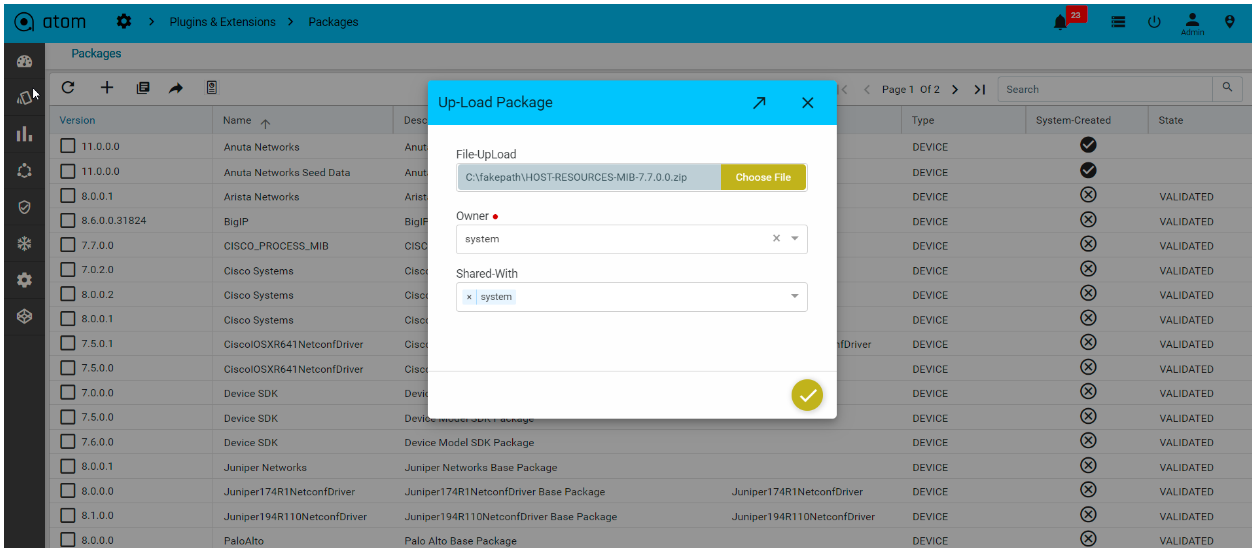
1. Fetch Type: Identifies the snmp fetch type such as GET or WALK
2. Is Accessible : Is it actual OID or the tabular header
3. Key OID’s : Lists out the all key oids for each oid



□	Name	Platform	Parent	Oid	Post-Processor-Prop	Fetch-Type	Is-Metric-Candidate	Is-Accessible	Snmp-Prop	Disp
□	ifLastChange	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.9		WALK				
□	ifLinkUpDownTrapEnable	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.14		WALK				
□	ifMtu	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.4		WALK				
□	ifName	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.1		WALK				
□	ifNumber	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.2.1.0		GET				
□	ifOperStatus	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.8		WALK				
□	ifOutBroadcastPkts	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.5		WALK				
□	ifOutDiscards	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.19		WALK				
□	ifOutErrors	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.20		WALK				
□	ifOutMulticastPkts	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.4		WALK				
□	ifOutNUcastPkts	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.18		WALK				
□	ifOutOctets	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.16		WALK				
□	ifOutQLen	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.21		WALK				
□	ifOutUcastPkts	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.17		WALK				
□	ifPhysAddress	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.6		WALK				
□	ifPromiscuousMode	ALL|ALL|ALL|ALL|ALL	ifXEntry	.1.3.6.1.2.1.31.1.1.1.16		WALK				
□	ifRcvAddressAddress	ALL|ALL|ALL|ALL|ALL	ifRcvAddressEntry	.1.3.6.1.2.1.31.1.4.1.1		WALK		⊗		
□	ifRcvAddressEntry	ALL|ALL|ALL|ALL|ALL	ifRcvAddressTable	.1.3.6.1.2.1.31.1.4.1		NONE		⊗		
□	ifRcvAddressStatus	ALL|ALL|ALL|ALL|ALL	ifRcvAddressEntry	.1.3.6.1.2.1.31.1.4.1.2		WALK				
□	ifRcvAddressTable	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.31.1.4		NONE		⊗		
□	ifRcvAddressType	ALL|ALL|ALL|ALL|ALL	ifRcvAddressEntry	.1.3.6.1.2.1.31.1.4.1.3		WALK				
□	ifSpecific	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.22		WALK				
□	ifSpeed	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.5		WALK				
□	ifStackEntry	ALL|ALL|ALL|ALL|ALL	ifStackTable	.1.3.6.1.2.1.31.1.2.1		NONE		⊗		
□	ifStackHigherLayer	ALL|ALL|ALL|ALL|ALL	ifStackEntry	.1.3.6.1.2.1.31.1.2.1.1		WALK		⊗		
□	ifStackLastChange	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.31.1.6.0		GET				

By Default, ATOM uses the MIB name as the default in device monitoring trees. To provide an alias, specify the entity name.

Note:: Navigate->Administration->Plugin & Extension->Packages:: We have other option to upload the mib packages are IF-MIB, Host -resource-mib,Cisco Process-Mib, bgp4 mib are etc.



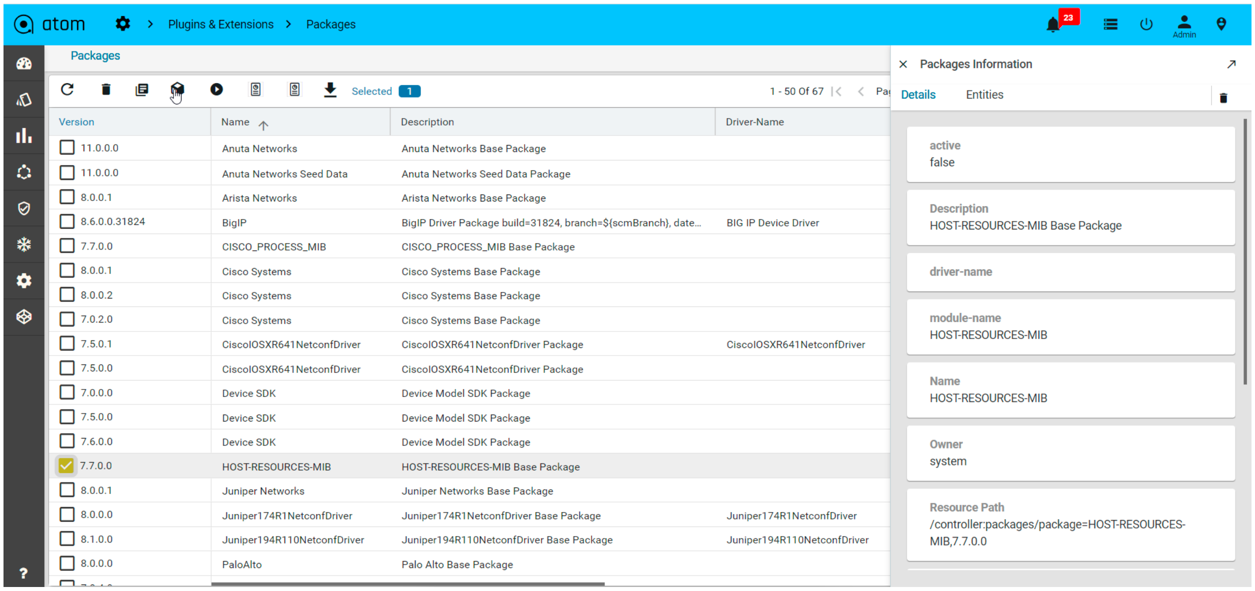
File-UpLoad: C:\fakepath\HOST-RESOURCES-MIB-7.7.0.0.zip

Owner ●: system

Shared-With: × system

Version	Name	Desc		Type	System-Created	State
□ 11.0.0.0	Anuta Networks	Anut		DEVICE	✓	
□ 11.0.0.0	Anuta Networks Seed Data	Anut		DEVICE	✓	
□ 8.0.0.1	Arista Networks	Arist		DEVICE	⊗	VALIDATED
□ 8.6.0.0.31824	BigIP	BigIP		DEVICE	⊗	VALIDATED
□ 7.7.0.0	CISCO_PROCESS_MIB	CISC		DEVICE	⊗	VALIDATED
□ 7.0.2.0	Cisco Systems	Cisc		DEVICE	⊗	VALIDATED
□ 8.0.0.2	Cisco Systems	Cisc		DEVICE	⊗	VALIDATED
□ 8.0.0.1	Cisco Systems	Cisc		DEVICE	⊗	VALIDATED
□ 7.5.0.1	CiscoIOSXR641NetconfDriver	Cisc	nfDriver	DEVICE	⊗	VALIDATED
□ 7.5.0.0	CiscoIOSXR641NetconfDriver	Cisc		DEVICE	⊗	VALIDATED
□ 7.0.0.0	Device SDK	Devi		DEVICE	⊗	VALIDATED
□ 7.5.0.0	Device SDK	Device		DEVICE	⊗	VALIDATED
□ 7.6.0.0	Device SDK	Device Model SDK Package		DEVICE	⊗	VALIDATED
□ 8.0.0.1	Juniper Networks	Juniper Networks Base Package		DEVICE	⊗	VALIDATED
□ 8.0.0.0	Juniper174R1NetconfDriver	Juniper174R1NetconfDriver Base Package	Juniper174R1NetconfDriver	DEVICE	⊗	VALIDATED
□ 8.1.0.0	Juniper194R110NetconfDriver	Juniper194R110NetconfDriver Base Package	Juniper194R110NetconfDriver	DEVICE	⊗	VALIDATED
□ 8.0.0.0	PaloAlto	Palo Alto Base Package		DEVICE	⊗	VALIDATED

To activate a MIB, select a MIB entry and click on the activate button.



Version	Name	Description	Driver-Name
□ 11.0.0.0	Anuta Networks	Anuta Networks Base Package	
□ 11.0.0.0	Anuta Networks Seed Data	Anuta Networks Seed Data Package	
□ 8.0.0.1	Arista Networks	Arista Networks Base Package	
□ 8.6.0.0.31824	BigIP	BigIP Driver Package build=31824, branch=${scmBranch}, date...	BIG IP Device Driver
□ 7.7.0.0	CISCO_PROCESS_MIB	CISCO_PROCESS_MIB Base Package	
□ 8.0.0.1	Cisco Systems	Cisco Systems Base Package	
□ 8.0.0.2	Cisco Systems	Cisco Systems Base Package	
□ 7.0.2.0	Cisco Systems	Cisco Systems Base Package	
□ 7.5.0.1	CiscoIOSXR641NetconfDriver	CiscoIOSXR641NetconfDriver Package	CiscoIOSXR641NetconfDriver
□ 7.5.0.0	CiscoIOSXR641NetconfDriver	CiscoIOSXR641NetconfDriver Package	
□ 7.0.0.0	Device SDK	Device Model SDK Package	
□ 7.5.0.0	Device SDK	Device Model SDK Package	
□ 7.6.0.0	Device SDK	Device Model SDK Package	
☑ 7.7.0.0	HOST-RESOURCES-MIB	HOST-RESOURCES-MIB Base Package	
□ 8.0.0.1	Juniper Networks	Juniper Networks Base Package	
□ 8.0.0.0	Juniper174R1NetconfDriver	Juniper174R1NetconfDriver Base Package	Juniper174R1NetconfDriver
□ 8.1.0.0	Juniper194R110NetconfDriver	Juniper194R110NetconfDriver Base Package	Juniper194R110NetconfDriver
□ 8.0.0.0	PaloAlto	Palo Alto Base Package	

active
false

Description
HOST-RESOURCES-MIB Base Package

driver-name

module-name
HOST-RESOURCES-MIB

Name
HOST-RESOURCES-MIB

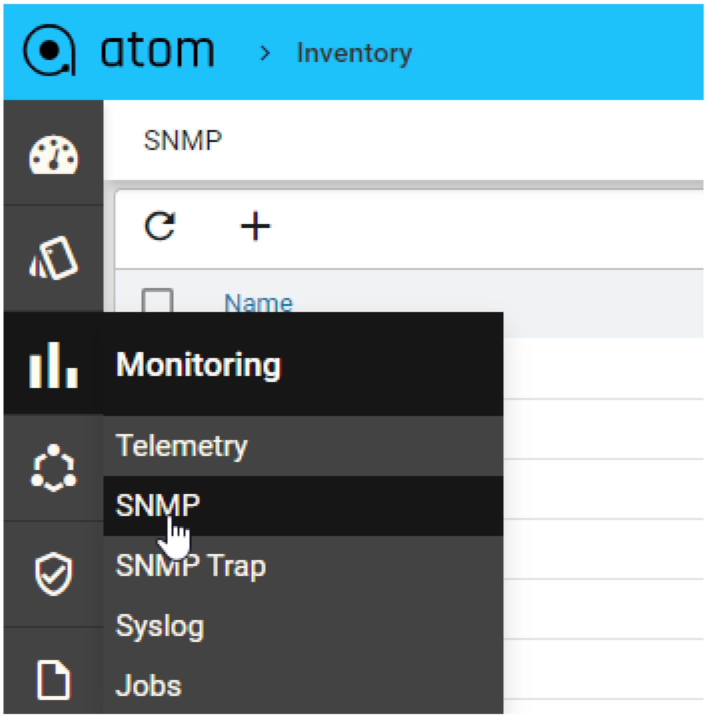
Owner
system

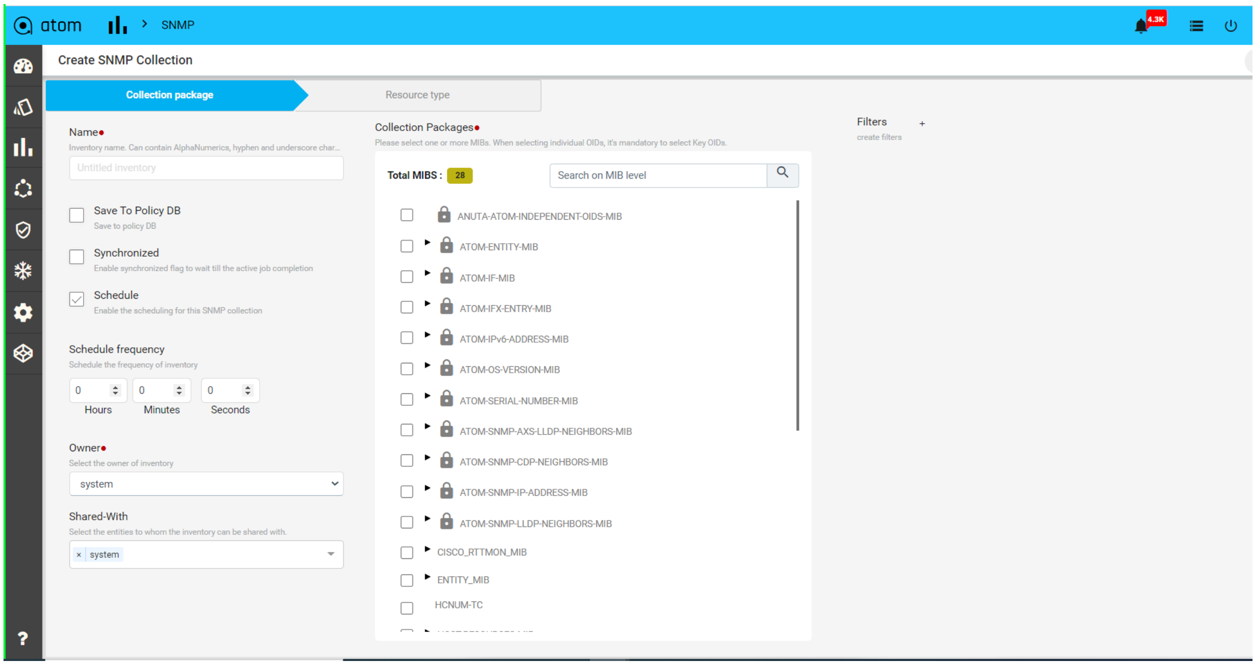
Resource Path
/controller:packages/package=HOST-RESOURCES-MIB,7.7.0.0

SNMP

SNMP Collections can be created for collecting Inventory information from the devices, checking the health of the devices, to measure performance of Network Objects and discovering the neighbours of the device.

1. From the left pane, navigate to **Monitoring** > **SNMP**
2. Click Add (**+**) to create a new SNMP collection profile
3. In the **New Inventory Collection** screen, enter the following details in the **Collection package** tab





Create SNMP Collection

Name●
Inventory name. Can contain AlphaNumerics, hyphen and underscore char...
Untitled inventory

☐ Save To Policy DB
Save to policy DB

☐ Synchronized
Enable synchronized flag to wait till the active job completion

☑ Schedule
Enable the scheduling for this SNMP collection

Schedule frequency
Schedule the frequency of inventory
0 Hours | 0 Minutes | 0 Seconds

Owner●
Select the owner of inventory
system

Shared-With
Select the entities to whom the inventory can be shared with.
× system

Collection Packages●
Please select one or more MIBs. When selecting individual OIDs, it's mandatory to select Key OIDs.

Total MIBS : 28
Search on MIB level

☐ ANUTA-ATOM-INDEPENDENT-OIDS-MIB
☐ ATOM-ENTITY-MIB
☐ ATOM-IF-MIB
☐ ATOM-IFX-ENTRY-MIB
☐ ATOM-IPv6-ADDRESS-MIB
☐ ATOM-OS-VERSION-MIB
☐ ATOM-SERIAL-NUMBER-MIB
☐ ATOM-SNMP-AXS-LLDP-NEIGHBORS-MIB
☐ ATOM-SNMP-CDP-NEIGHBORS-MIB
☐ ATOM-SNMP-IP-ADDRESS-MIB
☐ ATOM-SNMP-LLDP-NEIGHBORS-MIB
☐ CISCO_RTTMON_MIB
☐ ENTITY_MIB
☐ HCNUM-TC

- **Name**: Enter the appropriate name for the collection.
- **Synchronized:** It makes scheduled collection at regular tight intervals when it is set to true.

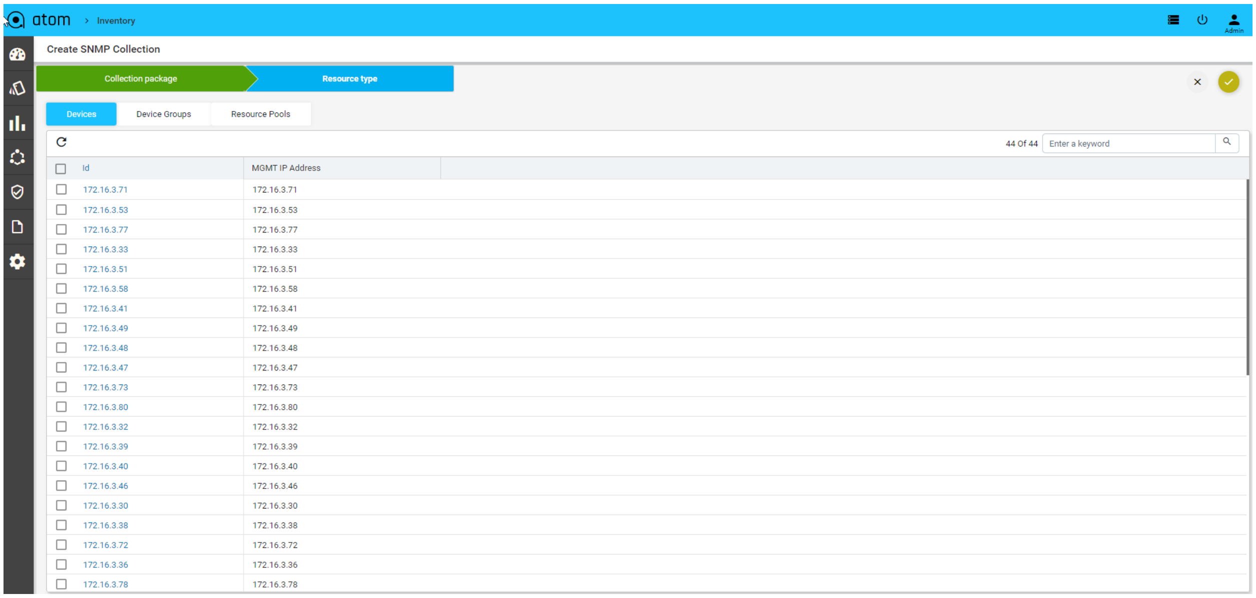
  eg: if we are polling the device every 1min to collect Interface counters but the device hasn't responded for previous requests as it has too many objects to gather. So, when we set the synchronized flag to true, it waits until the previous request is completed by the device. Otherwise, it makes continuous requests at regular intervals irrespective of the time spent on the device.

- **Save to Policy DB:** By default, all the metrics data will be stored in a time series database. To store anything as inventory with overridden policy, this has to be enabled. It stores the data on the ATOM policy database and it requires the YANG mappings to OID's which can be defined as part of the device package. Refer to the ATOM SDK to generate the YANG mappings for MIB.
- **Collection Packages:** Choose one or more Object identifiers which can be spread across the MIBs. ATOM will automatically let the users know about mandatory key OIDs for selected Objects. For example, if a user wants to collect InterfaceInErrors then they must require the interface names to map the values correctly.
- **Schedule frequency:** Choose the SNMP polling frequency

NOTE:

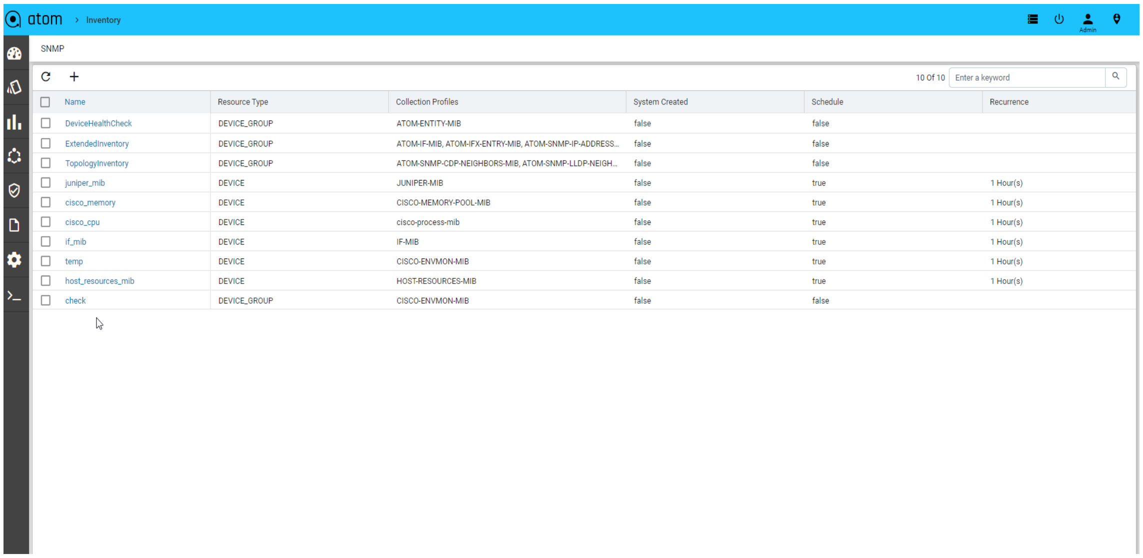
1. Don't select all the OID's in each MIB with less frequency, choose what is useful. Otherwise, it leads to HIGH CPU UTILIZATION on devices.

4. In the Resources type tab, choose the devices, device groups or resource pools to which the profile has to be applied



Id	MGMT IP Address
172.16.3.71	172.16.3.71
172.16.3.53	172.16.3.53
172.16.3.77	172.16.3.77
172.16.3.33	172.16.3.33
172.16.3.51	172.16.3.51
172.16.3.58	172.16.3.58
172.16.3.41	172.16.3.41
172.16.3.49	172.16.3.49
172.16.3.48	172.16.3.48
172.16.3.47	172.16.3.47
172.16.3.73	172.16.3.73
172.16.3.80	172.16.3.80
172.16.3.32	172.16.3.32
172.16.3.39	172.16.3.39
172.16.3.40	172.16.3.40
172.16.3.46	172.16.3.46
172.16.3.30	172.16.3.30
172.16.3.38	172.16.3.38
172.16.3.72	172.16.3.72
172.16.3.36	172.16.3.36
172.16.3.78	172.16.3.78

5. Click ✓ to save the collection profile



Name	Resource Type	Collection Profiles	System Created	Schedule	Recurrence
DeviceHealthCheck	DEVICE_GROUP	ATOM-ENTITY-MIB	false	false	
ExtendedInventory	DEVICE_GROUP	ATOM-IF-MIB, ATOM-IFX-ENTRY-MIB, ATOM-SNMP-IP-ADDRESS...	false	false	
TopologyInventory	DEVICE_GROUP	ATOM-SNMP-CDP-NEIGHBORS-MIB, ATOM-SNMP-LLDP-NEIGH...	false	false	
juniper_mib	DEVICE	JUNIPER-MIB	false	true	1 Hour(s)
cisco_memory	DEVICE	CISCO-MEMORY-POOL-MIB	false	true	1 Hour(s)
cisco_cpu	DEVICE	cisco-process-mib	false	true	1 Hour(s)
if_mib	DEVICE	IF-MIB	false	true	1 Hour(s)
temp	DEVICE	CISCO-ENVMON-MIB	false	true	1 Hour(s)
host_resources_mib	DEVICE	HOST-RESOURCES-MIB	false	true	1 Hour(s)
check	DEVICE_GROUP	CISCO-ENVMON-MIB	false	false	

6. Navigate to **Monitoring > SNMP** to view/modify the collection profile.

For each new collection, ATOM creates the metric schema for each MIB on every Device to showcase the metrics in logical hierarchy in device-explorer. Refer to the **Metric schema customisation.**

Telemetry

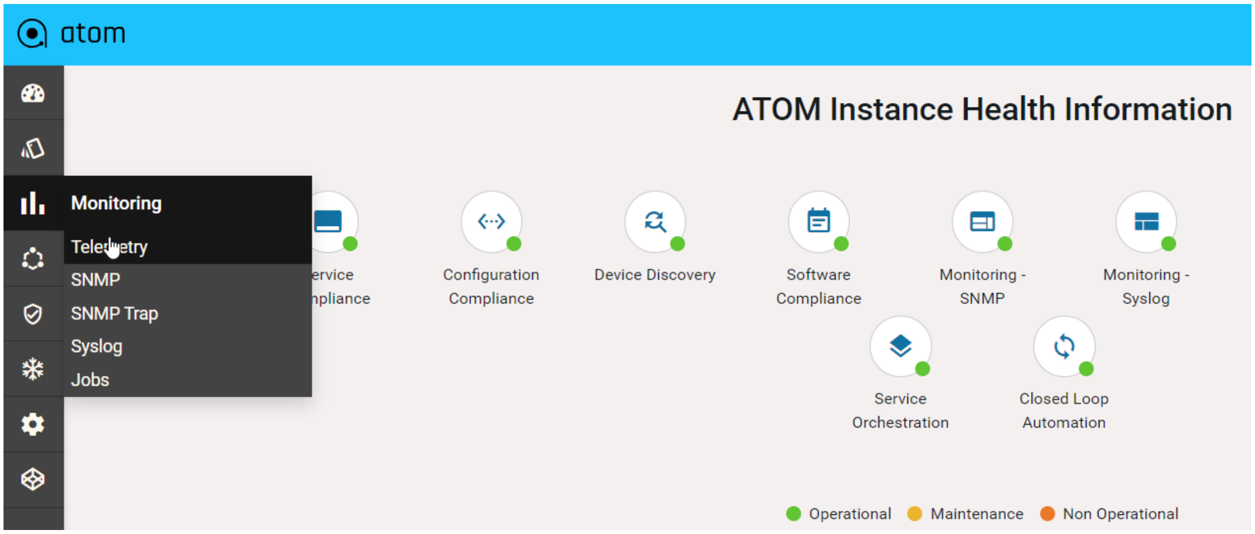
ATOM can act as a Telemetry receiver. ATOM Supports Model driven Telemetry, various Transport options, encoding and frequency of collection.

- Telemetry configuration in ATOM is optional if Telemetry is enabled manually on the devices

- ATOM can enable Telemetry subscription on the device. The section below discusses the steps to be followed.

Configure Telemetry Collection

1. Ensure that the **dry run** option is unchecked in **Administration > General Settings** tab.
2. For configuring the sensors on the device, navigate to **Monitoring > Telemetry**.

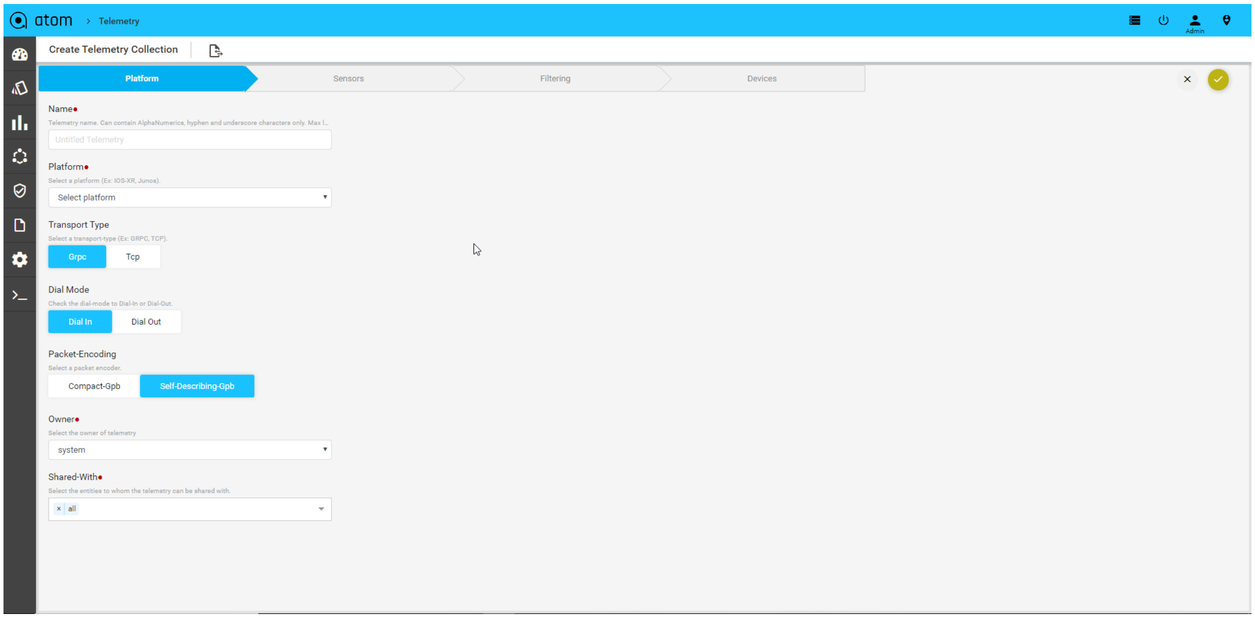


3. Click Add (**+**) to create a new streaming telemetry collection profile
4. In the **Create Telemetry Collection > Platform** tab, enter the following information
    - **Name**: Enter a name for the collection profile
    - **Platform**: Select the device platform that supports Telemetry
    - **Transport type**: Select the mode of transmission of telemetry data between the sender (device) and the receiver (ATOM's Agent), depending on your requirement
        i. gRPC
        ii. TCP
    - **Dial Mode**: Select **Dial Out** if the session establishment between the destination and the device should be initiated by the device itself.

> NOTE: By default, the Dial In option is enabled.

- **Packet Encoding:** Select the encoding format for the streamed data between the sender (device) and the receiver (ATOM's Agent)
    i. Compact gpb
    ii. Self-describing gpb

- **Owner**: Select the owner/tenant who owns the telemetry data
- **Shared-With**: Add the tenant names to share the data or alternatively leave it as “all” to make it globally available



Name●
Telemetry name. Can contain AlphaNumerics, hyphen and underscore characters only. Max l...
Untitled Telemetry

Platform●
Select a platform (Ex: IOS-XR, Junos).
Select platform

Transport Type
Select a transport-type (Ex: GRPC, TCP).
[✓ Grpc] Tcp

Dial Mode
Check the dial-mode to Dial-In or Dial-Out.
[✓ Dial In] Dial Out

Packet-Encoding
Select a packet encoder.
Compact-Gpb [✓ Self-Describing-Gpb]

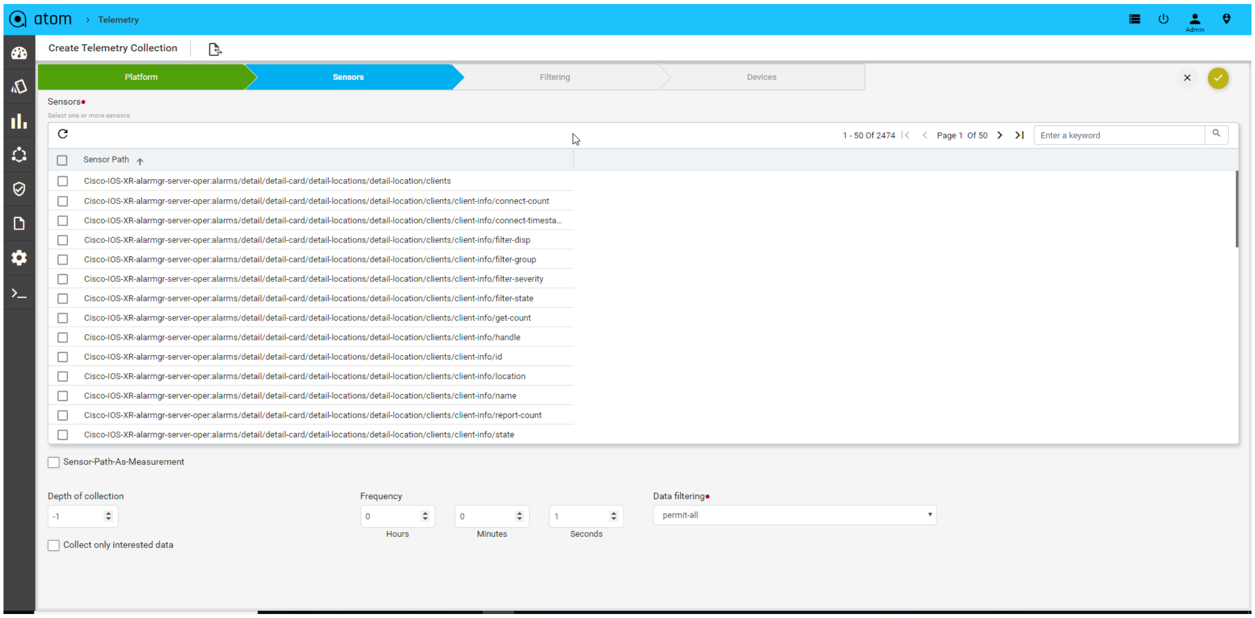
Owner●
Select the owner of telemetry
system

Shared-With●
Select the entities to whom the telemetry can be shared with.
× all

5. In the **Create Telemetry Collection > Sensors** tab, enter the following information

- **Sensors**: Select the sensor paths for the device platform selected

> NOTE: All the Xpaths of the entities described in the YANG model that the receiver (ATOM) has subscribed to in the sender (device) are displayed here.
>
> The sensors are the abstract paths defined in YANG mapped to device model paths published by the vendor. To view all the available device model paths or sensors published by the vendor and imported into ATOM, navigate to the **Administration > Plugins & Extensions > Device Support > Edit > Telemetry seed data**



Create Telemetry Collection

Sensors●
Select one or more sensors

1 - 50 Of 2474 |< < Page 1 Of 50 > >| Enter a keyword

□	Sensor Path ↑
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/connect-count
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/connect-timesta...
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/filter-disp
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/filter-group
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/filter-severity
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/filter-state
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/get-count
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/handle
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/id
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/location
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/name
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/report-count
□	Cisco-IOS-XR-alarmgr-server-oper:alarms/detail/detail-card/detail-locations/detail-location/clients/client-info/state

□ Sensor-Path-As-Measurement

Depth of collection: -1

Frequency: 0 Hours, 0 Minutes, 1 Seconds

Data filtering●: permit-all

□ Collect only interested data

- **Depth of collection:** In the selected sensor paths, enter the level in the container hierarchy at which the data should be streamed from the device.

  For example, a depth of collection of 0 returns only the leaf entities in the specified container and a depth of 1 returns the data from depth 0 and depth 1 levels the data from the container specified in the sensor path.

Example:

Sensor path: Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface

Depth of collection = -1

Result:

Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/arp-information/arp-is-learning-disabled (boolean)

Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/arp-information/arp-timeout (float)

Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/arp-information/arp-type-name (string)

Depth of collection = 0

Result:

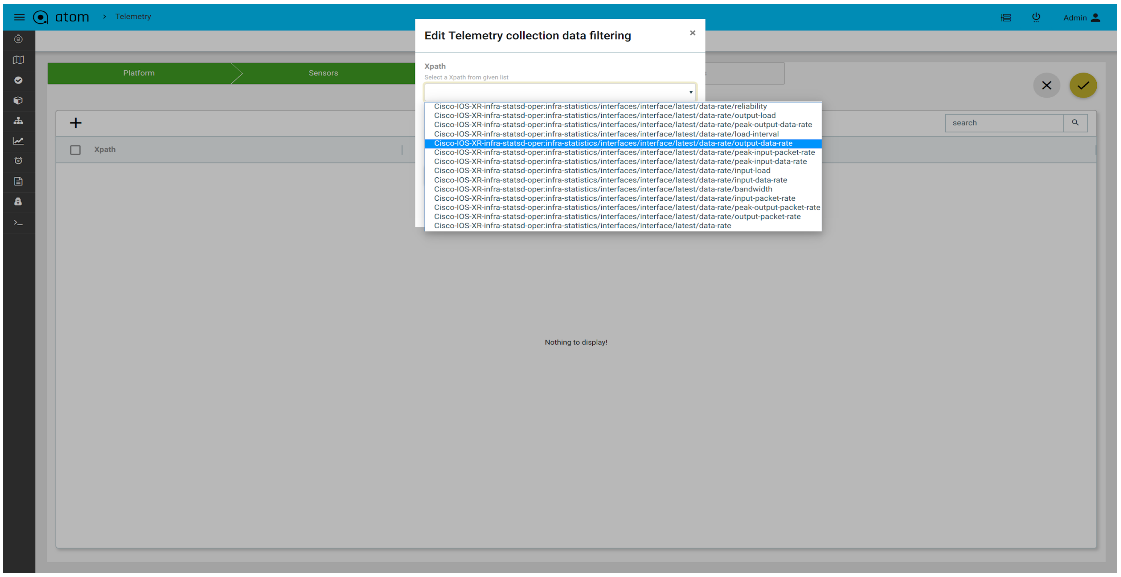
Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/bandwidth (float)

Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/crc-length (float)

Cisco-IOS-XR-pfi-im-cmd-oper:interfaces/interface-xr/interface/description (string)

- **Collect only interested data**: Check this box to collect the data selectively only for the required sensors.
- **Data filtering**: In the global filtering policy, permit or deny the collected data from the device to the Time-series database.
- **Frequency**: Enter the rate at which sensor data needs to be collected from the device to be saved into a Time-series database.

6. In the **Create Telemetry Collection > Filtering** tab, enter the following information
   - Click Add (**+**) to create Telemetry collection data filtering
   - In the **Xpath** field, choose the sensor path to be filtered from the drop-down list



Edit Telemetry collection data filtering

Xpath

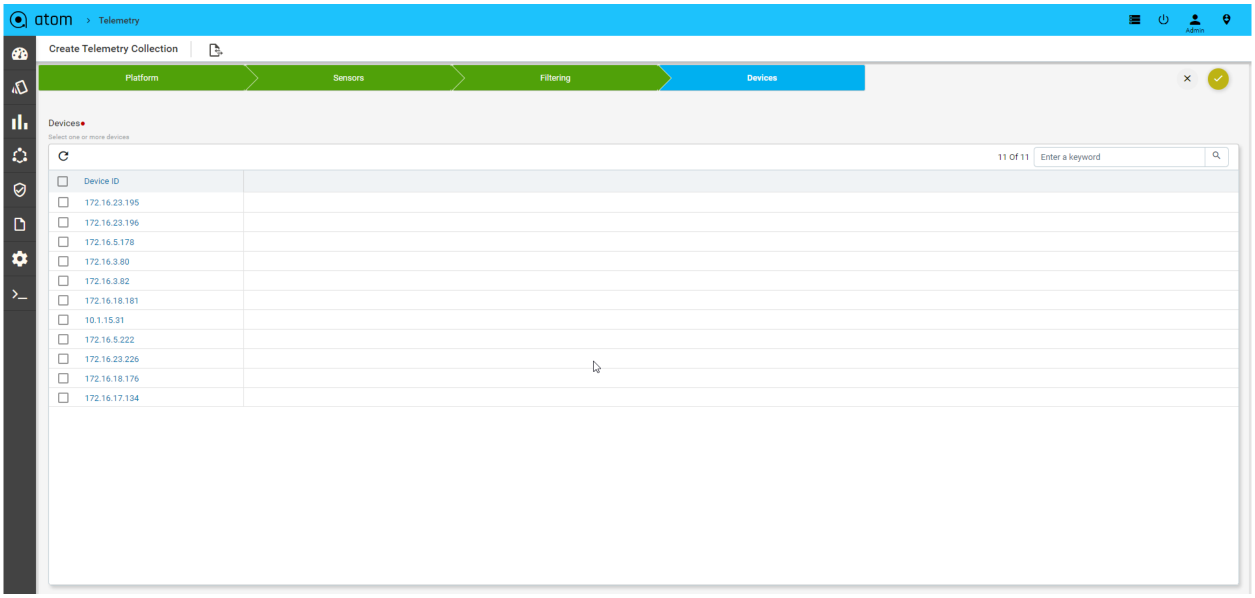
Select a Xpath from given list

Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/reliability
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/output-load
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/peak-output-data-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/load-interval
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/output-data-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/peak-input-packet-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/peak-input-data-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/input-load
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/input-data-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/bandwidth
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/input-packet-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/peak-output-packet-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate/output-packet-rate
Cisco-IOS-XR-infra-statsd-oper:infra-statistics/interfaces/interface/latest/data-rate

   - In the **Subtree** field, check or uncheck the value of subtree
   - In the **Filter** type, select Permit or Deny

> NOTE: You can exercise the filtering options(either permit or deny) at the granular level. The filtering option set here overrides the global filtering policy described in step 5

7. In the **Create Telemetry Collection > Devices** tab, select the Device (multiple devices can be selected), where the subscription services are running and the data should be pushed to the device.



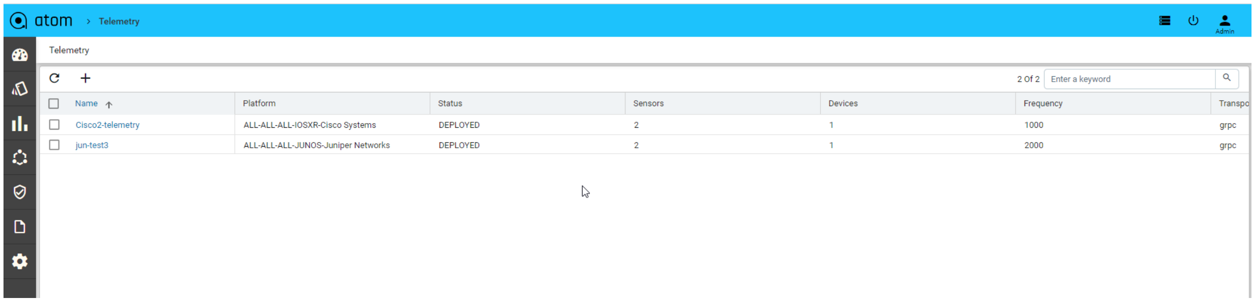
Devices•

Select one or more devices

11 Of 11 Enter a keyword

□	Device ID
□	172.16.23.195
□	172.16.23.196
□	172.16.5.178
□	172.16.3.80
□	172.16.3.82
□	172.16.18.181
□	10.1.15.31
□	172.16.5.222
□	172.16.23.226
□	172.16.18.176
□	172.16.17.134

8. Click ✓ to save the streaming telemetry collection profile.
9. After successful creation of collection, provision collection and deploy if it is dial in mode. If it is dial out mode then provision the collection only.
10. After successful deployment of the collection make sure that the status of the collection will be shown as DEPLOYED in the UI.



Telemetry

2 Of 2 Enter a keyword

□	Name ↑	Platform	Status	Sensors	Devices	Frequency	Transpo
□	Cisco2-telemetry	ALL-ALL-ALL-IOSXR-Cisco Systems	DEPLOYED	2	1	1000	grpc
□	jun-test3	ALL-ALL-ALL-JUNOS-Juniper Networks	DEPLOYED	2	1	2000	grpc

11. Navigate to **Monitoring > Telemetry** to view/modify the collection profile

SNMP Traps

Navigate->Administration->Plugins & Extension->Packages::

Upload the mib dependencies package & load it.

Navigate->Monitoring->SNMP::

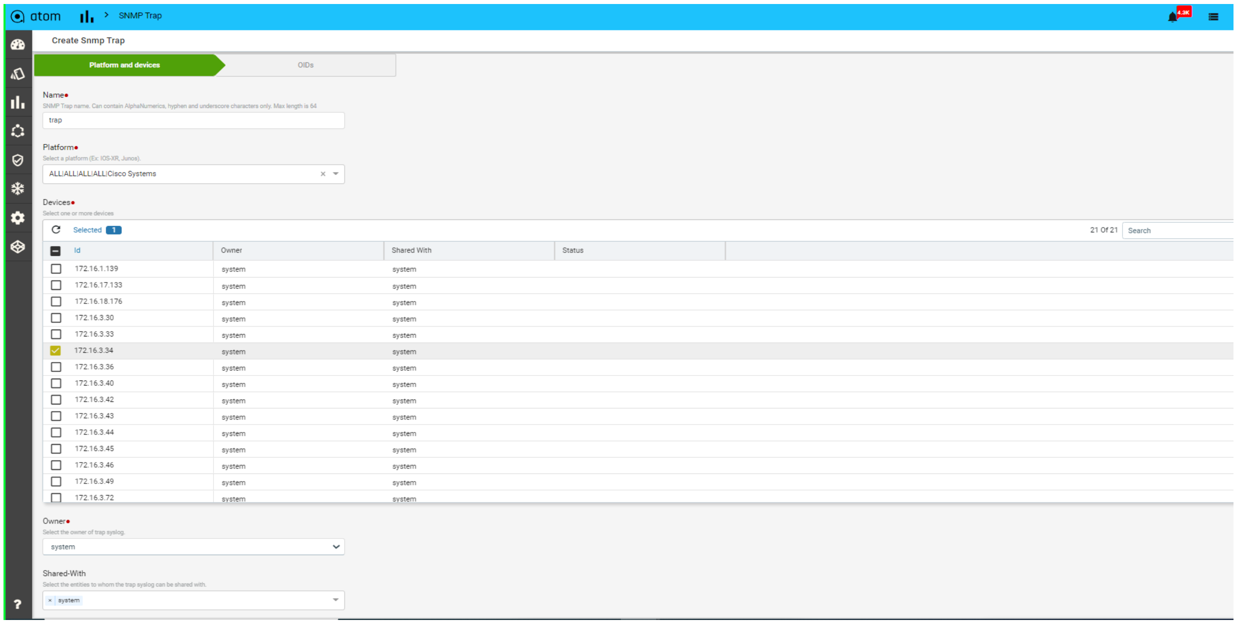
Add snmp collection with if-mib & csr devices and schedule it every two minutes & ran job it

Check snmp collection data is shown in the monitoring tab.

SNMP traps generated by the device can be collected and visualized in ATOM

1. Navigate to **Monitoring > SNMP trap** on the main menu
2. Click Add (**+**) to create a new SNMP trap collection profile

3. In the **Platform and devices** tab, enter the following information
   - **Name**: Enter a name for the SNMP trap profile
   - **Platform**: Select the device platform from the drop-down list
   - **Devices**: Select one or more devices from which SNMP traps need to be collected



Create Snmp Trap

Platform and devices | OIDs

Name•
SNMP Trap name. Can contain AlphaNumerics, hyphen and underscore characters only. Max length is 64
trap

Platform•
Select a platform (Ex: IOS-XR, Junos).
ALL|ALL|ALL|ALL|Cisco Systems

Devices•
Select one or more devices

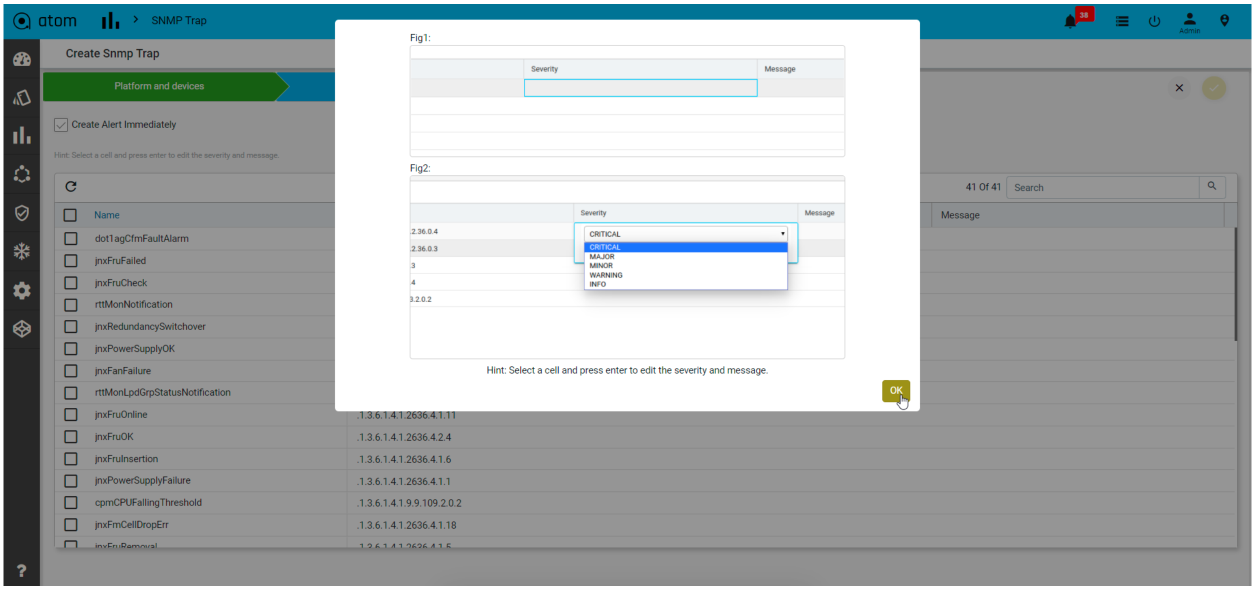
Selected 1 — 21 Of 21 — Search

	Id	Owner	Shared With	Status
☐	172.16.1.139	system	system	
☐	172.16.17.133	system	system	
☐	172.16.18.176	system	system	
☐	172.16.3.30	system	system	
☐	172.16.3.33	system	system	
☑	172.16.3.34	system	system	
☐	172.16.3.36	system	system	
☐	172.16.3.40	system	system	
☐	172.16.3.42	system	system	
☐	172.16.3.43	system	system	
☐	172.16.3.44	system	system	
☐	172.16.3.45	system	system	
☐	172.16.3.46	system	system	
☐	172.16.3.49	system	system	
☐	172.16.3.72	system	system	

Owner•
Select the owner of trap syslog.
system

Shared-With
Select the entities to whom the trap syslog can be shared with.
× system

Click on create alert immediately & enter link is up and down in mib oids



Create Snmp Trap

Platform and devices

☑ Create Alert Immediately

Hint: Select a cell and press enter to edit the severity and message.

41 Of 41 — Search

☐	Name		Message
☐	dot1agCfmFaultAlarm		
☐	jnxFruFailed		
☐	jnxFruCheck		
☐	rttMonNotification		
☐	jnxRedundancySwitchover		
☐	jnxPowerSupplyOK		
☐	jnxFanFailure		
☐	rttMonLpdGrpStatusNotification		
☐	jnxFruOnline	.1.3.6.1.4.1.2636.4.1.11	
☐	jnxFruOK	.1.3.6.1.4.1.2636.4.2.4	
☐	jnxFruInsertion	.1.3.6.1.4.1.2636.4.1.6	
☐	jnxPowerSupplyFailure	.1.3.6.1.4.1.2636.4.1.1	
☐	cpmCPUFallingThreshold	.1.3.6.1.4.1.9.9.109.2.0.2	
☐	jnxFmCellDropErr	.1.3.6.1.4.1.2636.4.1.18	
☐	jnxFruRemoval	.1.3.6.1.4.1.2636.4.1.5	

Fig1:

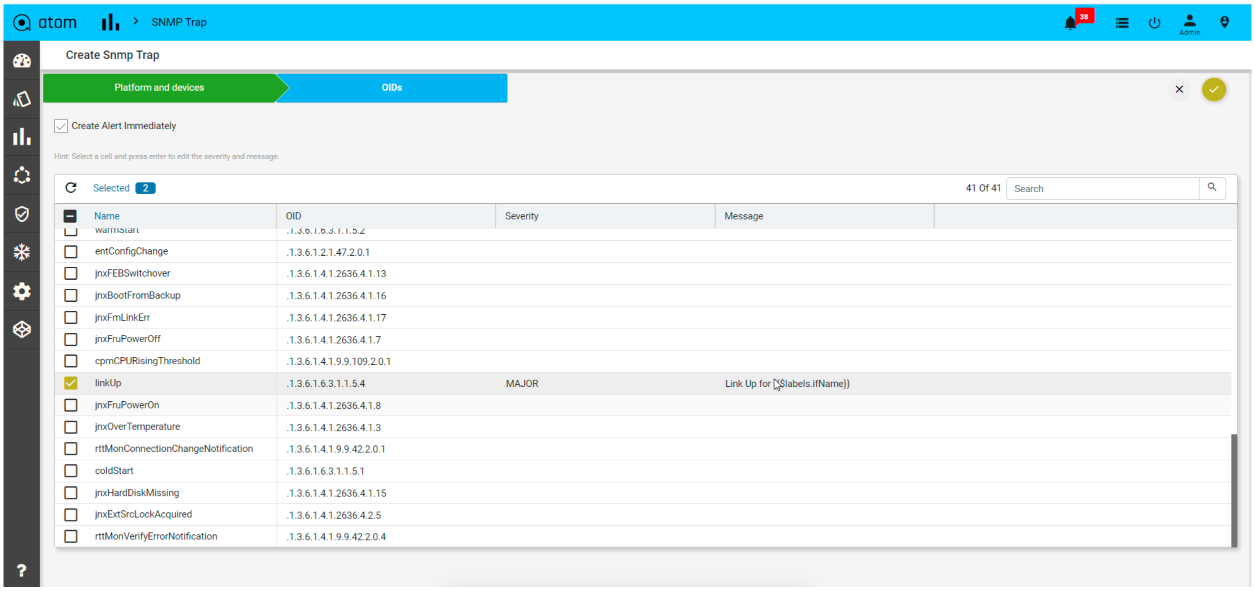
	Severity	Message

Fig2:

	Severity	Message
.2.36.0.4	CRITICAL	
.2.36.0.3		
3		
4		
3.2.0.2		

CRITICAL
MAJOR
MINOR
WARNING
INFO

Hint: Select a cell and press enter to edit the severity and message.



☑ Create Alert Immediately

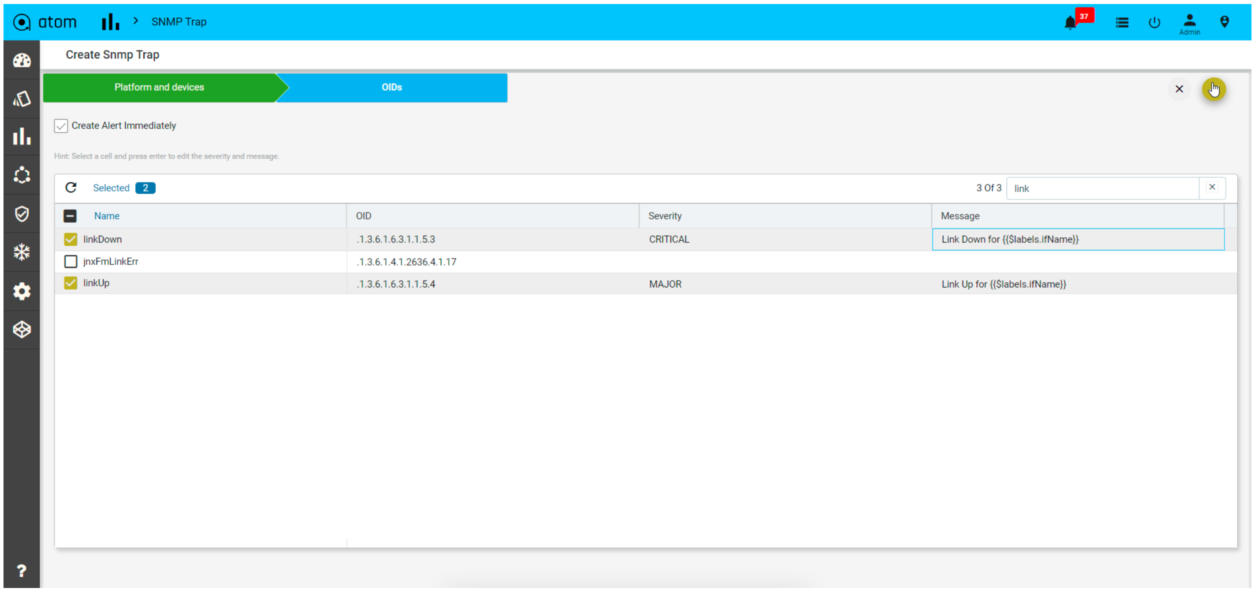
Hint: Select a cell and press enter to edit the severity and message.

Selected 2 — 41 Of 41 — Search

	Name	OID	Severity	Message
□	warmStart	.1.3.6.1.6.3.1.1.5.2		
□	entConfigChange	.1.3.6.1.2.1.47.2.0.1		
□	jnxFEBSwitchover	.1.3.6.1.4.1.2636.4.1.13		
□	jnxBootFromBackup	.1.3.6.1.4.1.2636.4.1.16		
□	jnxFmLinkErr	.1.3.6.1.4.1.2636.4.1.17		
□	jnxFruPowerOff	.1.3.6.1.4.1.2636.4.1.7		
□	cpmCPURisingThreshold	.1.3.6.1.4.1.9.9.109.2.0.1		
☑	linkUp	.1.3.6.1.6.3.1.1.5.4	MAJOR	Link Up for {{$labels.ifName}}
□	jnxFruPowerOn	.1.3.6.1.4.1.2636.4.1.8		
□	jnxOverTemperature	.1.3.6.1.4.1.2636.4.1.3		
□	rttMonConnectionChangeNotification	.1.3.6.1.4.1.9.9.42.2.0.1		
□	coldStart	.1.3.6.1.6.3.1.1.5.1		
□	jnxHardDiskMissing	.1.3.6.1.4.1.2636.4.1.15		
□	jnxExtSrcLockAcquired	.1.3.6.1.4.1.2636.4.2.5		
□	rttMonVerifyErrorNotification	.1.3.6.1.4.1.9.9.42.2.0.4		

4. In the OIDs tab, enter the following information
    - In the list provided, select the OIDs to be enabled for SNMP trap collection to enter link is up & link is down as above screen shot.
    - **Owner**: Choose the owner/tenant who owns the SNMP trap data
    - **Shared-With**: Add the tenant names to share the data or alternatively leave it as “all” to make it globally available

5. Click ✓ to save the collection profile

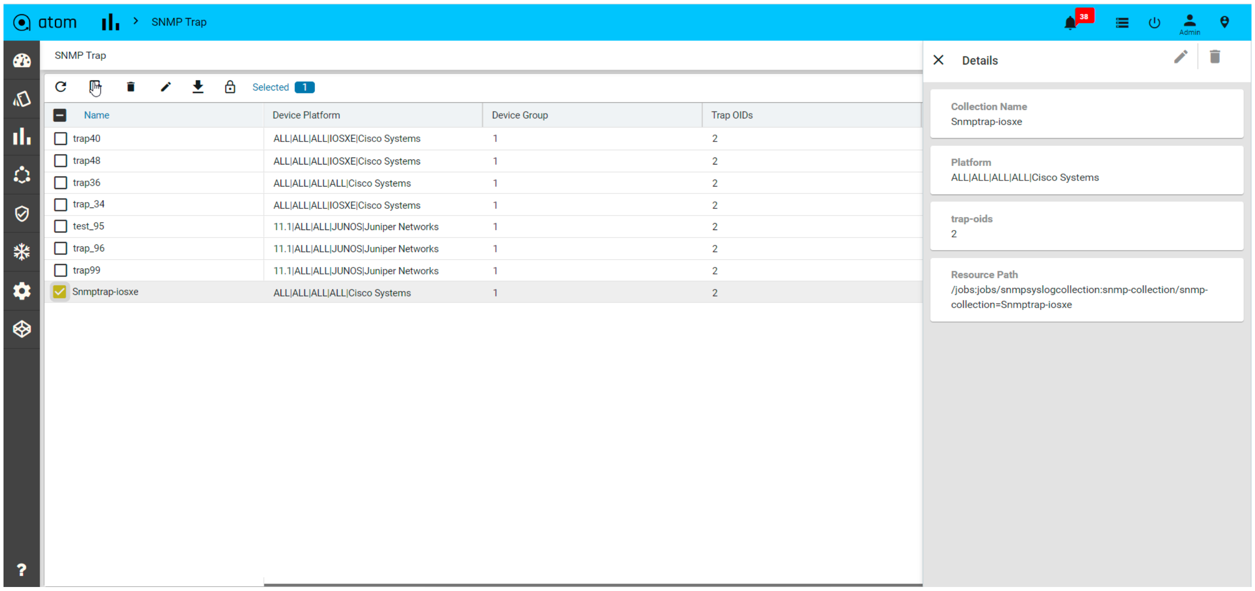


☑ Create Alert Immediately

Hint: Select a cell and press enter to edit the severity and message.

Selected 2 — 3 Of 3 — link

	Name	OID	Severity	Message
☑	linkDown	.1.3.6.1.6.3.1.1.5.3	CRITICAL	Link Down for {{$labels.ifName}}
□	jnxFmLinkErr	.1.3.6.1.4.1.2636.4.1.17		
☑	linkUp	.1.3.6.1.6.3.1.1.5.4	MAJOR	Link Up for {{$labels.ifName}}



☐ Name	Device Platform	Device Group	Trap OIDs
☐ trap40	ALL|ALL|ALL|IOSXE|Cisco Systems	1	2
☐ trap48	ALL|ALL|ALL|IOSXE|Cisco Systems	1	2
☐ trap36	ALL|ALL|ALL|ALL|Cisco Systems	1	2
☐ trap_34	ALL|ALL|ALL|IOSXE|Cisco Systems	1	2
☐ test_95	11.1|ALL|ALL|JUNOS|Juniper Networks	1	2
☐ trap_96	11.1|ALL|ALL|JUNOS|Juniper Networks	1	2
☐ trap99	11.1|ALL|ALL|JUNOS|Juniper Networks	1	2
☑ Snmptrap-iosxe	ALL|ALL|ALL|ALL|Cisco Systems	1	2

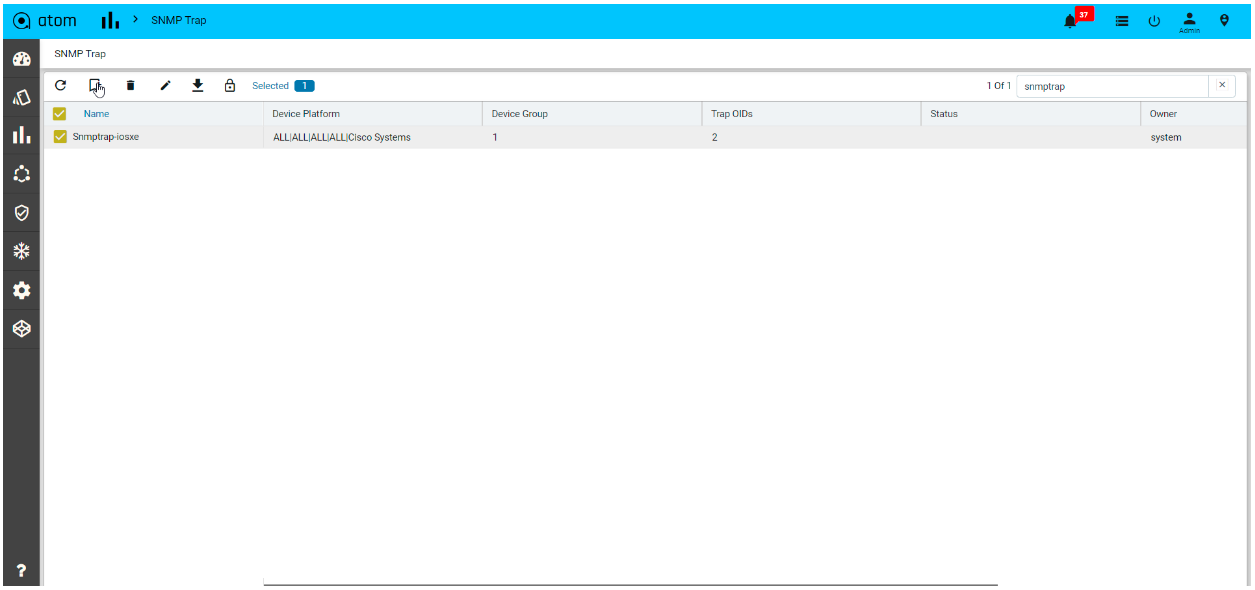
Collection Name
Snmptrap-iosxe

Platform
ALL|ALL|ALL|ALL|Cisco Systems

trap-oids
2

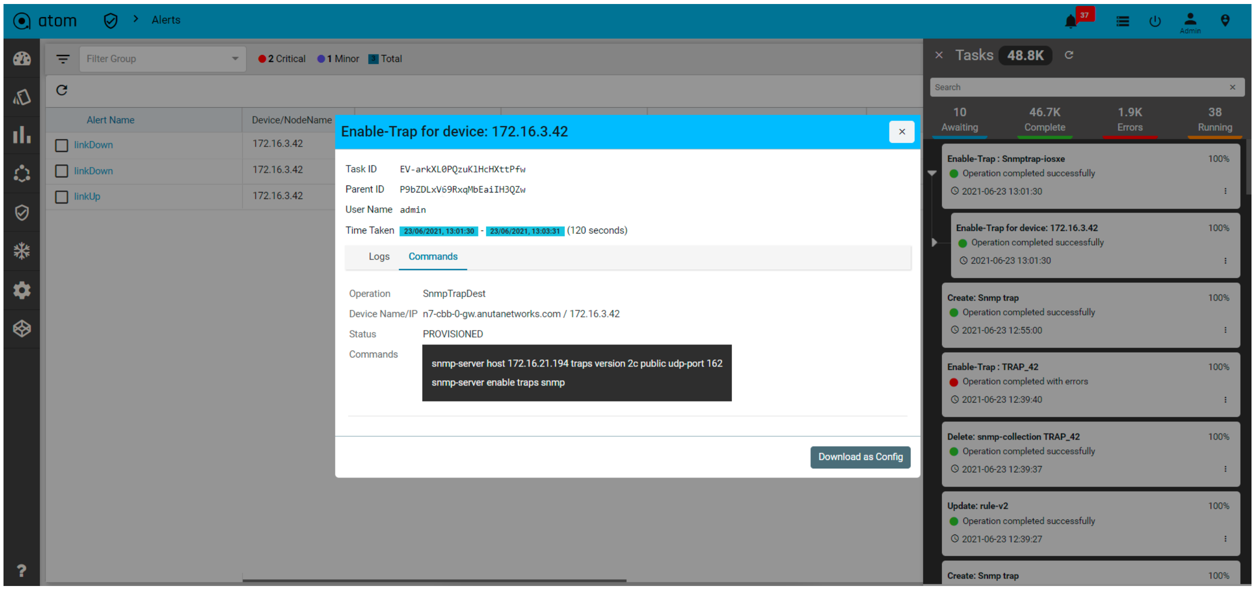
Resource Path
/jobs:jobs/snmpsyslogcollection:snmp-collection/snmp-collection=Snmptrap-iosxe

6. Navigate to **Monitoring > SNMP Trap** to view/modify the collection profile
7. Click the **Subscribe** button to provision the SNMP traps configured on the devices



☑ Name	Device Platform	Device Group	Trap OIDs	Status	Owner
☑ Snmptrap-iosxe	ALL|ALL|ALL|ALL|Cisco Systems	1	2		system

8. The subscription of snmp trap can be seen as shown as below commands



Alert Name	Device/NodeName
□ linkDown	172.16.3.42
□ linkDown	172.16.3.42
□ linkUp	172.16.3.42

Enable-Trap for device: 172.16.3.42

Task ID EV-arkXL0PQzuKlHcHXttPfw

Parent ID P9bZDLxV69RxqMbEaiIH3QZw

User Name admin

Time Taken 23/06/2021, 13:01:30 - 23/06/2021, 13:03:31 (120 seconds)

Operation SnmpTrapDest

Device Name/IP n7-cbb-0-gw.anutanetworks.com / 172.16.3.42

Status PROVISIONED

Commands

```
snmp-server host 172.16.21.194 traps version 2c public udp-port 162
snmp-server enable traps snmp
```

Tasks 48.8K

Search

10	46.7K	1.9K	38
Awaiting	Complete	Errors	Running

Enable-Trap : Snmptrap-iosxe 100%
● Operation completed successfully
2021-06-23 13:01:30

Enable-Trap for device: 172.16.3.42 100%
● Operation completed successfully
2021-06-23 13:01:30

Create: Snmp trap 100%
● Operation completed successfully
2021-06-23 12:55:00

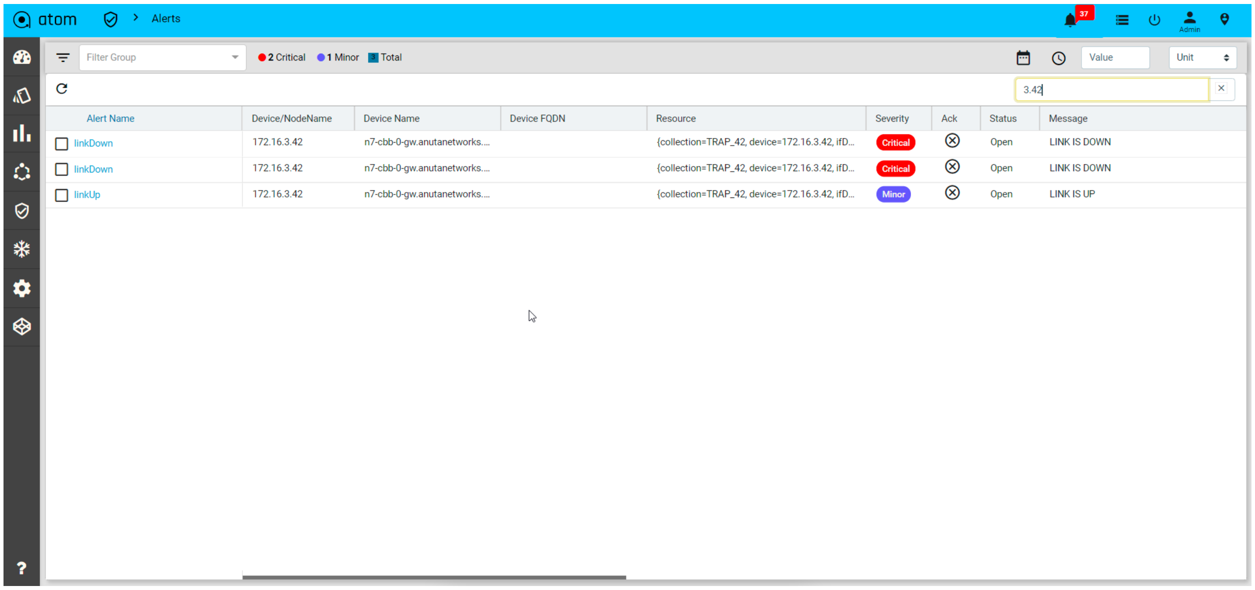
Enable-Trap : TRAP_42 100%
● Operation completed with errors
2021-06-23 12:39:40

Delete: snmp-collection TRAP_42 100%
● Operation completed successfully
2021-06-23 12:39:37

Update: rule-v2 100%
● Operation completed successfully
2021-06-23 12:39:27

Create: Snmp trap 100%

9.Check login device to shutdown the interface & check the alerts can be generated for snmp trap



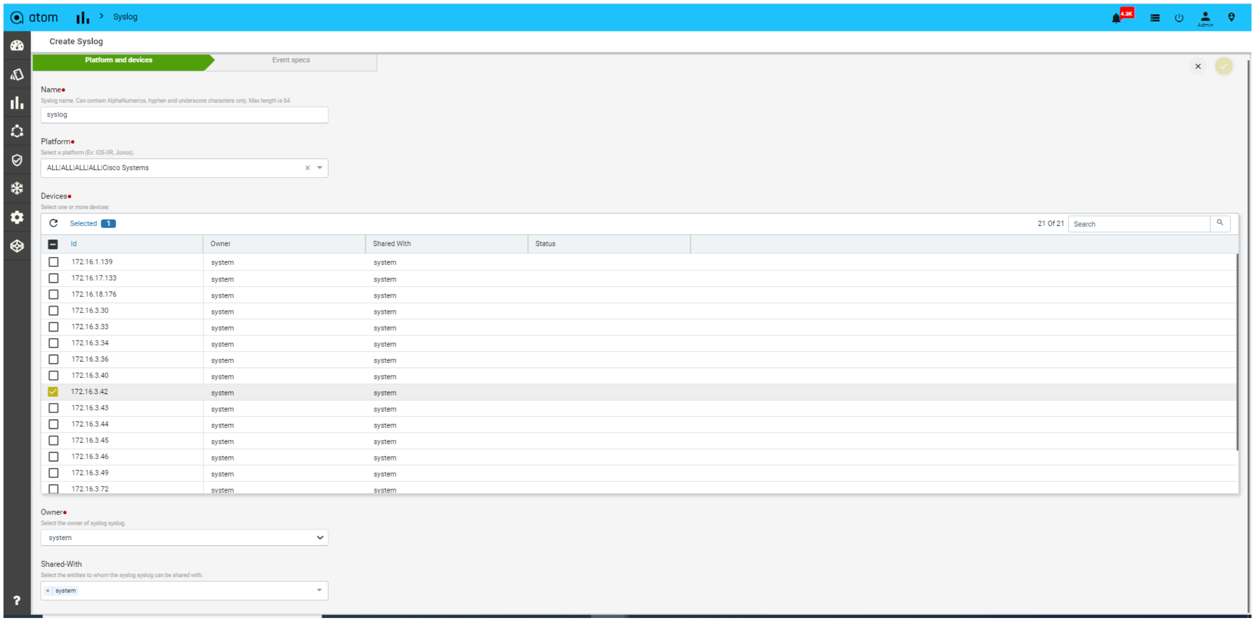
Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack	Status	Message
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks....		{collection=TRAP_42, device=172.16.3.42, ifD...	Critical	⊗	Open	LINK IS DOWN
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks....		{collection=TRAP_42, device=172.16.3.42, ifD...	Critical	⊗	Open	LINK IS DOWN
□ linkUp	172.16.3.42	n7-cbb-0-gw.anutanetworks....		{collection=TRAP_42, device=172.16.3.42, ifD...	Minor	⊗	Open	LINK IS UP

Syslogs

Syslogs generated by the device can be collected and visualized in ATOM

1. Navigate to Monitoring> Syslog on the main menu
2. Click Add (**+**) to create a new Syslog collection profile
3. In the **Platform and devices** tab, enter the following information
    - **Name**: Enter a name for the syslog collection profile

- **Platform**: From the drop-down list, select the device platform from which Syslog messages need to be collected
- **Devices**: select one or more devices from which Syslog need to be collected



Create Syslog

Name●
Syslog name. Can contain AlphaNumerics, hyphen and underscore characters only. Max length is 64
syslog

Platform●
Select a platform (Ex: IOS-XR, Junos).
ALL|ALL|ALL|ALL|Cisco Systems

Devices●
Select one or more devices

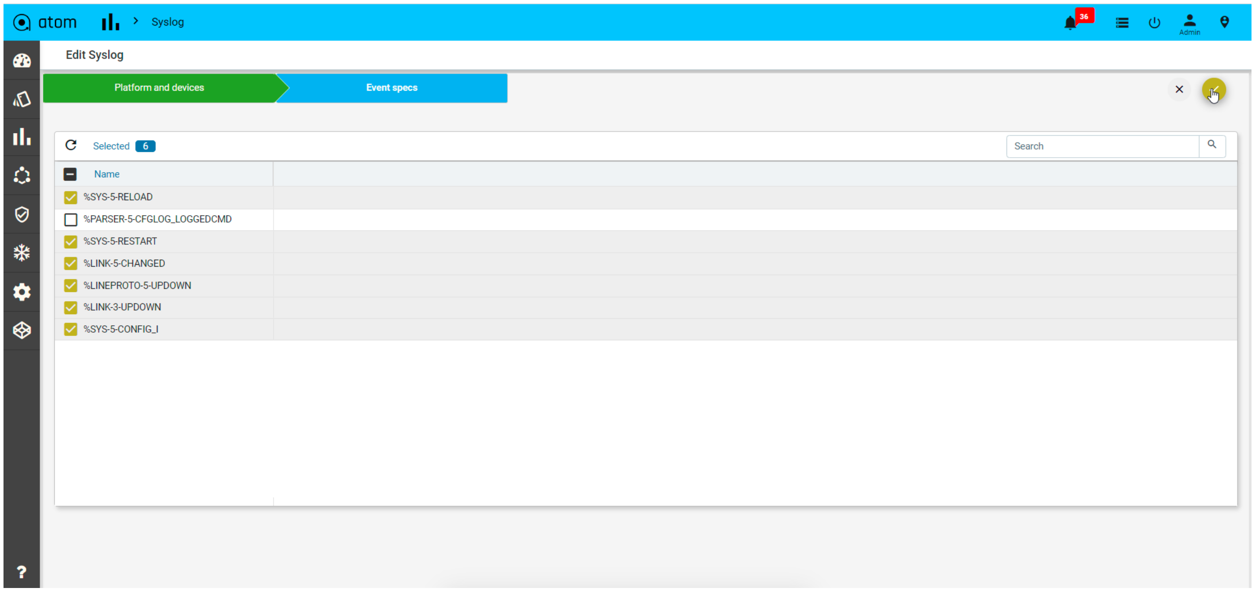
Selected 1 — 21 Of 21

☐	Id	Owner	Shared With	Status
☐	172.16.1.139	system	system	
☐	172.16.17.133	system	system	
☐	172.16.18.176	system	system	
☐	172.16.3.30	system	system	
☐	172.16.3.33	system	system	
☐	172.16.3.34	system	system	
☐	172.16.3.36	system	system	
☐	172.16.3.40	system	system	
☑	172.16.3.42	system	system	
☐	172.16.3.43	system	system	
☐	172.16.3.44	system	system	
☐	172.16.3.45	system	system	
☐	172.16.3.46	system	system	
☐	172.16.3.49	system	system	
☐	172.16.3.72	system	system	

Owner●
Select the owner of syslog syslog.
system

Shared-With
Select the entities to whom the syslog syslog can be shared with.
× system

4. In the **Event specs** tab, enter the following information
   - In the list provided, select the Event specs to be enabled for Syslog collection
   - **Owner**: Choose the owner/tenant who owns the Syslog data
   - **Shared-With**: Add the tenant names to share the data or alternatively leave it as “all” to make it globally available

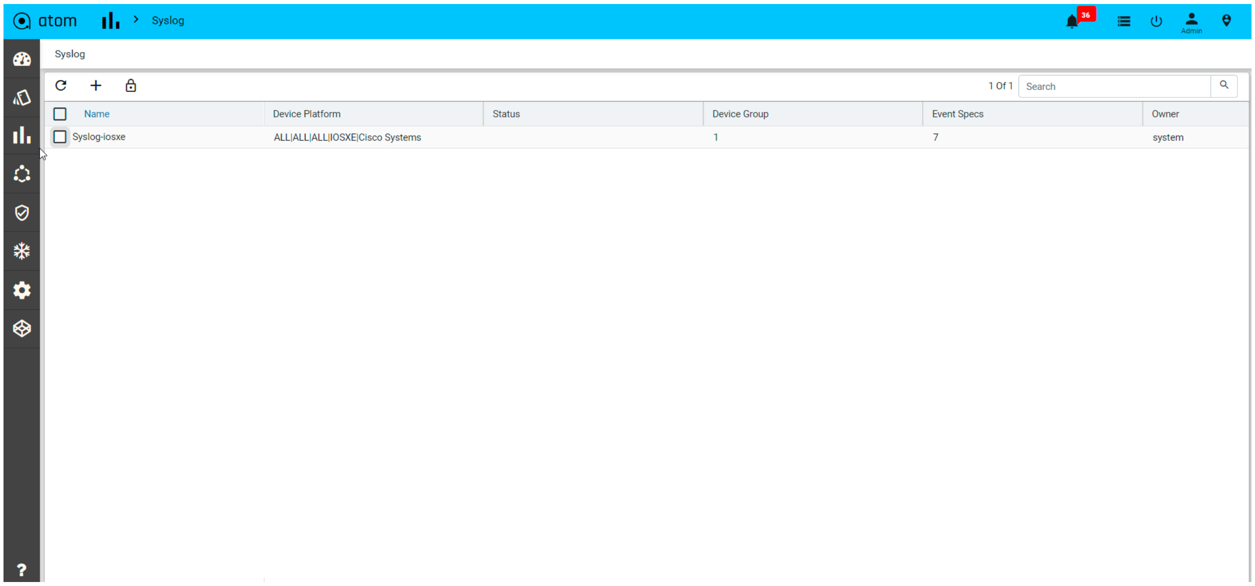


Edit Syslog

Selected 6

☐	Name
☑	%SYS-5-RELOAD
☐	%PARSER-5-CFGLOG_LOGGEDCMD
☑	%SYS-5-RESTART
☑	%LINK-5-CHANGED
☑	%LINEPROTO-5-UPDOWN
☑	%LINK-3-UPDOWN
☑	%SYS-5-CONFIG_I

5. Click ✓ to save the collection profile



Syslog

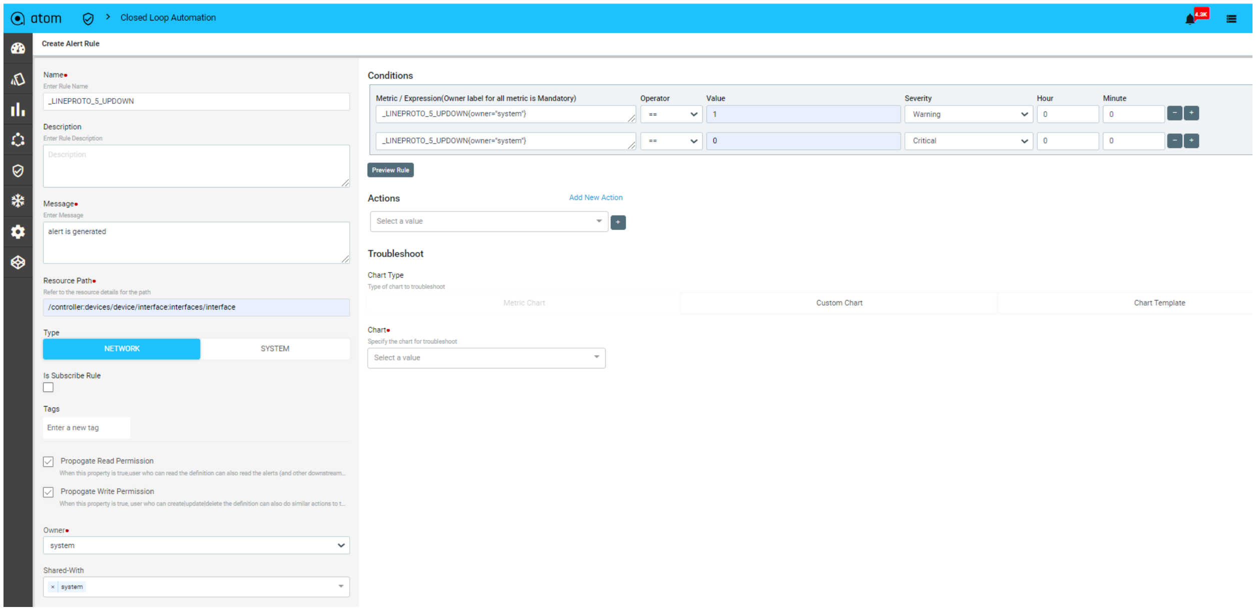
1 Of 1 Search

Name	Device Platform	Status	Device Group	Event Specs	Owner
Syslog-iosxe	ALL|ALL|ALL|IOSXE|Cisco Systems		1	7	system

6. Navigate to **Monitoring > Syslog** to view/modify the collection profile
7. Click the **Subscribe** button to provision the Syslog collection on the devices

Navigate->Assurance->Closed loop automation:

Create alert definition for syslog is link is up and down & activa it.



Create Alert Rule

Name• Enter Rule Name: _LINEPROTO_5_UPDOWN

Description Enter Rule Description: Description

Message• Enter Message: alert is generated

Resource Path• Refer to the resource details for the path: /controller:devices/device/interface:interfaces/interface

Type: NETWORK | SYSTEM

Is Subscribe Rule □

Tags: Enter a new tag

☑ Propogate Read Permission
When this property is true,user who can read the definition can also read the alerts (and other downstream...

☑ Propogate Write Permission
When this property is true, user who can create|update|delete the definition can also do similar actions to t...

Owner•: system

Shared-With: × system

Conditions

Metric / Expression(Owner label for all metric is Mandatory)	Operator	Value	Severity	Hour	Minute
_LINEPROTO_5_UPDOWN{owner="system"}	==	1	Warning	0	0
_LINEPROTO_5_UPDOWN{owner="system"}	==	0	Critical	0	0

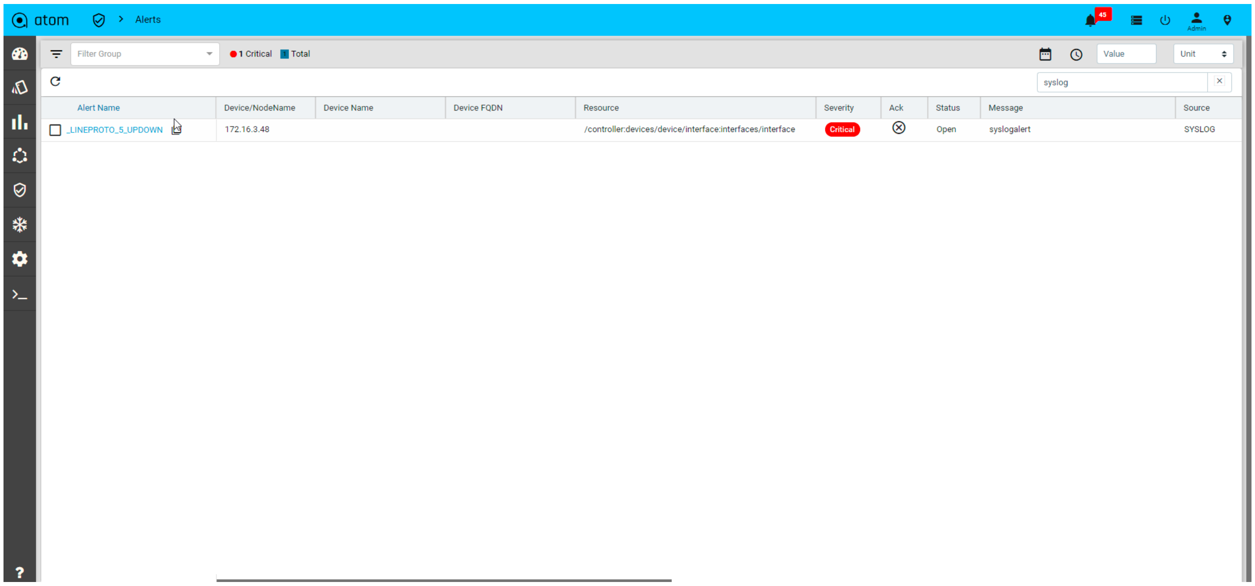
Actions: Select a value

Troubleshoot

Chart Type Type of chart to troubleshoot

Chart• Specify the chart for troubleshoot: Select a value

8. Check login device to make the interface is up/down
9. Syslog alerts can be generated after the interface is up/down.



Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack	Status	Message	Source
□ _LINEPROTO_5_UPDOWN	172.16.3.48			/controller:devices/device/interface:interfaces/interface	Critical	⊗	Open	syslogalert	SYSLOG

Charts & Templates

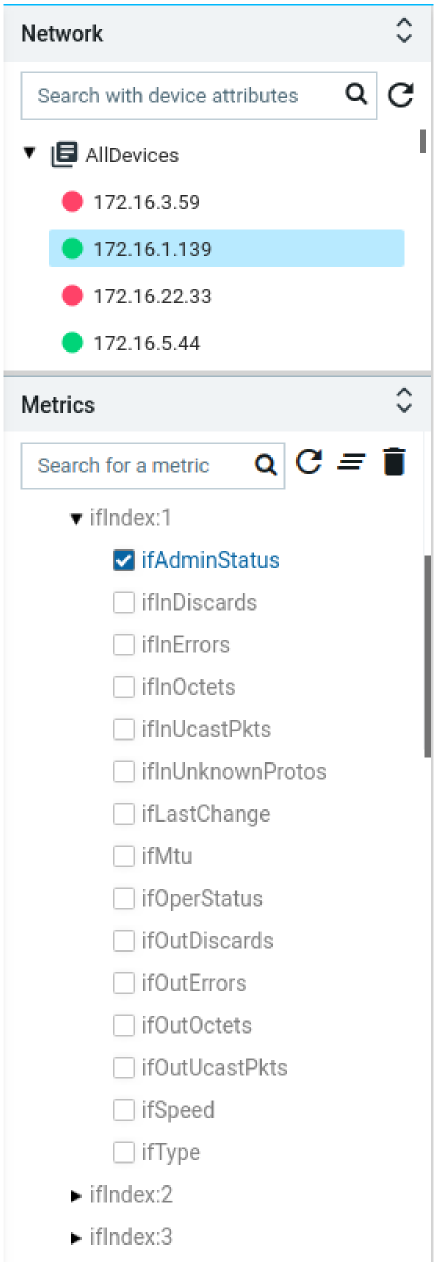
ATOM provides various customisations to visualise the collected metrics efficiently. Users can customise the mib names, metric names, logical grouping with human understandable keys, unified view of metric in single chart, context selection, multiple views through templates and also via dashboards.

Key Customization for each metric :

To change the keys in the device monitoring tree. By default key-oids will be shown as parents in a logical hierarchy. Most of the MIB's have Index numbers as the keys, so we can't keep track of them while looking at each metric. It is always required to keep well known objects to map the rest of the metrics.

eg: Interface Counters collected through the IFMIB will result below the tree by default. Here, it will have ifindex as the key by default which sits on top in the hierarchy.

Below is the snapshot without any customisations which has default key-oids at higher level in the tree. Here, Ifindex is the default key for IFMIB entries.



Network

Search with device attributes

▼ AllDevices

- 🟥 172.16.3.59
- 🟩 172.16.1.139
- 🟥 172.16.22.33
- 🟩 172.16.5.44

Metrics

Search for a metric

▼ ifIndex:1

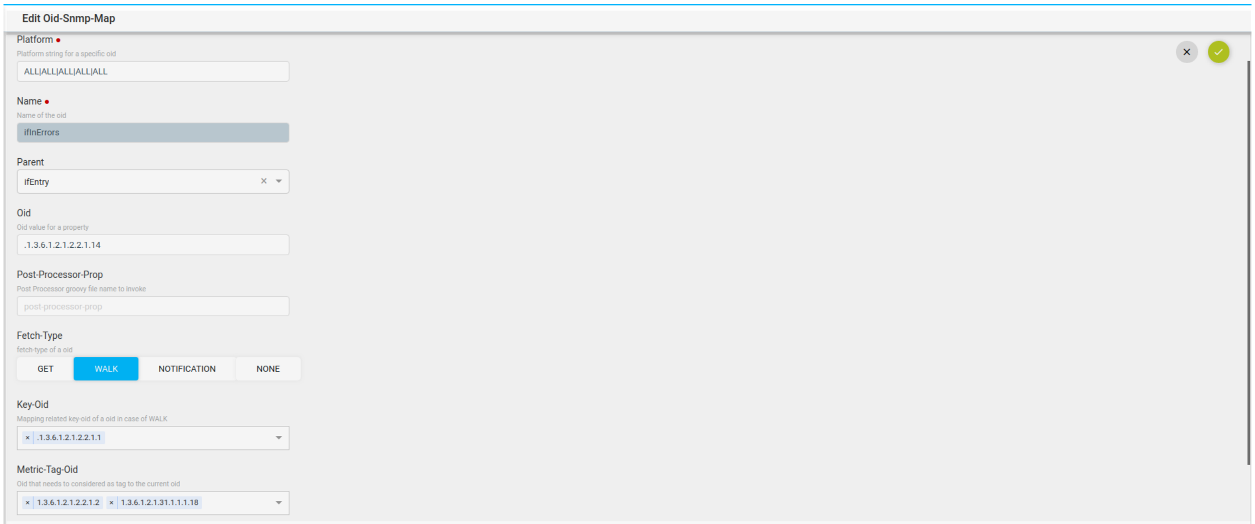
- ☑ ifAdminStatus
- ☐ ifInDiscards
- ☐ ifInErrors
- ☐ ifInOctets
- ☐ ifInUcastPkts
- ☐ ifInUnknownProtos
- ☐ ifLastChange
- ☐ ifMtu
- ☐ ifOperStatus
- ☐ ifOutDiscards
- ☐ ifOutErrors
- ☐ ifOutOctets
- ☐ ifOutUcastPkts
- ☐ ifSpeed
- ☐ ifType

▸ ifIndex:2

▸ ifIndex:3

To change the keys to represent this data more human understandable, navigate to the *Administration -> Plugins & Extensions -> SNMP -> SNMP OID Map*

Here, choose each metric and add/modify the metric-tag-oids to reflect them in the tree.



Edit Oid-Snmp-Map

Platform ●
Platform string for a specific oid
ALL|ALL|ALL|ALL|ALL

Name ●
Name of the oid
ifInErrors

Parent
ifEntry

Oid
Oid value for a property
.1.3.6.1.2.1.2.2.1.14

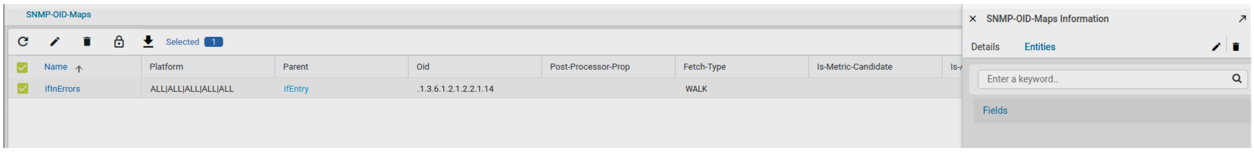
Post-Processor-Prop
Post Processor groovy file name to invoke
post-processor-prop

Fetch-Type
fetch-type of a oid
GET [✓ WALK] NOTIFICATION NONE

Key-Oid
Mapping related key-oid of a oid in case of WALK
× .1.3.6.1.2.1.2.2.1.1

Metric-Tag-Oid
Oid that needs to considered as tag to the current oid
× 1.3.6.1.2.1.2.2.1.2 × 1.3.6.1.2.1.31.1.1.1.18

We can add multiple metric tag OID’s, after each entry press ENTER to add another. To choose which property has to be primary for tree representation among multiple metric-tag-oids, we have to change the field settings. To change this, select the oid entry as shown in snapshots and select the entities -> fields on the right hand side.

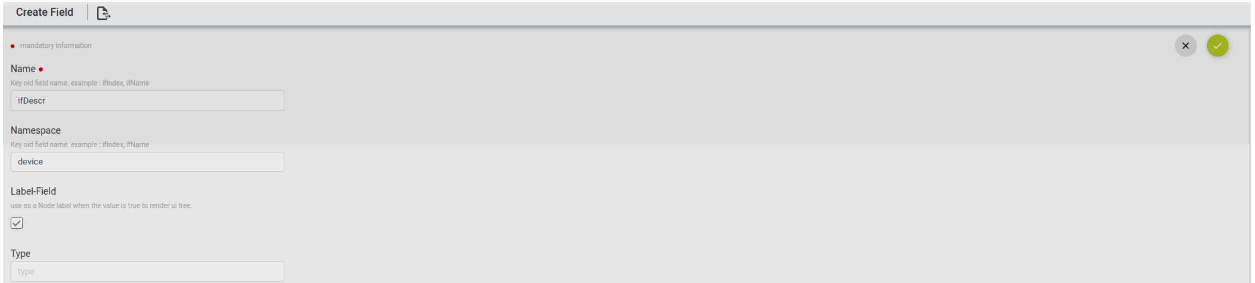


SNMP-OID-Maps

Selected 1

☑	Name	Platform	Parent	Oid	Post-Processor-Prop	Fetch-Type	Is-Metric-Candidate	Is-/
☑	ifInErrors	ALL|ALL|ALL|ALL|ALL	ifEntry	.1.3.6.1.2.1.2.2.1.14		WALK		

Here, add the fields by providing the oid name and select the label-field checkbox to true to make this as primary.



Create Field

● -mandatory information

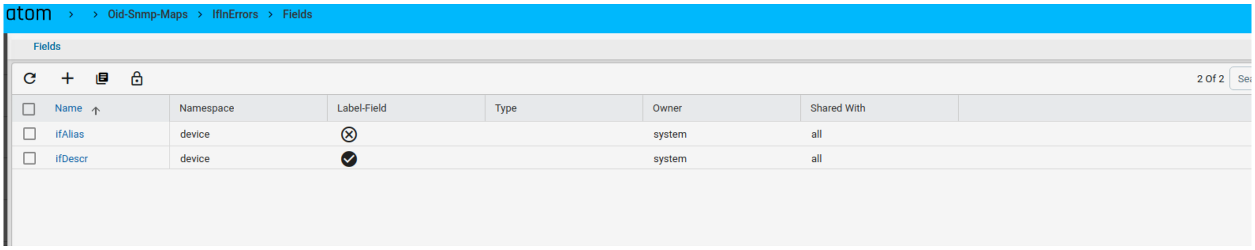
Name ●
Key oid field name. example : ifIndex, ifName
ifDescr

Namespace
Key oid field name. example : ifIndex, ifName
device

Label-Field
use as a Node label when the value is true to render ui tree.
☑

Type
type

If we add multiple fields, only one of the fields will become the primary.



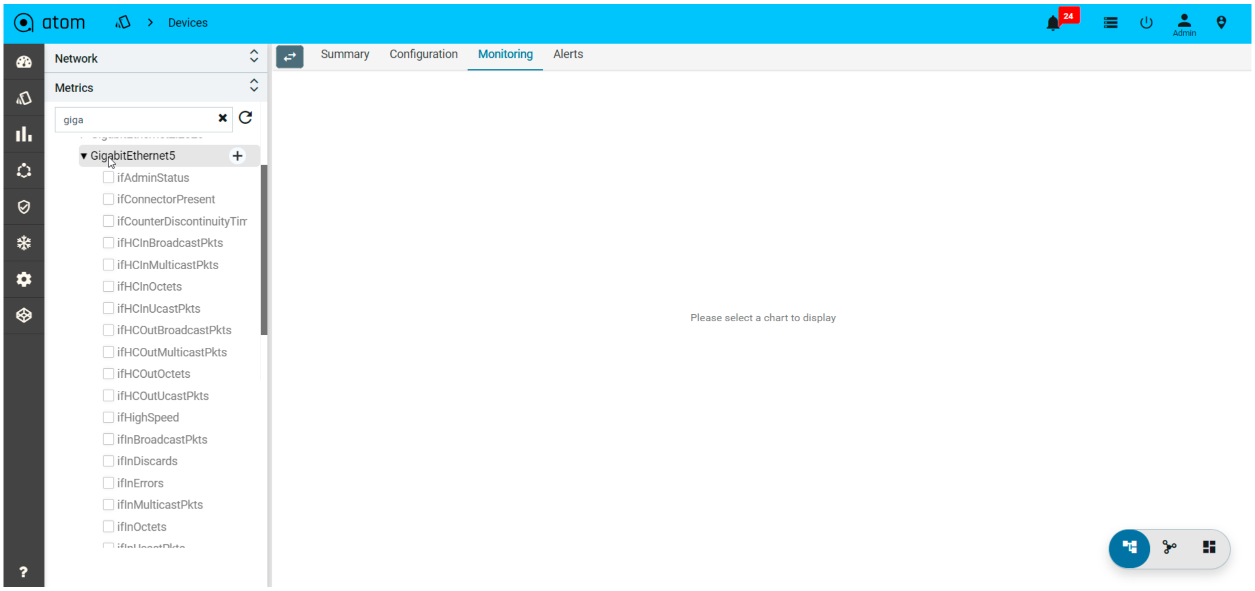
atom › › Oid-Snmp-Maps › IfInErrors › Fields

Fields

2 Of 2

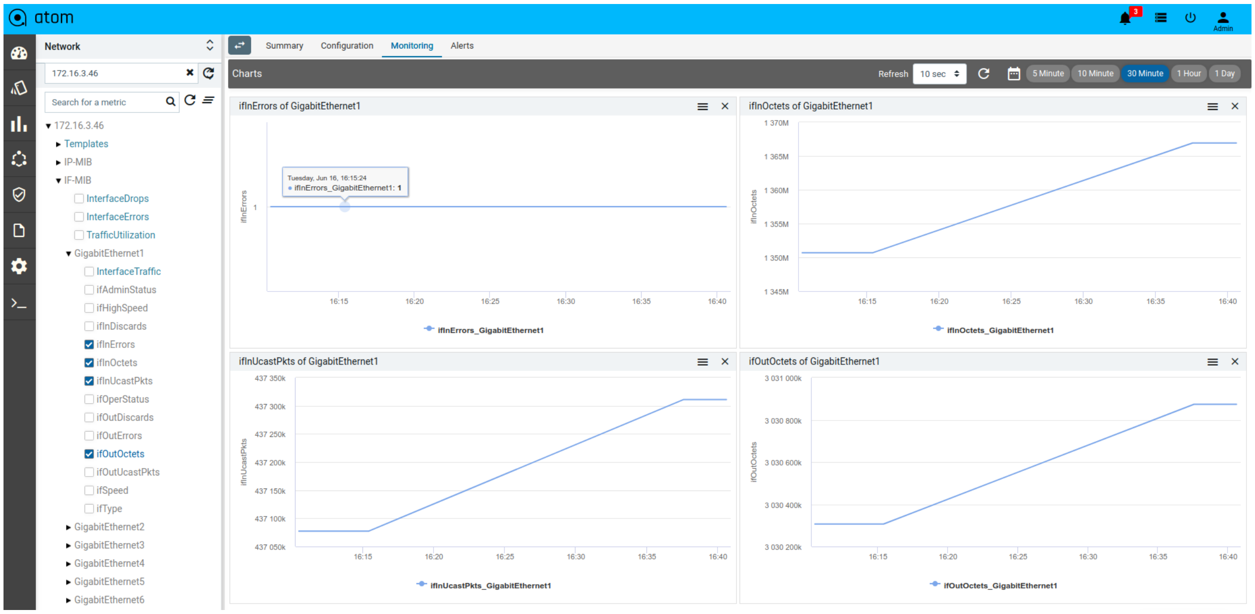
□	Name	Namespace	Label-Field	Type	Owner	Shared With
□	ifAlias	device	☒		system	all
□	ifDescr	device	✓		system	all

All the remaining fields will be shown on mouse over of the key on the device monitoring tree.



Metric Visualization on Device Explorer:

Navigate to Resource Manager -> Devices -> select the device -> Monitoring tab on the right hand side.



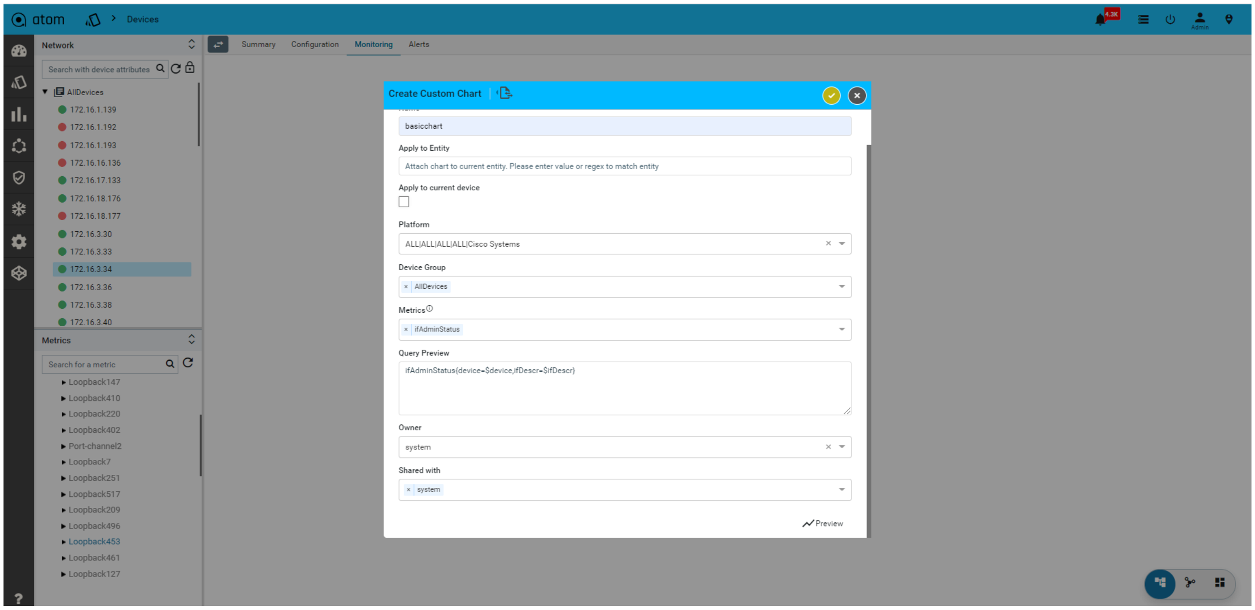
Refer Chart Actions section for various interactions.

Chart Creation

Create Simple Custom Chart:

Simple custom chart is to show multiple metrics in a single chart without further filtering. It will create a corresponding PromQL and retrieve the data.

eg: create a chart to show interface traffic which includes interface in & out packet counters, use preview option to see the data before saving.



Create Custom Chart

Name: basicchart

Apply to Entity: Attach chart to current entity. Please enter value or regex to match entity

Apply to current device: □

Platform: ALL|ALL|ALL|ALL|Cisco Systems

Device Group: AllDevices

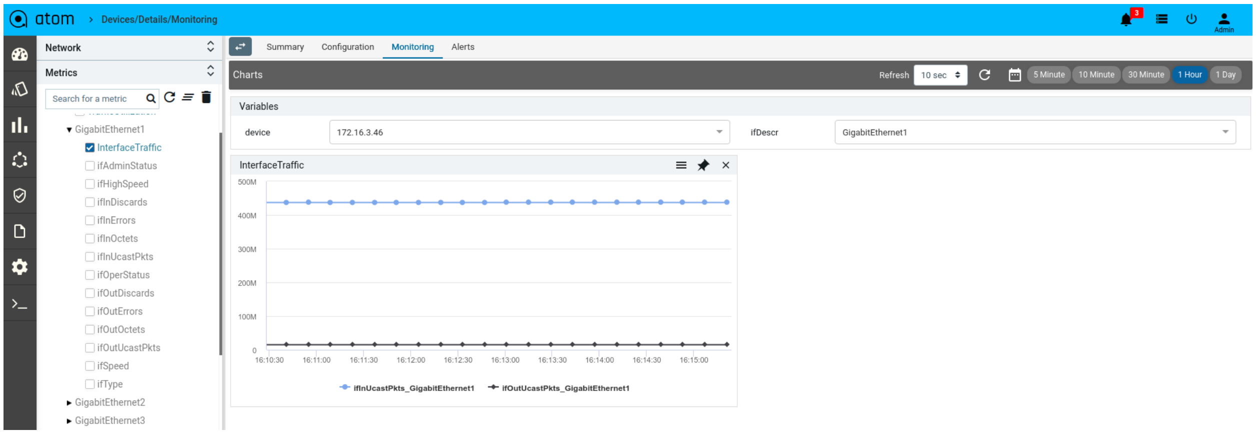
Metrics: ifAdminStatus

Query Preview:

```
ifAdminStatus{device=$device,ifDescr=$ifDescr}
```

Owner: system

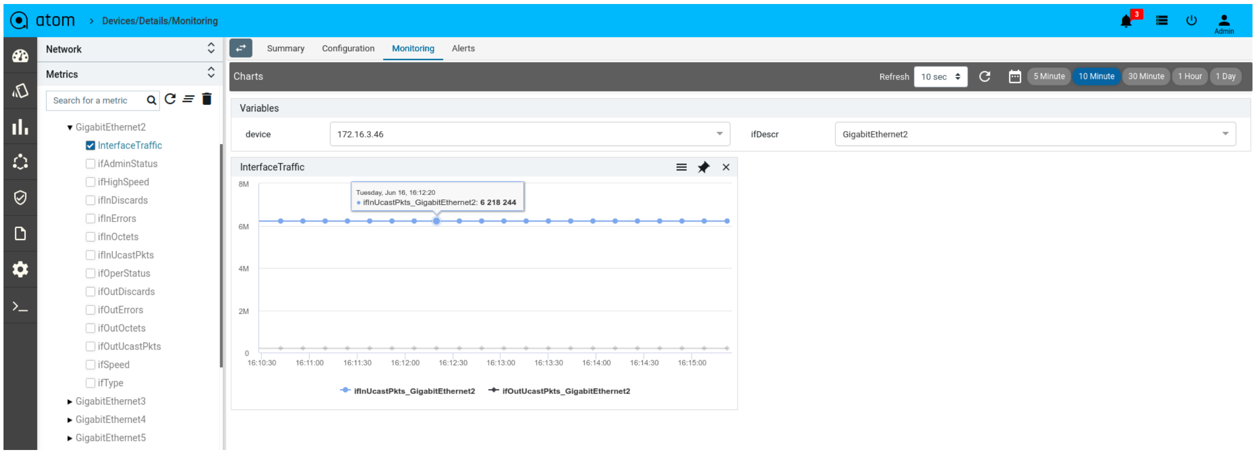
Shared with: system



Variables: device 172.16.3.46, ifDescr GigabitEthernet1

Refresh: 10 sec; 1 Hour

Once the chart is created at any node level and it will be applicable to all other siblings automatically. In the above snapshot, we have created Interface Traffic chart at Gi1 Interface and it will be shown under all other interfaces automatically with the right context selected.



device: 172.16.3.46

ifDescr: GigabitEthernet2

Tuesday, Jun 16, 16:12:20
ifInUcastPkts_GigabitEthernet2: **6 218 244**

Create an Advanced Custom Chart

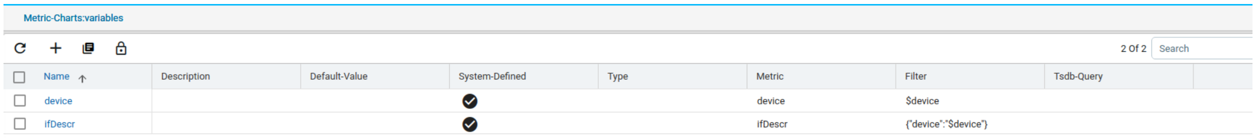
Advanced custom charts can have any valid promQL expression with/without variables. To use any variables, we need to define them beforehand.

Create the Variables for Charts

Variables are useful to move across instances or context easily with the dropdown selection. Variables can be used across the charts or templates.

To check the predefined variables or to create new global variable navigate to the *Administration -> UI Customizations -> Chart Variables*

Below are system defined variables.



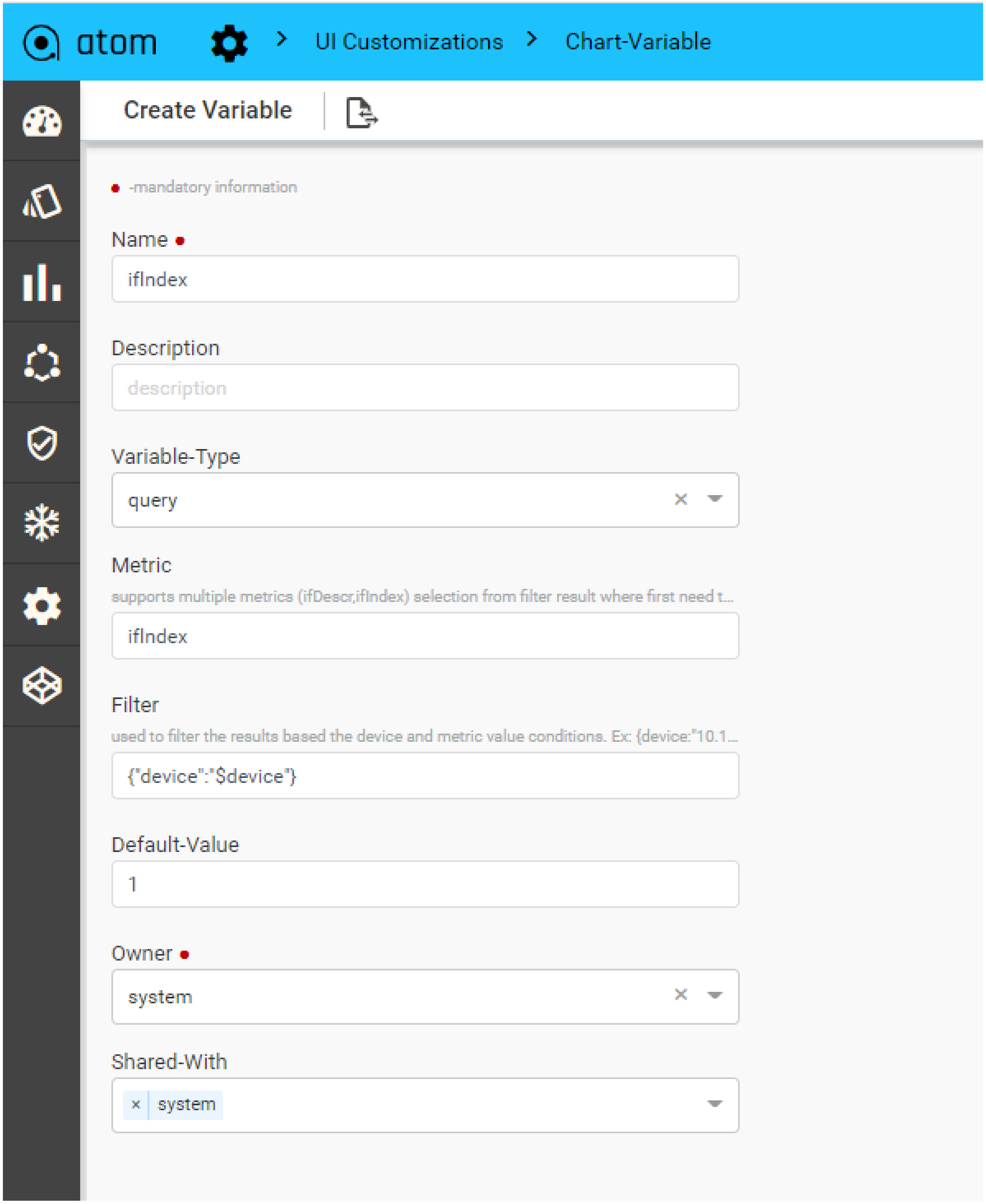
□	Name	Description	Default-Value	System-Defined	Type	Metric	Filter	Tsdb-Query
□	device			✓		device	$device	
□	ifDescr			✓		ifDescr	{"device":"$device"}	

Provide below fields to create a variable.

1. **Name:** Provide the name of variable
2. **Description:** Specify the description for the variable
3. **Default-value:** provide the default value for the variable. It is used when the given expression or query doesn't result in any value.
4. **Variable Type:** Variable value can be derived using following ways:
    a. **data-type :** It can be selected when the variable is known
    b. **query:** it is used to fetch the variable value by executing the query on a metric instance database.
    c. **top-n:** it is to get the current top n result and use those labels to plot a graph through selections.
5. **Metric**: to specify the key/column which is of interest to store in a variable.
6. **Filter**: It is equivalent to the where condition while fetching the metric value
7. **Tsdb-query:** To execute the top N query on tsdb and use the top n keys in the graph to render for any metric.

eg: To get the Top N Interface utilisation, we need to get the interface names which are utilizing high bandwidth in specified time periods.

Variable creation example:



Create Variable

● -mandatory information

Name ●
ifIndex

Description
description

Variable-Type
query

Metric
supports multiple metrics (ifDescr,ifIndex) selection from filter result where first need t...
ifIndex

Filter
used to filter the results based the device and metric value conditions. Ex: {device:"10.1...
{"device":"$device"}

Default-Value
1

Owner ●
system

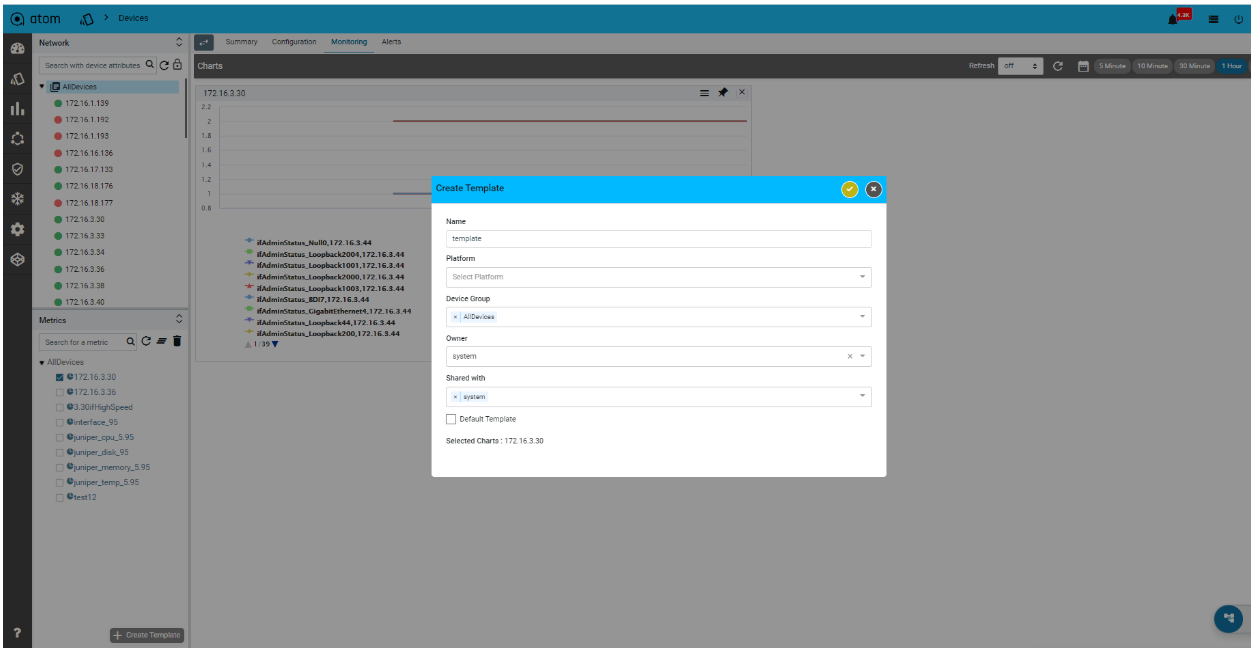
Shared-With
× system

Create Chart Templates:

Chart templates are used to combine one or more charts with/without variables and save it as a view. Templates can be restricted to specific platforms or Groups. Any one of the templates can be set as default, to render automatically when we move to a particular logical level. Applies-to function determine where the template has to show in the device monitoring tree.

Templates can be created from the Admin screen or from device explorer view.

To create a template from device explorer, select one more chart and click on create template bottom left side. User has to provide the name for each template and optionally we can restrict the scope of template to platform or device group.



Create Template

Name: template

Platform: Select Platform

Device Group: × AllDevices

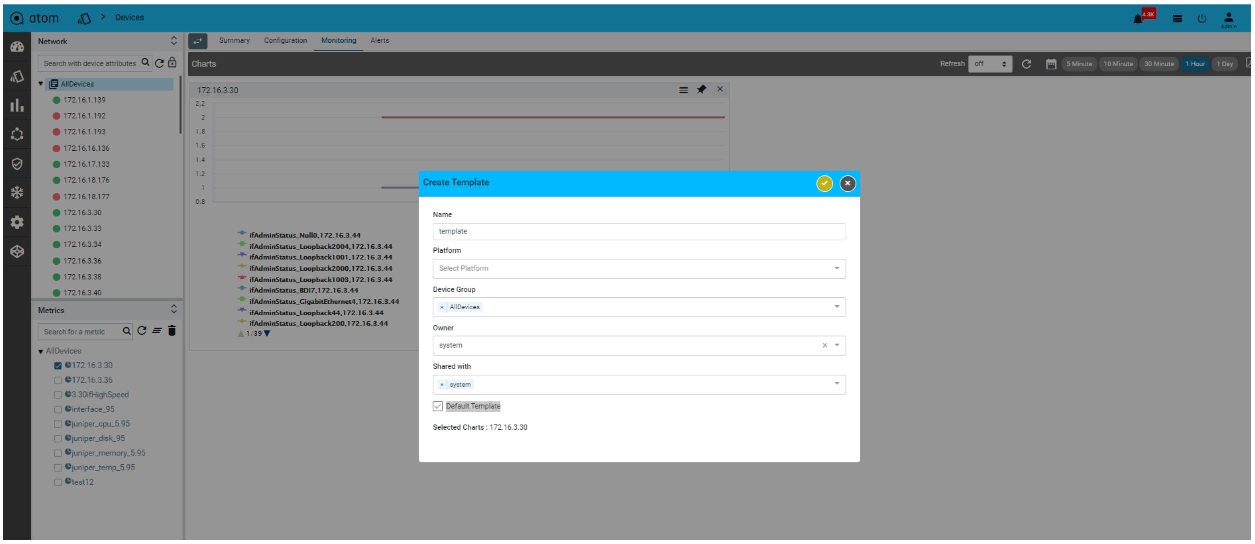
Owner: system

Shared with: × system

□ Default Template

Selected Charts : 172.16.3.30

Select any template as default template which will be shown at each device or group level without any further selection.



Create Template

Name: template

Platform: Select Platform

Device Group: × AllDevices

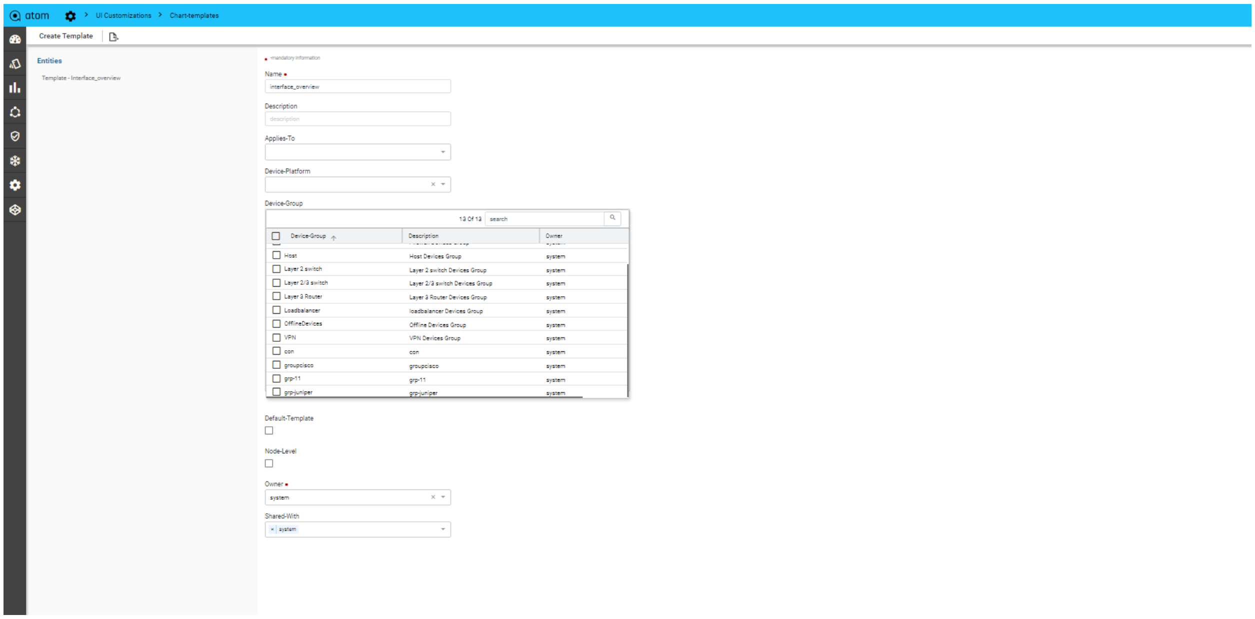
Owner: system

Shared with: × system

☑ Default Template

Selected Charts : 172.16.3.30

To create template from Admin Screen, Navigate to the Administration -> UI Customizations -> Chart Templates



● -mandatory information

Name ●
interface_overview

Description
description

Applies-To

Device-Platform

Device-Group

13 Of 13 search

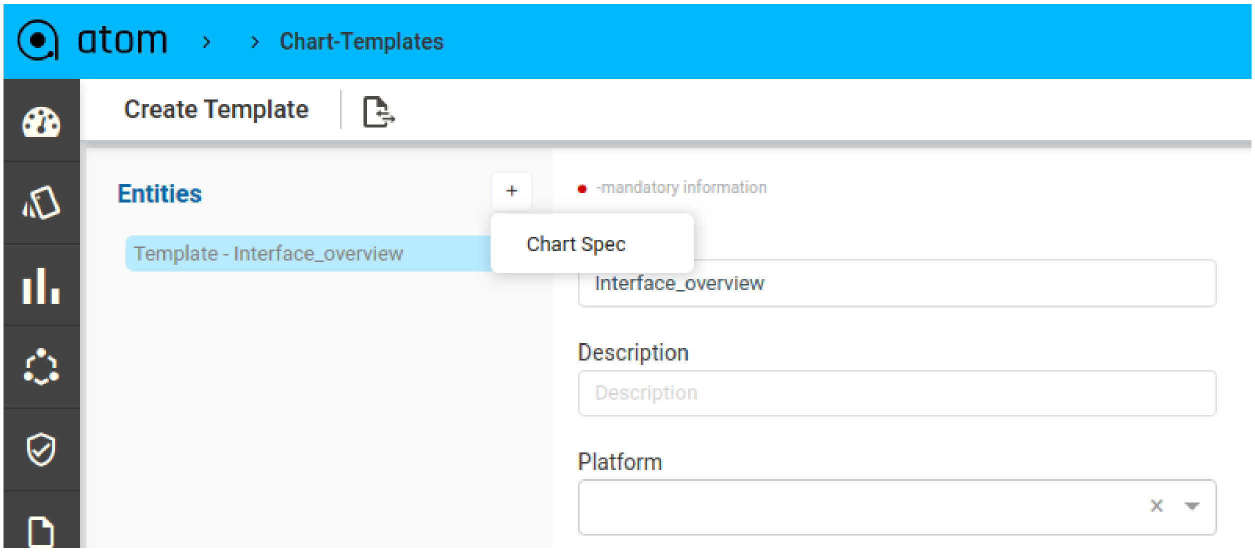
□	Device-Group	Description	Owner
□	Host	Host Devices Group	system
□	Layer 2 switch	Layer 2 switch Devices Group	system
□	Layer 2/3 switch	Layer 2/3 switch Devices Group	system
□	Layer 3 Router	Layer 3 Router Devices Group	system
□	Loadbalancer	loadbalancer Devices Group	system
□	OfflineDevices	Offline Devices Group	system
□	VPN	VPN Devices Group	system
□	con	con	system
□	groupcisco	groupcisco	system
□	grp-11	grp-11	system
□	grp-juniper	grp-juniper	system

Default-Template
□

Node-Level
□

Owner ●
system

Shared-With
× system

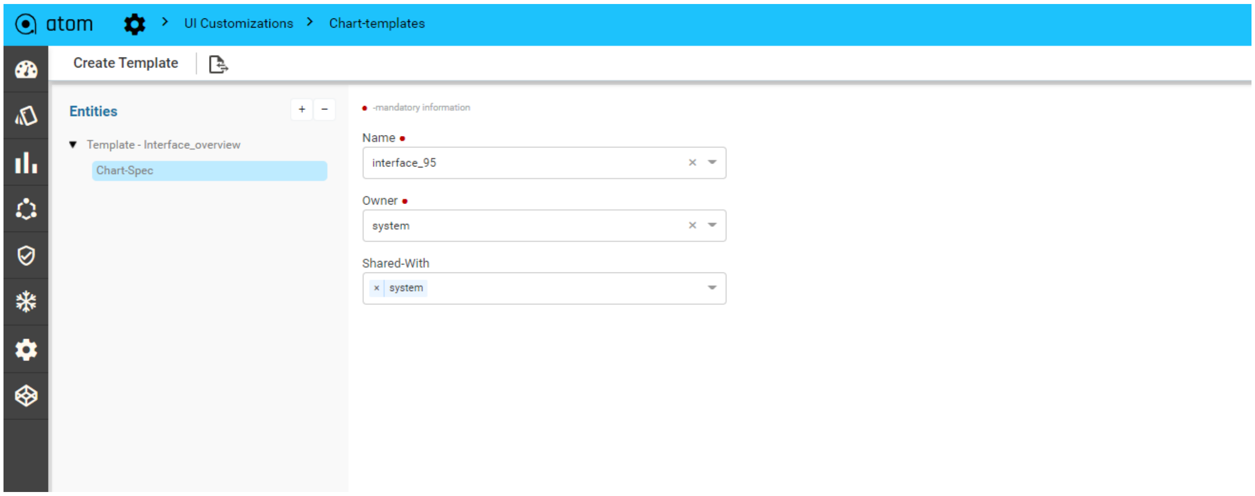


● -mandatory information

Interface_overview

Description
Description

Platform



Name: interface_95

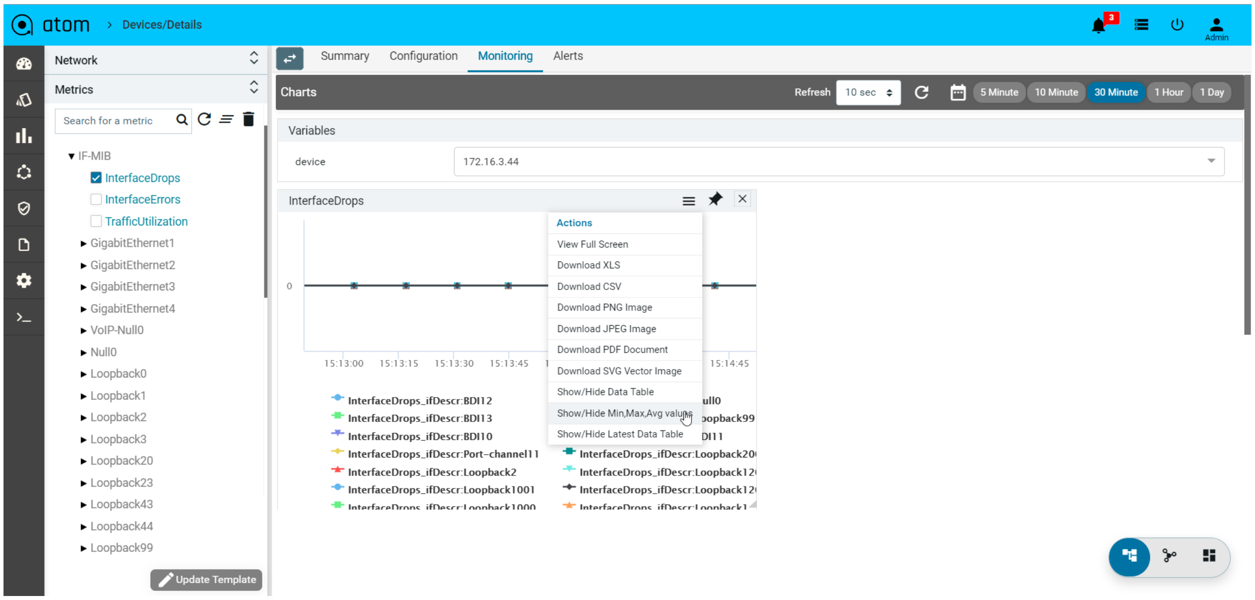
Owner: system

Shared-With: system

Chart Actions:

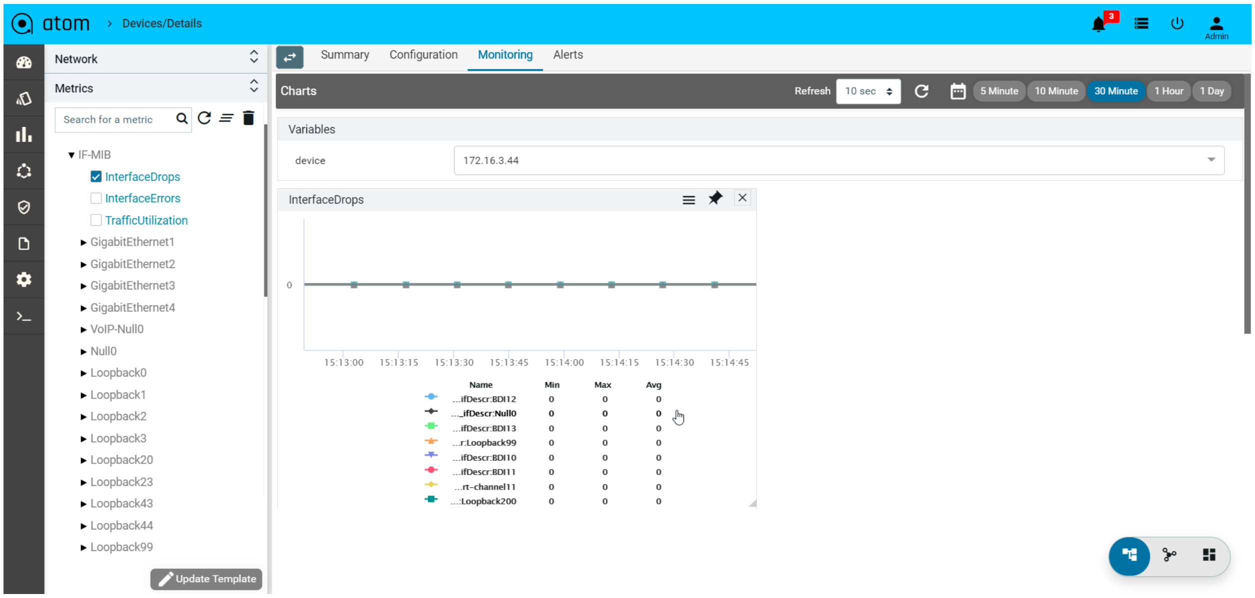
Each chart can be seen in full screen, downloaded in PNG, JPEG, SVG formats, export Time series data in csv or xls format, min/max/avg can be seen for each time series and also latest snapshot of time series data can been in a table below the graph. Currently, time selection is global which is applicable to all the charts or templates which are selected.

To see available actions for each chart.. Click on three vertical lines as shown below.



device: 172.16.3.44

min/max/avg:

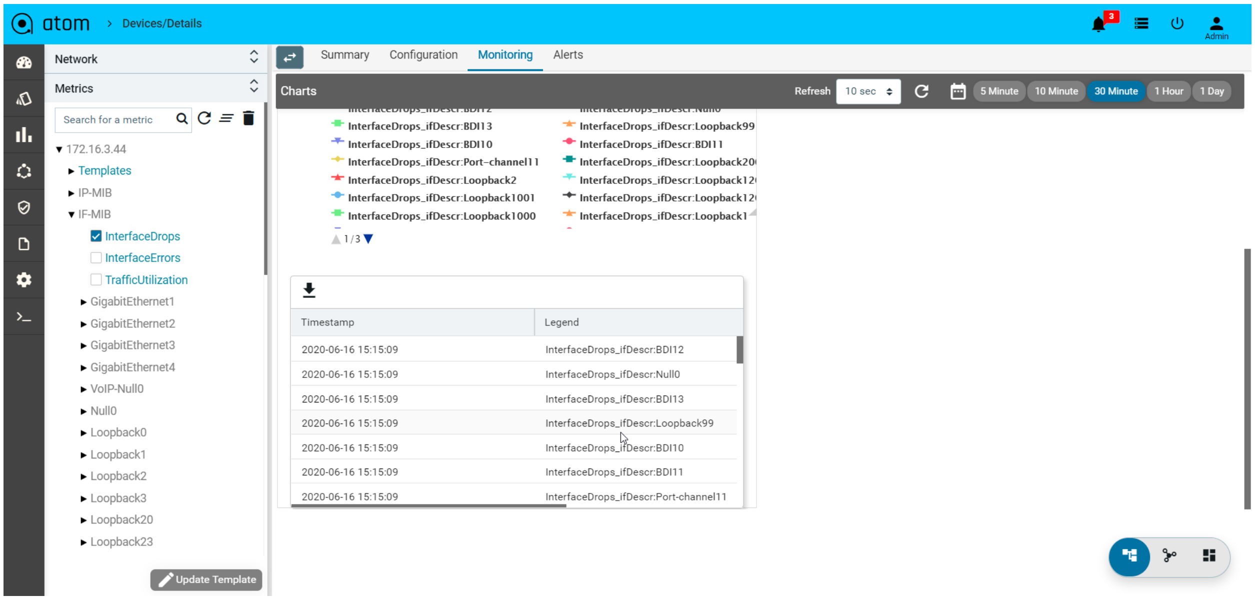


Refresh: 10 sec

device: 172.16.3.44

	Name	Min	Max	Avg
●	...ifDescr:BDI12	0	0	0
◆	..._ifDescr:Null0	0	0	0
■	...ifDescr:BDI13	0	0	0
★	...r:Loopback99	0	0	0
▼	...ifDescr:BDI10	0	0	0
●	...ifDescr:BDI11	0	0	0
◆	...rt–channel11	0	0	0
■	...:Loopback200	0	0	0

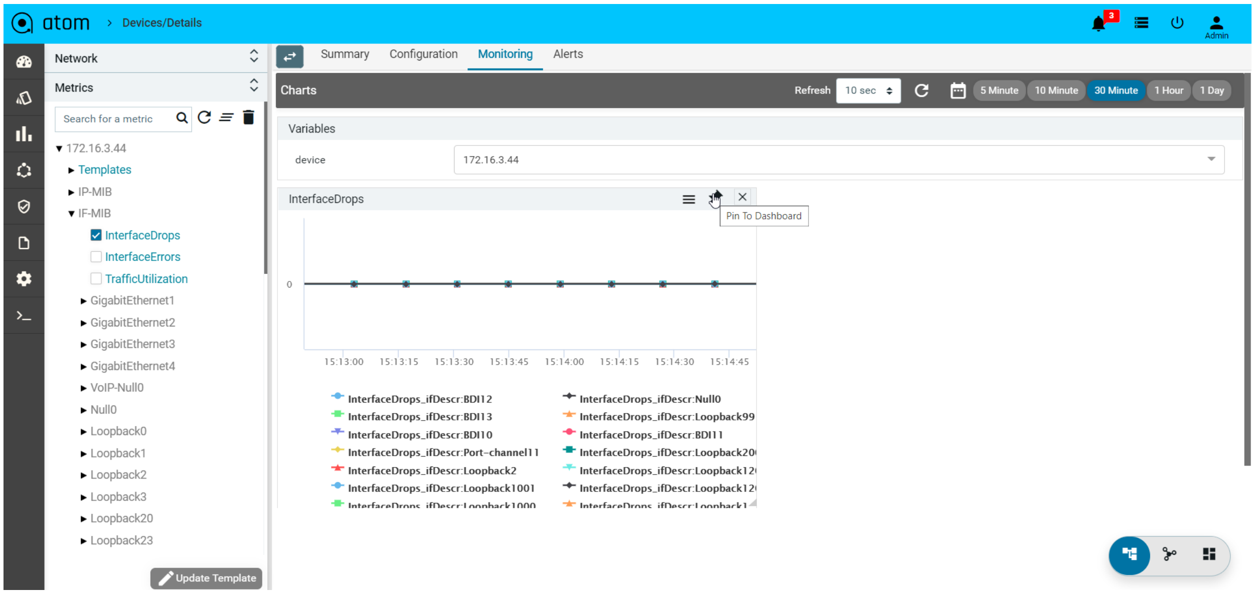
Latest data in table format:

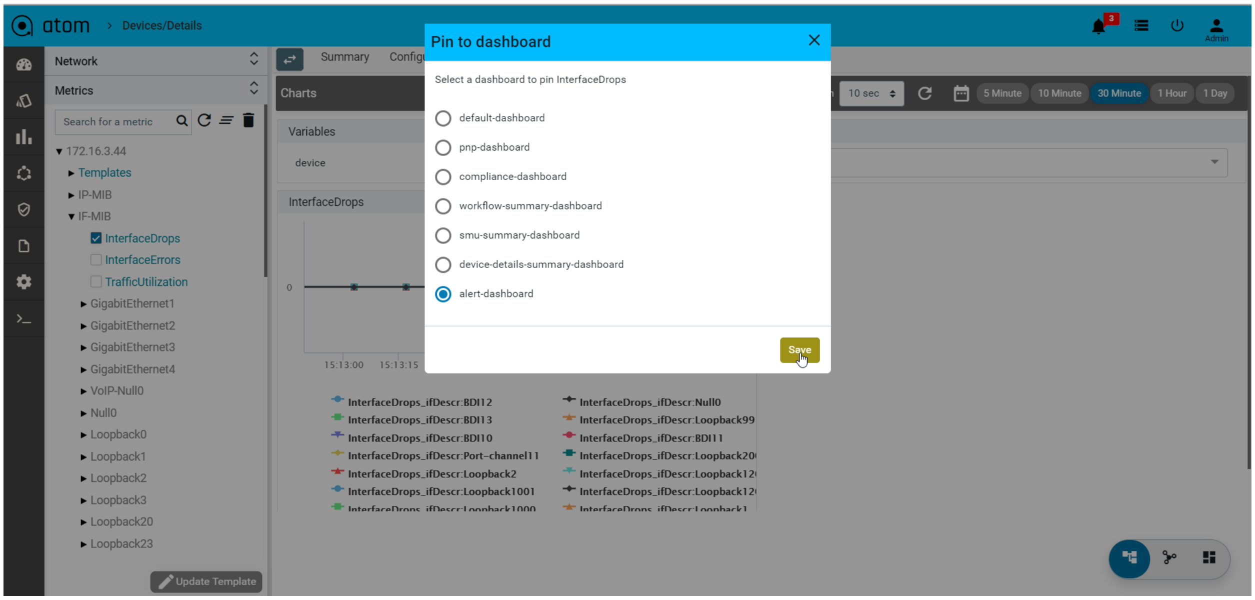

atom
Devices/Details
3
Admin
Network
Metrics
Search for a metric
172.16.3.44
Templates
IP-MIB
IF-MIB
☑ InterfaceDrops
□ InterfaceErrors
□ TrafficUtilization
GigabitEthernet1
GigabitEthernet2
GigabitEthernet3
GigabitEthernet4
VoIP-Null0
Null0
Loopback0
Loopback1
Loopback2
Loopback3
Loopback20
Loopback23
Update Template
Summary
Configuration
Monitoring
Alerts
Charts
5 Minute
10 Minute
30 Minute
1 Hour
1 Day
InterfaceDrops_ifDescr:BDI12
InterfaceDrops_ifDescr:Null0
InterfaceDrops_ifDescr:BDI13
InterfaceDrops_ifDescr:BDI10
InterfaceDrops_ifDescr:Port–channel11
InterfaceDrops_ifDescr:Loopback2
InterfaceDrops_ifDescr:Loopback1001
InterfaceDrops_ifDescr:Loopback1000
InterfaceDrops_ifDescr:Loopback99
InterfaceDrops_ifDescr:BDI11
InterfaceDrops_ifDescr:Loopback20
InterfaceDrops_ifDescr:Loopback12
InterfaceDrops_ifDescr:Loopback12
InterfaceDrops_ifDescr:Loopback1
1 / 3

Refresh: 10 sec

Timestamp	Legend
2020-06-16 15:15:09	InterfaceDrops_ifDescr:BDI12
2020-06-16 15:15:09	InterfaceDrops_ifDescr:Null0
2020-06-16 15:15:09	InterfaceDrops_ifDescr:BDI13
2020-06-16 15:15:09	InterfaceDrops_ifDescr:Loopback99
2020-06-16 15:15:09	InterfaceDrops_ifDescr:BDI10
2020-06-16 15:15:09	InterfaceDrops_ifDescr:BDI11
2020-06-16 15:15:09	InterfaceDrops_ifDescr:Port-channel11

Chart pinning to a dashboard




Pin to dashboard

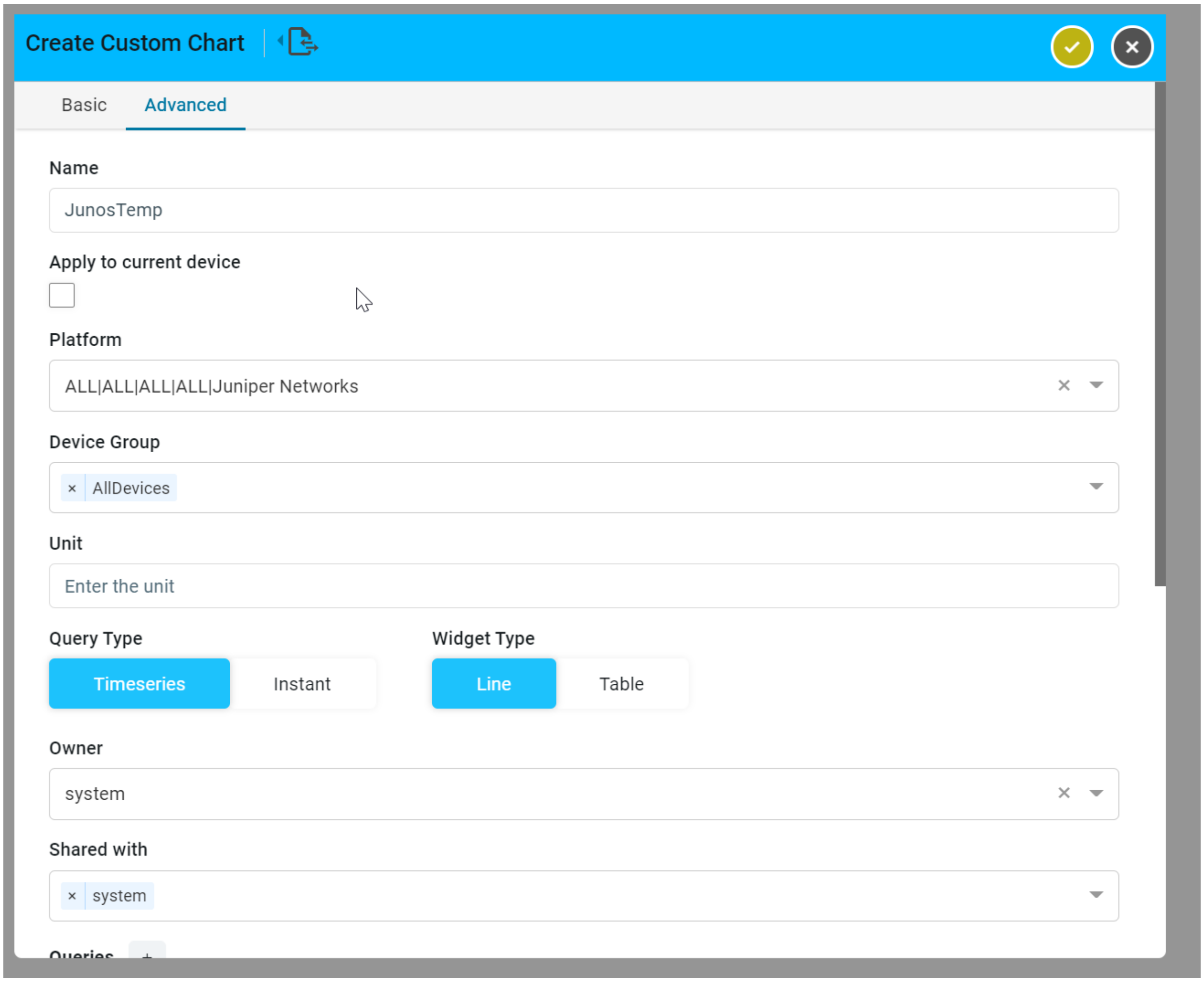
Select a dashboard to pin InterfaceDrops

○ default-dashboard
○ pnp-dashboard
○ compliance-dashboard
○ workflow-summary-dashboard
○ smu-summary-dashboard
○ device-details-summary-dashboard
● alert-dashboard

Save

Note: To have the static values for the variables in monitoring charts, create the Advanced charts by following the below steps.

1. Create Advanced chart



Name

JunosTemp

Apply to current device

□

Platform

ALL|ALL|ALL|ALL|Juniper Networks

Device Group

× AllDevices

Unit

Enter the unit

Query Type

Timeseries | Instant

Widget Type

Line | Table

Owner

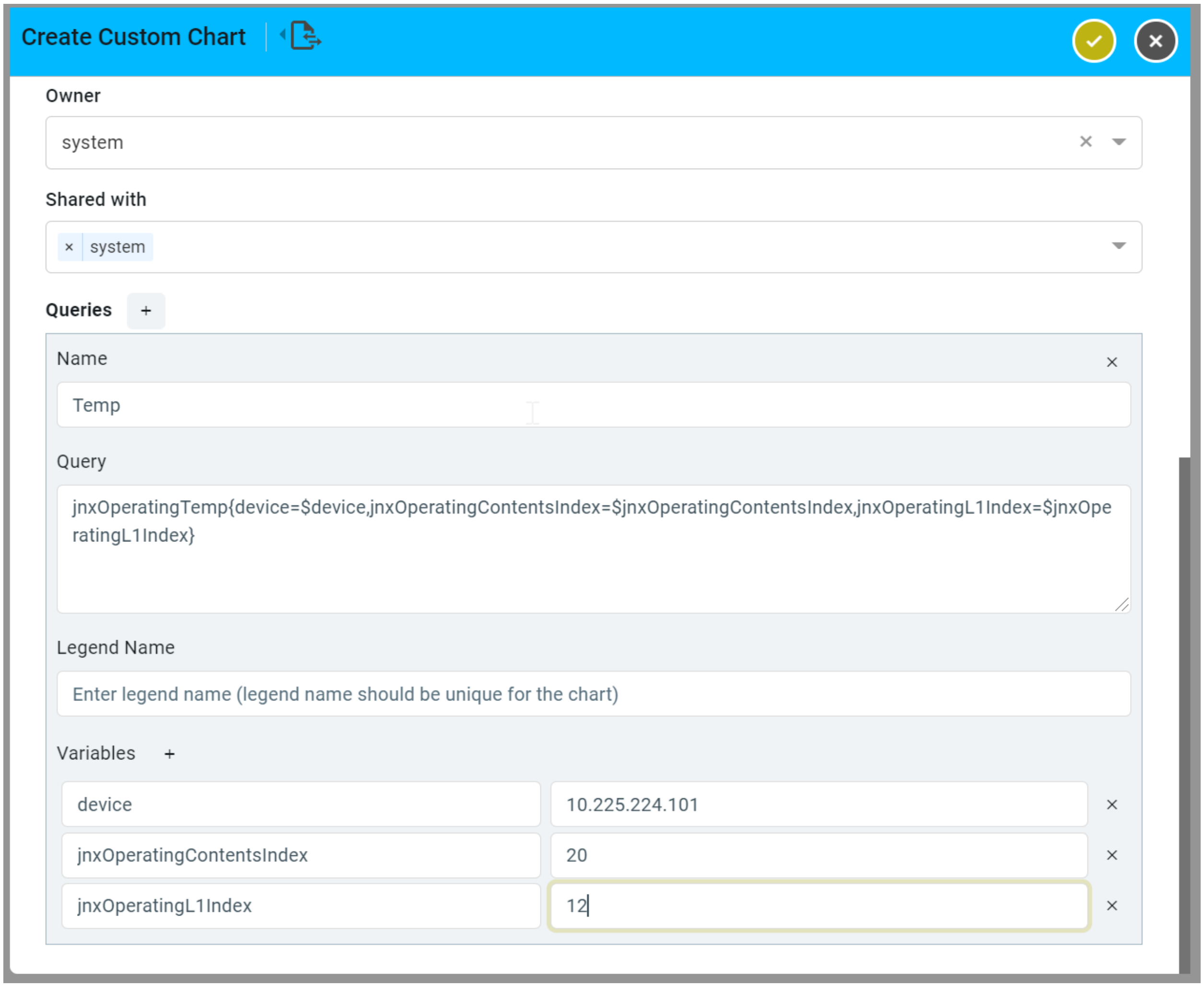
system

Shared with

× system

Queries +

2. Provide the variables as follows in the queries.



Create Custom Chart

Owner

system

Shared with

× system

Queries +

Name

Temp

Query

jnxOperatingTemp{device=$device,jnxOperatingContentsIndex=$jnxOperatingContentsIndex,jnxOperatingL1Index=$jnxOperatingL1Index}

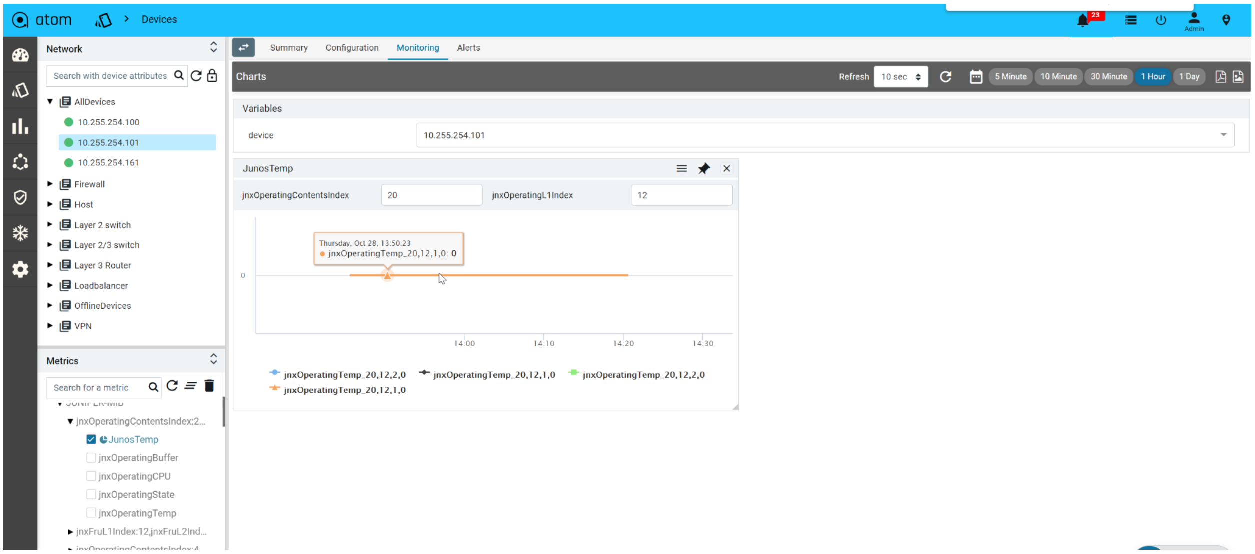
Legend Name

Enter legend name (legend name should be unique for the chart)

Variables +

device	10.225.224.101
jnxOperatingContentsIndex	20
jnxOperatingL1Index	12

3. Charts can be viewed with static values as below.



Variables

device: 10.255.254.101

jnxOperatingContentsIndex: 20

jnxOperatingL1Index: 12

Thursday, Oct 28, 13:50:23
● jnxOperatingTemp_20,12,1,0: 0

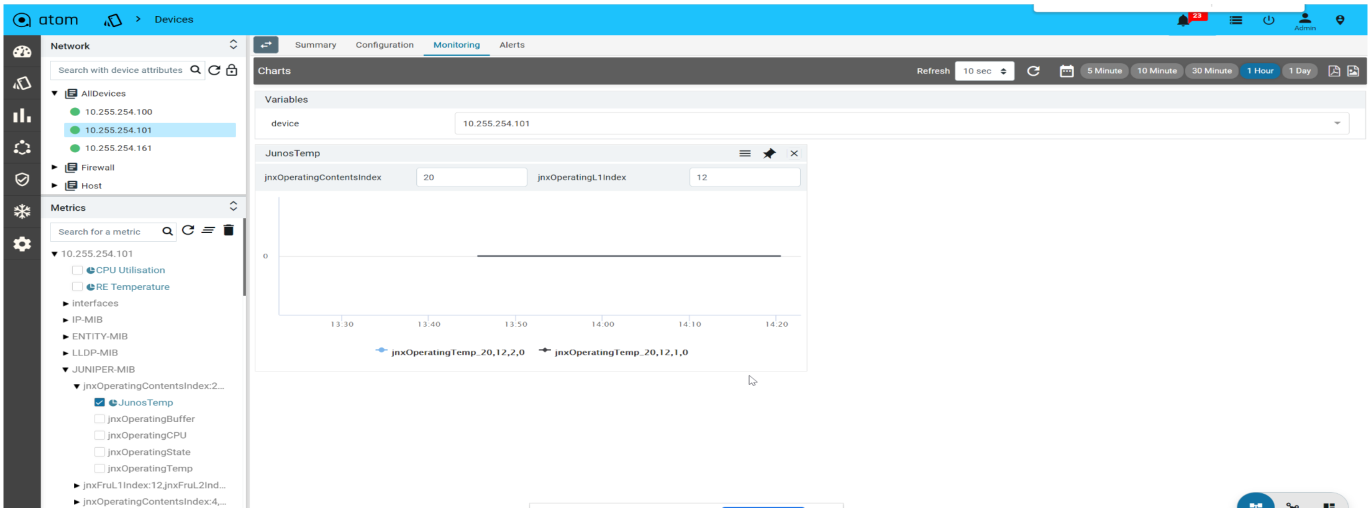
Alert, Actions & Closed Loop Automation

ATOM enables you to create Assurance profiles to facilitate 24x7 uptime of your network. Closed loop automation (CLA) framework allows you to define policies and remediation actions in violation of those policies.

ATOM collects operational & performance metrics from multiple data sources such as SNMP, SNMP traps, Syslog and Streaming Telemetry and stores them in a time-series database.

Following are the different activities on the metrics:

- Visualize Data Using Charts & Reports - To be covered in Monitoring
- Alerts against thresholds defined on the Metrics
- Alert Dashboards - Collection of Predefined & User Defined Dashlets
- Alert Routing to Email, Slack etc.,
- Actions on Alerts
- Closed Loop Automation Actions on the Alerts - Alerts can be routed to ATOM CLA framework where further correlation can be done against the defined behavior and remediation steps to resolve issues in the network. The actions to be taken for any breach in threshold values range from sending an email alert, a slack notification or raising the alarm in the system. For more advanced use cases, you can define auto-remediation actions such as executing a workflow to shut down an interface due to excessive BGP neighbor flaps or seek approvals by sending requests to ITSM tools such as Service Now. Each action can be triggered automatically or on demand by the user after analysing the event. Actions can be attached as generic (all events) or restricted scope by using alert filters.



Refresh 10 sec

device 10.255.254.101

jnxOperatingContentsIndex 20

jnxOperatingL1Index 12

Follow the below steps to get the event driven closed loop automation works.

1. Define the Alert Rule - When to trigger an alert
    a. Each alert rule consists of set of conditions, severity, duration to raise or clear an alert
2. Create the Alert Filter to Alert definition - Who gets affected
    a. It defines the scope for actions such as node level, severity based, location or hybrid etc. These are reusable entities.
3. Attach the action with suitable filter and type - What needs to be done after the event
    a. Attach the actions such as email, remediation, RCA/Diagnostics on set of alerts

Below are some of the use cases:

1. Generate an alert for the interface packet drop events & diagnose the issue (by performing a set of operational checks on the device through workflow) and perform the right action such as upgrading the link or changing the QoS policy etc..
2. Notify the management team on all critical events which needs immediate attention.
3. Send location specific alerts to corresponding slack channels and email groups.
4. Raise a servicenow incident for the hardware issues
5. Alert BGP adjacency state stuck issues and diagnose & perform the available actions (check & change BGP port issues and AS Numbers, Peer IP, update source etc..) on demand with manual triggers.
6. Create a dashboard with long standing issues on specific resource pools which are triggered from cisco IOS XR streaming telemetry sources.

Define Alert Rules

1. Navigate to **Assurance > Closed Loop Automation** to define the alert rules
2. Click **Add** and provide values for Name, Description, Message, Resource Path
    a. **Name** : Name of the alert definition which will contain the set of rules and associated actions
    b. **Description :** Provide the description about the what the rule is about
    c. **Message:** Define the message template which you would want to see as part of notification with variables replaced with corresponding values. It is based on Prometheus Go Templating. https://prometheus.io/docs/prometheus/latest/configuration/template_examples/
    d. **Resource Path:** Provide the unique XPATH using alert resulted variables. Resource Path and Name are the composite key to define the alert ingestion, maintain the history and resolve events appropriately. To use variables in the resource path, keep key names inside curly braces.check the following example: *Device={device}/Interface_name={ifDescr}*. Here, device and ifDescr are the variables

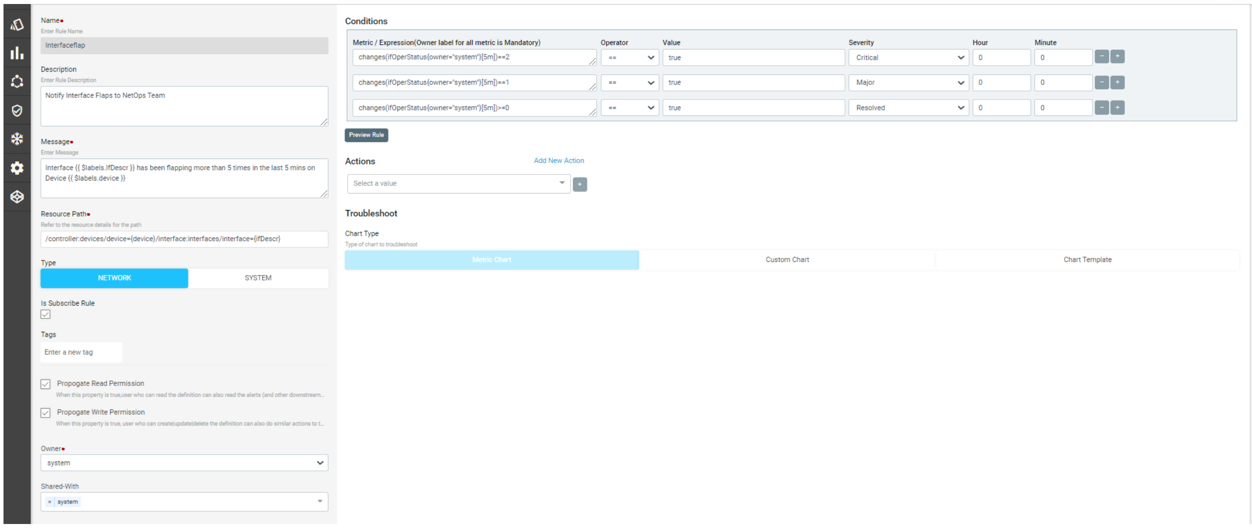
       Eg: Notifying each Interface Flap

i. **Name** : *InterfaceDown* and **Resource Path** : */device/interfacename* ,

   1. all the interface alerts will be treated as similar. If Gi1 Interface goes down on 10.0.0.1 and Gi2 comes to operationally UP on 10.0.0.2 then it will clear the Gi1 Active alert on other devices.

ii. **Name** : *InterfaceDown* and **Resource Path** : */device={device}* then all the interface alerts will be aggregated by device

   1. Every InterfaceDown alert of the same device will become the history of other alerts and clear the events raised by other interfaces on that device.



Name•
Enter Rule Name
Interfaceflap

Description
Enter Rule Description
Notify Interface Flaps to NetOps Team

Message•
Enter Message
Interface {{ $labels.IfDescr }} has been flapping more than 5 times in the last 5 mins on Device {{ $labels.device }}

Resource Path•
Refer to the resource details for the path
/controller:devices/device={device}/interface:interfaces/interface={ifDescr}

Type
NETWORK | SYSTEM

Is Subscribe Rule
☑

Tags
Enter a new tag

☑ Propogate Read Permission
When this property is true,user who can read the definition can also read the alerts (and other downstream...

☑ Propogate Write Permission
When this property is true, user who can create|update|delete the definition can also do similar actions to t...

Owner•
system

Shared-With
× system

Conditions

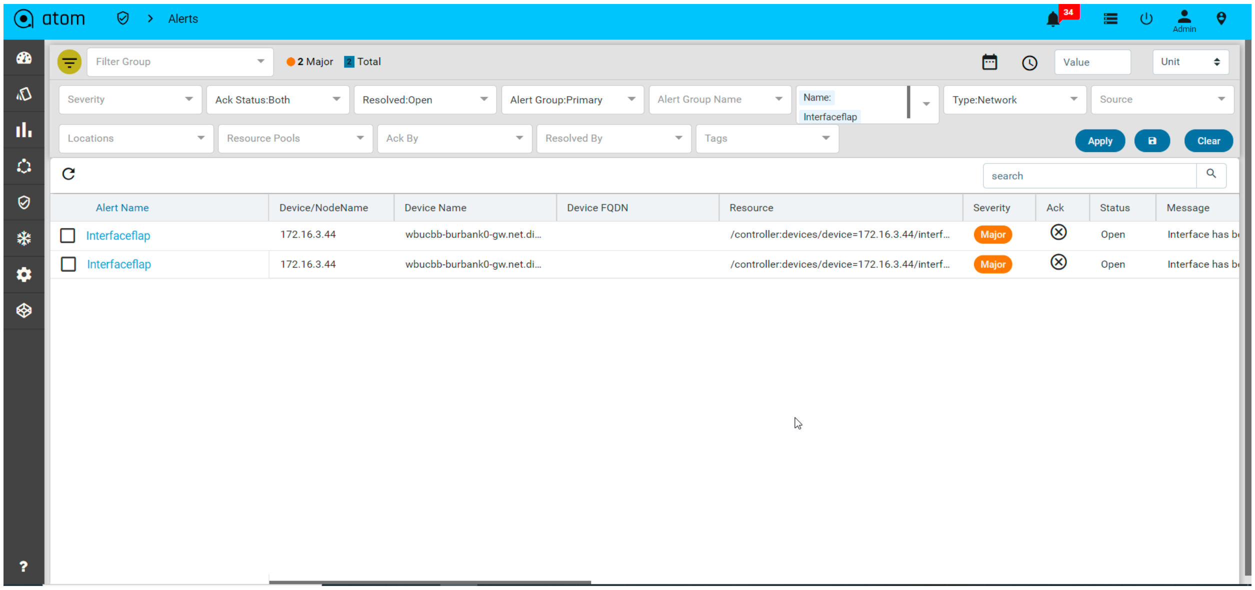
Metric / Expression(Owner label for all metric is Mandatory)	Operator	Value	Severity	Hour	Minute
changes(ifOperStatus{owner="system"}[5m])==2	==	true	Critical	0	0
changes(ifOperStatus{owner="system"}[5m])==1	==	true	Major	0	0
changes(ifOperStatus{owner="system"}[5m])>=0	==	true	Resolved	0	0

Preview Rule

Actions
Add New Action
Select a value

Troubleshoot

Chart Type
Type of chart to troubleshoot
Metric Chart | Custom Chart | Chart Template



atom > Alerts

Filter Group ● 2 Major 2 Total Value Unit

Severity | Ack Status:Both | Resolved:Open | Alert Group:Primary | Alert Group Name | Name: Interfaceflap | Type:Network | Source

Locations | Resource Pools | Ack By | Resolved By | Tags

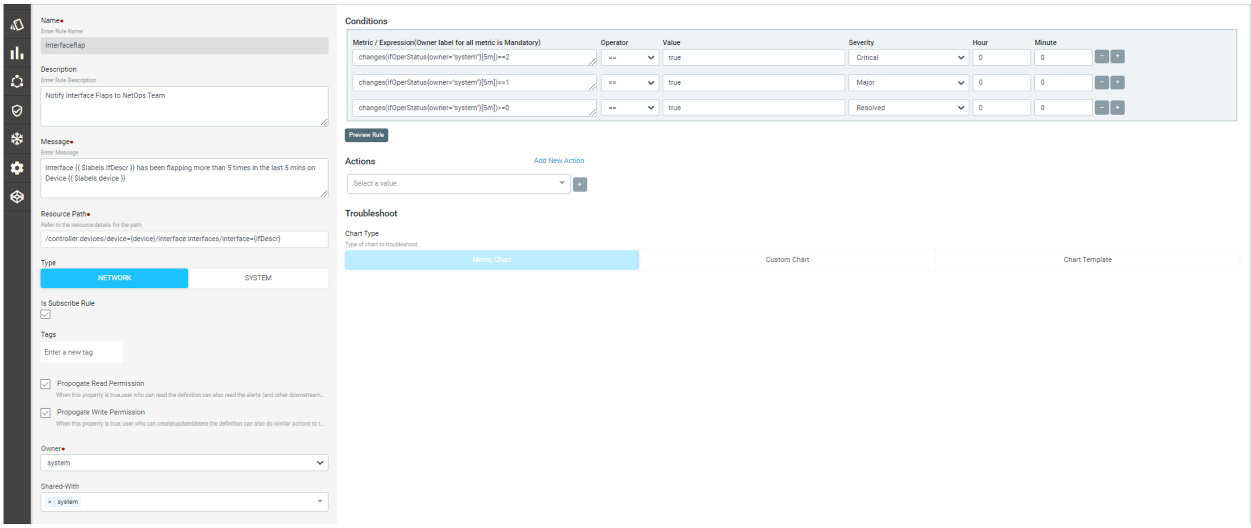
Apply Clear

search

	Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack	Status	Message
□	Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major	⊗	Open	Interface has b
□	Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major	⊗	Open	Interface has b

In both (i) & (ii) cases, manual action can be performed only on the latest instance of that since they are grouped by upper level or ad hoc entities.

iii. **Name** : *InterfaceDown* and **Resource Path** : */device={device}/Interface_name={ifDescr}* then all the interface alerts will be aggregated by device & Interface



Name•
Enter Rule Name
Interfaceflap

Description
Enter Rule Description
Notify Interface Flaps to NetOps Team

Message•
Enter Message
Interface {{ $labels.IfDescr }} has been flapping more than 5 times in the last 5 mins on Device {{ $labels.device }}

Resource Path•
Refer to the resource details for the path
/controller:devices/device={device}/interface:interfaces/interface={ifDescr}

Type
NETWORK | SYSTEM

Is Subscribe Rule
☑

Tags
Enter a new tag

☑ Propogate Read Permission
When this property is true,user who can read the definition can also read the alerts (and other downstream...

☑ Propogate Write Permission
When this property is true, user who can create|update|delete the definition can also do similar actions to t...

Owner•
system

Shared-With
× system

Conditions

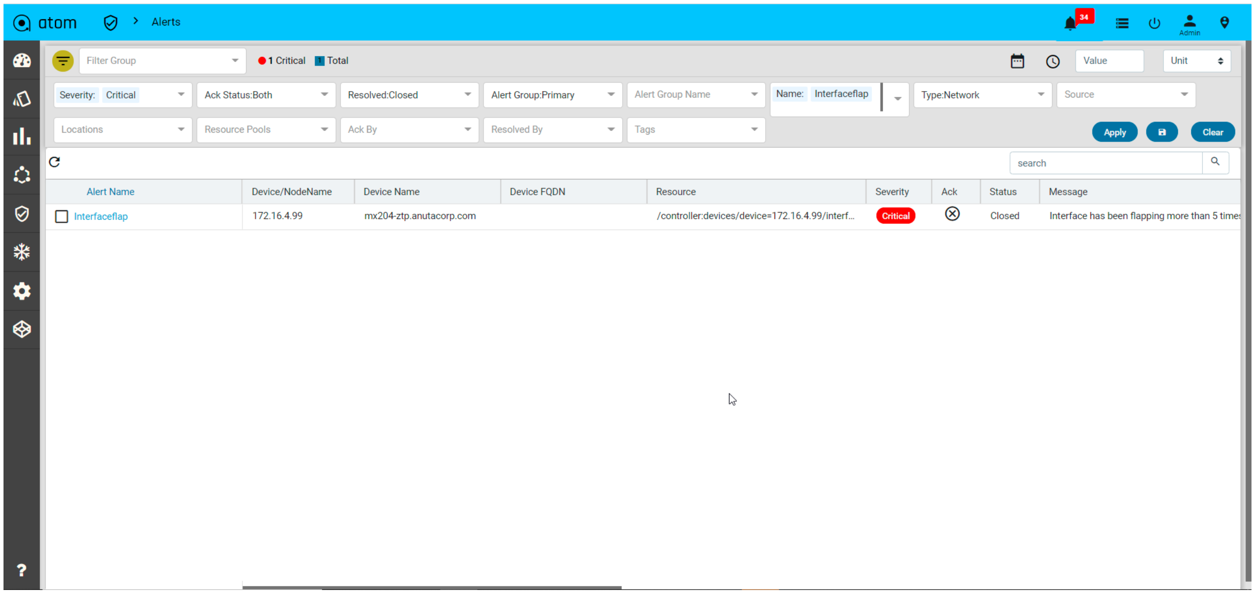
Metric / Expression(Owner label for all metric is Mandatory)	Operator	Value	Severity	Hour	Minute
changes(ifOperStatus{owner="system"}[5m])==2	==	true	Critical	0	0
changes(ifOperStatus{owner="system"}[5m])==1	==	true	Major	0	0
changes(ifOperStatus{owner="system"}[5m])>=0	==	true	Resolved	0	0

Preview Rule

Actions
Add New Action
Select a value

Troubleshoot

Chart Type
Type of chart to troubleshoot
Metric Chart | Custom Chart | Chart Template



atom > Alerts

Filter Group ● 1 Critical 1 Total

Severity: Critical | Ack Status:Both | Resolved:Closed | Alert Group:Primary | Alert Group Name | Name: Interfaceflap | Type:Network | Source

Locations | Resource Pools | Ack By | Resolved By | Tags

Apply | Clear

search

	Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack	Status	Message
□	Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interf...	Critical	⊗	Closed	Interface has been flapping more than 5 times

1. It makes every event independent and manual actions can be performed at any time since we have the right set of affected object information available instead of just the latest event from that group.

2. Auto clearing of events will happen properly. If Gi1 goes down on device 10.0.0.1 will raise an alert and it gets cleared only when it comes operationally on the same Interface on the correct device.

e. **Type**: By Default, it is of type *NETWORK*. Please, don't switch this flag for device related alert rules as it defines which database query for metrics and alerts.

f. **Tags:** Provide a new tag name or choose the existing ones. it will be useful to create or apply the filter efficiently in an aggregated way.

3. Configure the condition for each rule with the required thresholds.

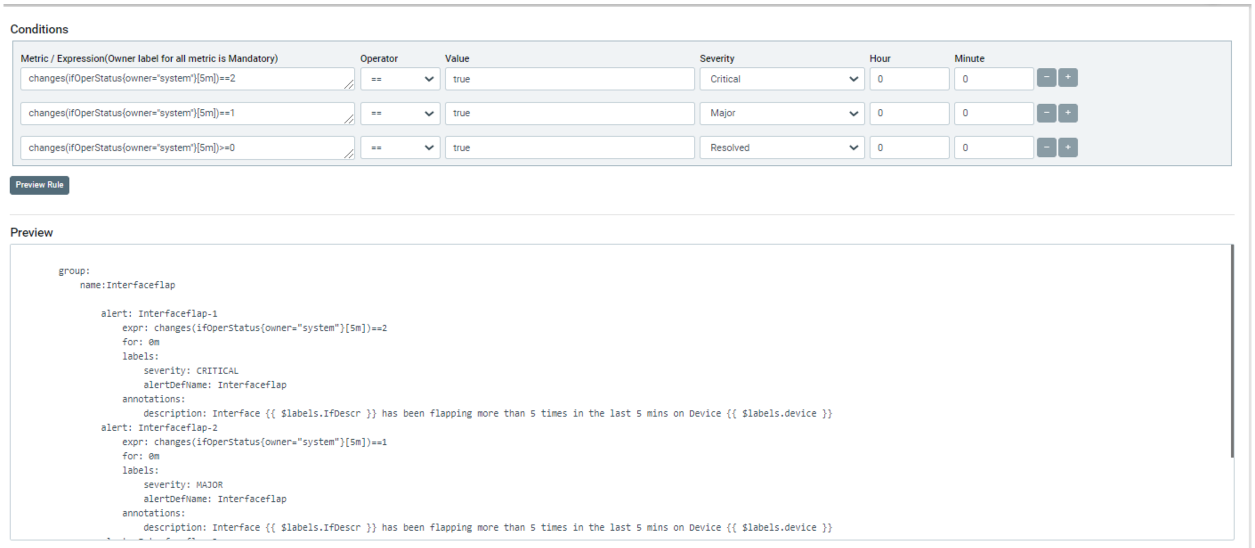
a. **Metric/Expression**: Provide the metric or expression in the condition

i. If the condition has the expression with boundaries then no need to change the operator and value. It should be == true in that case.

ii. If the condition has only the metric or expression which doesn't have any logical boundaries then operator and value will be useful. Refer below snapshot for more details.

b. **Severity**: A severity level can be attached to the alerts if the sensors being monitored breach the threshold values.

c. **Duration:** Alerts will be fired once they have been returned for this long



Conditions

Metric / Expression(Owner label for all metric is Mandatory)	Operator	Value	Severity	Hour	Minute
changes(ifOperStatus{owner="system"}[5m])==2	==	true	Critical	0	0
changes(ifOperStatus{owner="system"}[5m])==1	==	true	Major	0	0
changes(ifOperStatus{owner="system"}[5m])>=0	==	true	Resolved	0	0

Preview

```
group:
    name:Interfaceflap

        alert: Interfaceflap-1
            expr: changes(ifOperStatus{owner="system"}[5m])==2
            for: 0m
            labels:
                severity: CRITICAL
                alertDefName: Interfaceflap
            annotations:
                description: Interface {{ $labels.IfDescr }} has been flapping more than 5 times in the last 5 mins on Device {{ $labels.device }}
        alert: Interfaceflap-2
            expr: changes(ifOperStatus{owner="system"}[5m])==1
            for: 0m
            labels:
                severity: MAJOR
                alertDefName: Interfaceflap
            annotations:
                description: Interface {{ $labels.IfDescr }} has been flapping more than 5 times in the last 5 mins on Device {{ $labels.device }}
```

4. 'Live Preview' shows the generated prometheus rule with the defined thresholds and its metadata.

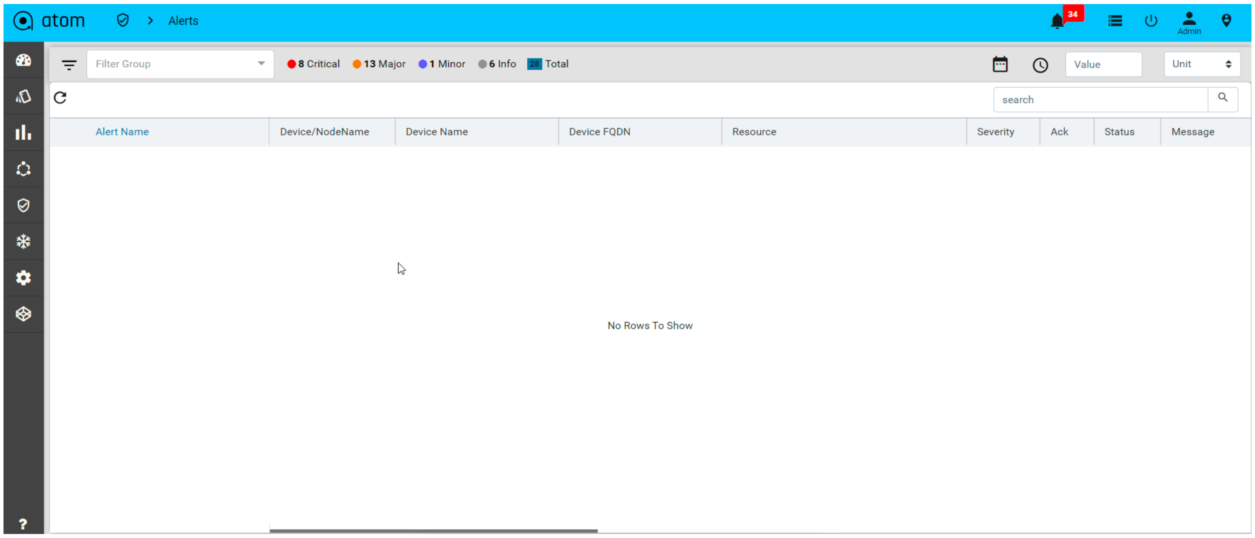
Define Alert Filter

Alert filters are to define the scope for any action to be performed or group them together based on certain criteria. We have the following attributes to create the filters : Name, Acknowledge State, Resolved State, Alert Name, Severity, Device-Groups, Resource Pools, Locations, Tags and Relative or Absolute times.

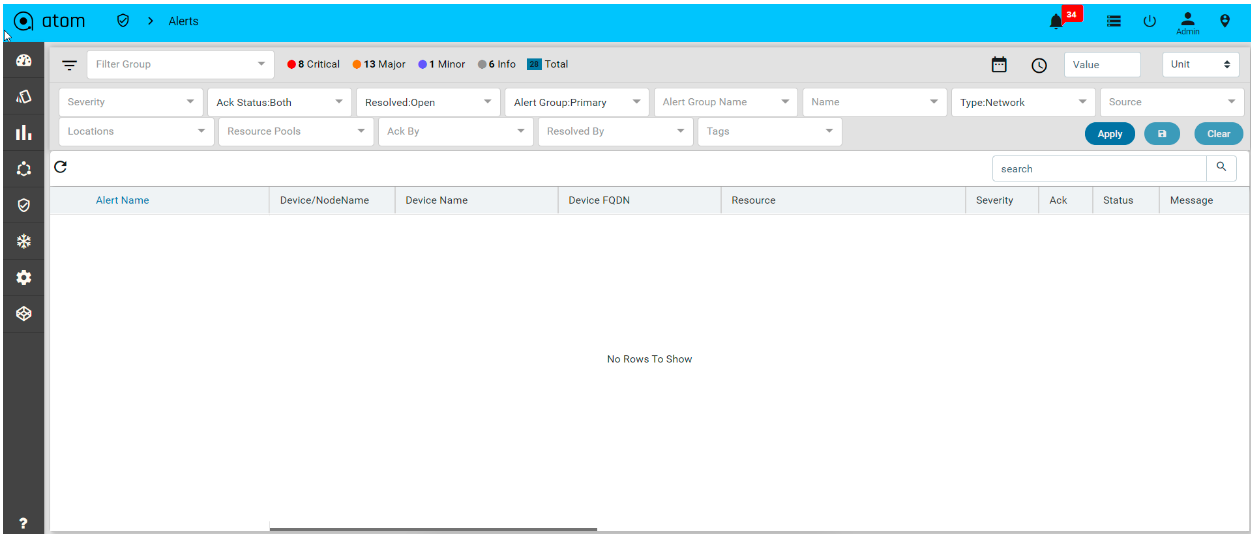
Follow below steps to create and view and filters:

1. Navigate to Assurance -> Alerts
2. Click on top left corner icon to see the available attributes to define the alert filter
3. Choose the values from the dropdowns and apply the filter to see existing alerts.
4. If step #3 provides the desired filtered result then go ahead and save the filter by providing the name and optionally save as a dashlet in the dashboard. Refer to the Dashboards section for more details.

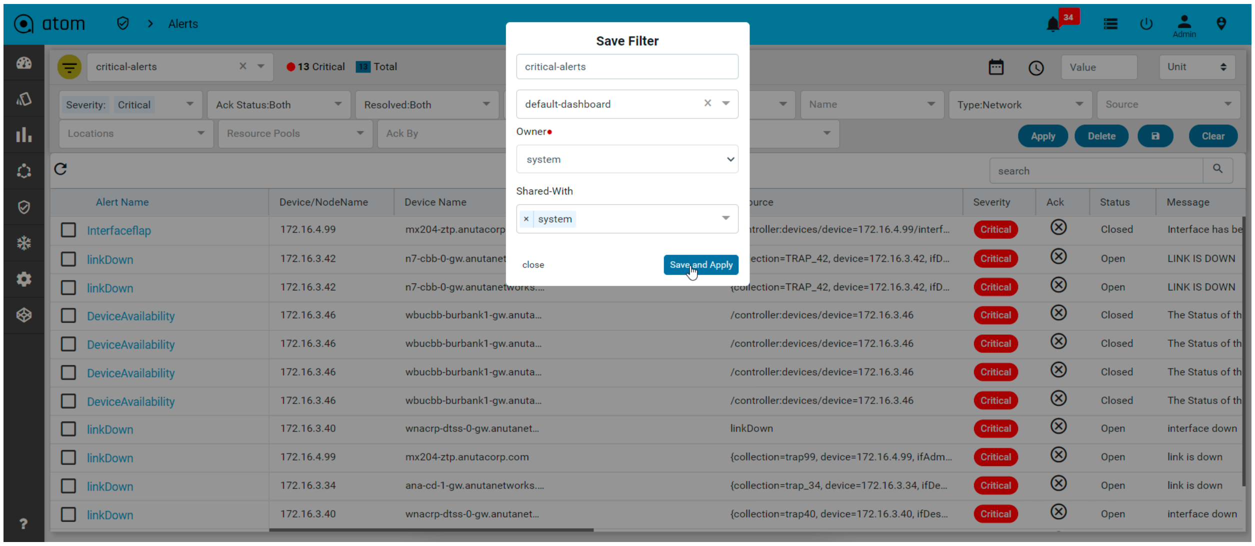
Navigate to the top left corner and click on the filter icon to see possible filter attributes.



Choose the filter attributes and click on the Save button to **'Save Filter'.**



Save filter will provide an option to provide a name and to attach to the dashboard.



Save Filter

critical-alerts

default-dashboard

Owner•

system

Shared-With

× system

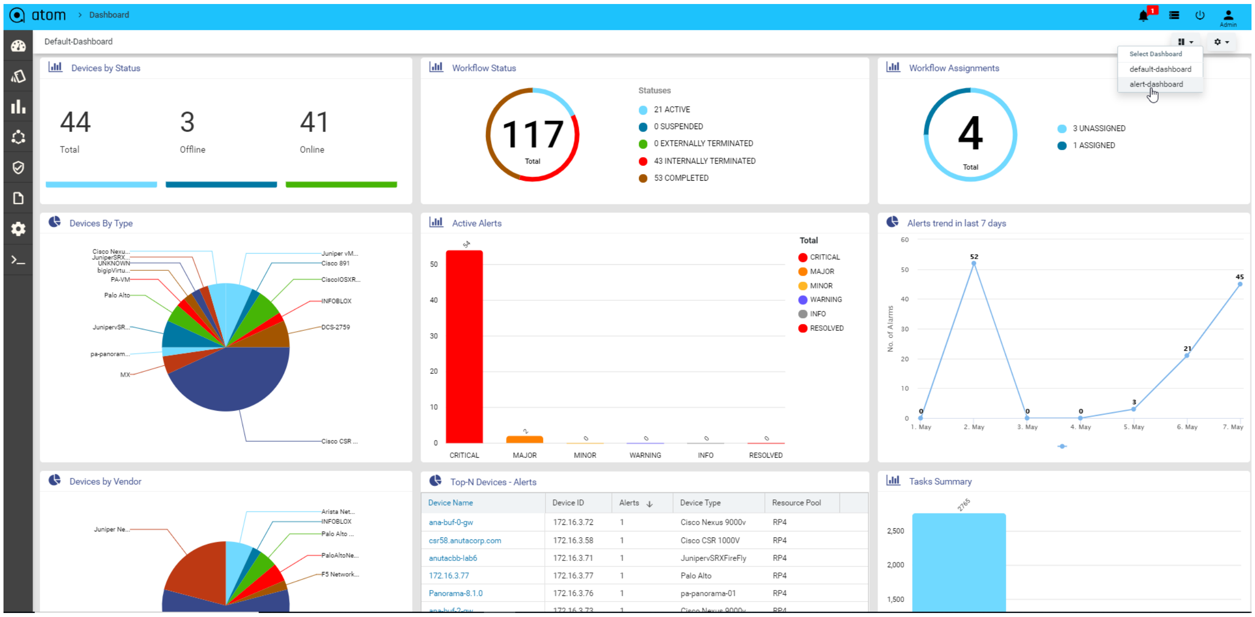
Filter: critical-alerts

Severity: Critical | Ack Status:Both | Resolved:Both | Name | Type:Network | Source | Locations | Resource Pools | Ack By

	Alert Name	Device/NodeName	Device Name	Resource	Severity	Ack	Status	Message
□	Interfaceflap	172.16.4.99	mx204-ztp.anutacorp	troller:devices/device=172.16.4.99/interf...	Critical	⊗	Closed	Interface has be
□	linkDown	172.16.3.42	n7-cbb-0-gw.anutanet	ection=TRAP_42, device=172.16.3.42, ifD...	Critical	⊗	Open	LINK IS DOWN
□	linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks....	{collection=TRAP_42, device=172.16.3.42, ifD...	Critical	⊗	Open	LINK IS DOWN
□	DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...	/controller:devices/device=172.16.3.46	Critical	⊗	Closed	The Status of th
□	DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...	/controller:devices/device=172.16.3.46	Critical	⊗	Closed	The Status of th
□	DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...	/controller:devices/device=172.16.3.46	Critical	⊗	Closed	The Status of th
□	DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...	/controller:devices/device=172.16.3.46	Critical	⊗	Closed	The Status of th
□	linkDown	172.16.3.40	wnacrp-dtss-0-gw.anutanet...	linkDown	Critical	⊗	Open	interface down
□	linkDown	172.16.4.99	mx204-ztp.anutacorp.com	{collection=trap99, device=172.16.4.99, ifAdm...	Critical	⊗	Open	link is down
□	linkDown	172.16.3.34	ana-cd-1-gw.anutanetworks....	{collection=trap_34, device=172.16.3.34, ifDe...	Critical	⊗	Open	link is down
□	linkDown	172.16.3.40	wnacrp-dtss-0-gw.anutanet...	{collection=trap40, device=172.16.3.40, ifDes...	Critical	⊗	Open	interface down

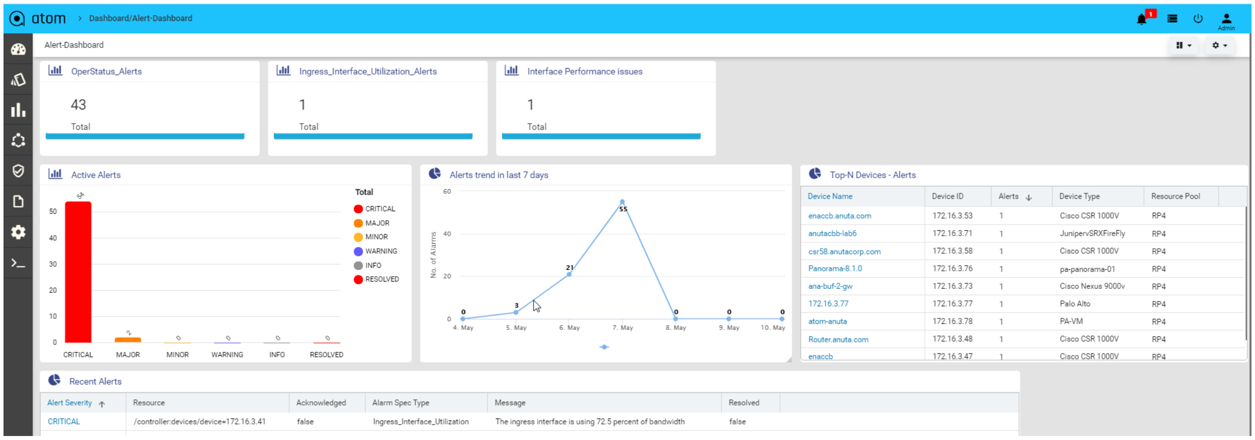
To clear selected filter attributes, click on the **Clear** button in left down corner

Navigate Dashboard> select alert-Dashboard in right corner and click on it to view the saved filter dashboard



Top-N Devices - Alerts

Device Name	Device ID	Alerts	Device Type	Resource Pool
ana-buf-0-gw	172.16.3.72	1	Cisco Nexus 9000v	RP4
csr58.anutacorp.com	172.16.3.58	1	Cisco CSR 1000V	RP4
anutacbb-lab6	172.16.3.71	1	JunipervSRXFireFly	RP4
172.16.3.77	172.16.3.77	1	Palo Alto	RP4
Panorama-8.1.0	172.16.3.76	1	pa-panorama-01	RP4
ana-buf-2-gw	172.16.3.73	1	Cisco Nexus 9000v	RP4



Top-N Devices - Alerts

Device Name	Device ID	Alerts	Device Type	Resource Pool
enaccb.anuta.com	172.16.3.53	1	Cisco CSR 1000V	RP4
anutacbb-lab6	172.16.3.71	1	JunipervSRXFireFly	RP4
csr58.anutacorp.com	172.16.3.58	1	Cisco CSR 1000V	RP4
Panorama-8.1.0	172.16.3.76	1	pa-panorama-01	RP4
ana-buf-2-gw	172.16.3.73	1	Cisco Nexus 9000v	RP4
172.16.3.77	172.16.3.77	1	Palo Alto	RP4
atom-anuta	172.16.3.78	1	PA-VM	RP4
Router.anuta.com	172.16.3.48	1	Cisco CSR 1000V	RP4
enaccb	172.16.3.47	1	Cisco CSR 1000V	RP4

Recent Alerts

Alert Severity	Resource	Acknowledged	Alarm Spec Type	Message	Resolved
CRITICAL	/controller:devices/device=172.16.3.41	false	Ingress_Interface_Utilization	The ingress interface is using 72.5 percent of bandwidth	false

Attach Remediation Actions

Once you define the baseline behavior by specifying the sensors to be monitored, the next step is to define the actions to be automated. The actions range from simple notifications to complex remediation actions. Here, we will bridge the alert to action behavior by using alert filters.

The steps below will help you define the necessary actions for the rules defined

1. Navigate to the Assurance -> Closed Loop Automation
2. Click on the Alert Actions tab
3. Click the Add (+) button to create the action template and provide the Name, Description.
    a. **Name** : provide unique name to for action template
    b. **Description** : provide the description of action and what is does

c. **Trigger For** : It is used to define scope of action. *All Filters* will enable this action for all the alerts and *Alert filters* will restrict scope to defined criteria as per selected named filters.

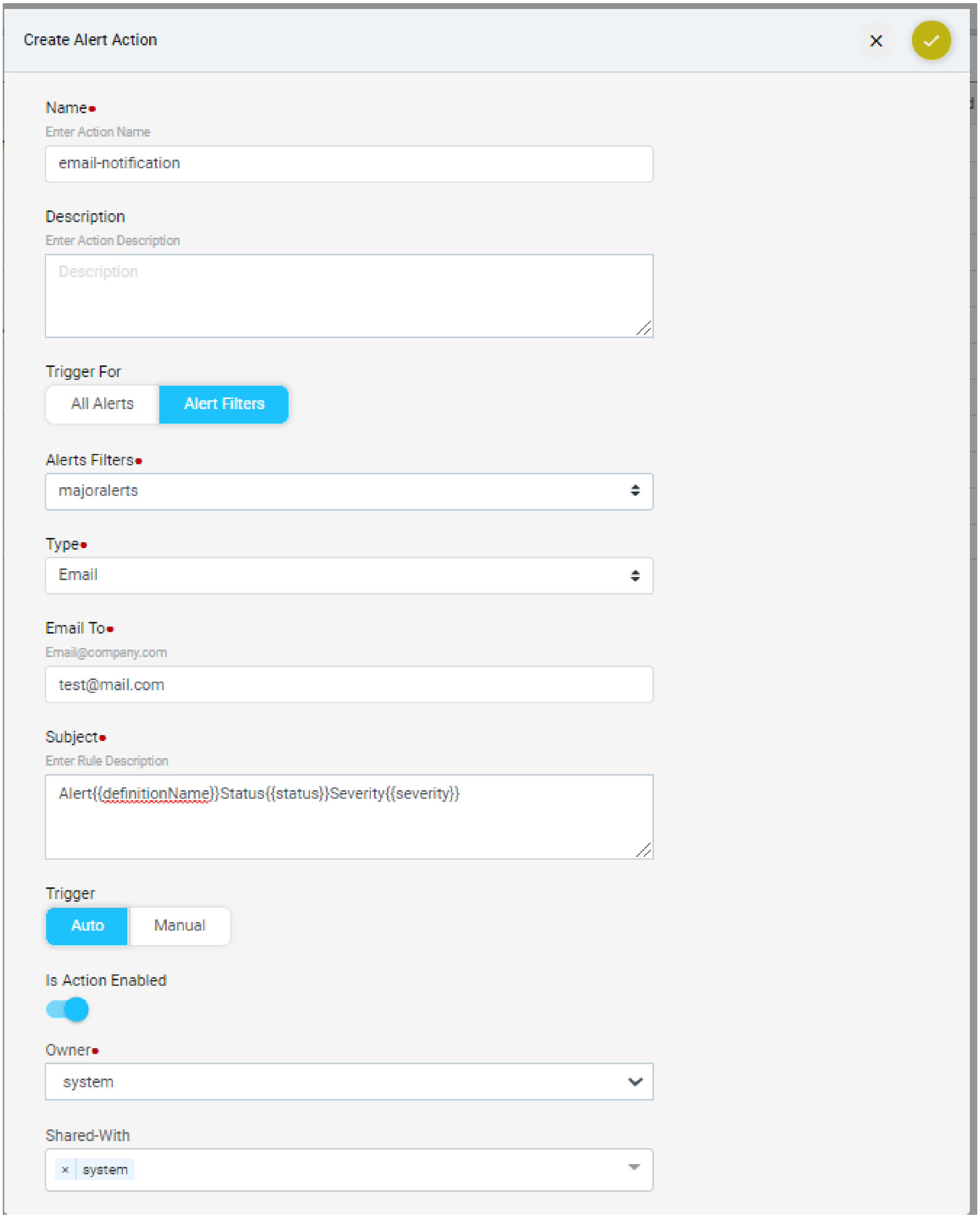
d. **Alert Filters:** Select the name of the alert filter to attach an action

e. **Type:** choose the type of action such as slack, email and workflow or rpc

f. **Trigger: Auto** Trigger is used to perform closed loop automation use cases and **Manual** trigger is used to perform on demand diagnostics and notifications. However, any type of trigger can be used based on the use case and criticality of the affect.

g. **Is Action Enabled:** It is to make sure the defined Action template is ready to attach for an alert or not. If we disable this, this particular action template won't be shown or get triggered when the event happens.

Below is the snapshot to send an email notification for every alert



Create Alert Action

Name•
Enter Action Name
email-notification

Description
Enter Action Description
Description

Trigger For
All Alerts | Alert Filters

Alerts Filters•
majoralerts

Type•
Email

Email To•
Email@company.com
test@mail.com

Subject•
Enter Rule Description
Alert{{definitionName}}Status{{status}}Severity{{severity}}

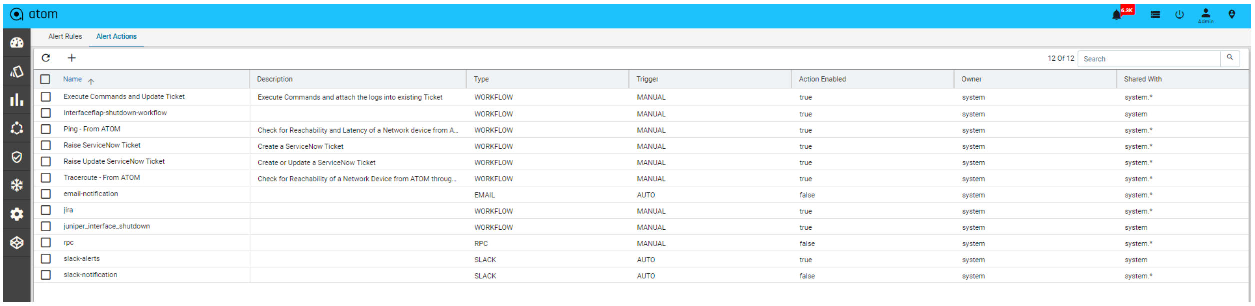
Trigger
Auto | Manual

Is Action Enabled

Owner•
system

Shared-With
× system

If Action is enabled then those all enabled actions will show in Alerts action window as shown below

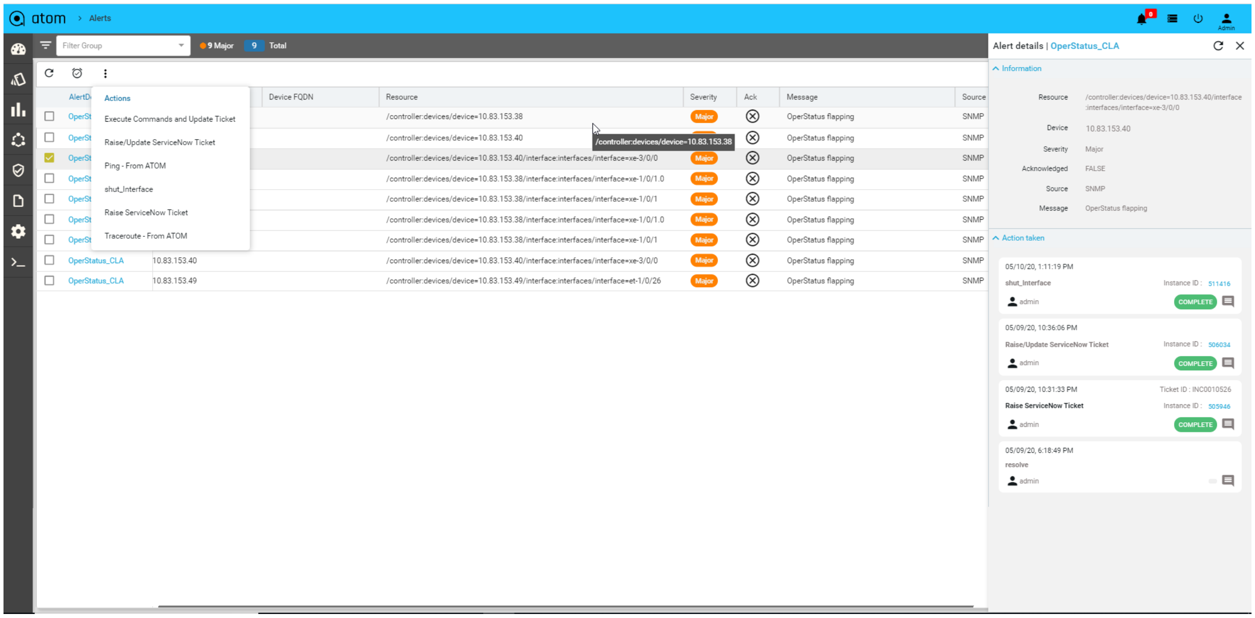


atom

Alert Rules | Alert Actions

12 Of 12 Search

☐	Name	Description	Type	Trigger	Action Enabled	Owner	Shared With
☐	Execute Commands and Update Ticket	Execute Commands and attach the logs into existing Ticket	WORKFLOW	MANUAL	true	system	system.*
☐	Interfaceflap-shutdown-workflow		WORKFLOW	MANUAL	true	system	system
☐	Ping - From ATOM	Check for Reachability and Latency of a Network device from A...	WORKFLOW	MANUAL	true	system	system.*
☐	Raise ServiceNow Ticket	Create a ServiceNow Ticket	WORKFLOW	MANUAL	true	system	system.*
☐	Raise Update ServiceNow Ticket	Create or Update a ServiceNow Ticket	WORKFLOW	MANUAL	true	system	system.*
☐	Traceroute - From ATOM	Check for Reachability of a Network Device from ATOM throug...	WORKFLOW	MANUAL	true	system	system.*
☐	email-notification		EMAIL	AUTO	false	system	system.*
☐	jira		WORKFLOW	MANUAL	true	system	system.*
☐	juniper_interface_shutdown		WORKFLOW	MANUAL	true	system	system
☐	rpc		RPC	MANUAL	false	system	system.*
☐	slack-alerts		SLACK	AUTO	true	system	system
☐	slack-notification		SLACK	AUTO	false	system	system.*



atom > Alerts

Filter Group ● 9 Major 9 Total

Actions
- Execute Commands and Update Ticket
- Raise/Update ServiceNow Ticket
- Ping - From ATOM
- shut_Interface
- Raise ServiceNow Ticket
- Traceroute - From ATOM

	AlertD		Device FQDN	Resource	Severity	Ack	Message	Source
☐	OperSt			/controller:devices/device=10.83.153.38	Major	⊗	OperStatus flapping	SNMP
☐	OperSt			/controller:devices/device=10.83.153.40		⊗	OperStatus flapping	SNMP
☑	OperSt			/controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0	Major	⊗	OperStatus flapping	SNMP
☐	OperSt			/controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1.0	Major	⊗	OperStatus flapping	SNMP
☐	OperSt			/controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1	Major	⊗	OperStatus flapping	SNMP
☐	OperSt			/controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1.0	Major	⊗	OperStatus flapping	SNMP
☐	OperSt			/controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1	Major	⊗	OperStatus flapping	SNMP
☐	OperStatus_CLA	10.83.153.40		/controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0	Major	⊗	OperStatus flapping	SNMP
☐	OperStatus_CLA	10.83.153.49		/controller:devices/device=10.83.153.49/interface:interfaces/interface=et-1/0/26	Major	⊗	OperStatus flapping	SNMP

/controller:devices/device=10.83.153.38

Alert details | OperStatus_CLA

Information

Resource /controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0
Device 10.83.153.40
Severity Major
Acknowledged FALSE
Source SNMP
Message OperStatus flapping

Action taken

05/10/20, 1:11:19 PM
shut_Interface Instance ID : 511416
admin COMPLETE

05/09/20, 10:36:06 PM
Raise/Update ServiceNow Ticket Instance ID : 506034
admin COMPLETE

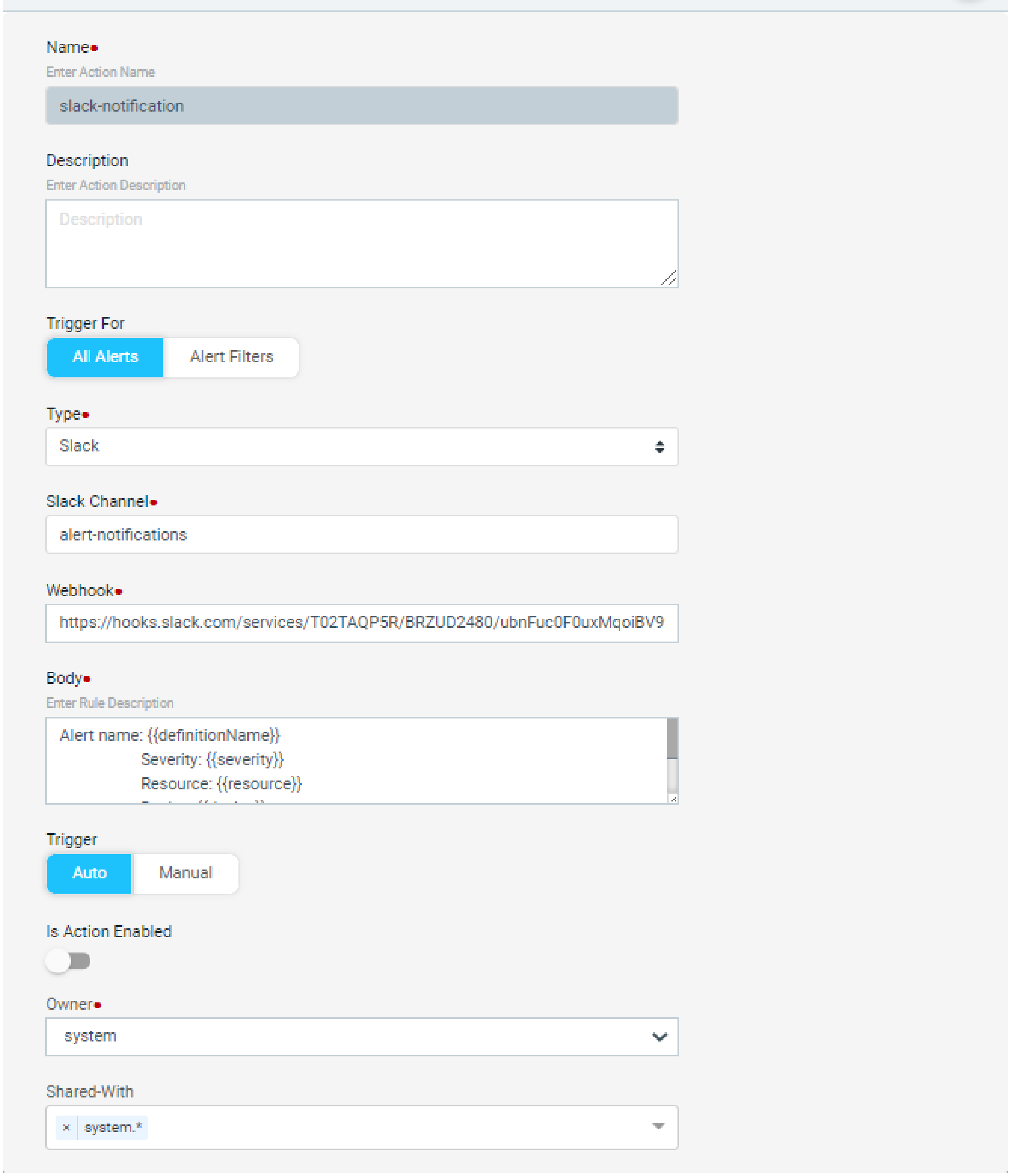
05/09/20, 10:31:33 PM Ticket ID : INC0010526
Raise ServiceNow Ticket Instance ID : 505946
admin COMPLETE

05/09/20, 6:18:49 PM
resolve
admin

Actions

Slack

1. **Slack Channel**: Provide the channel name
2. **Webhook**: Provide the slack channel webhook, Refer below link to create incoming webhook in slack https://api.slack.com/messaging/webhooks#posting_with_webhooks
3. **Body**: Provide the template to format the message while notifying via slack, here you can use the keys from alert



Name•
Enter Action Name
slack-notification

Description
Enter Action Description
Description

Trigger For

Type•
Slack

Slack Channel•
alert-notifications

Webhook•
https://hooks.slack.com/services/T02TAQP5R/BRZUD2480/ubnFuc0F0uxMqoiBV9

Body•
Enter Rule Description

```
Alert name: {{definitionName}}
            Severity: {{severity}}
            Resource: {{resource}}
```

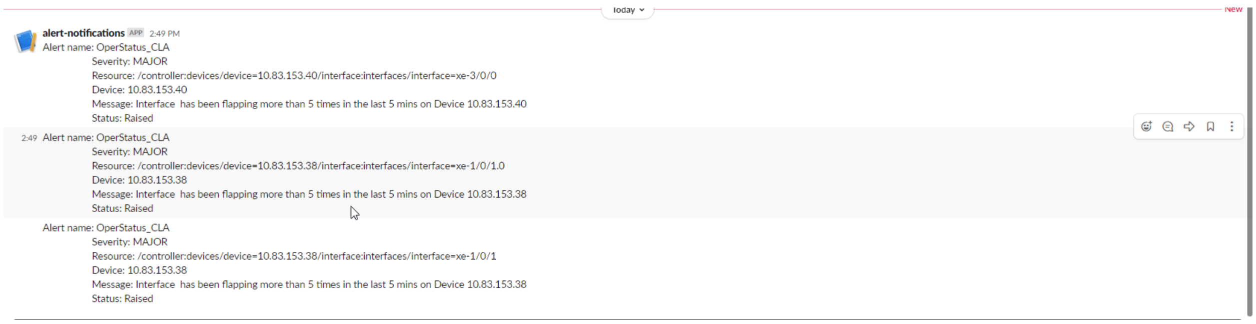
Trigger

Is Action Enabled

Owner•
system

Shared-With
× system.*

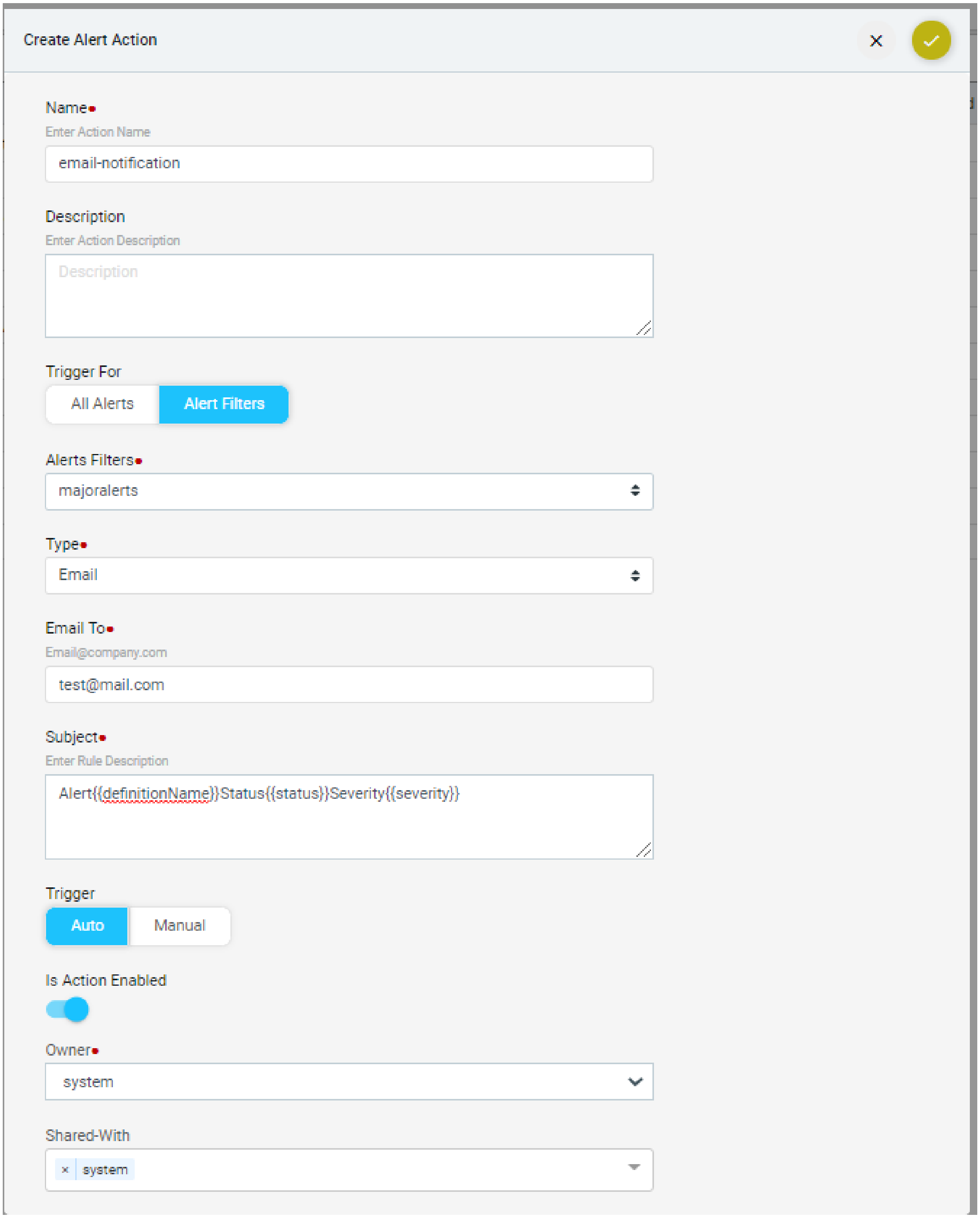
Below the slack notification



```
Alert name: OperStatus_CLA
        Severity: MAJOR
        Resource: /controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0
        Device: 10.83.153.40
        Message: Interface  has been flapping more than 5 times in the last 5 mins on Device 10.83.153.40
        Status: Raised
2:49 Alert name: OperStatus_CLA
        Severity: MAJOR
        Resource: /controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1.0
        Device: 10.83.153.38
        Message: Interface  has been flapping more than 5 times in the last 5 mins on Device 10.83.153.38
        Status: Raised
Alert name: OperStatus_CLA
        Severity: MAJOR
        Resource: /controller:devices/device=10.83.153.38/interface:interfaces/interface=xe-1/0/1
        Device: 10.83.153.38
        Message: Interface  has been flapping more than 5 times in the last 5 mins on Device 10.83.153.38
        Status: Raised
```

Email

1. Email to: Provide the email address
2. Subject: Provide the subject for an email



Create Alert Action

Name●
Enter Action Name
email-notification

Description
Enter Action Description
Description

Trigger For
All Alerts [✓ Alert Filters]

Alerts Filters●
majoralerts

Type●
Email

Email To●
Email@company.com
test@mail.com

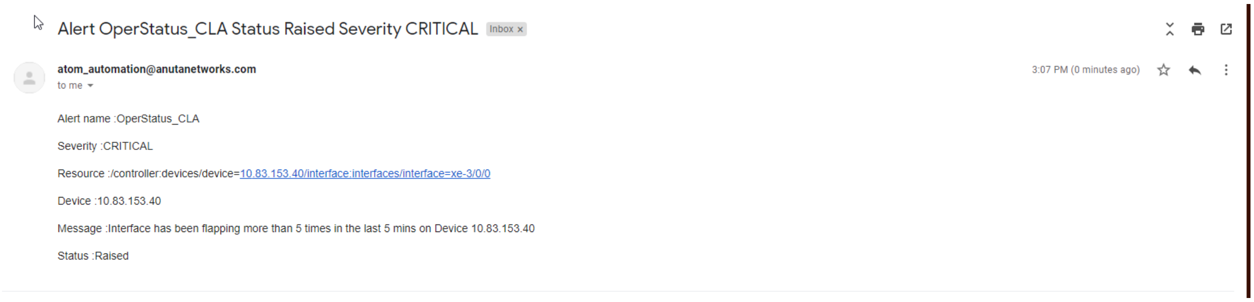
Subject●
Enter Rule Description
Alert{{definitionName}}Status{{status}}Severity{{severity}}

Trigger
[✓ Auto] Manual

Is Action Enabled
●

Owner●
system

Shared-With
× system



Alert OperStatus_CLA Status Raised Severity CRITICAL Inbox ×

atom_automation@anutanetworks.com
to me ▾

3:07 PM (0 minutes ago)

Alert name :OperStatus_CLA

Severity :CRITICAL

Resource :/controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0

Device :10.83.153.40

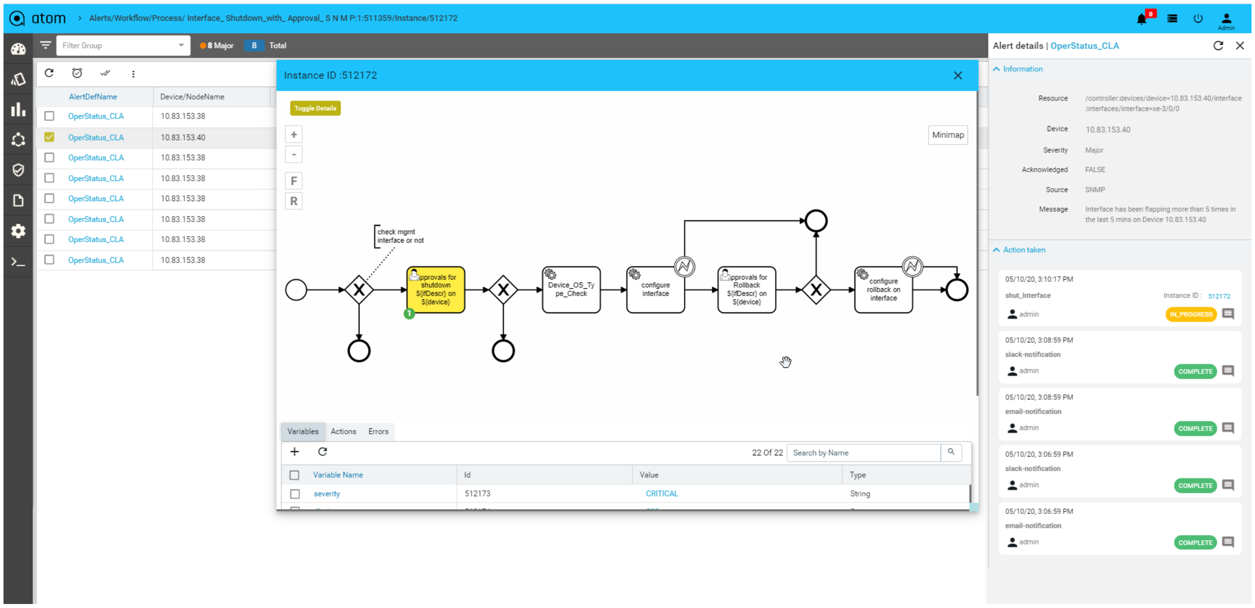
Message :Interface has been flapping more than 5 times in the last 5 mins on Device 10.83.153.40

Status :Raised

Currently, templatization for email body is not supported in ATOM.

Workflow

Workflow: Choose the available workflow by its name to diagnose or remediate the issue or refer the workflow section to create new workflow and packaging



atom > Alerts/Workflow/Process/ Interface_ Shutdown_with_ Approval_ S N M P:1:511359/Instance/512172

Filter Group ● 8 Major 8 Total

	AlertDefName	Device/NodeName
□	OperStatus_CLA	10.83.153.38
☑	OperStatus_CLA	10.83.153.40
□	OperStatus_CLA	10.83.153.38
□	OperStatus_CLA	10.83.153.38
□	OperStatus_CLA	10.83.153.38
□	OperStatus_CLA	10.83.153.38
□	OperStatus_CLA	10.83.153.38
□	OperStatus_CLA	10.83.153.38

Instance ID :512172

Toggle Details
Minimap
+
-
F
R
check mgmt interface or not
pprovals for shutdown ${ifDescr} on ${device}
1
Device_OS_Type_Check
configure interface
pprovals for Rollback ${ifDescr} on ${device}
configure rollback on interface
Variables
Actions
Errors

22 Of 22 Search by Name

□	Variable Name	Id	Value	Type
□	severity	512173	CRITICAL	String

Alert details | OperStatus_CLA

Information

Resource	/controller:devices/device=10.83.153.40/interface:interfaces/interface=xe-3/0/0
Device	10.83.153.40
Severity	Major
Acknowledged	FALSE
Source	SNMP
Message	Interface has been flapping more than 5 times in the last 5 mins on Device 10.83.153.40

Action taken

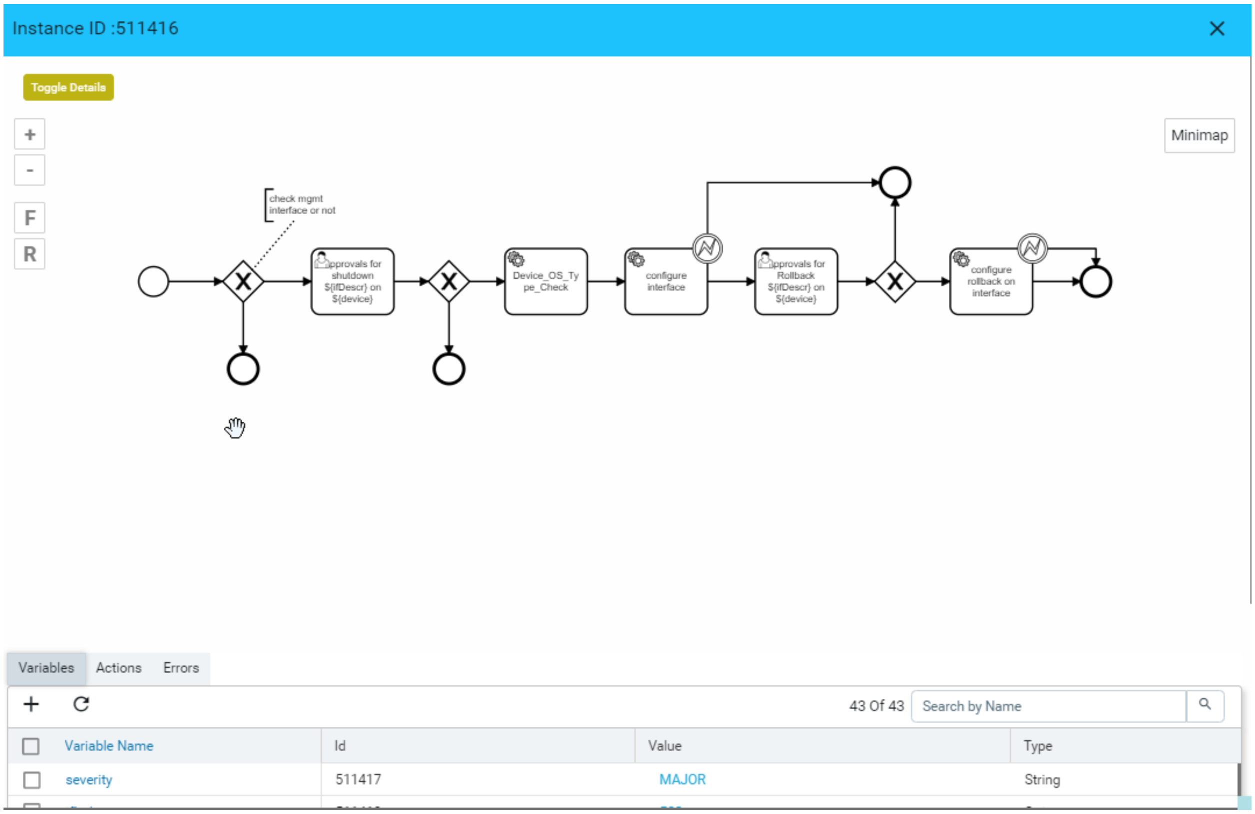
05/10/20, 3:10:17 PM
shut_Interface Instance ID : 512172
admin IN_PROGRESS

05/10/20, 3:08:59 PM
slack-notification
admin COMPLETE

05/10/20, 3:08:59 PM
email-notification
admin COMPLETE

05/10/20, 3:06:59 PM
slack-notification
admin COMPLETE

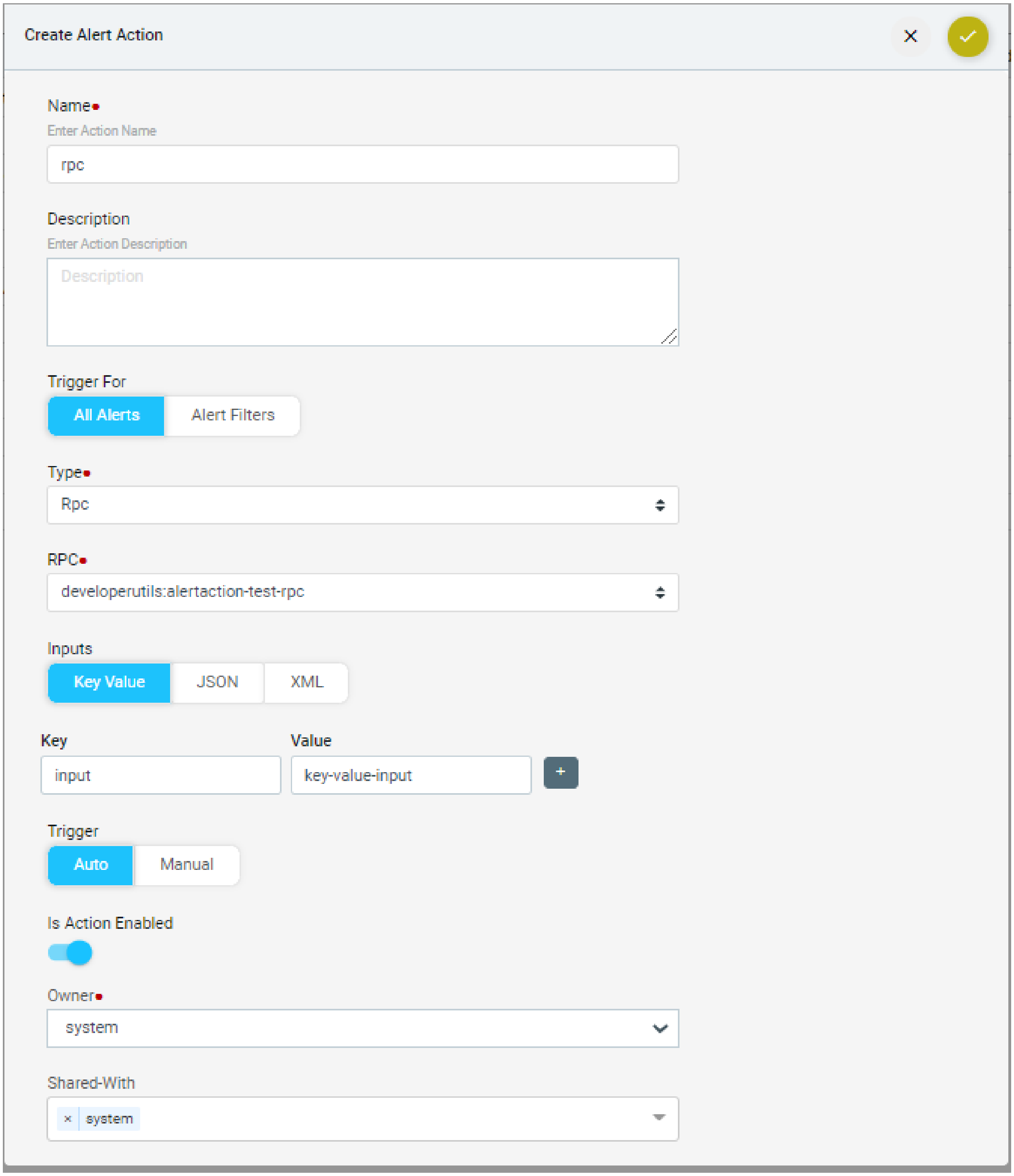
05/10/20, 3:06:59 PM
email-notification
admin COMPLETE


Instance ID :511416
Toggle Details
+
-
F
R
Minimap
check mgmt interface or not
pprovals for shutdown ${ifDescr} on ${device}
Device_OS_Type_Check
configure interface
pprovals for Rollback ${ifDescr} on ${device}
configure rollback on interface
Variables
Actions
Errors
+
43 Of 43
Search by Name

□	Variable Name	Id	Value	Type
□	severity	511417	MAJOR	String

RPC

1. **RPC:** choose the available RPC’s or refer the developer guide to create new rpc’s
2. **Inputs:** Choose input method key-value or json, xml to provide the payload



Create Alert Action

Name•
Enter Action Name
rpc

Description
Enter Action Description
Description

Trigger For

Type•
Rpc

RPC•
developerutils:alertaction-test-rpc

Inputs

Key	Value
input	key-value-input

Trigger

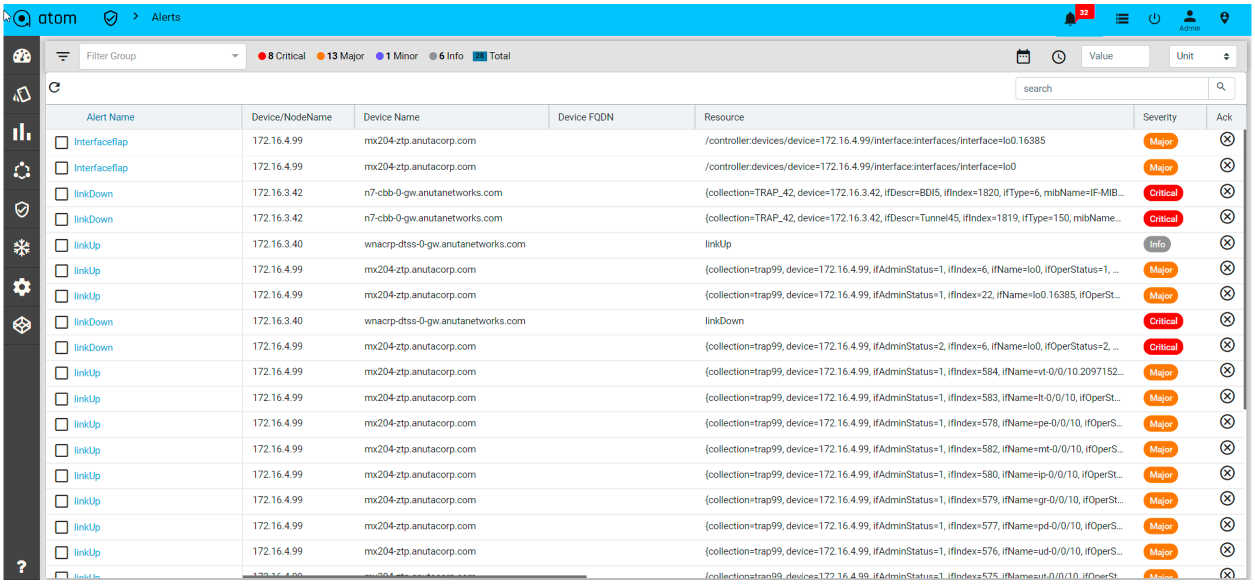
Is Action Enabled

Owner•
system

Shared-With
× system

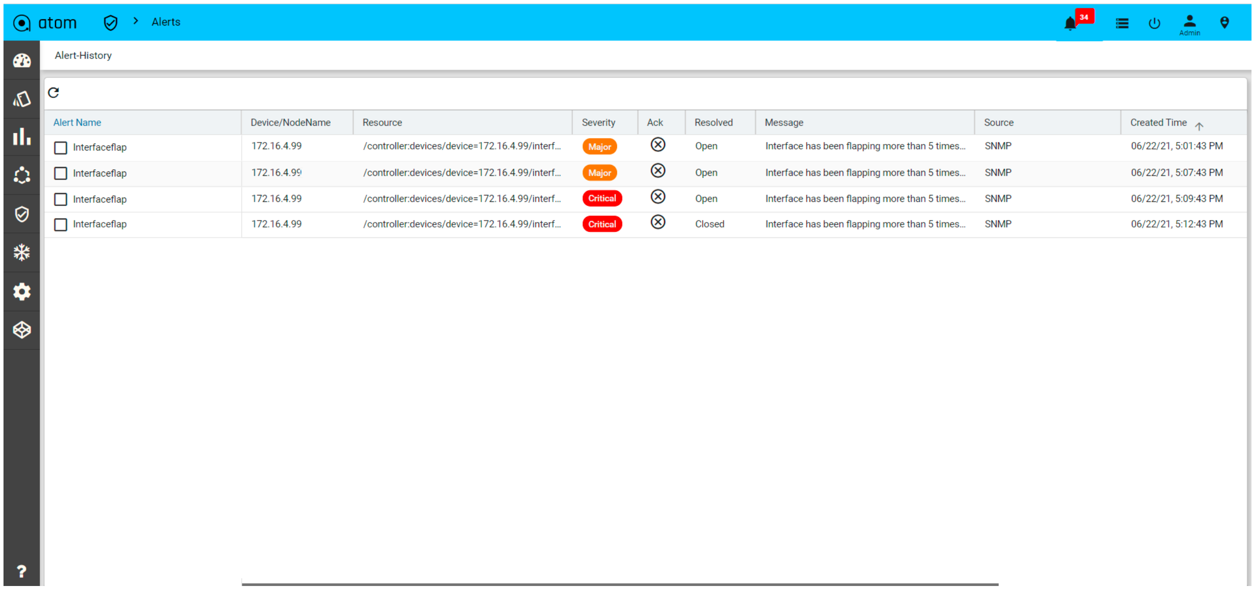
Alerts Summary

Below is the snapshot for alert summary



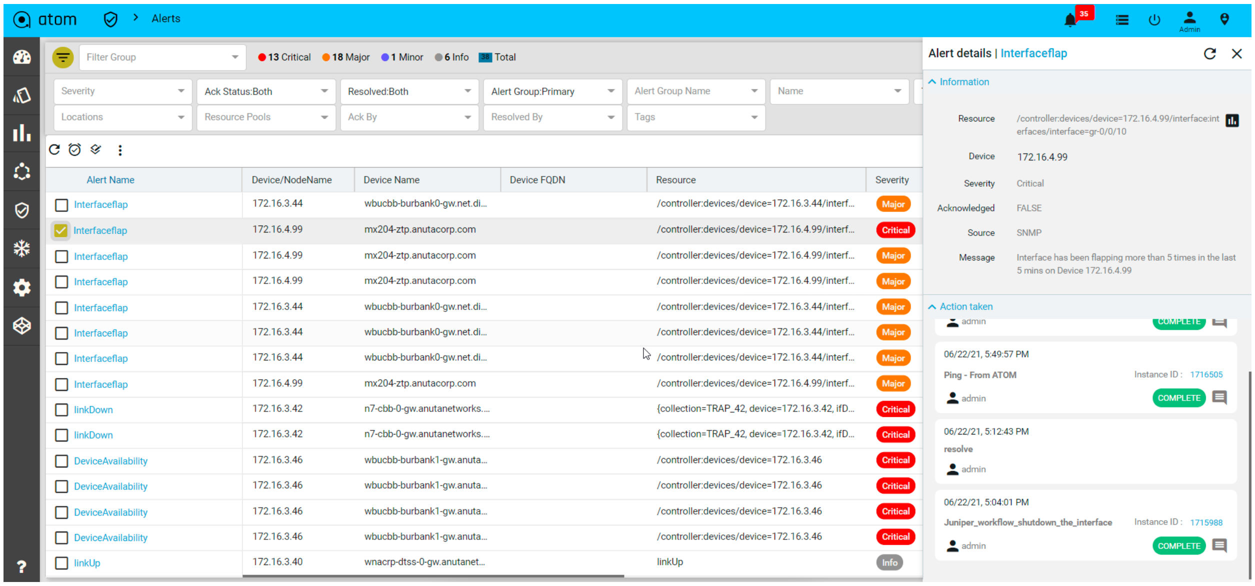
Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity	Ack
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interface:interfaces/interface=lo0.16385	Major	⊗
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interface:interfaces/interface=lo0	Major	⊗
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks.com		{collection=TRAP_42, device=172.16.3.42, ifDescr=BDI5, ifIndex=1820, ifType=6, mibName=IF-MIB...	Critical	⊗
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks.com		{collection=TRAP_42, device=172.16.3.42, ifDescr=Tunnel45, ifIndex=1819, ifType=150, mibName...	Critical	⊗
□ linkUp	172.16.3.40	wnacrp-dtss-0-gw.anutanetworks.com		linkUp	Info	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=6, ifName=lo0, ifOperStatus=1, ...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=22, ifName=lo0.16385, ifOperSt...	Major	⊗
□ linkDown	172.16.3.40	wnacrp-dtss-0-gw.anutanetworks.com		linkDown	Critical	⊗
□ linkDown	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=2, ifIndex=6, ifName=lo0, ifOperStatus=2, ...	Critical	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=584, ifName=vt-0/0/10.2097152...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=583, ifName=lt-0/0/10, ifOperSt...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=578, ifName=pe-0/0/10, ifOperS...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=582, ifName=mt-0/0/10, ifOperS...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=580, ifName=ip-0/0/10, ifOperSt...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=579, ifName=gr-0/0/10, ifOperSt...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=577, ifName=pd-0/0/10, ifOperS...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=576, ifName=ud-0/0/10, ifOperS...	Major	⊗
□ linkUp	172.16.4.99	mx204-ztp.anutacorp.com		{collection=trap99, device=172.16.4.99, ifAdminStatus=1, ifIndex=575, ifName=ut-0/0/10, ifOperSt...	Major	⊗

To see the alert history, click on the entry.



Alert Name	Device/NodeName	Resource	Severity	Ack	Resolved	Message	Source	Created Time ↑
□ Interfaceflap	172.16.4.99	/controller:devices/device=172.16.4.99/interf...	Major	⊗	Open	Interface has been flapping more than 5 times...	SNMP	06/22/21, 5:01:43 PM
□ Interfaceflap	172.16.4.99	/controller:devices/device=172.16.4.99/interf...	Major	⊗	Open	Interface has been flapping more than 5 times...	SNMP	06/22/21, 5:07:43 PM
□ Interfaceflap	172.16.4.99	/controller:devices/device=172.16.4.99/interf...	Critical	⊗	Open	Interface has been flapping more than 5 times...	SNMP	06/22/21, 5:09:43 PM
□ Interfaceflap	172.16.4.99	/controller:devices/device=172.16.4.99/interf...	Critical	⊗	Closed	Interface has been flapping more than 5 times...	SNMP	06/22/21, 5:12:43 PM

Manual actions will be shown on click of alert record with vertical ellipsis on top



Alert Name	Device/NodeName	Device Name	Device FQDN	Resource	Severity
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major
☑ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interf...	Critical
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interf...	Major
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interf...	Major
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.di...		/controller:devices/device=172.16.3.44/interf...	Major
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interf...	Major
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks....		{collection=TRAP_42, device=172.16.3.42, ifD...	Critical
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks....		{collection=TRAP_42, device=172.16.3.42, ifD...	Critical
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...		/controller:devices/device=172.16.3.46	Critical
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...		/controller:devices/device=172.16.3.46	Critical
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...		/controller:devices/device=172.16.3.46	Critical
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anuta...		/controller:devices/device=172.16.3.46	Critical
□ linkUp	172.16.3.40	wnacrp-dtss-0-gw.anutanet...		linkUp	Info

Alert details | Interfaceflap

Information

Resource	/controller:devices/device=172.16.4.99/interface:interfaces/interface=gr-0/0/10
Device	172.16.4.99
Severity	Critical
Acknowledged	FALSE
Source	SNMP
Message	Interface has been flapping more than 5 times in the last 5 mins on Device 172.16.4.99

Action taken

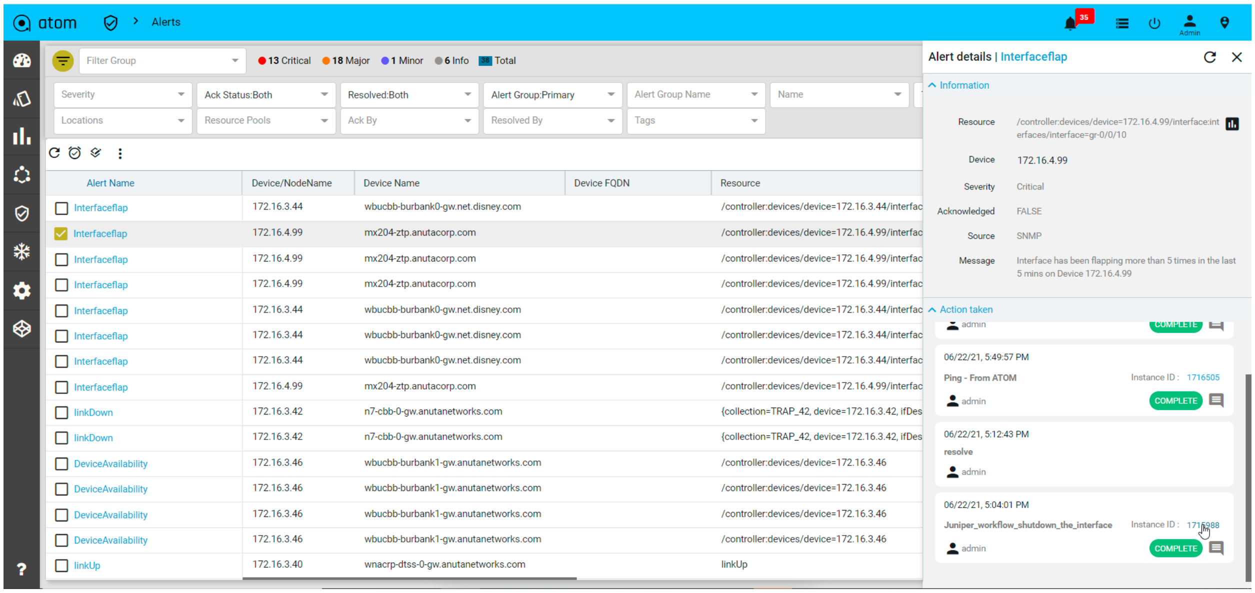
admin COMPLETE

06/22/21, 5:49:57 PM
Ping - From ATOM Instance ID : 1716505
admin COMPLETE

06/22/21, 5:12:43 PM
resolve
admin

06/22/21, 5:04:01 PM
Juniper_workflow_shutdown_the_interface Instance ID : 1715988
admin COMPLETE

Filter objects can be seen on click on the action in top left



Alert Name	Device/NodeName	Device Name	Device FQDN	Resource
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.disney.com		/controller:devices/device=172.16.3.44/interfac
☑ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interfac
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interfac
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interfac
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.disney.com		/controller:devices/device=172.16.3.44/interfac
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.disney.com		/controller:devices/device=172.16.3.44/interfac
□ Interfaceflap	172.16.3.44	wbucbb-burbank0-gw.net.disney.com		/controller:devices/device=172.16.3.44/interfac
□ Interfaceflap	172.16.4.99	mx204-ztp.anutacorp.com		/controller:devices/device=172.16.4.99/interfac
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks.com		{collection=TRAP_42, device=172.16.3.42, ifDes
□ linkDown	172.16.3.42	n7-cbb-0-gw.anutanetworks.com		{collection=TRAP_42, device=172.16.3.42, ifDes
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anutanetworks.com		/controller:devices/device=172.16.3.46
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anutanetworks.com		/controller:devices/device=172.16.3.46
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anutanetworks.com		/controller:devices/device=172.16.3.46
□ DeviceAvailability	172.16.3.46	wbucbb-burbank1-gw.anutanetworks.com		/controller:devices/device=172.16.3.46
□ linkUp	172.16.3.40	wnacrp-dtss-0-gw.anutanetworks.com		linkUp

Alert details | Interfaceflap

Information

Resource	/controller:devices/device=172.16.4.99/interface:interfaces/interface=gr-0/0/10
Device	172.16.4.99
Severity	Critical
Acknowledged	FALSE
Source	SNMP
Message	Interface has been flapping more than 5 times in the last 5 mins on Device 172.16.4.99

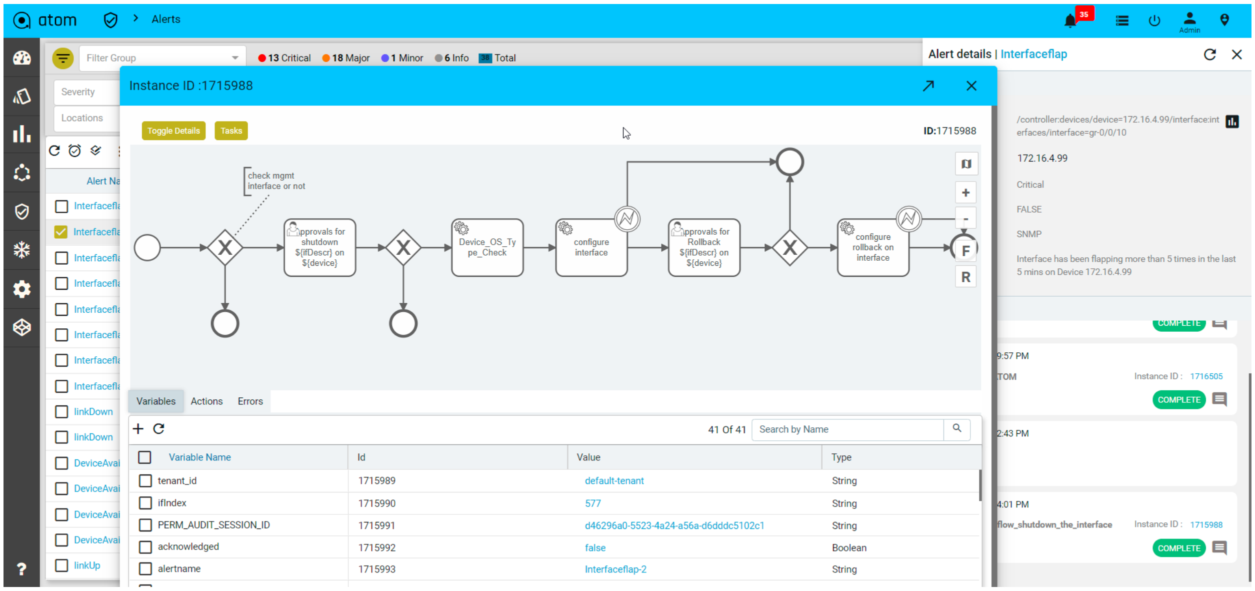
Action taken

admin COMPLETE

06/22/21, 5:49:57 PM
Ping - From ATOM Instance ID : 1716505
admin COMPLETE

06/22/21, 5:12:43 PM
resolve
admin

06/22/21, 5:04:01 PM
Juniper_workflow_shutdown_the_interface Instance ID : 1715988
admin COMPLETE



☐ Variable Name	Id	Value	Type
☐ tenant_id	1715989	default-tenant	String
☐ ifIndex	1715990	577	String
☐ PERM_AUDIT_SESSION_ID	1715991	d46296a0-5523-4a24-a56a-d6dddc5102c1	String
☐ acknowledged	1715992	false	Boolean
☐ alertname	1715993	Interfaceflap-2	String

/controller:devices/device=172.16.4.99/interface:interfaces/interface=gr-0/0/10

172.16.4.99

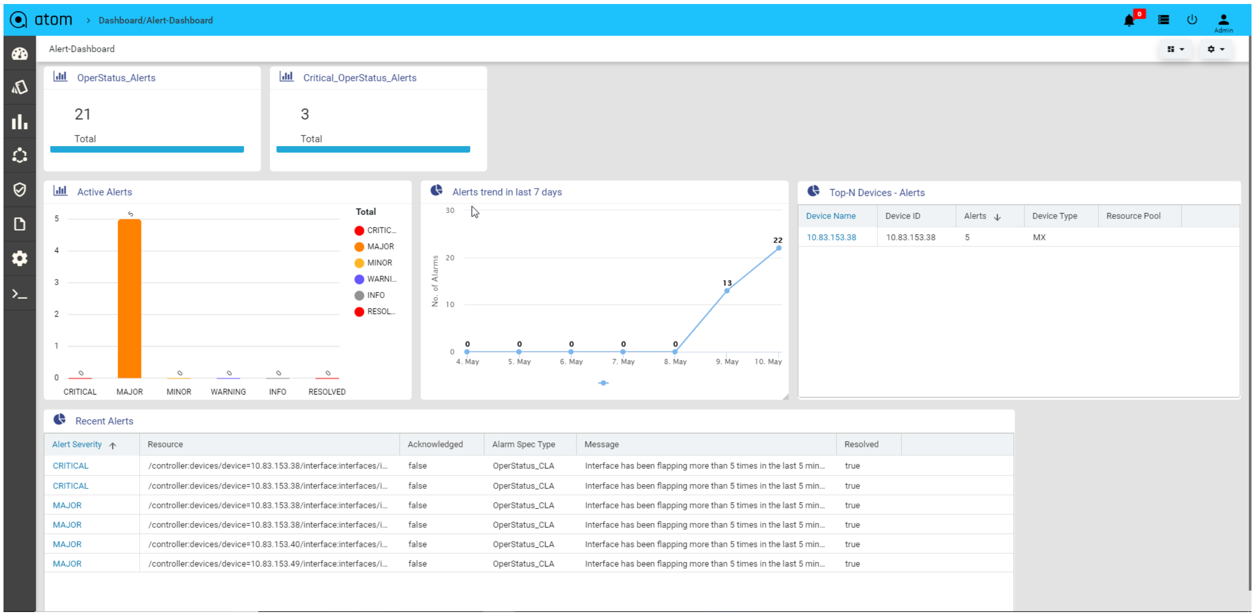
Critical

FALSE

SNMP

Interface has been flapping more than 5 times in the last 5 mins on Device 172.16.4.99

Alert Dashboard



Device Name	Device ID	Alerts ↓	Device Type	Resource Pool
10.83.153.38	10.83.153.38	5	MX	

Alert Severity ↑	Resource	Acknowledged	Alarm Spec Type	Message	Resolved
CRITICAL	/controller:devices/device=10.83.153.38/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true
CRITICAL	/controller:devices/device=10.83.153.38/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true
MAJOR	/controller:devices/device=10.83.153.38/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true
MAJOR	/controller:devices/device=10.83.153.38/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true
MAJOR	/controller:devices/device=10.83.153.40/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true
MAJOR	/controller:devices/device=10.83.153.49/interface:interfaces/i...	false	OperStatus_CLA	Interface has been flapping more than 5 times in the last 5 min...	true

Inventory

[[Introduction - Chassis, Interface, Software]]

iSoftware Image Management

Image Upgrade Workflow

Upload an Image and work through a Business process to take a device from V1 to V2 with pre-checks and Post-checks to ensure the device is working as expected after the upgrade.

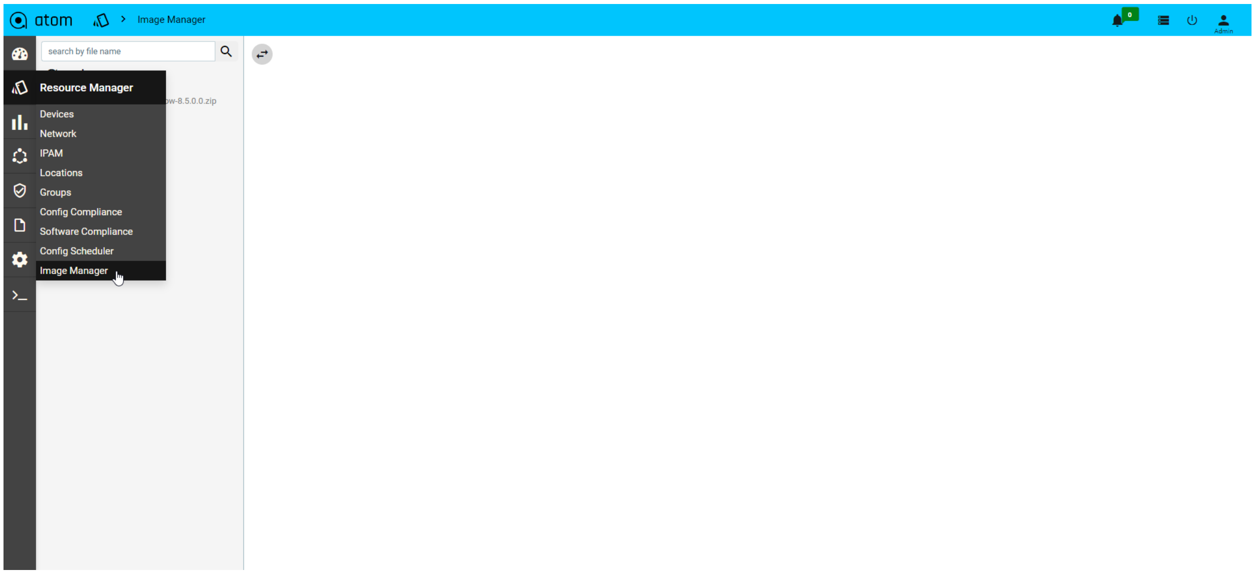
Image Repository

ATOM acts as a Network Element Image Repository (Image Server) as well as Config Repository. Devices can boot an Image from ATOM Image Server manually or through ATOM Network Element Software Image Upgrade Workflow. Image Manager is a replica of the Minio repository. All the images are saved to a minio bucket named ‘atom.device.images’ and all the configs are saved to ‘atom.device.configs’. The supported protocols are Http, anonymous ftp, tftp.

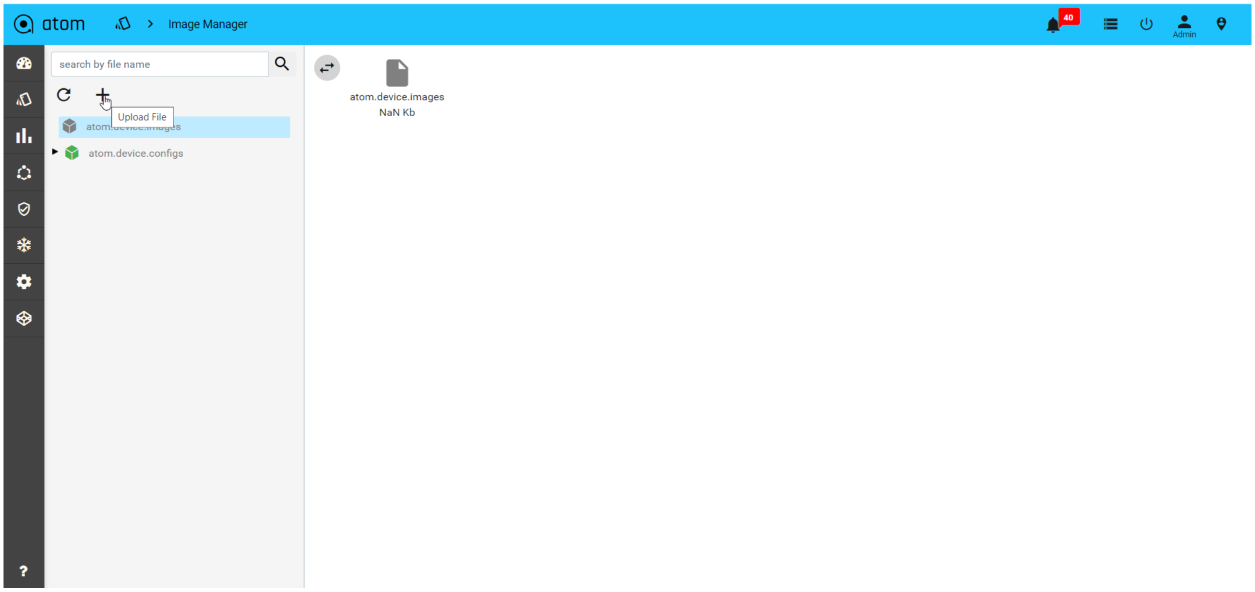
.

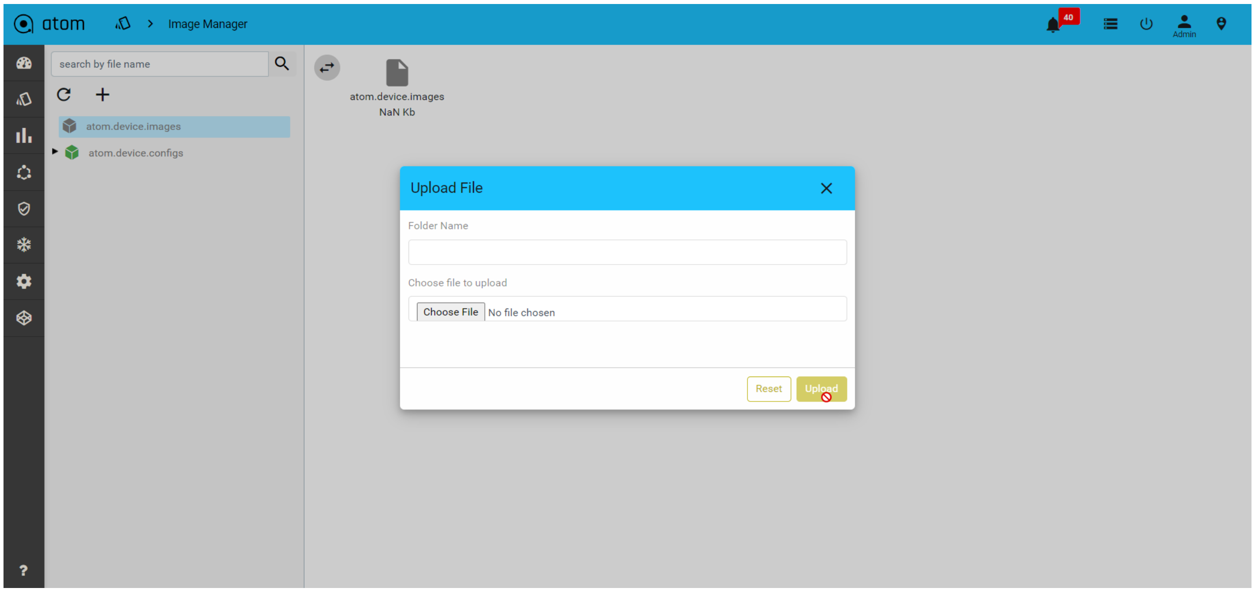
Following steps on ATOM & Upload Images:

1. To upload a file to the Image Manager navigate to **Resource Manager > Image Manager**

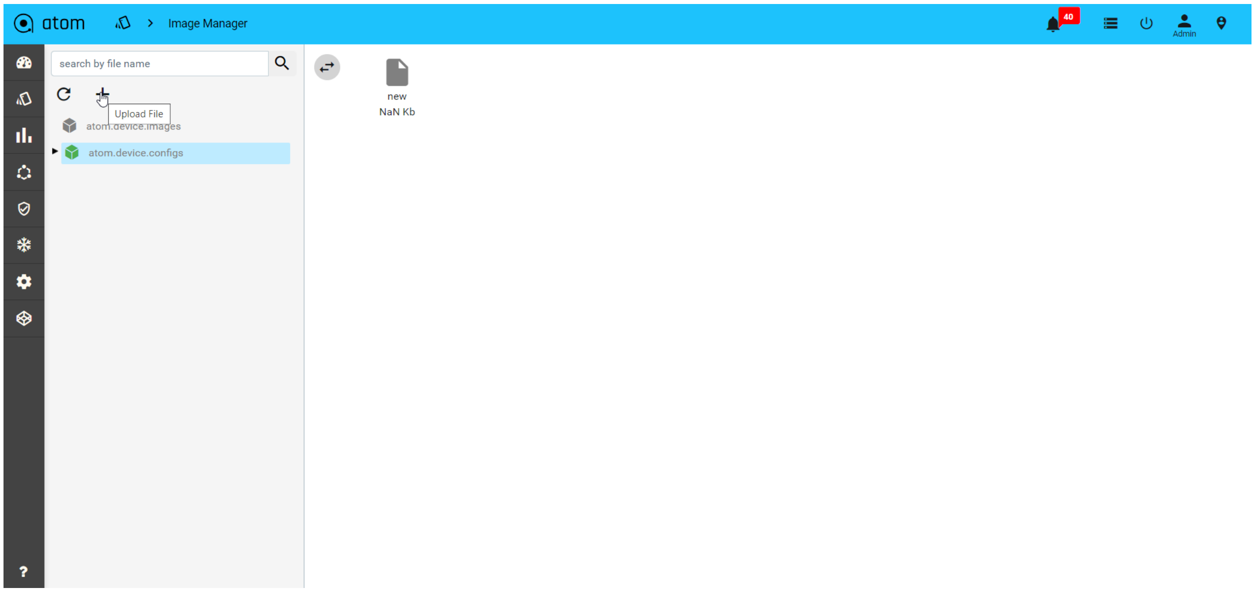


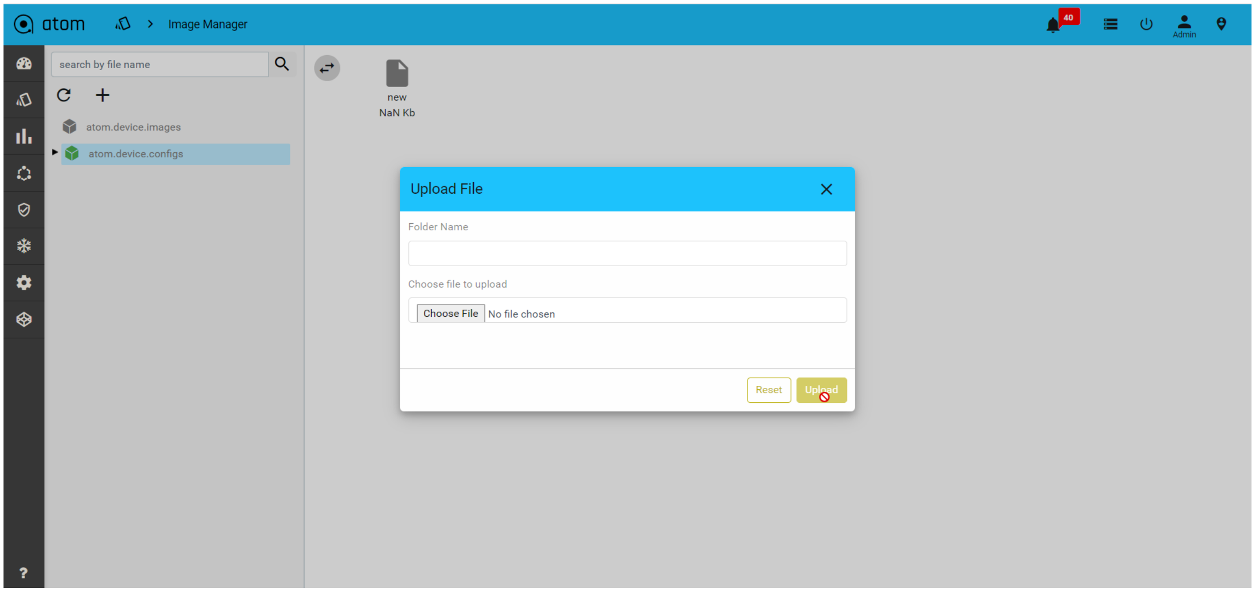
2. To upload image file, click on the upload option after selecting ‘atom.device.images’ option





3. To upload config file, click on the upload file option after selecting ‘atom.device.configs’ option





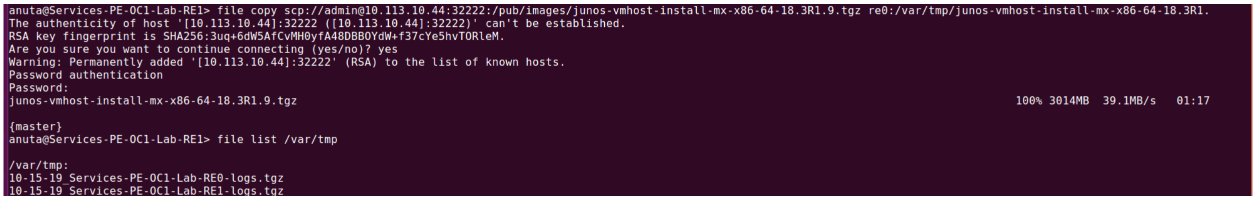
Once files are uploaded to the image-manager then login to the client device, then transfer the files to a particular location on the device by using scp protocol..

Syntax : file copy

scp://{user-name}@{agent-node-ip}/{path}/{file-name} {Destination path}/{file-name}

Example :

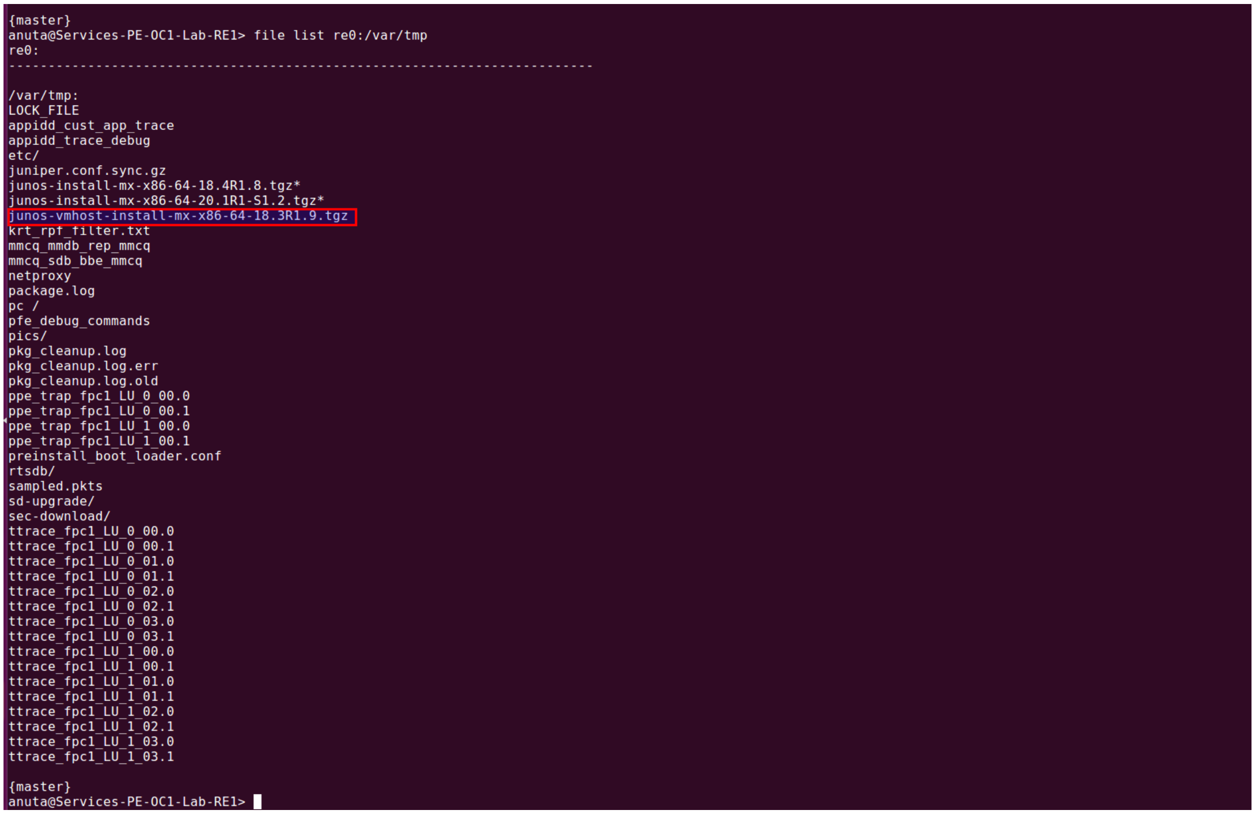
scp://admin@10.113.10.44/pub/images/junos-vmhost-install-mx-x86-64-18.3R1.9.tgz re0:/var/tmp/junos-vmhost-install-mx-x86-64-18.3R1.9.tgz



```
anuta@Services-PE-OC1-Lab-RE1> file copy scp://admin@10.113.10.44:32222:/pub/images/junos-vmhost-install-mx-x86-64-18.3R1.9.tgz re0:/var/tmp/junos-vmhost-install-mx-x86-64-18.3R1.
The authenticity of host '[10.113.10.44]:32222 ([10.113.10.44]:32222)' can't be established.
RSA key fingerprint is SHA256:3uq+6dW5AfCvMH0yfA48DBBOYdW+f37cYe5hvTORleM.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '[10.113.10.44]:32222' (RSA) to the list of known hosts.
Password authentication
Password:
junos-vmhost-install-mx-x86-64-18.3R1.9.tgz                                                                                 100% 3014MB  39.1MB/s   01:17

{master}
anuta@Services-PE-OC1-Lab-RE1> file list /var/tmp

/var/tmp:
10-15-19_Services-PE-OC1-Lab-RE0-logs.tgz
10-15-19_Services-PE-OC1-Lab-RE1-logs.tgz
```



```
{master}
anuta@Services-PE-OC1-Lab-RE1> file list re0:/var/tmp
re0:
--------------------------------------------------------------------------

/var/tmp:
LOCK_FILE
appidd_cust_app_trace
appidd_trace_debug
etc/
juniper.conf.sync.gz
junos-install-mx-x86-64-18.4R1.8.tgz*
junos-install-mx-x86-64-20.1R1-S1.2.tgz*
junos-vmhost-install-mx-x86-64-18.3R1.9.tgz
krt_rpf_filter.txt
mmcq_mmdb_rep_mmcq
mmcq_sdb_bbe_mmcq
netproxy
package.log
pc /
pfe_debug_commands
pics/
pkg_cleanup.log
pkg_cleanup.log.err
pkg_cleanup.log.old
ppe_trap_fpc1_LU_0_00.0
ppe_trap_fpc1_LU_0_00.1
ppe_trap_fpc1_LU_1_00.0
ppe_trap_fpc1_LU_1_00.1
preinstall_boot_loader.conf
rtsdb/
sampled.pkts
sd-upgrade/
sec-download/
ttrace_fpc1_LU_0_00.0
ttrace_fpc1_LU_0_00.1
ttrace_fpc1_LU_0_01.0
ttrace_fpc1_LU_0_01.1
ttrace_fpc1_LU_0_02.0
ttrace_fpc1_LU_0_02.1
ttrace_fpc1_LU_0_03.0
ttrace_fpc1_LU_0_03.1
ttrace_fpc1_LU_1_00.0
ttrace_fpc1_LU_1_00.1
ttrace_fpc1_LU_1_01.0
ttrace_fpc1_LU_1_01.1
ttrace_fpc1_LU_1_02.0
ttrace_fpc1_LU_1_02.1
ttrace_fpc1_LU_1_03.0
ttrace_fpc1_LU_1_03.1

{master}
anuta@Services-PE-OC1-Lab-RE1>
```

Software Version Compliance

Software Version Compliance feature enables defining policies and enforcing software currency checks for network devices. The policies support defining N-1 (previous), N (current), N+1 (next) compliant versions for vendor and device models. Reports are generated for the software version checks. Summary reports by device model and vendor are available. The out of compliance devices can then be upgraded using Software Upgrade workflows available in ATOM.

Network Automation

ATOM provides stateful or Service and stateless (MOP) automation framework.

Stateless Low Code or MOP automation - Low Code Workflow automation enables network administrators to perform method-of-procedures involving different actions configuration, operations including show & exec commands on the device. Multiple actions can be stitched together to form a flow. Such flow is executed on one more device with appropriate user inputs.

Example:

1. Device Software Image Upgrade

2. Protocol Migration [IPV4 TO V6, OSPF to ISIS]
3. Hardware RMA/ Refresh [Moving from one vendor to another]

MOP Automation can be a combination of Stateless Action and Staful actions as well. In such scenarios MOP will contain stateless actions like pre-checks while performing API invocations against Device or Service Models to perform stateful transactional action.

Such tasks have no requirement for statefulness and can be best developed using Workflow Automation.

Example:

1. Application Deployment in Data Center with Pre-checks and Post-Checks
2. Branch Config Deployment with Pre-Checks & Post-Checks

Stateful Service Automation - ATOM Service automation helps administrators develop stateful and atomic transactions. Admins can create service models that enable Create, Update and Delete operations (CRUD). Such operations can be carried out throughout the life of the service. Brownfield service discovery is also supported.

Example:

1. Application Deployment in Data Center
2. Layer-3 VPN
3. Layer-2 VPN
4. Private Cloud to Public Cloud Interconnect

Network Workflow & Low Code Automation

Workflow breaks down an activity into subtasks and ties them together with network events, provisioning actions, show-commands, pre-checks, post-checks, user forms and approvals, timed background tasks, inventory checks etc.

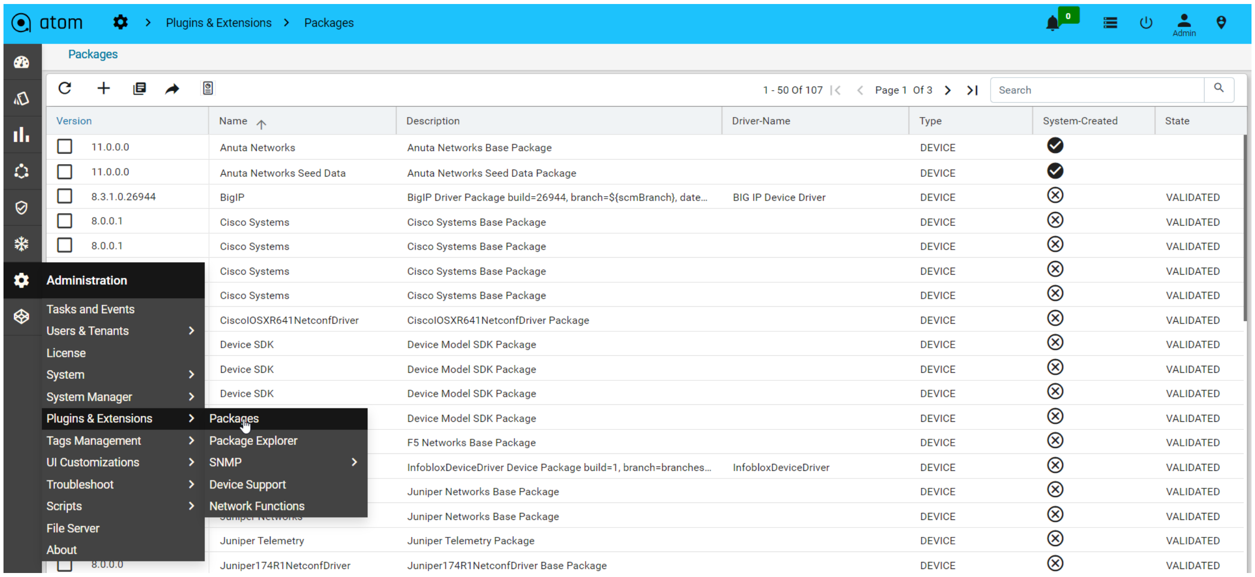
Workflow Automation offers an intuitive graphical designer to automate network provisioning and maintenance activities.

Administrators can create simple or complex flows using ATOM Workflow’s drag and drop interface. ATOM Workflow has prebuilt adaptors to enable integration with ticketing, billing, OSS, BSS and many other network elements. Workflow can also automate multi-level approval sequences. Use workflows for a one time project or for repetitive tasks. Workflow development is covered in “Workflow Modelling” section in the ATOM Platform Guide guide. For automation of tasks that require stateful and atomic transactions it is advised to use ATOM Service Models discussed in ATOM Platform Guide.

Uploading Workflow Package

Navigate to **Administration** > **Plugins & Extensions** > **Packages**

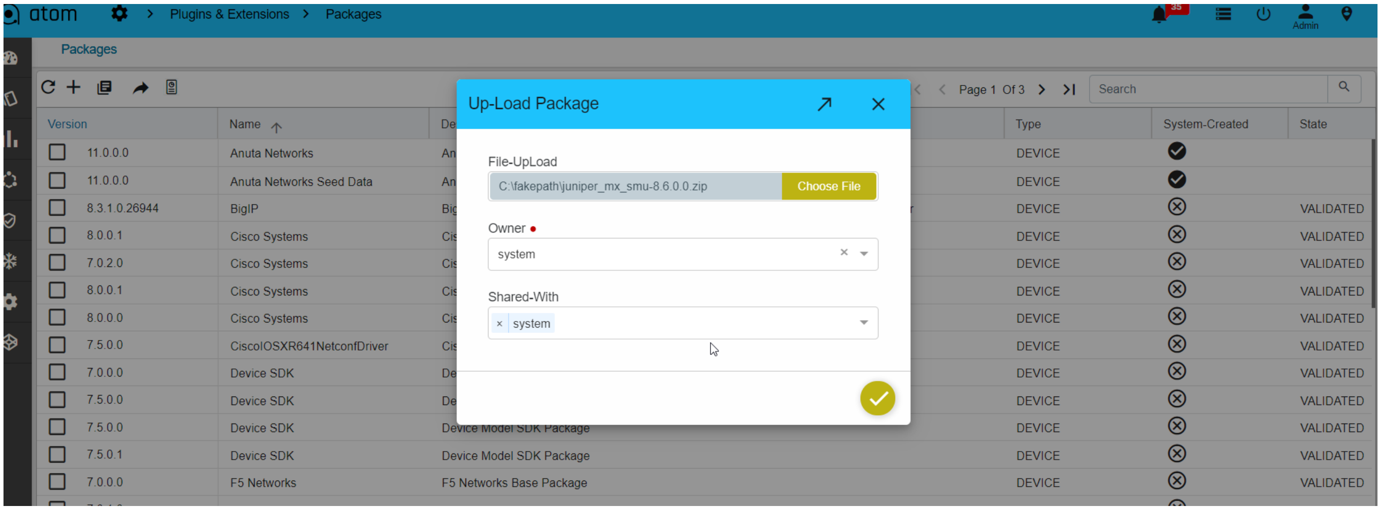
1. Click on **Add** at the top bar to upload the packages.



1 - 50 Of 107 Page 1 Of 3 Search

Version	Name	Description	Driver-Name	Type	System-Created	State
□ 11.0.0.0	Anuta Networks	Anuta Networks Base Package		DEVICE	✓	
□ 11.0.0.0	Anuta Networks Seed Data	Anuta Networks Seed Data Package		DEVICE	✓	
□ 8.3.1.0.26944	BigIP	BigIP Driver Package build=26944, branch=${scmBranch}, date...	BIG IP Device Driver	DEVICE	⊗	VALIDATED
□ 8.0.0.1	Cisco Systems	Cisco Systems Base Package		DEVICE	⊗	VALIDATED
□ 8.0.0.1	Cisco Systems	Cisco Systems Base Package		DEVICE	⊗	VALIDATED
	Cisco Systems	Cisco Systems Base Package		DEVICE	⊗	VALIDATED
	Cisco Systems	Cisco Systems Base Package		DEVICE	⊗	VALIDATED
	CiscoIOSXR641NetconfDriver	CiscoIOSXR641NetconfDriver Package		DEVICE	⊗	VALIDATED
	Device SDK	Device Model SDK Package		DEVICE	⊗	VALIDATED
	Device SDK	Device Model SDK Package		DEVICE	⊗	VALIDATED
	Device SDK	Device Model SDK Package		DEVICE	⊗	VALIDATED
		Device Model SDK Package		DEVICE	⊗	VALIDATED
		F5 Networks Base Package		DEVICE	⊗	VALIDATED
		InfobloxDeviceDriver Device Package build=1, branch=branches...	InfobloxDeviceDriver	DEVICE	⊗	VALIDATED
		Juniper Networks Base Package		DEVICE	⊗	VALIDATED
		Juniper Networks Base Package		DEVICE	⊗	VALIDATED
	Juniper Telemetry	Juniper Telemetry Package		DEVICE	⊗	VALIDATED
□ 8.0.0.0	Juniper174R1NetconfDriver	Juniper174R1NetconfDriver Base Package		DEVICE	⊗	VALIDATED

2. Upload workflow package and click on the tick mark



File-UpLoad: C:\fakepath\juniper_mx_smu-8.6.0.0.zip

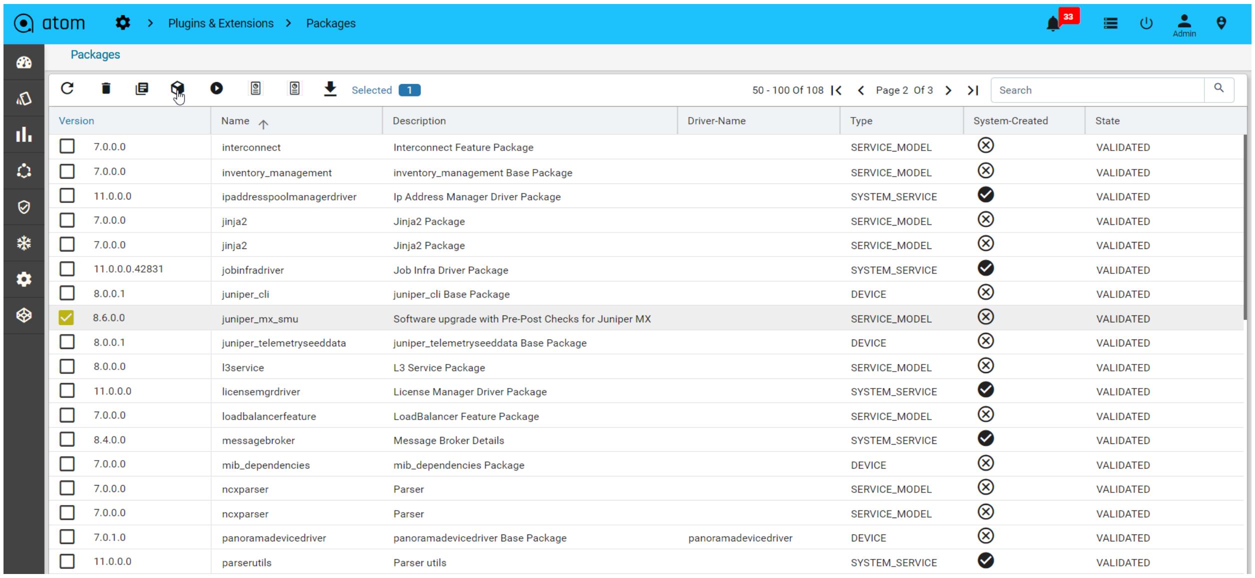
Owner ●: system

Shared-With: × system

Page 1 Of 3 Search

Version	Name	Description	Type	System-Created	State
□ 11.0.0.0	Anuta Networks		DEVICE	✓	
□ 11.0.0.0	Anuta Networks Seed Data		DEVICE	✓	
□ 8.3.1.0.26944	BigIP		DEVICE	⊗	VALIDATED
□ 8.0.0.1	Cisco Systems		DEVICE	⊗	VALIDATED
□ 7.0.2.0	Cisco Systems		DEVICE	⊗	VALIDATED
□ 8.0.0.1	Cisco Systems		DEVICE	⊗	VALIDATED
□ 8.0.0.0	Cisco Systems		DEVICE	⊗	VALIDATED
□ 7.5.0.0	CiscoIOSXR641NetconfDriver		DEVICE	⊗	VALIDATED
□ 7.0.0.0	Device SDK		DEVICE	⊗	VALIDATED
□ 7.5.0.0	Device SDK		DEVICE	⊗	VALIDATED
□ 7.5.0.0	Device SDK	Device Model SDK Package	DEVICE	⊗	VALIDATED
□ 7.5.0.1	Device SDK	Device Model SDK Package	DEVICE	⊗	VALIDATED
□ 7.0.0.0	F5 Networks	F5 Networks Base Package	DEVICE	⊗	VALIDATED

3. Select the package and click on **Activate**



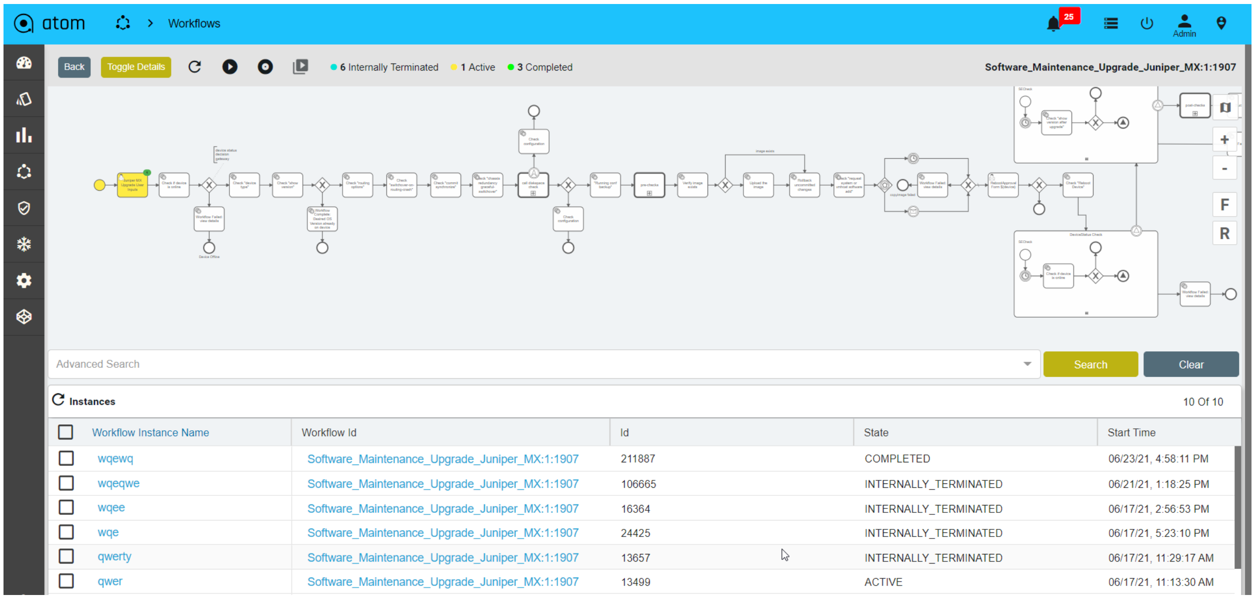
	Version	Name	Description	Driver-Name	Type	System-Created	State
□	7.0.0.0	interconnect	Interconnect Feature Package		SERVICE_MODEL	⊗	VALIDATED
□	7.0.0.0	inventory_management	inventory_management Base Package		SERVICE_MODEL	⊗	VALIDATED
□	11.0.0.0	ipaddresspoolmanagerdriver	Ip Address Manager Driver Package		SYSTEM_SERVICE	✓	VALIDATED
□	7.0.0.0	jinja2	Jinja2 Package		SERVICE_MODEL	⊗	VALIDATED
□	7.0.0.0	jinja2	Jinja2 Package		SERVICE_MODEL	⊗	VALIDATED
□	11.0.0.0.42831	jobinfradriver	Job Infra Driver Package		SYSTEM_SERVICE	✓	VALIDATED
□	8.0.0.1	juniper_cli	juniper_cli Base Package		DEVICE	⊗	VALIDATED
☑	8.6.0.0	juniper_mx_smu	Software upgrade with Pre-Post Checks for Juniper MX		SERVICE_MODEL	⊗	VALIDATED
□	8.0.0.1	juniper_telemetryseeddata	juniper_telemetryseeddata Base Package		DEVICE	⊗	VALIDATED
□	8.0.0.0	l3service	L3 Service Package		SERVICE_MODEL	⊗	VALIDATED
□	11.0.0.0	licensemgrdriver	License Manager Driver Package		SYSTEM_SERVICE	✓	VALIDATED
□	7.0.0.0	loadbalancerfeature	LoadBalancer Feature Package		SERVICE_MODEL	⊗	VALIDATED
□	8.4.0.0	messagebroker	Message Broker Details		SYSTEM_SERVICE	✓	VALIDATED
□	7.0.0.0	mib_dependencies	mib_dependencies Package		DEVICE	⊗	VALIDATED
□	7.0.0.0	ncxparser	Parser		SERVICE_MODEL	⊗	VALIDATED
□	7.0.0.0	ncxparser	Parser		SERVICE_MODEL	⊗	VALIDATED
□	7.0.1.0	panoramadevicedriver	panoramadevicedriver Base Package	panoramadevicedriver	DEVICE	⊗	VALIDATED
□	11.0.0.0	parserutils	Parser utils		SYSTEM_SERVICE	✓	VALIDATED

Workflow Lifecycle Management

A workflow definition defines the structure of a workflow. A workflow instance is an individual execution of a workflow definition.The relation of the workflow instance to the workflow definition is the same as the relation between Object and Class in Object Oriented Programming.The workflow engine is responsible for creating workflow instances and managing their state.

Workflow Instances traverse different states as they progress from the start to end.The various states are as listed below:

- **Active** : Once the workflow is started it gets into an active state. Through-out the different tasks , workflow continues to be in an active state and indicates an error free execution.
- **Error State** : If there are unhandled exceptions in the scripts and programmatic/syntactic errors in inline scripts the workflow execution goes to an error state.
- **Internally Terminated** : If there are any errors in communication with the device or any custom RPCs throw exceptions which don't have explicit error handling defined in the workflow they are internally terminated by ATOM and state is updated accordingly.
- **Externally Terminated:** If the Network Administrator finds any unexpected behavior during any point in the workflow execution he has an option of manually terminating the workflow instance. This is the only state which the end user can manually state to terminate the flow.
- **Completed**:Once the workflow is terminated and has reached the stop event, the workflow goes to a completed stage and indicates a successful positive flow execution.

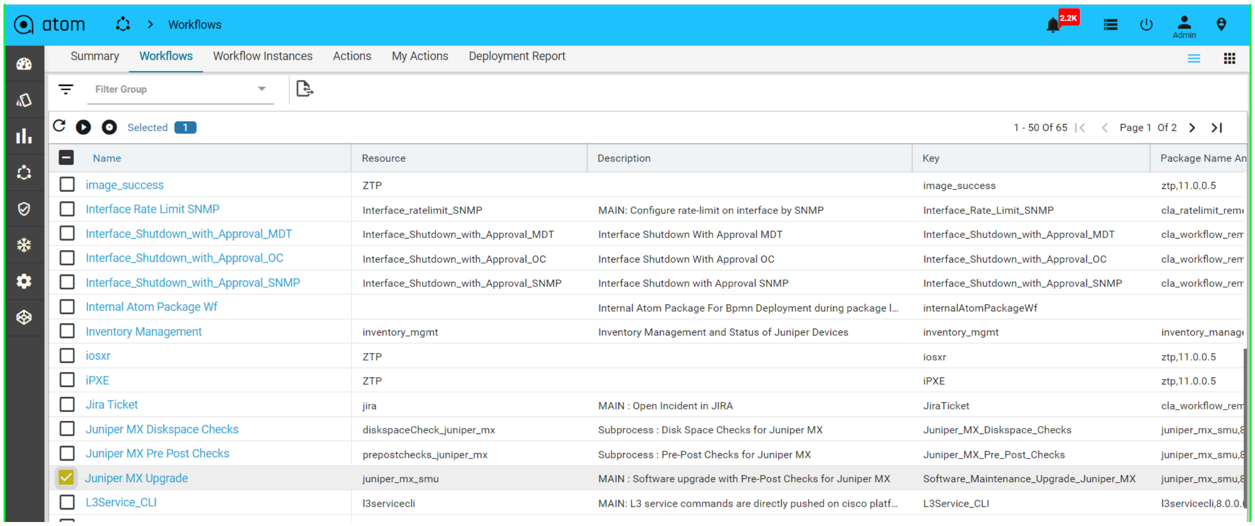


	Workflow Instance Name	Workflow Id	Id	State	Start Time
□	wqewq	Software_Maintenance_Upgrade_Juniper_MX:1:1907	211887	COMPLETED	06/23/21, 4:58:11 PM
□	wqeqwe	Software_Maintenance_Upgrade_Juniper_MX:1:1907	106665	INTERNALLY_TERMINATED	06/21/21, 1:18:25 PM
□	wqee	Software_Maintenance_Upgrade_Juniper_MX:1:1907	16364	INTERNALLY_TERMINATED	06/17/21, 2:56:53 PM
□	wqe	Software_Maintenance_Upgrade_Juniper_MX:1:1907	24425	INTERNALLY_TERMINATED	06/17/21, 5:23:10 PM
□	qwerty	Software_Maintenance_Upgrade_Juniper_MX:1:1907	13657	INTERNALLY_TERMINATED	06/17/21, 11:29:17 AM
□	qwer	Software_Maintenance_Upgrade_Juniper_MX:1:1907	13499	ACTIVE	06/17/21, 11:13:30 AM

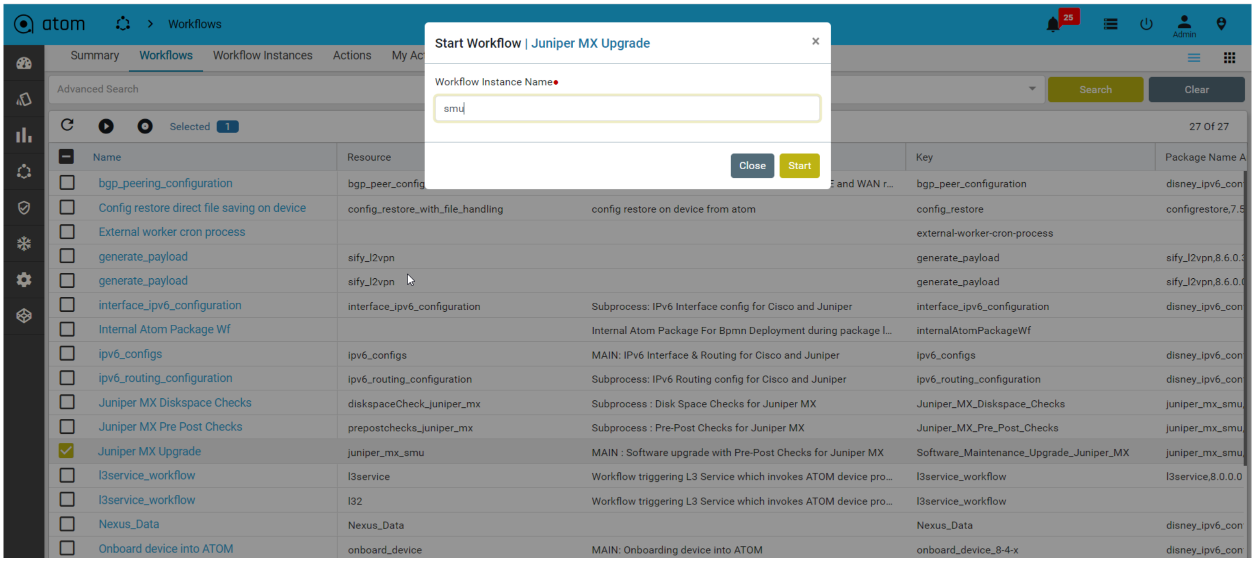
Start Workflows :

To start a workflow instance follow the steps below.

1. Navigate to **Automation > Workflows** > **Workflows**
2. Select the workflow package from the list
3. Click on **Start** to start an instance of the workflow and provide valid Instance Name



	Name	Resource	Description	Key	Package Name An
□	image_success	ZTP		image_success	ztp,11.0.0.5
□	Interface Rate Limit SNMP	Interface_ratelimit_SNMP	MAIN: Configure rate-limit on interface by SNMP	Interface_Rate_Limit_SNMP	cla_ratelimit_rem
□	Interface_Shutdown_with_Approval_MDT	Interface_Shutdown_with_Approval_MDT	Interface Shutdown With Approval MDT	Interface_Shutdown_with_Approval_MDT	cla_workflow_rem
□	Interface_Shutdown_with_Approval_OC	Interface_Shutdown_with_Approval_OC	Interface Shutdown With Approval OC	Interface_Shutdown_with_Approval_OC	cla_workflow_rem
□	Interface_Shutdown_with_Approval_SNMP	Interface_Shutdown_with_Approval_SNMP	Interface Shutdown with Approval SNMP	Interface_Shutdown_with_Approval_SNMP	cla_workflow_rem
□	Internal Atom Package Wf		Internal Atom Package For Bpmn Deployment during package l...	internalAtomPackageWf	
□	Inventory Management	inventory_mgmt	Inventory Management and Status of Juniper Devices	inventory_mgmt	inventory_manag
□	iosxr	ZTP		iosxr	ztp,11.0.0.5
□	iPXE	ZTP		iPXE	ztp,11.0.0.5
□	Jira Ticket	jira	MAIN : Open Incident in JIRA	JiraTicket	cla_workflow_rem
□	Juniper MX Diskspace Checks	diskspaceCheck_juniper_mx	Subprocess : Disk Space Checks for Juniper MX	Juniper_MX_Diskspace_Checks	juniper_mx_smu,8
□	Juniper MX Pre Post Checks	prepostchecks_juniper_mx	Subprocess : Pre-Post Checks for Juniper MX	Juniper_MX_Pre_Post_Checks	juniper_mx_smu,8
☑	Juniper MX Upgrade	juniper_mx_smu	MAIN : Software upgrade with Pre-Post Checks for Juniper MX	Software_Maintenance_Upgrade_Juniper_MX	juniper_mx_smu,8
□	L3Service_CLI	l3servicecli	MAIN: L3 service commands are directly pushed on cisco platf...	L3Service_CLI	l3servicecli,8.0.0.



Start Workflow | Juniper MX Upgrade ×

Workflow Instance Name•

smu

Close Start

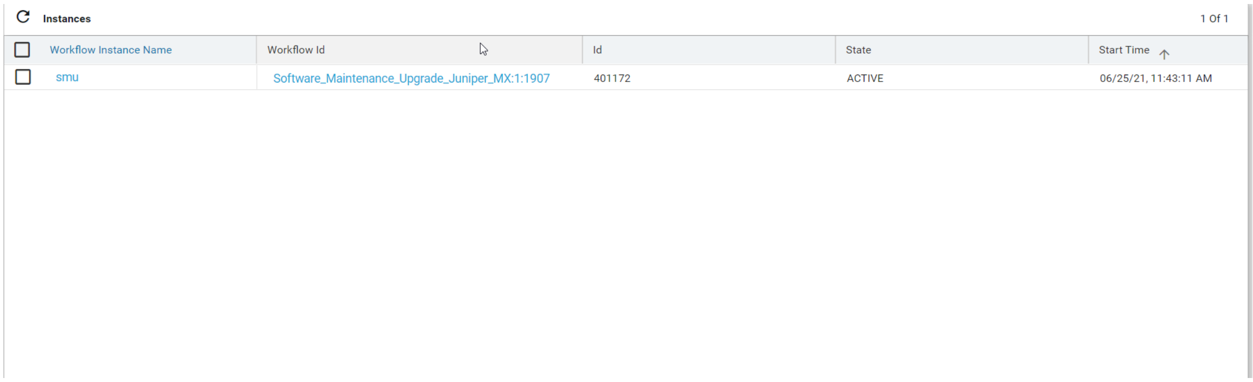
	Name	Resource		Key	Package Name A
□	bgp_peering_configuration	bgp_peer_config	E and WAN r...	bgp_peer_configuration	disney_ipv6_con
□	Config restore direct file saving on device	config_restore_with_file_handling	config restore on device from atom	config_restore	configrestore,7.5
□	External worker cron process			external-worker-cron-process	
□	generate_payload	sify_l2vpn		generate_payload	sify_l2vpn,8.6.0.3
□	generate_payload	sify_l2vpn		generate_payload	sify_l2vpn,8.6.0.0
□	interface_ipv6_configuration	interface_ipv6_configuration	Subprocess: IPv6 Interface config for Cisco and Juniper	interface_ipv6_configuration	disney_ipv6_con
□	Internal Atom Package Wf		Internal Atom Package For Bpmn Deployment during package l...	internalAtomPackageWf	
□	ipv6_configs	ipv6_configs	MAIN: IPv6 Interface & Routing for Cisco and Juniper	ipv6_configs	disney_ipv6_con
□	ipv6_routing_configuration	ipv6_routing_configuration	Subprocess: IPv6 Routing config for Cisco and Juniper	ipv6_routing_configuration	disney_ipv6_con
□	Juniper MX Diskspace Checks	diskspaceCheck_juniper_mx	Subprocess : Disk Space Checks for Juniper MX	Juniper_MX_Diskspace_Checks	juniper_mx_smu,
□	Juniper MX Pre Post Checks	prepostchecks_juniper_mx	Subprocess : Pre-Post Checks for Juniper MX	Juniper_MX_Pre_Post_Checks	juniper_mx_smu,
☑	Juniper MX Upgrade	juniper_mx_smu	MAIN : Software upgrade with Pre-Post Checks for Juniper MX	Software_Maintenance_Upgrade_Juniper_MX	juniper_mx_smu,
□	l3service_workflow	l3service	Workflow triggering L3 Service which invokes ATOM device pro...	l3service_workflow	l3service,8.0.0.0
□	l3service_workflow	l32	Workflow triggering L3 Service which invokes ATOM device pro...	l3service_workflow	
□	Nexus_Data	Nexus_Data		Nexus_Data	disney_ipv6_con
□	Onboard device into ATOM	onboard_device	MAIN: Onboarding device into ATOM	onboard_device_8-4-x	disney_ipv6_con

Inspecting Workflows:

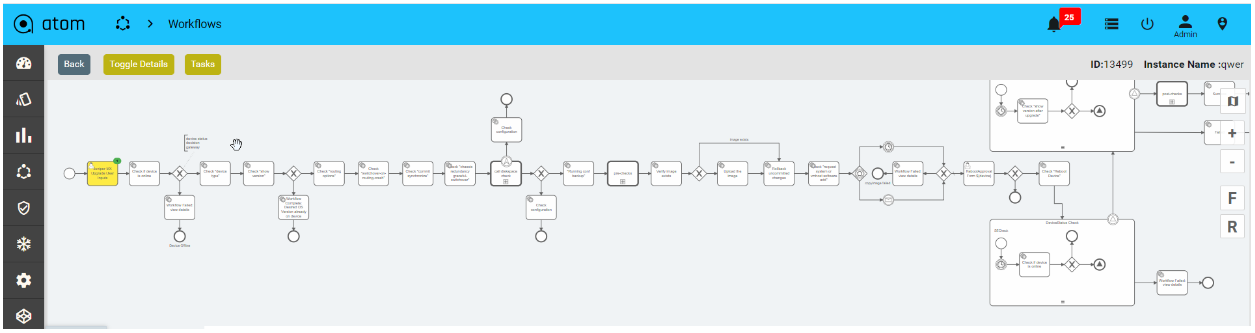
To view the current running stage of the workflow

1. Navigate to **Workflows** > **Instances**
2. Click on **Inspect**

This opens a window with the workflow elements. Green indicates successfully completed tasks. Yellow indicates the current task being executed



□	Workflow Instance Name	Workflow Id	Id	State	Start Time
□	smu	Software_Maintenance_Upgrade_Juniper_MX:1:1907	401172	ACTIVE	06/25/21, 11:43:11 AM



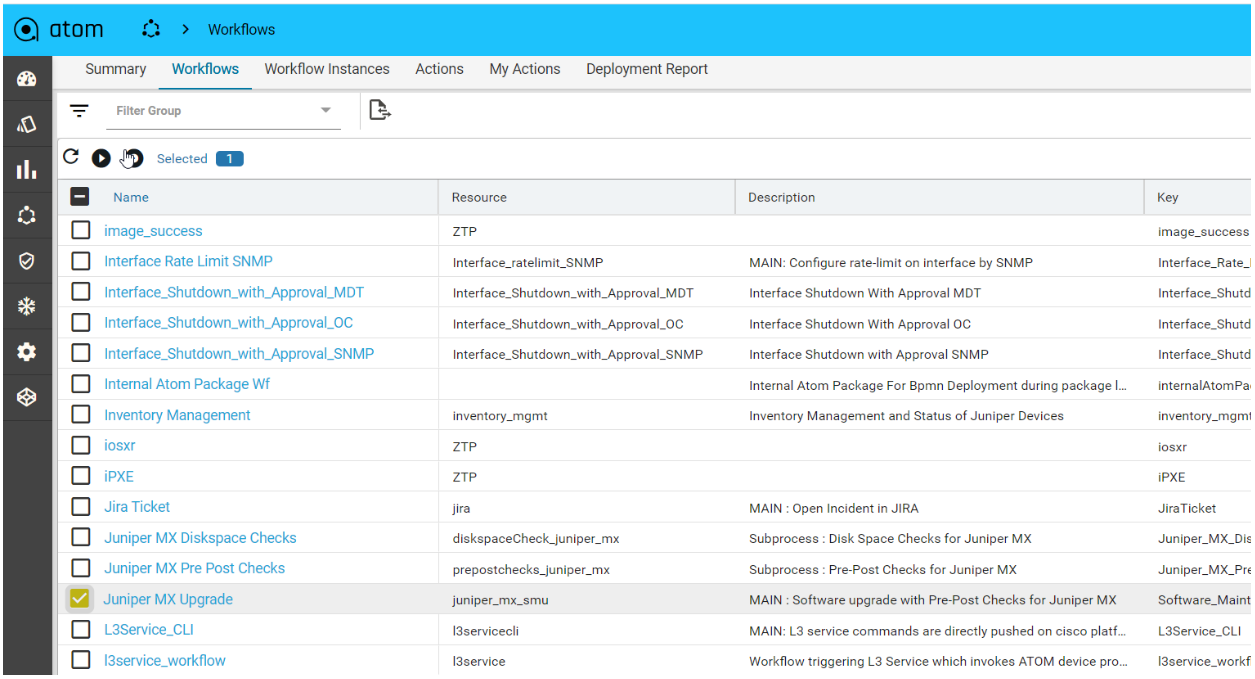
ID:13499 Instance Name :qwer

Suspend/Pause Workflows:

In the workflow definition view and in the workflow instance view, can suspend the selected workflow definition or workflow instance by using the suspend button on the panel.

Workflow Definition Suspension

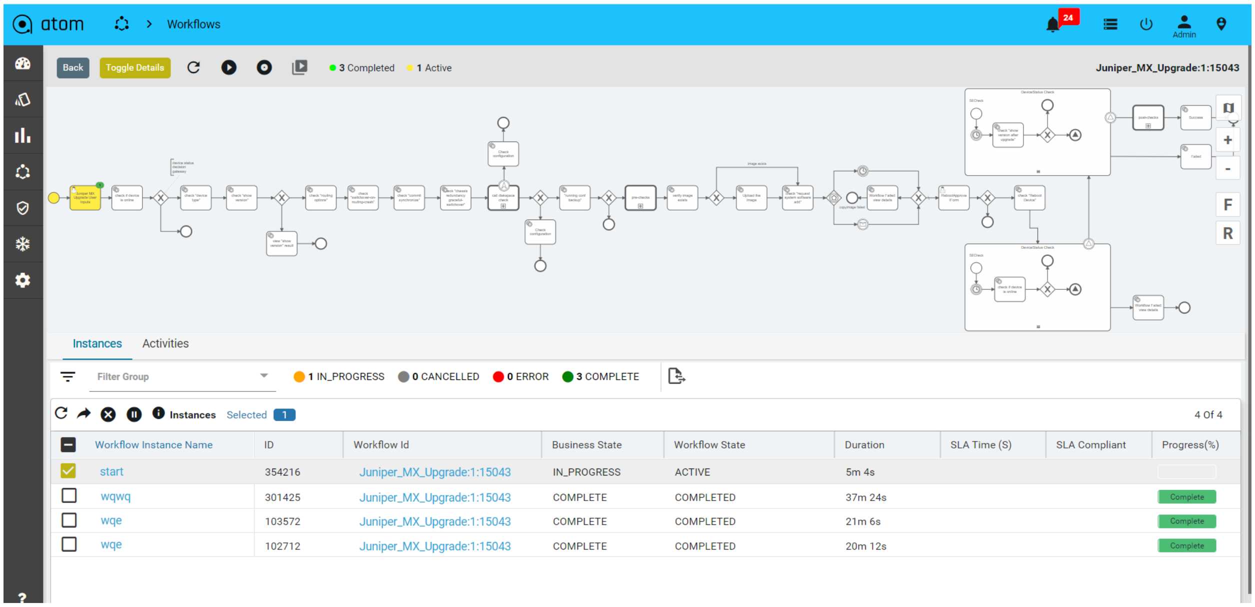
If you suspend the workflow definition, you prevent the workflow definition from being instantiated. No further operations can be done while the workflow definition is in the suspended state. You can simply re-activate the workflow definition .



	Name	Resource	Description	Key
□	image_success	ZTP		image_success
□	Interface Rate Limit SNMP	Interface_ratelimit_SNMP	MAIN: Configure rate-limit on interface by SNMP	Interface_Rate_I
□	Interface_Shutdown_with_Approval_MDT	Interface_Shutdown_with_Approval_MDT	Interface Shutdown With Approval MDT	Interface_Shutd
□	Interface_Shutdown_with_Approval_OC	Interface_Shutdown_with_Approval_OC	Interface Shutdown With Approval OC	Interface_Shutd
□	Interface_Shutdown_with_Approval_SNMP	Interface_Shutdown_with_Approval_SNMP	Interface Shutdown with Approval SNMP	Interface_Shutd
□	Internal Atom Package Wf		Internal Atom Package For Bpmn Deployment during package l...	internalAtomPa
□	Inventory Management	inventory_mgmt	Inventory Management and Status of Juniper Devices	inventory_mgmt
□	iosxr	ZTP		iosxr
□	iPXE	ZTP		iPXE
□	Jira Ticket	jira	MAIN : Open Incident in JIRA	JiraTicket
□	Juniper MX Diskspace Checks	diskspaceCheck_juniper_mx	Subprocess : Disk Space Checks for Juniper MX	Juniper_MX_Dis
□	Juniper MX Pre Post Checks	prepostchecks_juniper_mx	Subprocess : Pre-Post Checks for Juniper MX	Juniper_MX_Pre
☑	Juniper MX Upgrade	juniper_mx_smu	MAIN : Software upgrade with Pre-Post Checks for Juniper MX	Software_Maint
□	L3Service_CLI	l3servicecli	MAIN: L3 service commands are directly pushed on cisco platf...	L3Service_CLI
□	l3service_workflow	l3service	Workflow triggering L3 Service which invokes ATOM device pro...	l3service_workf

Workflow Instance Suspension:

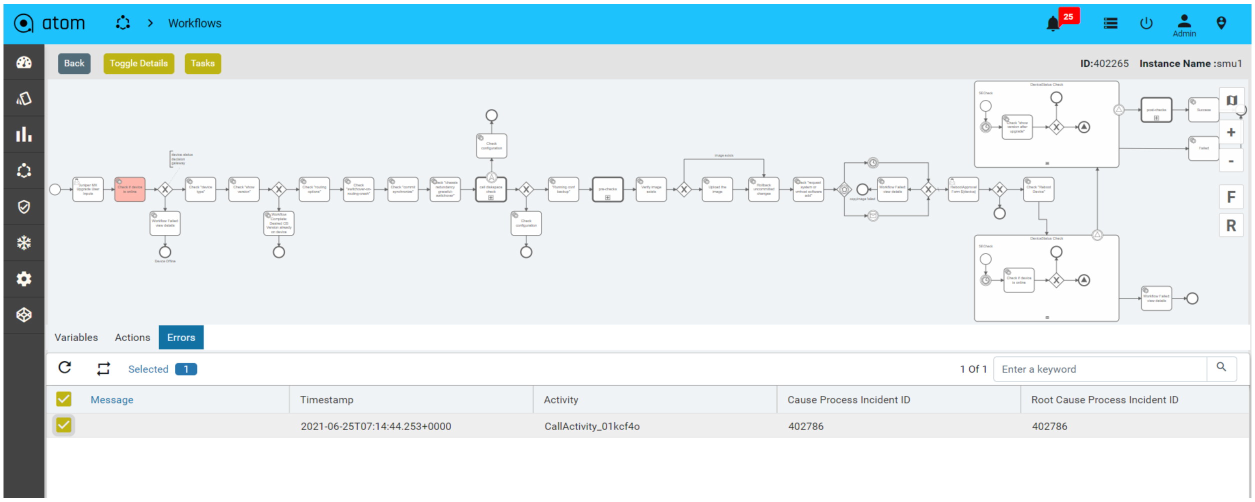
If you suspend the workflow instance, you can prevent the workflow instance from being executed any further. This includes suspending all tasks included in the process instance. You can re-activate the process instance at any later point of time.



☐	Workflow Instance Name	ID	Workflow Id	Business State	Workflow State	Duration	SLA Time (S)	SLA Compliant	Progress(%)
☑	start	354216	Juniper_MX_Upgrade:1:15043	IN_PROGRESS	ACTIVE	5m 4s			
☐	wqwq	301425	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	37m 24s			Complete
☐	wqe	103572	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	21m 6s			Complete
☐	wqe	102712	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	20m 12s			Complete

Workflow Instance Error:

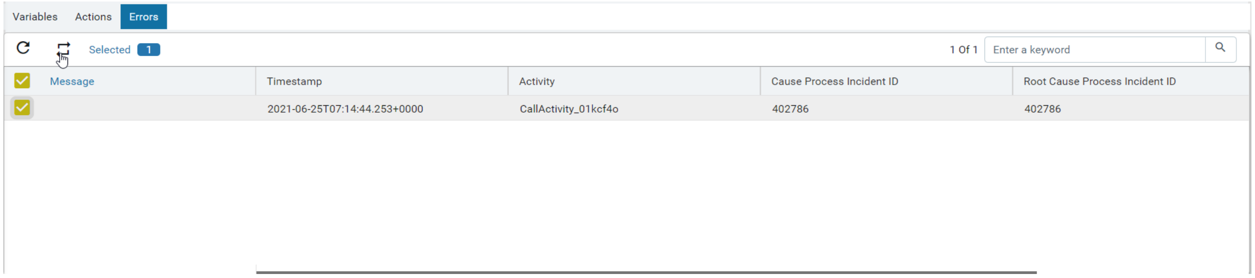
Unresolved programmatic/syntactic errors of a process instance or a sub process instance are indicated by Atom workflow engine as errors. The Errors tab in the workflow instance view lists the failed activities with additional information.



☑	Message	Timestamp	Activity	Cause Process Incident ID	Root Cause Process Incident ID
☑		2021-06-25T07:14:44.253+0000	CallActivity_01kcf4o	402786	402786

Retry a Failed Job

To resolve an error you can use the Retry button on the top panel. Select the corresponding instance, so the atom-engine will re-trigger this job and increment its retry value in the database.



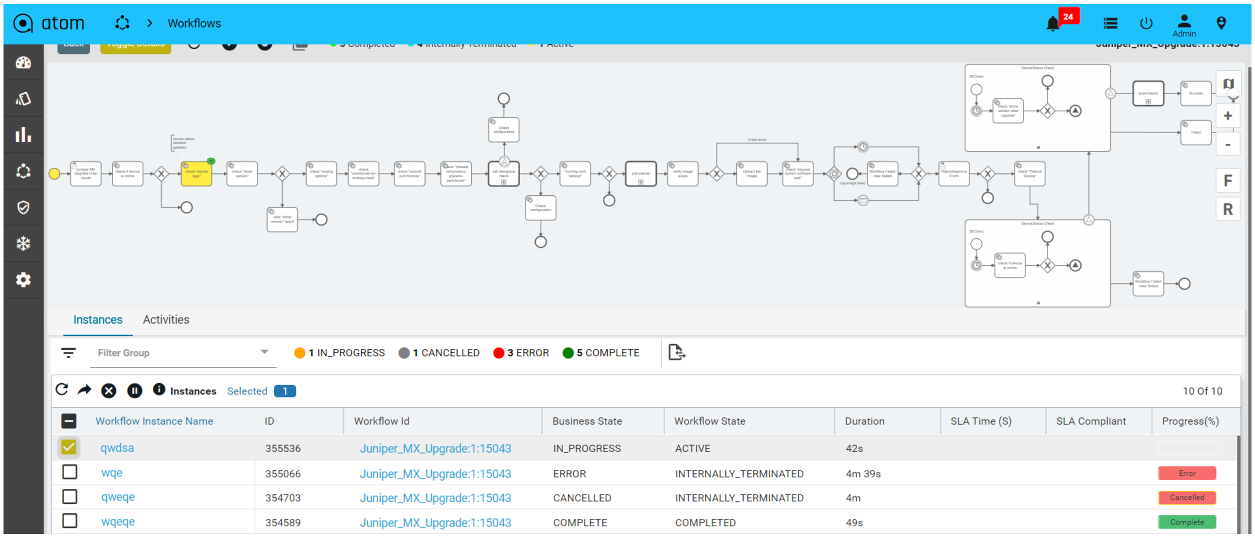
☑	Message	Timestamp	Activity	Cause Process Incident ID	Root Cause Process Incident ID
☑		2021-06-25T07:14:44.253+0000	CallActivity_01kcf4o	402786	402786

Workflow Variables

Workflow Instance Variables can be used to add data to workflow runtime state. Various API methods/Service Tasks that change the state of these entities allow updating of the attached variables. In general, a variable consists of a name and a value. The name is used for identification across workflow constructs. For example, if one activity sets a variable named var, a follow-up activity can access it by using this name. The value of a variable is the value held by that particular named variable in the Atom engine for that particular workflow instance context.

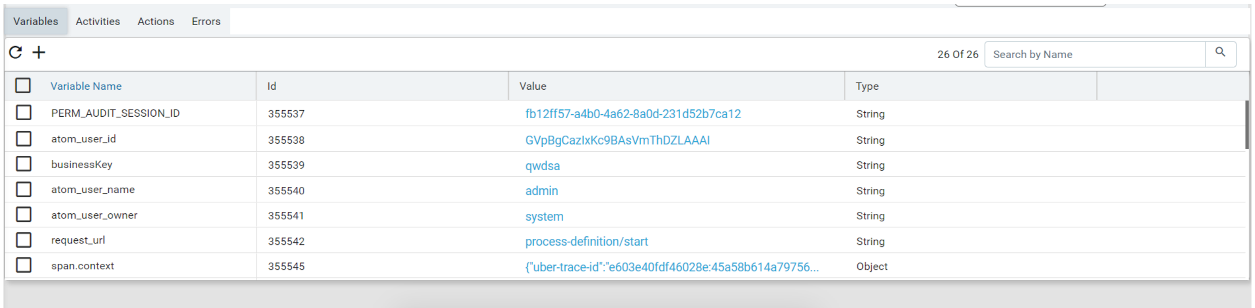
To view the workflow variables

1. Select the particular workflow instance that is active.



☐	Workflow Instance Name	ID	Workflow Id	Business State	Workflow State	Duration	SLA Time (S)	SLA Compliant	Progress(%)
☑	qwdsa	355536	Juniper_MX_Upgrade:1:15043	IN_PROGRESS	ACTIVE	42s			
☐	wqe	355066	Juniper_MX_Upgrade:1:15043	ERROR	INTERNALLY_TERMINATED	4m 39s			Error
☐	qweqe	354703	Juniper_MX_Upgrade:1:15043	CANCELLED	INTERNALLY_TERMINATED	4m			Cancelled
☐	wqeqe	354589	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	49s			Complete

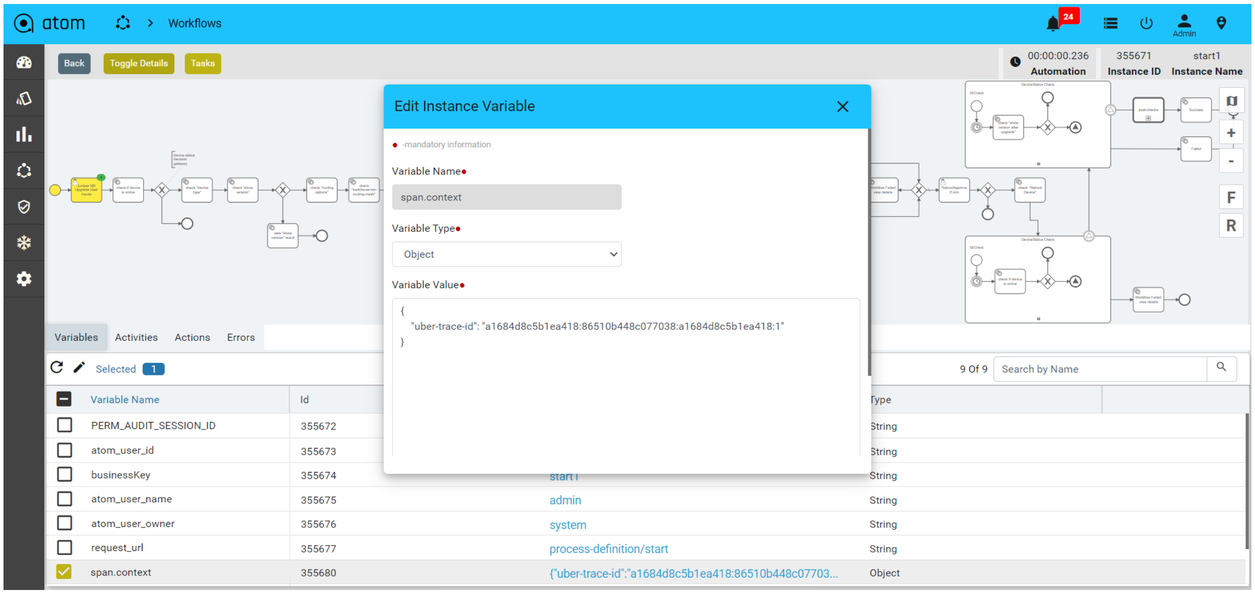
2. View the workflow variables in the bottom panel.



26 Of 26 Search by Name

□	Variable Name	Id	Value	Type
□	PERM_AUDIT_SESSION_ID	355537	fb12ff57-a4b0-4a62-8a0d-231d52b7ca12	String
□	atom_user_id	355538	GVpBgCazlxKc9BAsVmThDZLAAAI	String
□	businessKey	355539	qwdsa	String
□	atom_user_name	355540	admin	String
□	atom_user_owner	355541	system	String
□	request_url	355542	process-definition/start	String
□	span.context	355545	{"uber-trace-id":"e603e40fdf46028e:45a58b614a79756...	Object

3. Users can also edit the variable values during runtime.



Edit Instance Variable

● -mandatory information

Variable Name●

span.context

Variable Type●

Object

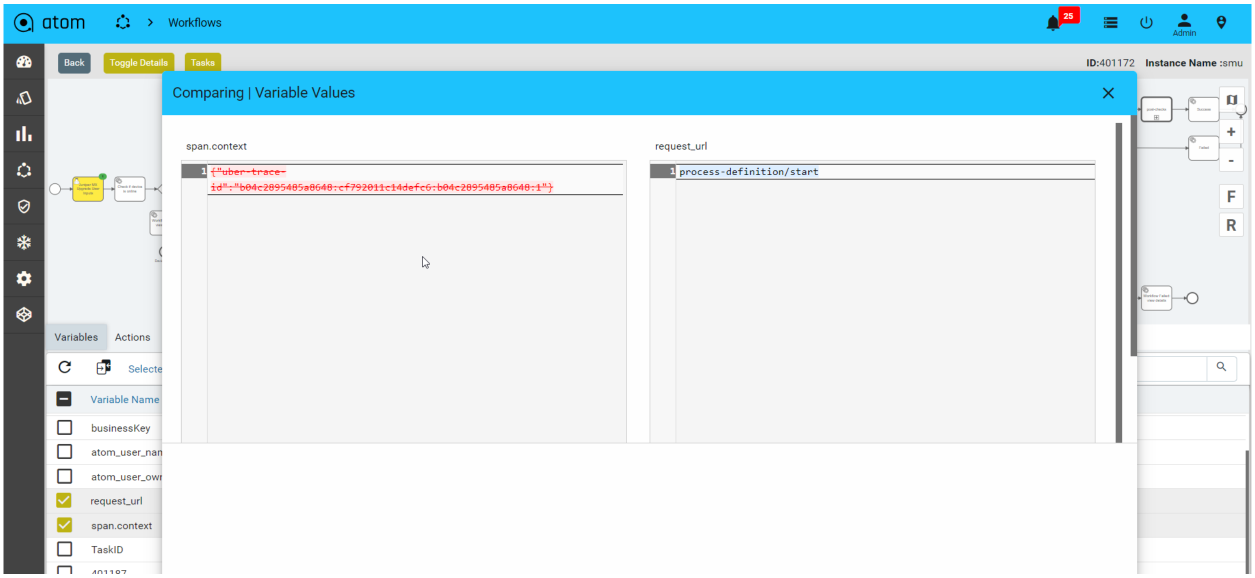
Variable Value●

```
{
  "uber-trace-id": "a1684d8c5b1ea418:86510b448c077038:a1684d8c5b1ea418:1"
}
```

9 Of 9 Search by Name

▬	Variable Name	Id	Value	Type
□	PERM_AUDIT_SESSION_ID	355672		String
□	atom_user_id	355673		String
□	businessKey	355674	start1	String
□	atom_user_name	355675	admin	String
□	atom_user_owner	355676	system	String
□	request_url	355677	process-definition/start	String
☑	span.context	355680	{"uber-trace-id":"a1684d8c5b1ea418:86510b448c07703...	Object

4. Alternatively User can compare two variable values and see the difference on the screen.



Comparing | Variable Values

span.context

```
1 ~~{"uber-trace-id":"b04c2895485a8648:cf792011c14defc6:b04c2895485a8648:1"}~~
```

request_url

```
1 process-definition/start
```

▬	Variable Name
□	businessKey
□	atom_user_nan
□	atom_user_owr
☑	request_url
☑	span.context
□	TaskID
□	401187

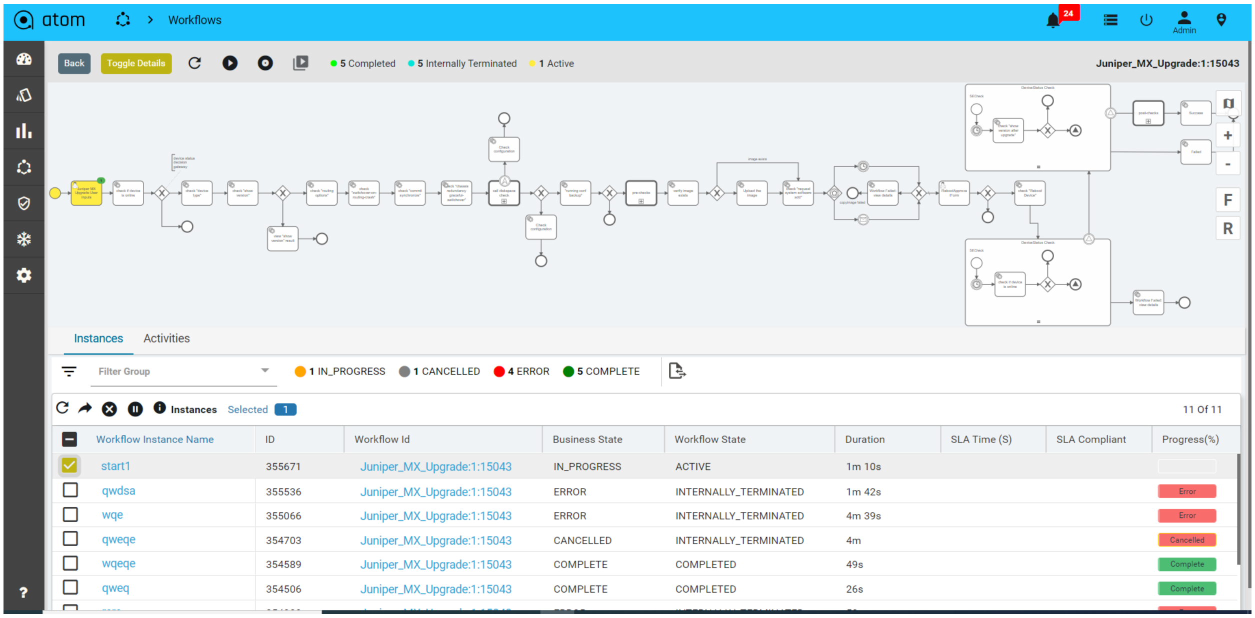
User Inputs:

Some workflows may require the administrator to enter some values at particular stages. Workflow execution will be stalled until the values are entered.

To view if any Action items are pending against a particular workflow instance we can view it under the specific workflow instance view :

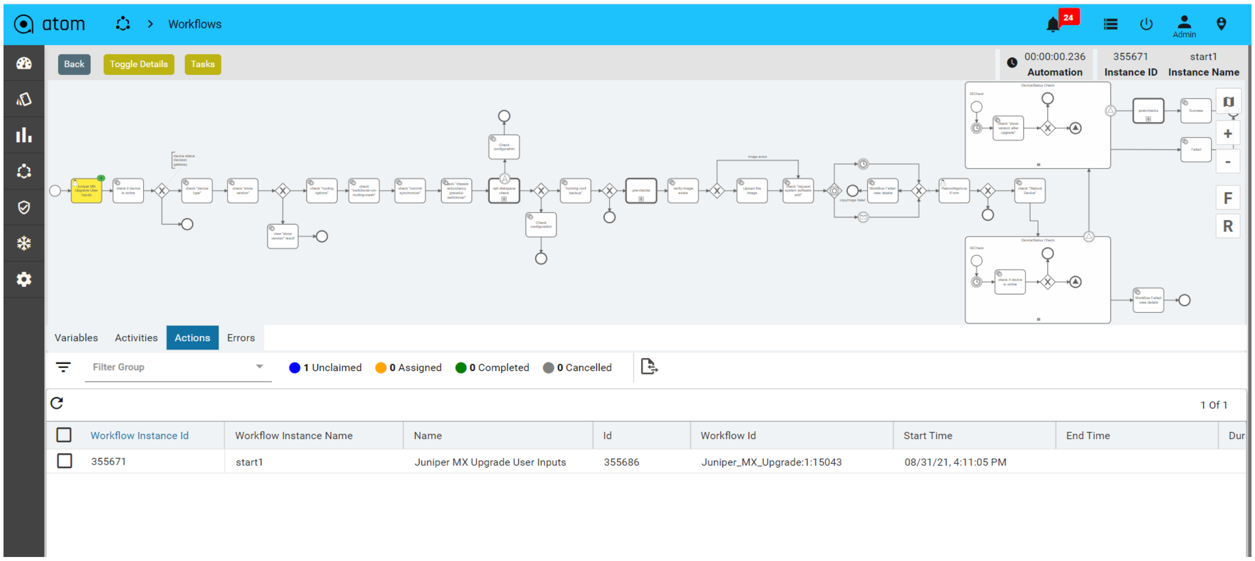
For viewing such tasks:

1. Select the particular workflow instance that is active.



	Workflow Instance Name	ID	Workflow Id	Business State	Workflow State	Duration	SLA Time (S)	SLA Compliant	Progress(%)
☑	start1	355671	Juniper_MX_Upgrade:1:15043	IN_PROGRESS	ACTIVE	1m 10s			
☐	qwdsa	355536	Juniper_MX_Upgrade:1:15043	ERROR	INTERNALLY_TERMINATED	1m 42s			Error
☐	wqe	355066	Juniper_MX_Upgrade:1:15043	ERROR	INTERNALLY_TERMINATED	4m 39s			Error
☐	qweqe	354703	Juniper_MX_Upgrade:1:15043	CANCELLED	INTERNALLY_TERMINATED	4m			Cancelled
☐	wqeqe	354589	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	49s			Complete
☐	qweq	354506	Juniper_MX_Upgrade:1:15043	COMPLETE	COMPLETED	26s			Complete

2. Once Selected navigate to the action tabs to view all pending action items against this particular workflow instance.



00:00:00.236 Automation | 355671 Instance ID | start1 Instance Name

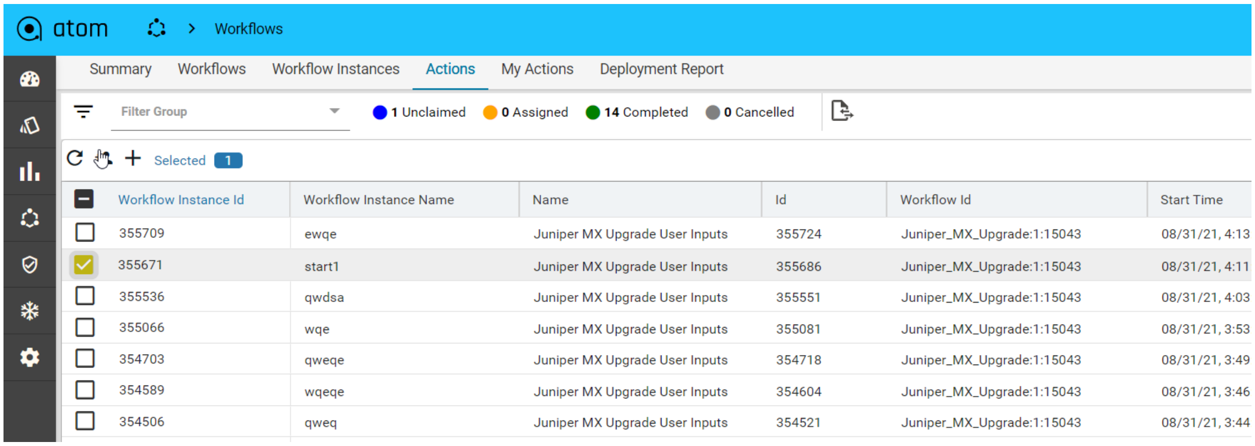
● 1 Unclaimed ● 0 Assigned ● 0 Completed ● 0 Cancelled

1 Of 1

□	Workflow Instance Id	Workflow Instance Name	Name	Id	Workflow Id	Start Time	End Time	Dur
□	355671	start1	Juniper MX Upgrade User Inputs	355686	Juniper_MX_Upgrade:1:15043	08/31/21, 4:11:05 PM		

For completing such tasks

1. Navigate to **Workflows** > **Actions**
2. Select the workflow task and click on **Claim** to claim the task

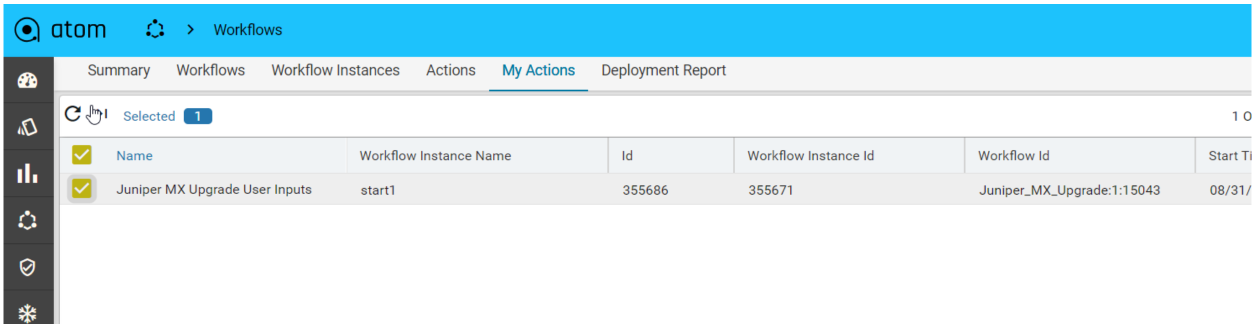


● 1 Unclaimed ● 0 Assigned ● 14 Completed ● 0 Cancelled

Selected 1

☐	Workflow Instance Id	Workflow Instance Name	Name	Id	Workflow Id	Start Time
□	355709	ewqe	Juniper MX Upgrade User Inputs	355724	Juniper_MX_Upgrade:1:15043	08/31/21, 4:13
☑	355671	start1	Juniper MX Upgrade User Inputs	355686	Juniper_MX_Upgrade:1:15043	08/31/21, 4:11
□	355536	qwdsa	Juniper MX Upgrade User Inputs	355551	Juniper_MX_Upgrade:1:15043	08/31/21, 4:03
□	355066	wqe	Juniper MX Upgrade User Inputs	355081	Juniper_MX_Upgrade:1:15043	08/31/21, 3:53
□	354703	qweqe	Juniper MX Upgrade User Inputs	354718	Juniper_MX_Upgrade:1:15043	08/31/21, 3:49
□	354589	wqeqe	Juniper MX Upgrade User Inputs	354604	Juniper_MX_Upgrade:1:15043	08/31/21, 3:46
□	354506	qweq	Juniper MX Upgrade User Inputs	354521	Juniper_MX_Upgrade:1:15043	08/31/21, 3:44

3. Navigate to **Workflow** > **My Actions**
4. Select the task claimed at step 2 and click on **Complete**

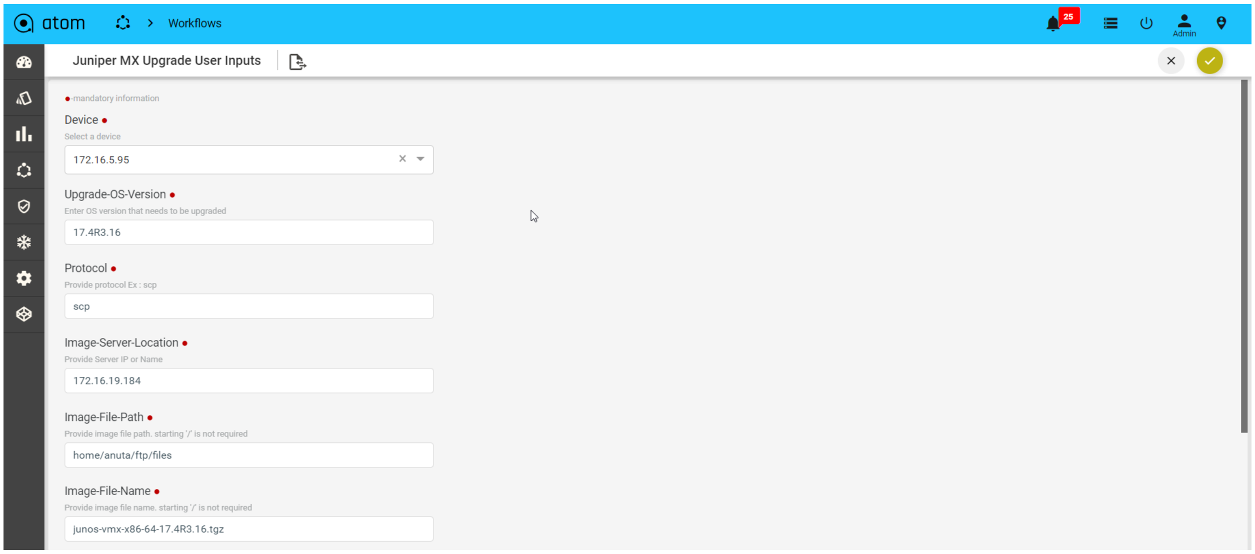


Selected 1

1 O

☑	Name	Workflow Instance Name	Id	Workflow Instance Id	Workflow Id	Start Ti
☑	Juniper MX Upgrade User Inputs	start1	355686	355671	Juniper_MX_Upgrade:1:15043	08/31/

5. Enter values and click on the tick mark



Juniper MX Upgrade User Inputs

●-mandatory information

Device ●
Select a device
172.16.5.95

Upgrade-OS-Version ●
Enter OS version that needs to be upgraded
17.4R3.16

Protocol ●
Provide protocol Ex : scp
scp

Image-Server-Location ●
Provide Server IP or Name
172.16.19.184

Image-File-Path ●
Provide image file path. starting '/' is not required
home/anuta/ftp/files

Image-File-Name ●
Provide image file name. starting '/' is not required
junos-vmx-x86-64-17.4R3.16.tgz

Network Service Automation

Stateful services are developed using ATOM SDK and involve Service model developed in YANG and optional business logic in Python. Such services have a continuous life cycle and undergo multiple changes over a period.

Services can be deployed in two modes -

Greenfield Mode - A user can instantiate the service, a set of network configurations, using the service template. These service templates are rendered from schema files that have been developed as a part of the Service package. ATOM automatically generates and applies relevant configurations on to the devices.

Brownfield Mode - ATOM automatically discovers services running on the device and maps it to the service template. For detailed information about service packages and how to write your own service models, and usage of "maps-to" extension, refer to the "*ATOM Platform Guide*".

Ordering Greenfield Services in ATOM:

To order a service, that was modelled earlier, do the following:

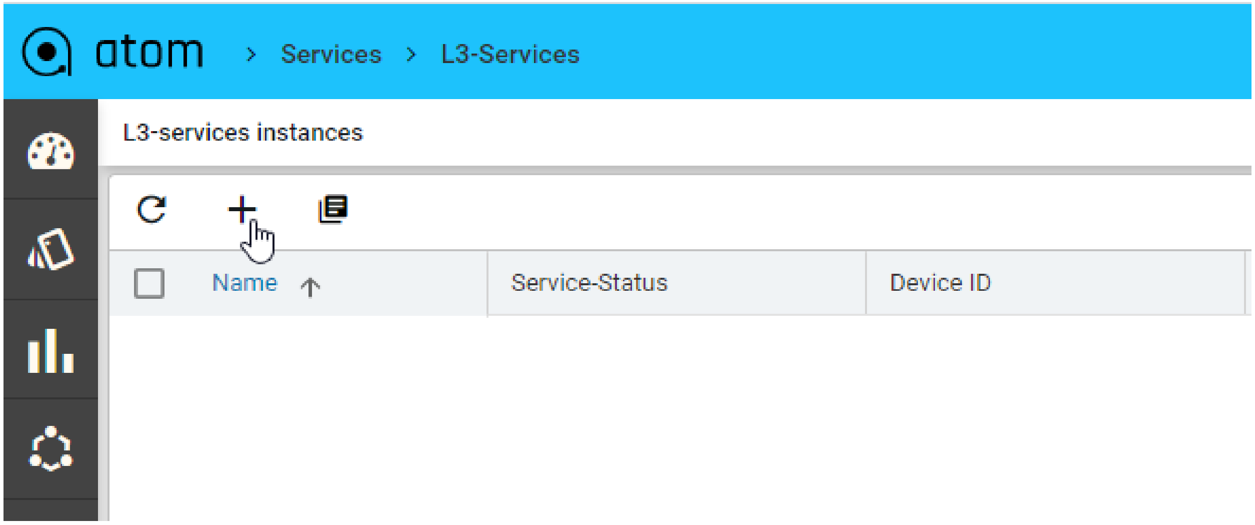
1. Navigate to **Automation** > **Services**
2. In the right pane, click Add
3. In the ensuing form, enter values for the fields that are displayed.
4. Click **OK**

ATOM automatically generates relevant network configurations.

Note: If “Dry Run” is enabled in the Administration tab, the generated configurations will not be applied to the devices.

Let us take an example of creating an instance of the “L3 Services” in ATOM. The schematic representation of the service is defined in the .yang file (in this case, *l3service.yang* file). This file is contained in the model folder of the corresponding service package (l3 service package) uploaded as a plugin to ATOM.

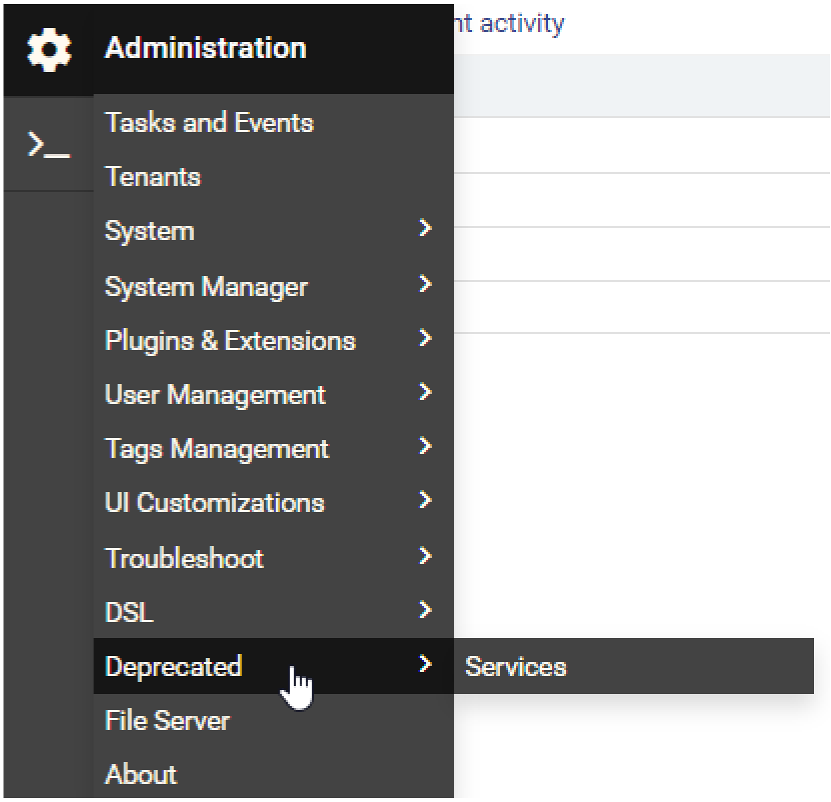
1. Navigate to **Administration** > **Plugins & Extensions**
2. Navigate to **Automation** > **Services** > **l3-services and click on Add**



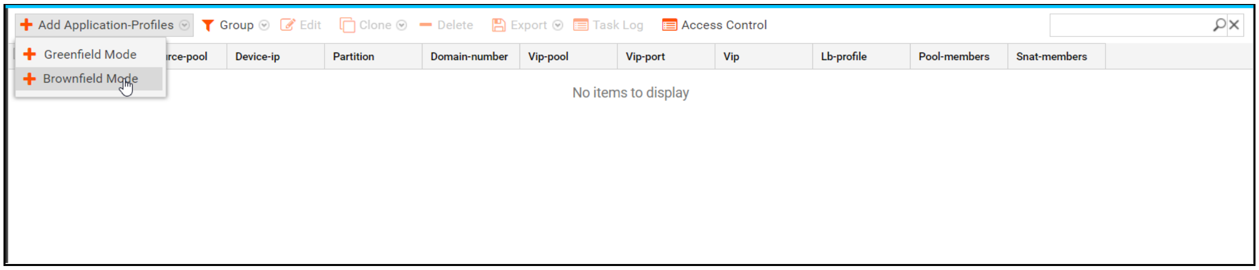
Deploying BSD services in ATOM:

Let us take an example of the deploying the “Application Profiles” service in Brownfield deployment mode:

1. Obtain the appropriate service package from Anuta Networks
2. Upload the service package into ATOM.
3. Navigate to **Administration** > **Deprecated > Services** to view the uploaded service package.



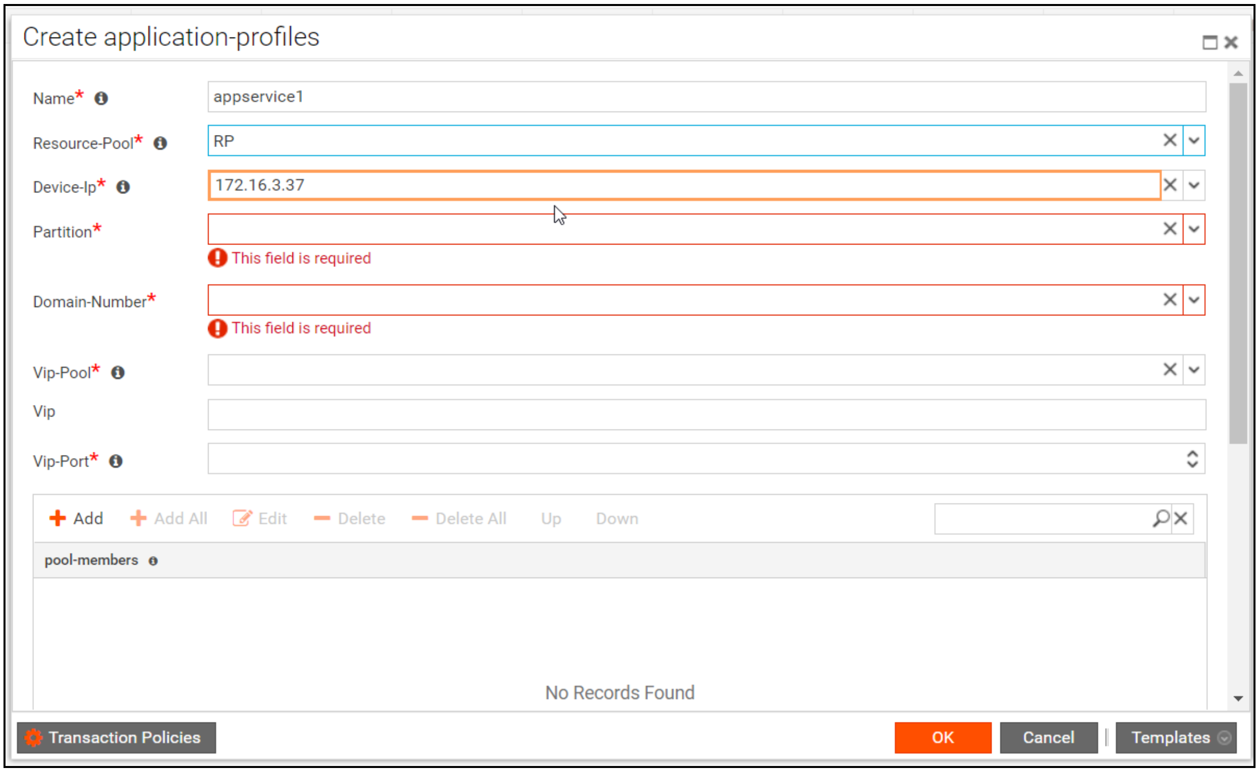
4. In the **Add Application Profiles** pane, select the **Brownfield Mode** as shown below:



No items to display

5. In the **Create Application Services** form, all the values discovered from the device are populated in the parameters shown below:

   Enter values in the fields that have been marked mandatory.



Create application-profiles

Name*	appservice1
Resource-Pool*	RP
Device-Ip*	172.16.3.37
Partition*	This field is required
Domain-Number*	This field is required
Vip-Pool*	
Vip	
Vip-Port*	

pool-members

No Records Found

> **Note**: The borders of the fields that contain the auto discovered values are coloured in brown color.

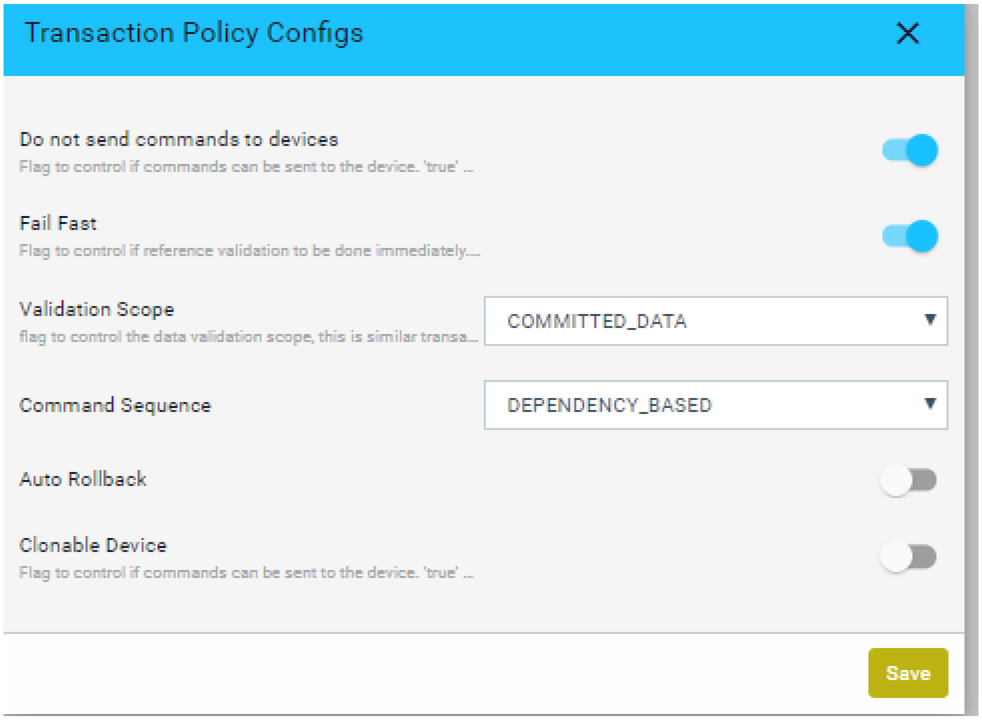
6. Click **OK** after selecting the requisite values in each of the fields.

   The commands that are generated in ATOM are not pushed to the device because of the mode of Brownfield deployment.

Transactional control at the Service level

For every service, the admin can control whether the corresponding configurations, generated by ATOM, should be pushed to the device. This gives an admin a granular level of control wherein some services can be sent to the device and a few can be retained on ATOM.

1. Navigate to **Automation** > **Services**
2. Click the service that you want to configure the transaction policies.
3. You can either enter the values of the fields or import the values from a template to fill the form.
4. In the Create service template,click **Transaction Policies > Transaction Policy Configs** screen to set the control at the transaction level as shown:



Transaction Policy Configs

Do not send commands to devices
Flag to control if commands can be sent to the device. 'true' ...

Fail Fast
Flag to control if reference validation to be done immediately....

Validation Scope: COMMITTED_DATA
flag to control the data validation scope, this is similar transa...

Command Sequence: DEPENDENCY_BASED

Auto Rollback

Clonable Device
Flag to control if commands can be sent to the device. 'true' ...

Option	Type	Description
do-not- send-commands- to -devices	boolean	Controls whether commands can be sent to the device. devices Select this option to commit the data to ATOM datastore, but no configuration changes will be applied on the device. Useful for testing or in the case of a brown-field environment to create services. **Note**: The value set for this option at the transaction policy overrides the value at the global level (in the General Settings)
fail-fast	boolean	Controls whether the reference validation should be done immediately. False: Defers the validation to after ‘commit-task’ state of the transaction
validation-scope-type	enum	Controls whether data validation scope is across transactions. This flag is similar to

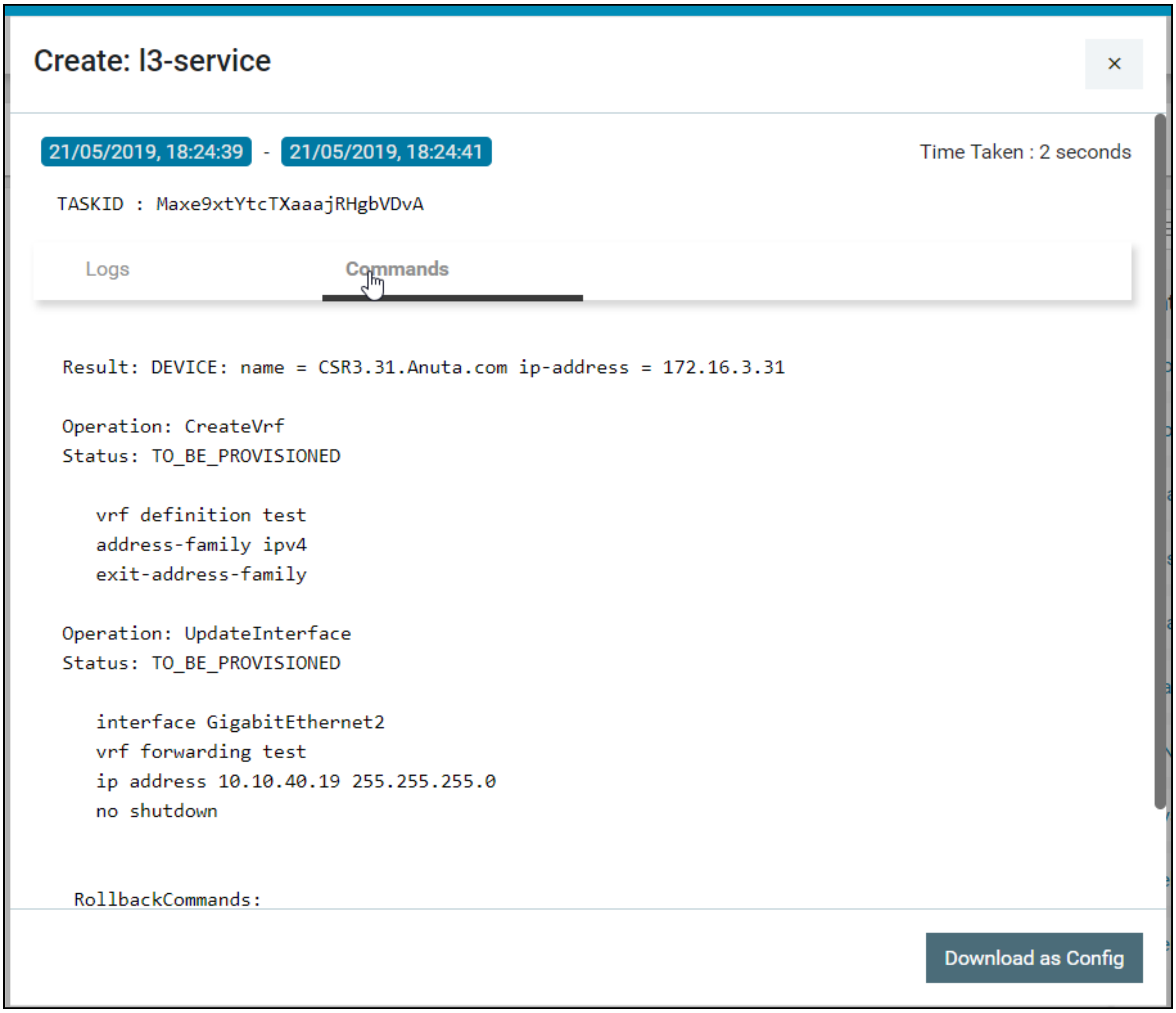
		isolation control in traditional **RDBMS**, but limited to just data validation. Allowed values are "COMMITTED_DATA" and "UNCOMMITTED_DATA".
● COMMITTED_DATA		Validation will be done only using the committed data. Current transaction will not see changes done by other parallel transactions
● UNCOMMITTED_DATA		Data validation will be done using the uncommitted data. Current transaction will see changes done by other parallel transactions
● Command-sequence-policy	enum	Controls whether the generated commands need to be ordered according to the dependencies specified in the model.
● DEPENDENCY_ BASED		Generated commands will be re-ordered based on the dependencies specified in the data model.
● NONE		Generated commands reflect the order of the requests sent from the client, no re-ordering is done

The values for following options can be cross-verified before creation of each service

- Fail Fast
- Validation Scope
- Command Sequence Policy

5. Click the task created for the created service to view the commands generated by ATOM in the Task Details.

   In the Task details, click Commands to view the generated commands by ATOM. As the commands should not be sent to the device, (if do-not-send-commands-to-device option is selected), the status of the commands is set to “TO_BE_PROVISIONED” as shown below:



```
TASKID : Maxe9xtYtcTXaaajRHgbVDvA
```

```
Result: DEVICE: name = CSR3.31.Anuta.com ip-address = 172.16.3.31

Operation: CreateVrf
Status: TO_BE_PROVISIONED

   vrf definition test
   address-family ipv4
   exit-address-family

Operation: UpdateInterface
Status: TO_BE_PROVISIONED

   interface GigabitEthernet2
   vrf forwarding test
   ip address 10.10.40.19 255.255.255.0
   no shutdown


 RollbackCommands:
```

The generated commands can be downloaded and verified with the expected configurations for that service.

Cancelling an ordered Service:

1. Select the service and click **Delete**.
2. In the **Confirmation** window, before selecting the **Yes** button, click the **Transaction Policies**.
3. Select the option , “**Do-not-send-commands-to-devices**” in the policy

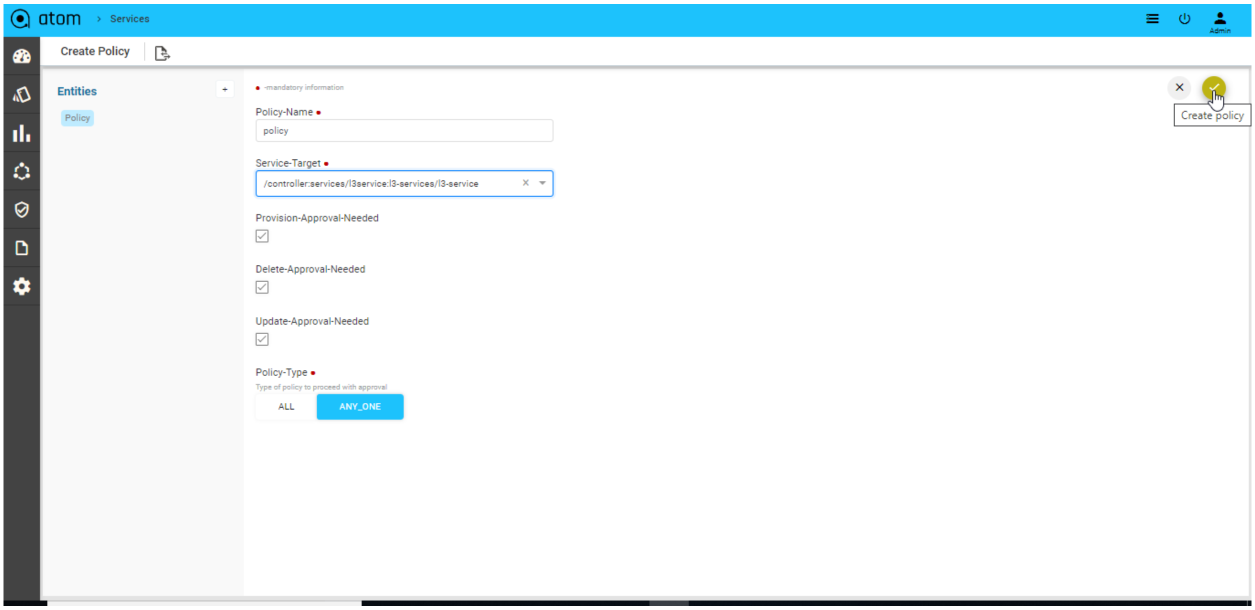
In the corresponding task generated, in the Task Details pane, click **Commands** to view the generated commands by ATOM. As the commands should not be sent to the device (if “do not send commands to the device” option selected in the transaction policy config), the status of the command is set to “TO_BE_PROVISIONED”.

IMPORTANT: If this option is not selected properly as per create behavior, the service deletion might fail.

Service Approvals

You can create policies for approving creation, deletion or updation of the service configurations on devices. In addition, you can add approvers who must approve the operations defined in the service approval policy. Apart from seeking approvals for services, you can set approvers for any of the operations for any entity in ATOM.

1. Navigate to **Automation** ->**Services**-> **Approvals**
2. In the right pane, click **Add Policy** to create the details as shown below:



● -mandatory information

Policy-Name ●
policy

Service-Target ●
/controller:services/l3service:l3-services/l3-service

Provision-Approval-Needed
☑

Delete-Approval-Needed
☑

Update-Approval-Needed
☑

Policy-Type ●
Type of policy to proceed with approval
ALL [✓ ANY_ONE]

3. Navigate to the right pane to add details as described below:
   1. **Policy Name**: Enter a name for the approval policy
   2. **Service Target**: Enter the path for the object in the data model tree for which approval is required.

      For example: If the object of interest is a service, enter the path of the service.

/controller:services/l3service:l3-services, which means that the operation of interest on this managed-cpe -service will be sent to the approver or approvers for their perusal before being pushed to the device.

iii. **Provision Approval Needed**: Check this option if the user selected as the approver should approve the configurations before they are pushed to the respective device or devices.

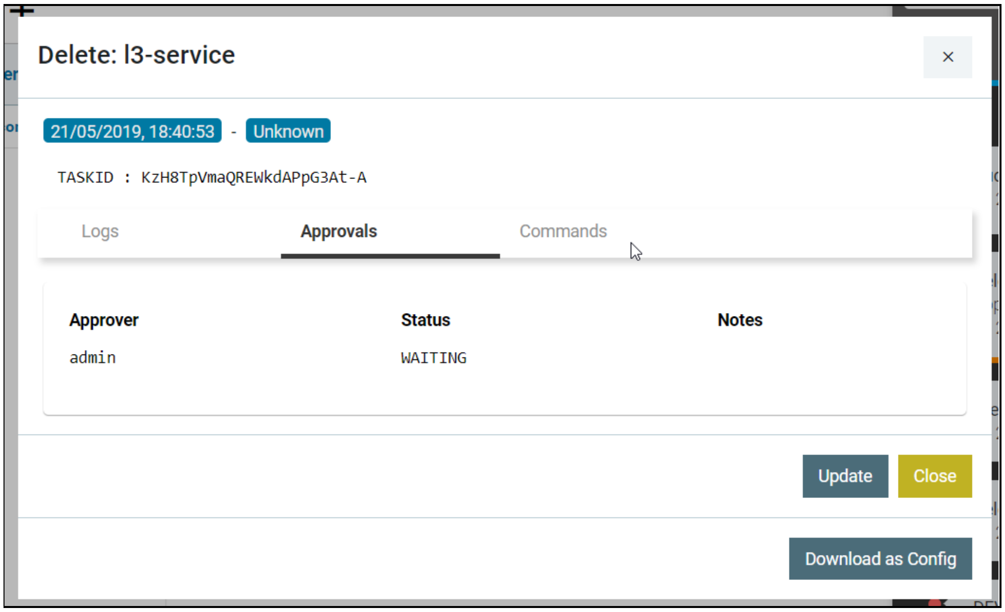
iv. **Delete Approval Needed:** Check this option if the approver should approve the configurations that are required for deletion of the service configurations from the device or devices.

v. **Update Approval Needed**: Check this option if the admin should approve the configurations that are required to update the service configurations on the device or devices.

vi. **Policy Type**: This option enables you to set if approvals are required from a single approver or multiple approvers.

- **ALL**: The task that is generated as a result of a service operation awaits the approval of all the approvers who have been added for that service .

In the following example, the operation of creating a 'customer' needs approval of two approvers, 'admin' and 'User1'. The task is completed successfully after receiving the approval of all the approvers as shown below:



Delete: l3-service

21/05/2019, 18:40:53 - Unknown

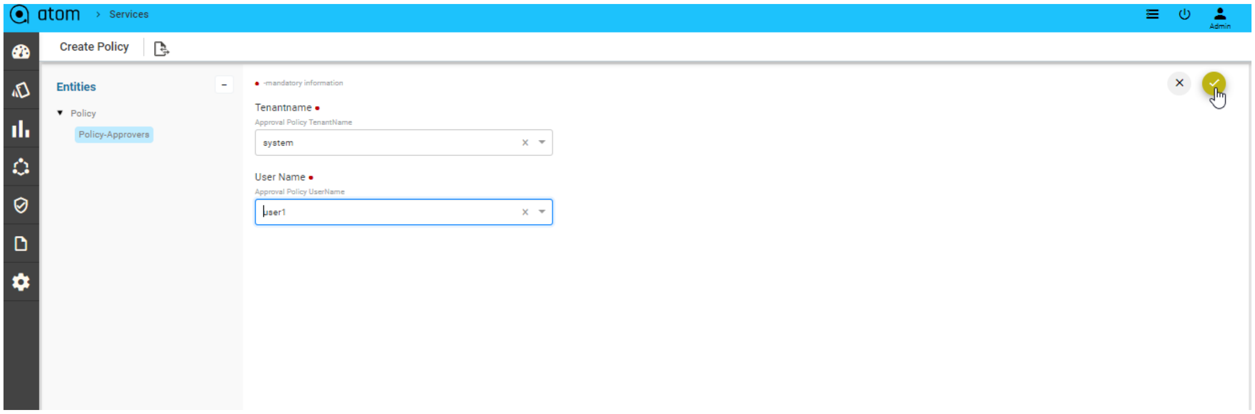
TASKID : KzH8TpVmaQREWkdAPpG3At-A

Approver	Status	Notes
admin	WAITING	

- **ANY_ONE**: The task generated as a result of a service operation awaits the approval of any of the multiple approvers added for that service.

NOTE: All changes made in the service approval policy will come into effect only for the subsequent service instantiations and will not affect the ongoing service operations.

4. Navigate to the left pane to add the tenant users who should approve the configurations generated by ATOM for any of the service operations (create, delete or update).



● -mandatory information

Tenantname ●
Approval Policy TenantName
system

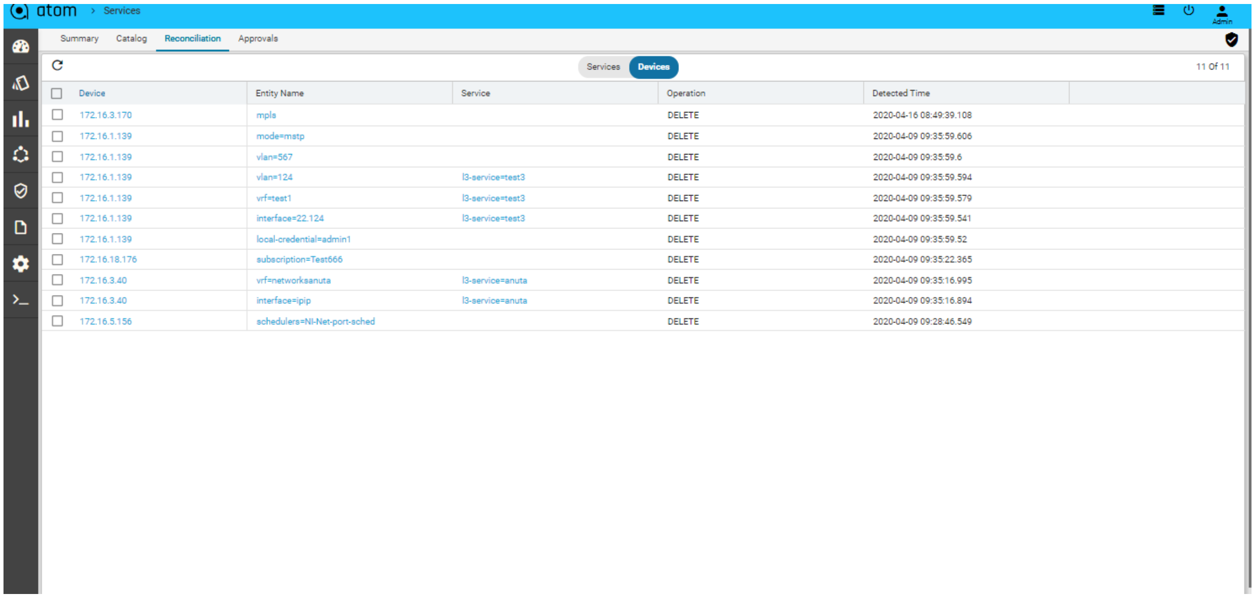
User Name ●
Approval Policy UserName
user1

> **NOTE:** Do not edit the name of the user (UserName) who has been added as an approver in the service policy.

Configuration Drift (Network Services)

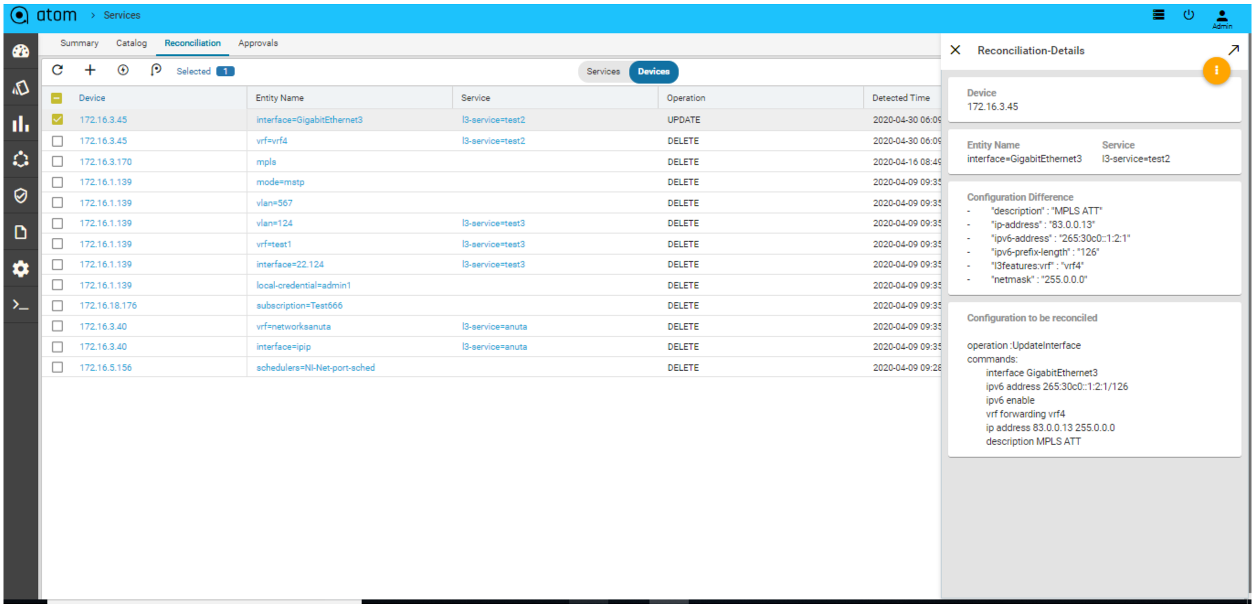
Whenever there is a configuration change in the device that does not match with the generated configuration on ATOM, a reconciliation task is generated in ATOM. After viewing the config diff generated, the administrator can decide how to reconcile these config differences so that the device and ATOM are always in sync with respect to the configuration states.

- Navigate to **Automation->Services->Reconciliation** in the left pane
- In the right pane, click **Reconciliation** > **Entities** to view all the reconciliation entities that are generated at the device level and service level.



☐	Device	Entity Name	Service	Operation	Detected Time
☐	172.16.3.170	mpls		DELETE	2020-04-16 08:49:39.108
☐	172.16.1.139	mode=mstp		DELETE	2020-04-09 09:35:59.606
☐	172.16.1.139	vlan=567		DELETE	2020-04-09 09:35:59.6
☐	172.16.1.139	vlan=124	l3-service=test3	DELETE	2020-04-09 09:35:59.594
☐	172.16.1.139	vrf=test1	l3-service=test3	DELETE	2020-04-09 09:35:59.579
☐	172.16.1.139	interface=22.124	l3-service=test3	DELETE	2020-04-09 09:35:59.541
☐	172.16.1.139	local-credential=admin1		DELETE	2020-04-09 09:35:59.52
☐	172.16.18.176	subscription=Test666		DELETE	2020-04-09 09:35:22.365
☐	172.16.3.40	vrf=networksanuta	l3-service=anuta	DELETE	2020-04-09 09:35:16.995
☐	172.16.3.40	interface=ipip	l3-service=anuta	DELETE	2020-04-09 09:35:16.894
☐	172.16.5.156	schedulers=NI-Net-port-sched		DELETE	2020-04-09 09:28:46.549

- Double click the reconciliation entity of your choice, to view the Reconciliation details:



☐	Device	Entity Name	Service	Operation	Detected Time
☑	172.16.3.45	interface=GigabitEthernet3	l3-service=test2	UPDATE	2020-04-30 06:09
☐	172.16.3.45	vrf=vrf4	l3-service=test2	DELETE	2020-04-30 06:09
☐	172.16.3.170	mpls		DELETE	2020-04-16 08:49
☐	172.16.1.139	mode=mstp		DELETE	2020-04-09 09:35
☐	172.16.1.139	vlan=567		DELETE	2020-04-09 09:35
☐	172.16.1.139	vlan=124	l3-service=test3	DELETE	2020-04-09 09:35
☐	172.16.1.139	vrf=test1	l3-service=test3	DELETE	2020-04-09 09:35
☐	172.16.1.139	interface=22.124	l3-service=test3	DELETE	2020-04-09 09:35
☐	172.16.1.139	local-credential=admin1		DELETE	2020-04-09 09:35
☐	172.16.18.176	subscription=Test666		DELETE	2020-04-09 09:35
☐	172.16.3.40	vrf=networksanuta	l3-service=anuta	DELETE	2020-04-09 09:35
☐	172.16.3.40	interface=ipip	l3-service=anuta	DELETE	2020-04-09 09:35
☐	172.16.5.156	schedulers=NI-Net-port-sched		DELETE	2020-04-09 09:28

Reconciliation-Details

Device
172.16.3.45

Entity Name	Service
interface=GigabitEthernet3	l3-service=test2

Configuration Difference

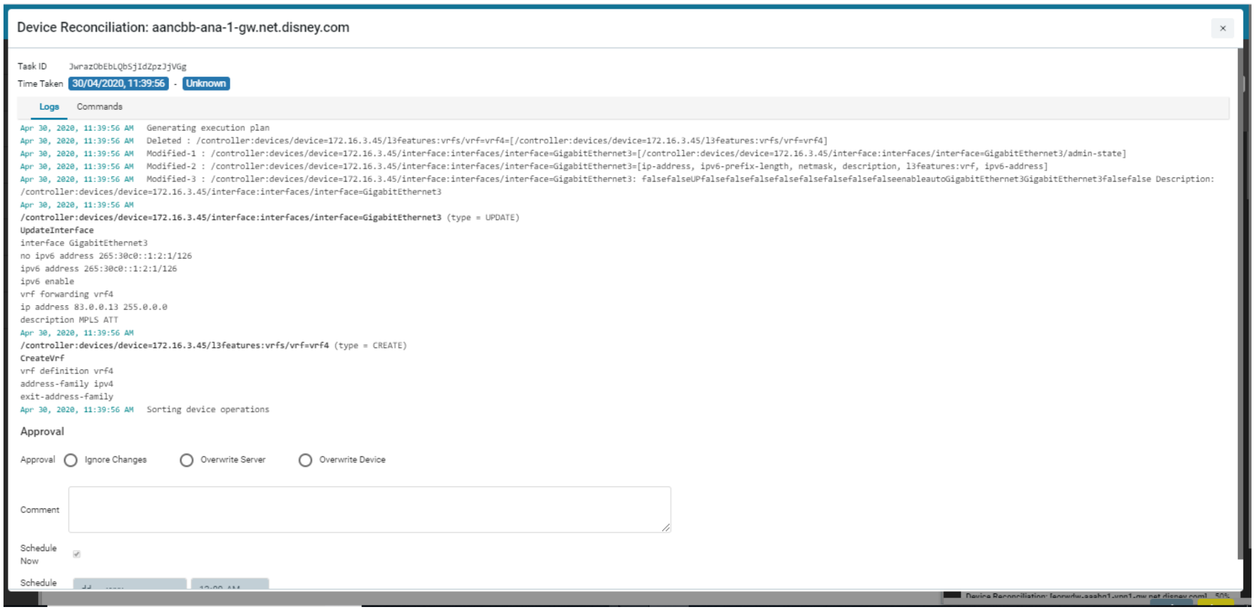
```
-      "description" : "MPLS ATT"
-      "ip-address" : "83.0.0.13"
-      "ipv6-address" : "265:30c0::1:2:1"
-      "ipv6-prefix-length" : "126"
-      "l3features:vrf" : "vrf4"
-      "netmask" : "255.0.0.0"
```

Configuration to be reconciled

```
operation :UpdateInterface
commands:
     interface GigabitEthernet3
     ipv6 address 265:30c0::1:2:1/126
     ipv6 enable
     vrf forwarding vrf4
     ip address 83.0.0.13 255.0.0.0
     description MPLS ATT
```

The configuration difference between ATOM and the device is shown on the left pane where as the right pane displays the configurations that should be pushed to the device to reconcile with the state of ATOM.

- Click the **Reconciliation Policy** to create the policies for reconciling the config differences either with the state of ATOM or with that of the device.
  - **OVERWRITE SERVER** - The generated config diff is pushed to the database of ATOM to reconcile with the state of the device
  - **OVERWRITE DEVICE** - The generated config diff is pushed to the device to reconcile with the state of ATOM.
  - **WAIT FOR APPROVAL** - Select this option if the generated reconciliation entities require a review by an administrator. The generated config diff is sent to an approver who can take the decision of either pushing the configurations to the device or overwriting the ATOM database.



Device Reconciliation: aancbb-ana-1-gw.net.disney.com

Task ID JwrazObEbLQbSjIdZpzJjVGg

Time Taken 30/04/2020, 11:39:56 - Unknown

```
Apr 30, 2020, 11:39:56 AM   Generating execution plan
Apr 30, 2020, 11:39:56 AM   Deleted : /controller:devices/device=172.16.3.45/l3features:vrfs/vrf=vrf4=[/controller:devices/device=172.16.3.45/l3features:vrfs/vrf=vrf4]
Apr 30, 2020, 11:39:56 AM   Modified-1 : /controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3=[/controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3/admin-state]
Apr 30, 2020, 11:39:56 AM   Modified-2 : /controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3=[ip-address, ipv6-prefix-length, netmask, description, l3features:vrf, ipv6-address]
Apr 30, 2020, 11:39:56 AM   Modified-3 : /controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3: falsefalseUPfalsefalsefalsefalsefalsefalsefalsefalseenableautoGigabitEthernet3GigabitEthernet3falsefalse Description:
/controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3
Apr 30, 2020, 11:39:56 AM
/controller:devices/device=172.16.3.45/interface:interfaces/interface=GigabitEthernet3 (type = UPDATE)
UpdateInterface
interface GigabitEthernet3
no ipv6 address 265:30c0::1:2:1/126
ipv6 address 265:30c0::1:2:1/126
ipv6 enable
vrf forwarding vrf4
ip address 83.0.0.13 255.0.0.0
description MPLS ATT
Apr 30, 2020, 11:39:56 AM
/controller:devices/device=172.16.3.45/l3features:vrfs/vrf=vrf4 (type = CREATE)
CreateVrf
vrf definition vrf4
address-family ipv4
exit-address-family
Apr 30, 2020, 11:39:56 AM   Sorting device operations
```

Approval

Approval ○ Ignore Changes ○ Overwrite Server ○ Overwrite Device

Comment

Schedule Now ☑

Schedule

Setting the Global Policy :

The policy configured in this setting will have an impact on all the reconciliation entities generated for all devices.

Setting the Device Policy:

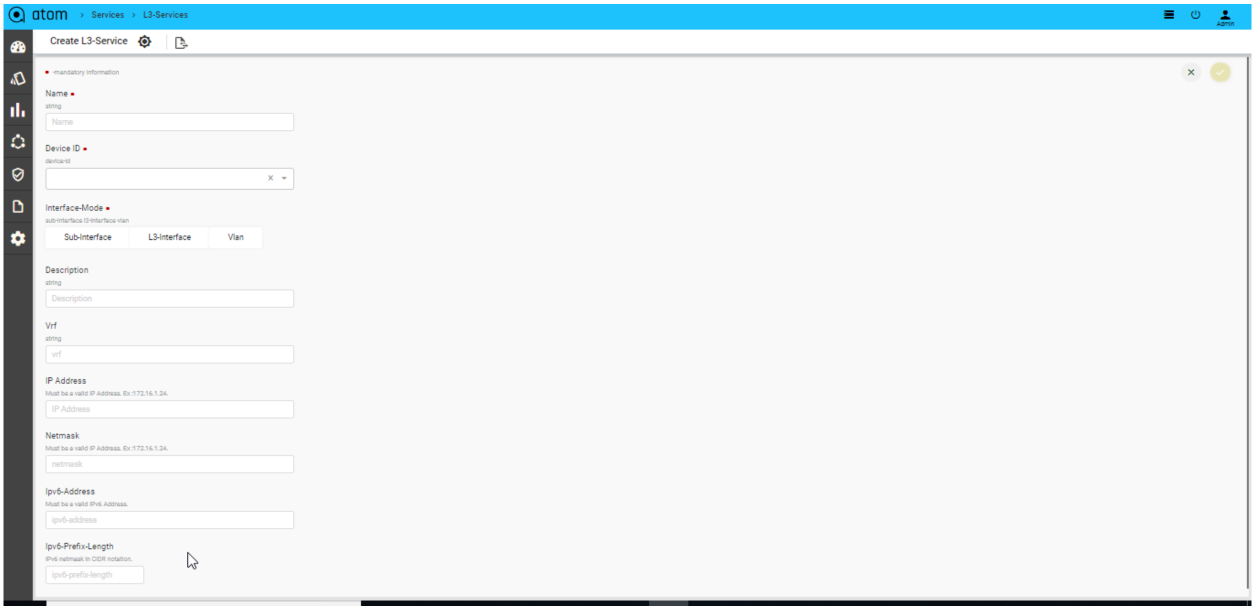
You can set granular control of what needs to be done with the config diff generated by ATOM for a specific device or a set of devices. The policy configured at the global level can be overridden by the device level.

For example, if the global level the policy is set is WAIT FOR APPROVAL but at the device level it is set to OVERWRITE DEVICE, all the reconciliation entities generated in ATOM for that device will be reconciled with the state of ATOM.

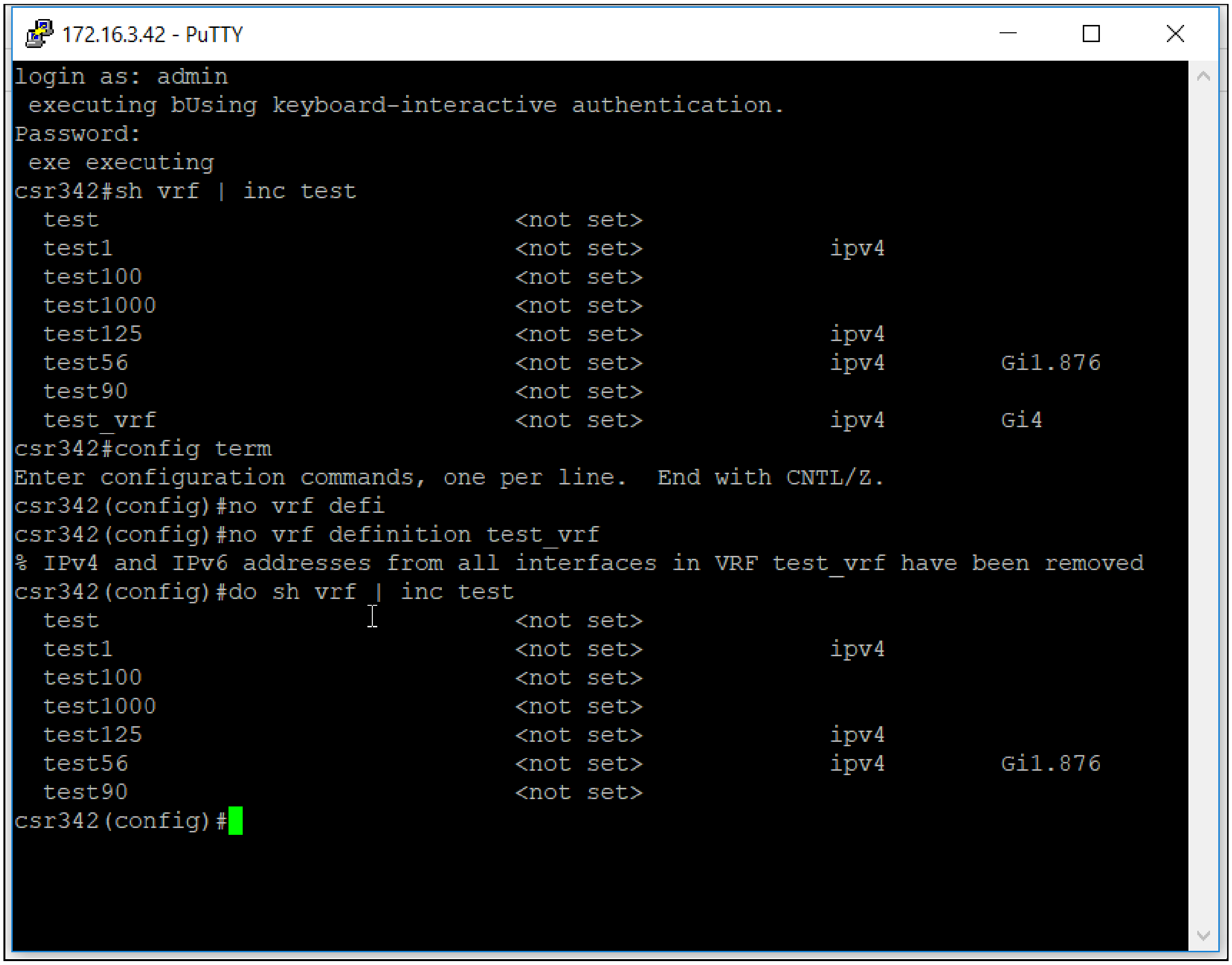
Example

Let us understand how service compliance and reconciliation work by taking the service, L3 service" as follows:

1. Create a service instance in ATOM



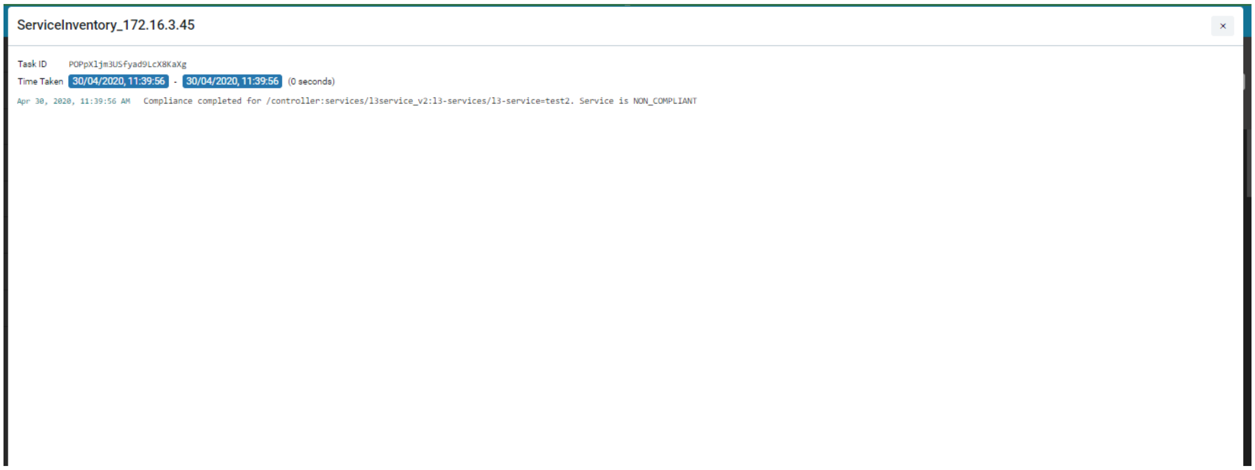
2. Login to the device console and delete the “test VRF” from the device



```
login as: admin
 executing bUsing keyboard-interactive authentication.
Password:
 exe executing
csr342#sh vrf | inc test
  test                               <not set>
  test1                              <not set>             ipv4
  test100                            <not set>
  test1000                           <not set>
  test125                            <not set>             ipv4
  test56                             <not set>             ipv4        Gi1.876
  test90                             <not set>
  test_vrf                           <not set>             ipv4        Gi4
csr342#config term
Enter configuration commands, one per line.  End with CNTL/Z.
csr342(config)#no vrf defi
csr342(config)#no vrf definition test_vrf
% IPv4 and IPv6 addresses from all interfaces in VRF test_vrf have been removed
csr342(config)#do sh vrf | inc test
  test                               <not set>
  test1                              <not set>             ipv4
  test100                            <not set>
  test1000                           <not set>
  test125                            <not set>             ipv4
  test56                             <not set>             ipv4        Gi1.876
  test90                             <not set>
csr342(config)#
```

3. As there is a config difference between the device and ATOM, a Reconciliation task is triggered in ATOM.

As the config change in the device is related to the created service in ATOM, a Service Inventory task is created.



ServiceInventory_172.16.3.45

Task ID POPpXljm3USfyad9LcX8KaXg

Time Taken 30/04/2020, 11:39:56 - 30/04/2020, 11:39:56 (0 seconds)

```
Apr 30, 2020, 11:39:56 AM   Compliance completed for /controller:services/l3service_v2:l3-services/l3-service=test2. Service is NON_COMPLIANT
```

The Service is marked as “Non Compliant” service as shown in the “Compliance” Dashboard.

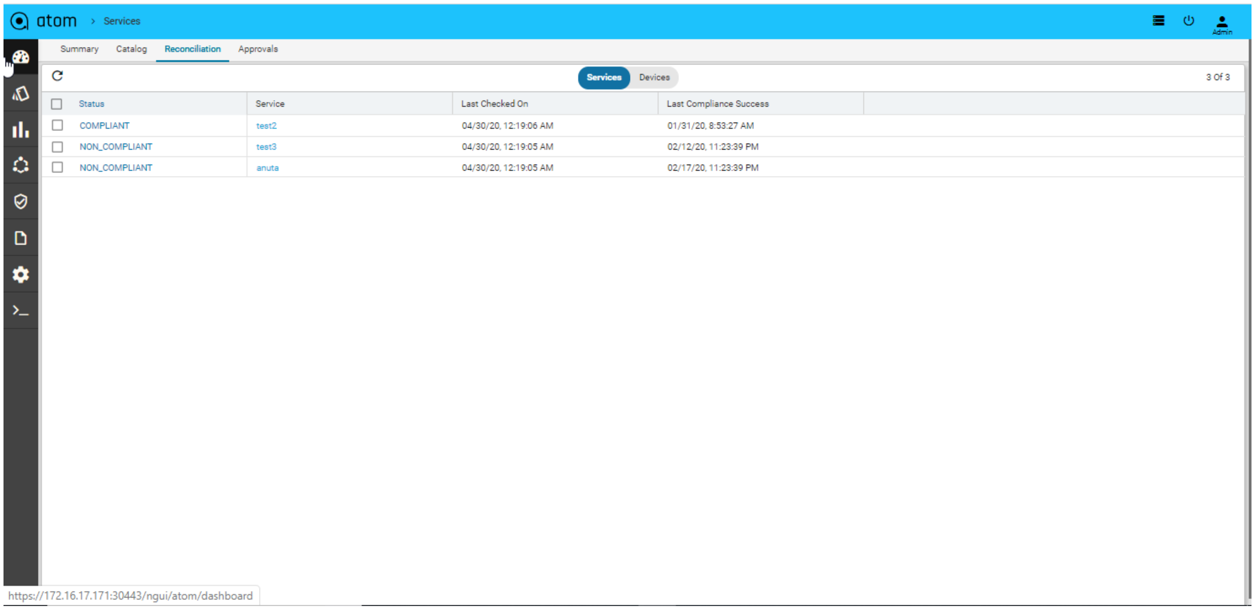
You can either resolve the service violation or look at the Reconciliation entities created.

Service Compliance

ATOM helps to detect any configuration deviations in network at the service level. ATOM detects the missing, deleted, violated configurations of the services that have been instantiated in ATOM and sends the reconciliation report.

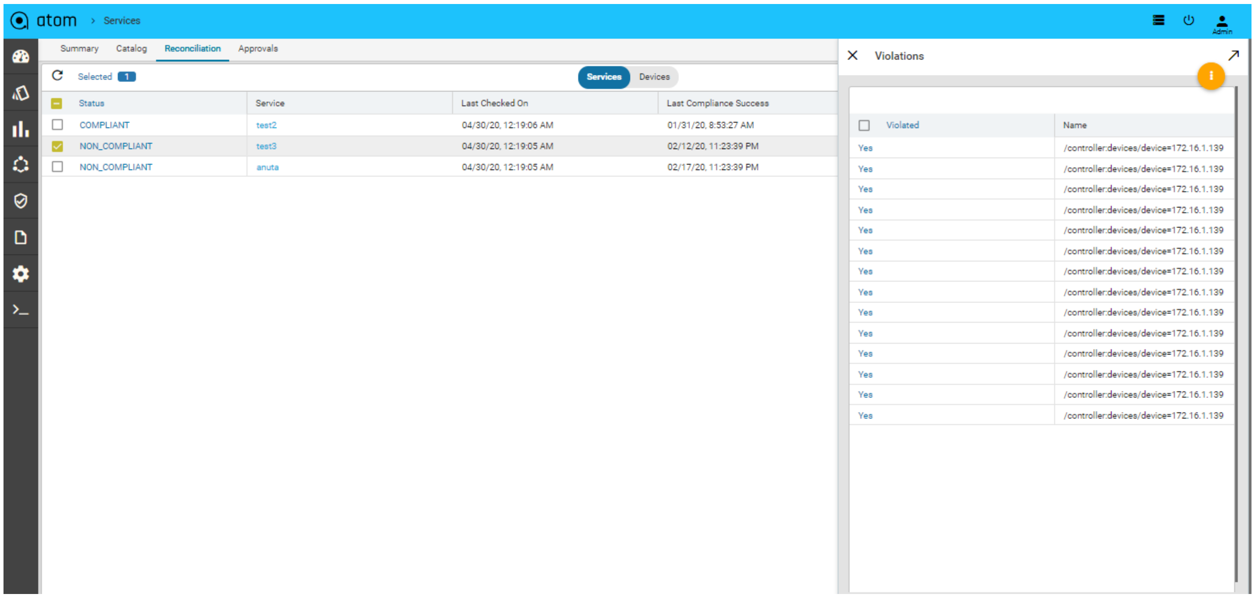
When a service is instantiated on a device, all the necessary configurations are generated by ATOM and pushed to the device. After the successful creation of the service on the device, ATOM compares the running configuration on the device, compares this with the services that were generated , flags the violations and marks the service as non-compliant.

If there is any service that is non-compliant, navigate to **Automation -> Services->Reconciliation->Services**



☐ Status	Service	Last Checked On	Last Compliance Success
☐ COMPLIANT	test2	04/30/20, 12:19:06 AM	01/31/20, 8:53:27 AM
☐ NON_COMPLIANT	test3	04/30/20, 12:19:05 AM	02/12/20, 11:23:39 PM
☐ NON_COMPLIANT	anuta	04/30/20, 12:19:05 AM	02/17/20, 11:23:39 PM

Click **Non Compliant Services** to view those services



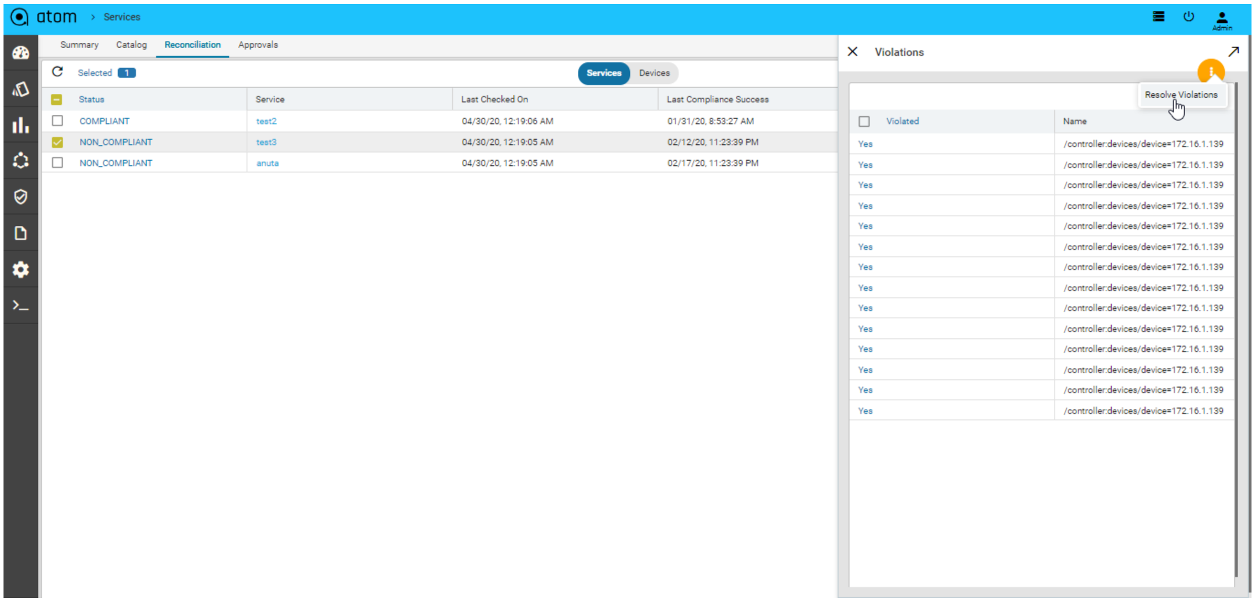
Status	Service	Last Checked On	Last Compliance Success
☐ COMPLIANT	test2	04/30/20, 12:19:06 AM	01/31/20, 8:53:27 AM
☑ NON_COMPLIANT	test3	04/30/20, 12:19:05 AM	02/12/20, 11:23:39 PM
☐ NON_COMPLIANT	anuta	04/30/20, 12:19:05 AM	02/17/20, 11:23:39 PM

☐ Violated	Name
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139

Resolving Service Violations

ATOM generates the config diff, in the service created through ATOM. and pushes the deleted configurations (that were either removed intentionally or accidentally) to the device, thus enabling the administrator to maintain the same state of configuration in both.

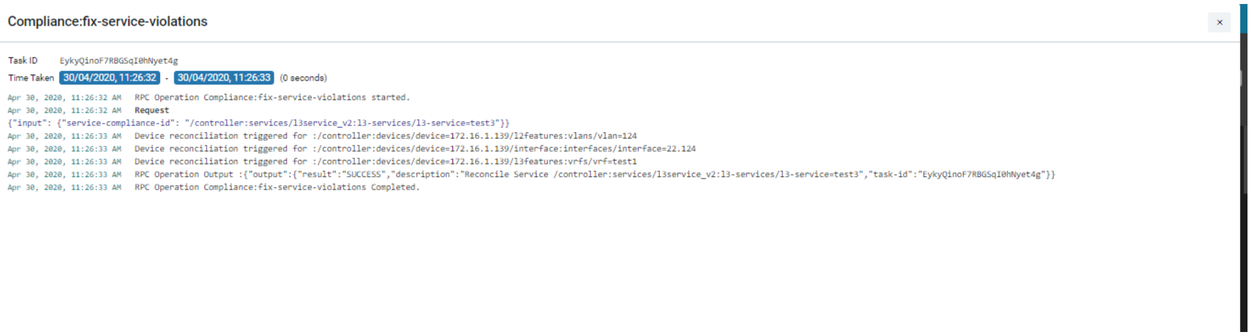
1. Select **Non Compliant Services** > Click **Resolve Violations**



	Status	Service	Last Checked On	Last Compliance Success
☐	COMPLIANT	test2	04/30/20, 12:19:06 AM	01/31/20, 8:53:27 AM
☑	NON_COMPLIANT	test3	04/30/20, 12:19:05 AM	02/12/20, 11:23:39 PM
☐	NON_COMPLIANT	anuta	04/30/20, 12:19:05 AM	02/17/20, 11:23:39 PM

☐ Violated	Name
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139
Yes	/controller:devices/device=172.16.1.139

2. Click the Task Viewer and look for the task named **“RPC Operation: Compliance:fix-service-violations”**


Compliance:fix-service-violations

Task ID EykyQinoF7RBGSqI0hNyet4g

Time Taken 30/04/2020, 11:26:32 - 30/04/2020, 11:26:33 (0 seconds)

```
Apr 30, 2020, 11:26:32 AM   RPC Operation Compliance:fix-service-violations started.
Apr 30, 2020, 11:26:32 AM   Request
{"input": {"service-compliance-id": "/controller:services/l3service_v2:l3-services/l3-service=test3"}}
Apr 30, 2020, 11:26:33 AM   Device reconciliation triggered for :/controller:devices/device=172.16.1.139/l2features:vlans/vlan=124
Apr 30, 2020, 11:26:33 AM   Device reconciliation triggered for :/controller:devices/device=172.16.1.139/interface:interfaces/interface=22.124
Apr 30, 2020, 11:26:33 AM   Device reconciliation triggered for :/controller:devices/device=172.16.1.139/l3features:vrfs/vrf=test1
Apr 30, 2020, 11:26:33 AM   RPC Operation Output :{"output":{"result":"SUCCESS","description":"Reconcile Service /controller:services/l3service_v2:l3-services/l3-service=test3","task-id":"EykyQinoF7RBGSqI0hNyet4g"}}
Apr 30, 2020, 11:26:33 AM   RPC Operation Compliance:fix-service-violations Completed.
```

Agents

ATOM Agent handles all device communication which communicates with Other ATOM Components either remotely or locally based on deployment mode.

Each ATOM Agent manages multiple network devices. ATOM agents can be assigned with multiple CIDR blocks to manage the devices. It is used to communicate, collect and monitor the networking devices in your infrastructure using standard protocols. Once the agent collects the data, it gets encrypted and sent to Anuta ATOM Server over an outgoing SSL Connection.

One Agent can typically manage hundreds of devices. However, it depends on many other factors such as device type, data collection, size of the data, frequency etc. Checkout ATOM Agent Hardware requirements for further information.

ATOM Agent Deployment is discussed in detail in “ATOM Agent Deployment Guide”.

Administration

As an administrator, you can manage changes in the ATOM that will affect the behavior of the system and have a global effect on all the components of ATOM.

- "Tasks" and “Events”
- “Tenants"
- "System"
- “System Manager”
- "Plugins and Extensions"
- “User Management"
- “Tag management"
- “UI Customizations"
- “Troubleshoot"
- “DSL"
- “Deprecated"
- “File Server"
- “About"

Tasks & Events

You can view any activity, “task”that is being executed in ATOM as a result of an user- initiated action. Tasks are generated during the following operations such as:

- Adding or Deleting Devices
- Executing Jobs
- Validating the resource pool and running the Inventory
- Configuration out -of -sync between the device and ATOM
- Creating or Deleting Networks

1. Select any Task and click **Details** to view the configurations associated with that task.
2. You can search for any Task by entering a query in the Search field.
3. Select any task and click **Cancel** to view the task is to be cancelled
4. Select any task and click **Download Log** to view the system related logs and message.

   For example, enter “Create” in the Search field, if you want to query for all the Create operations that have been executed so far. All the Create tasks that have been triggered in various operations are displayed as shown below:
5. Click **Retry** when the creation of a Service (during instantiation of the Service) fails due to deficit in the operational resources or during provisioning. 4. Click Task log to view the system related logs and messages

Events

Events represent an important part of an operation or a change in the state of an object in ATOM. For example, an event is generated when a user logins to ATOM. In addition, login attempts to a device using any of the transport types is also displayed.

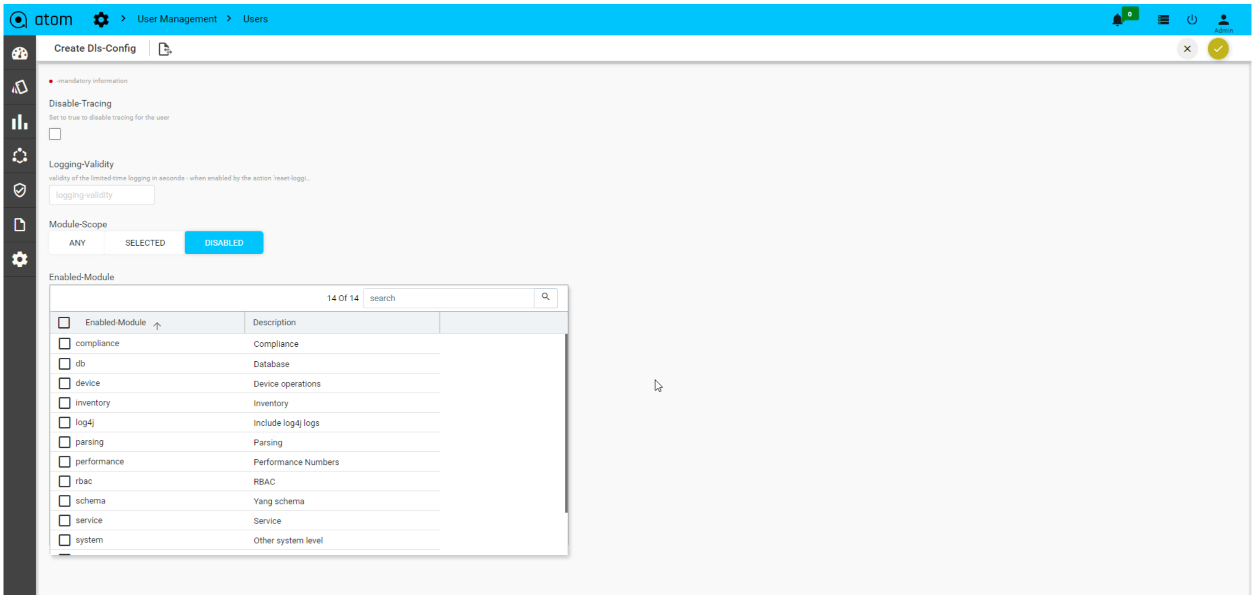
Select a task and click Details to view the schema of the service, click Commands to view the configurations associated with the service generated by ATOM.

TraceLogs

Trace Logs enables users to end-to-end distributed tracing of a task.User can monitor the performance of the task and latency optimisation can be done. It actually helps users to encounter the root cause analysis. The Tracelog option was enabled in tasks UI and also in tasks and events.
Select any task and click **Trace Logs** to view the task in distributed tracing.
Trace logs UI can be visualized from jaeger UI, this shows a complete cycle of the task and all the components involved in it.

To Enable TraceLogs Navigate to **Administration** > **User Management** > **Users**

Here select a User and **Entities > DLS-Config**



Create Dls-Config

● -mandatory information

Disable-Tracing

Set to true to disable tracing for the user

□

Logging-Validity

validity of the limited-time logging in seconds - when enabled by the action 'reset-loggi...

logging-validity

Module-Scope

ANY | SELECTED | [✓ DISABLED]

Enabled-Module

14 Of 14 search

□ Enabled-Module	Description
□ compliance	Compliance
□ db	Database
□ device	Device operations
□ inventory	Inventory
□ log4j	Include log4j logs
□ parsing	Parsing
□ performance	Performance Numbers
□ rbac	RBAC
□ schema	Yang schema
□ service	Service
□ system	Other system level

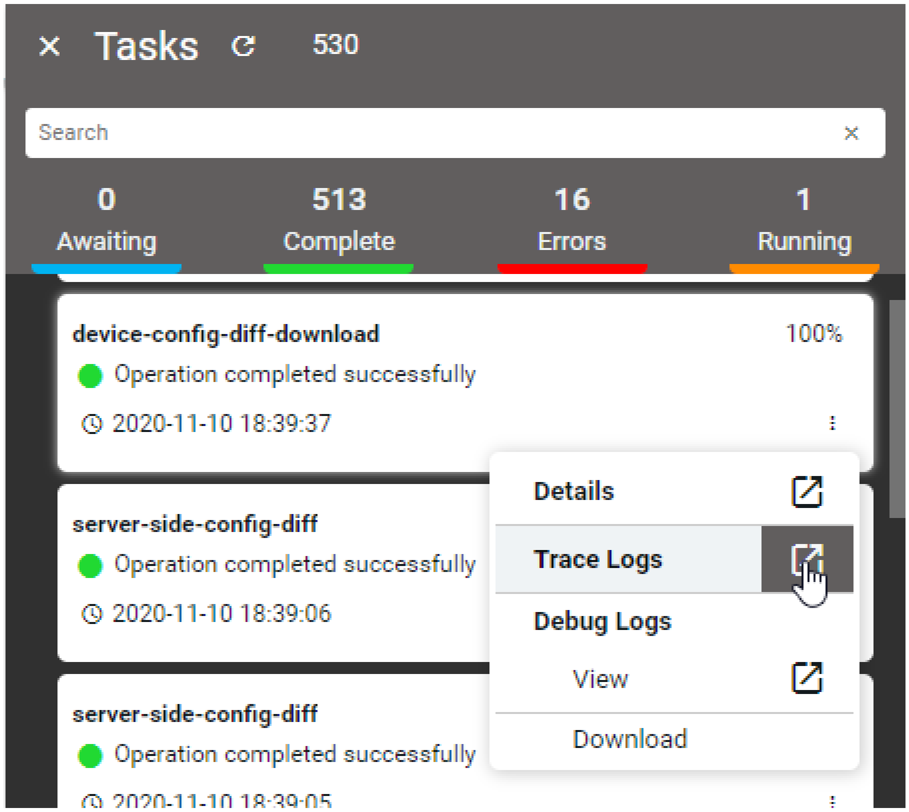
- **Disable-Tracing:** Set true to disable tracing for the user.
- **Logging-Validity:** Validity of the limited-time logging in seconds.
- **Module-Scope:** List of the modules that are supported for tracing.

  Any: Enables any of the modules selected.

  Selected: Enables only selected modules to tracelogs.

  Disabled: Selected Module will disabled while tracing.

Note: When you select the trace logs from tasks UI it opens in the new tab as jaeger UI with SSO URLs. When you select trace logs from Tasks and Events then it opens in the ATOM application itself as a new window. To enable trace logs from deployment jaeger-tracing pods should be up.

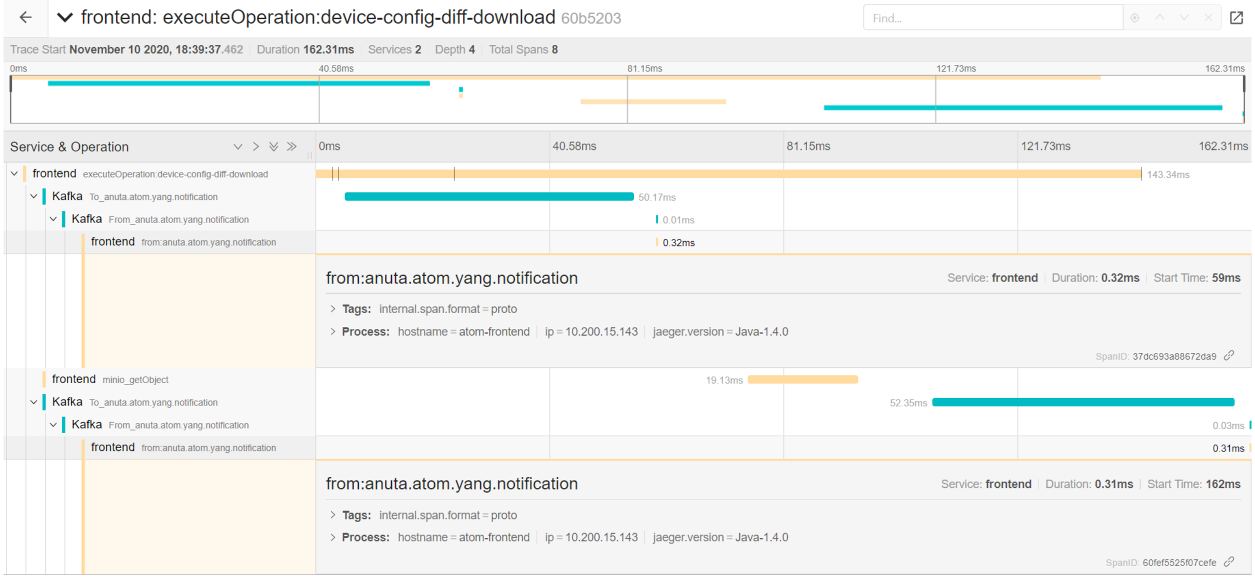


0 Awaiting | 513 Complete | 16 Errors | 1 Running

device-config-diff-download 100%
Operation completed successfully
2020-11-10 18:39:37

server-side-config-diff
Operation completed successfully
2020-11-10 18:39:06

server-side-config-diff
Operation completed successfully
2020-11-10 18:39:05



frontend: executeOperation:device-config-diff-download 60b5203

Trace Start November 10 2020, 18:39:37.462 | Duration 162.31ms | Services 2 | Depth 4 | Total Spans 8

```
frontend  executeOperation:device-config-diff-download    143.34ms
  Kafka  To_anuta.atom.yang.notification                  50.17ms
    Kafka  From_anuta.atom.yang.notification              0.01ms
      frontend  from:anuta.atom.yang.notification         0.32ms
```

from:anuta.atom.yang.notification — Service: frontend | Duration: 0.32ms | Start Time: 59ms

> Tags: internal.span.format = proto
> Process: hostname = atom-frontend | ip = 10.200.15.143 | jaeger.version = Java-1.4.0

SpanID: 37dc693a88672da9

```
  frontend  minio_getObject                               19.13ms
  Kafka  To_anuta.atom.yang.notification                  52.35ms
    Kafka  From_anuta.atom.yang.notification              0.03ms
      frontend  from:anuta.atom.yang.notification         0.31ms
```

from:anuta.atom.yang.notification — Service: frontend | Duration: 0.31ms | Start Time: 162ms

> Tags: internal.span.format = proto
> Process: hostname = atom-frontend | ip = 10.200.15.143 | jaeger.version = Java-1.4.0

SpanID: 60fef5525f07cefe

System

As an administrator, you may want to configure or modify the system settings or customize these settings after installing ATOM.

- "Rule Engine"
- "License"

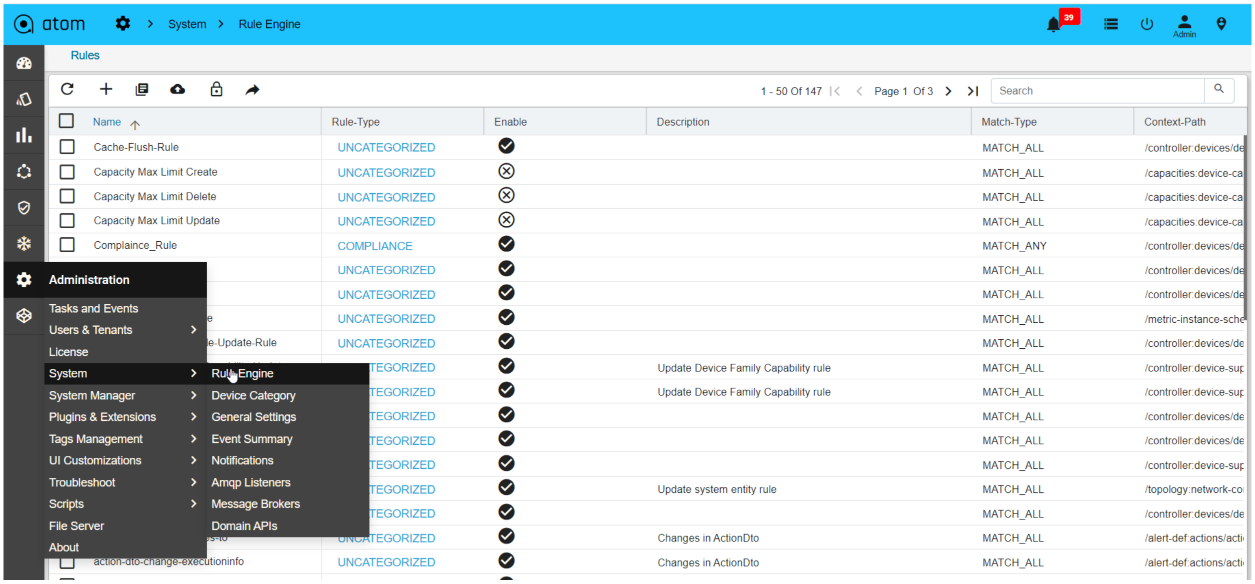
- "General Settings"
- "Look and Feel"
- "Event Summary"
- "Notifications"
- "Message Brokers"

Rule Engine

Rule engine is a functionality in which the user-defined business logic is executed to bring about changes in the state of the resources managed by ATOM. The logic describes the sequence of operations that is associated with data in a database to carry out the rule. You can create rules in the Rule engine for ATOM to handle changes in devices in a maintainable, reusable, extensible way. Rule engines support rules, conditions, priority (based on index), and other functions. Rules can be constructed to serve various functions, some of which are listed below:

- Resources Validation
- Triggering different actions based on some user defined conditions

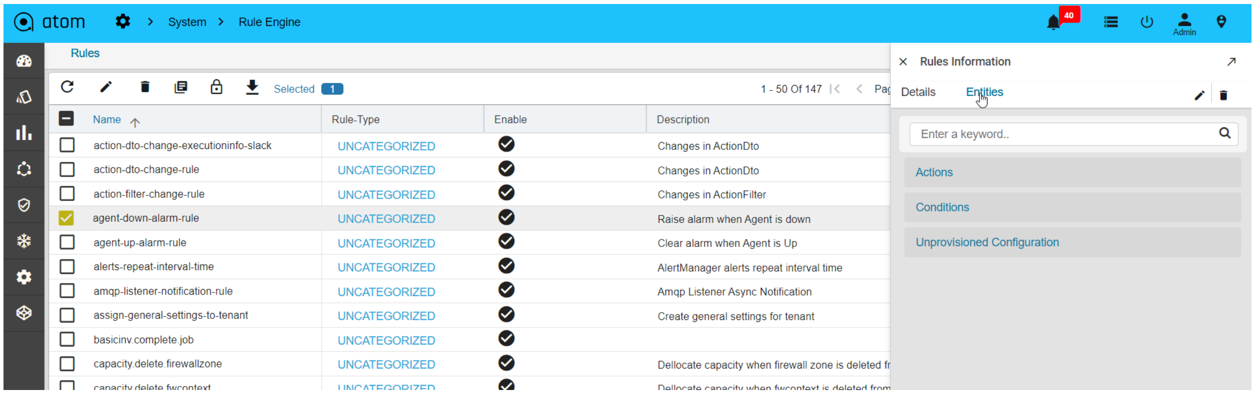
All the system defined rules available in ATOM as shown in the following snippet:



Name	Rule-Type	Enable	Description	Match-Type	Context-Path
Cache-Flush-Rule	UNCATEGORIZED	✓		MATCH_ALL	/controller:devices/de
Capacity Max Limit Create	UNCATEGORIZED	⊗		MATCH_ALL	/capacities:device-ca
Capacity Max Limit Delete	UNCATEGORIZED	⊗		MATCH_ALL	/capacities:device-ca
Capacity Max Limit Update	UNCATEGORIZED	⊗		MATCH_ALL	/capacities:device-ca
Complaince_Rule	COMPLIANCE	✓		MATCH_ANY	/controller:devices/de
	UNCATEGORIZED	✓		MATCH_ALL	/controller:devices/de
	UNCATEGORIZED	✓		MATCH_ALL	/controller:devices/de
e	UNCATEGORIZED	✓		MATCH_ALL	/metric-instance-sche
e-Update-Rule	UNCATEGORIZED	✓		MATCH_ALL	/controller:devices/de
	TEGORIZED	✓	Update Device Family Capability rule	MATCH_ALL	/controller:device-sup
	TEGORIZED	✓	Update Device Family Capability rule	MATCH_ALL	/controller:device-sup
	TEGORIZED	✓		MATCH_ALL	/controller:devices/de
	TEGORIZED	✓		MATCH_ALL	/controller:devices/de
	TEGORIZED	✓		MATCH_ALL	/controller:device-sup
	TEGORIZED	✓	Update system entity rule	MATCH_ALL	/topology:network-co
	TEGORIZED	✓		MATCH_ALL	/controller:devices/de
es-to	UNCATEGORIZED	✓	Changes in ActionDto	MATCH_ALL	/alert-def:actions/acti
action-dto-change-executioninfo	UNCATEGORIZED	✓	Changes in ActionDto	MATCH_ALL	/alert-def:actions/acti

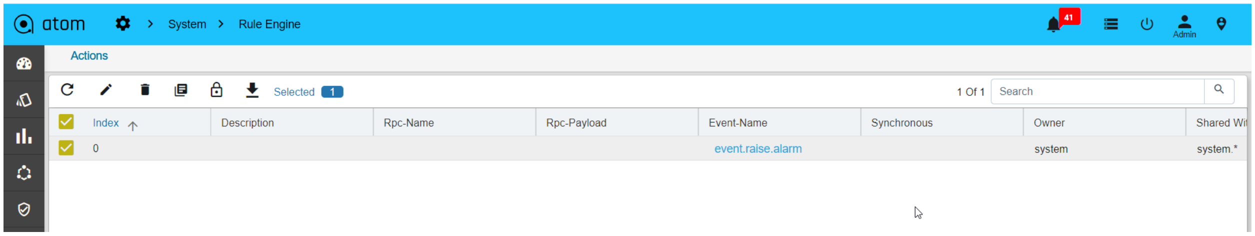
Click on any rule > Entities of your interest and view the Actions and Conditions associated with that rule.

For example, double click the ‘agent-down-alarm’ rule as shown below:

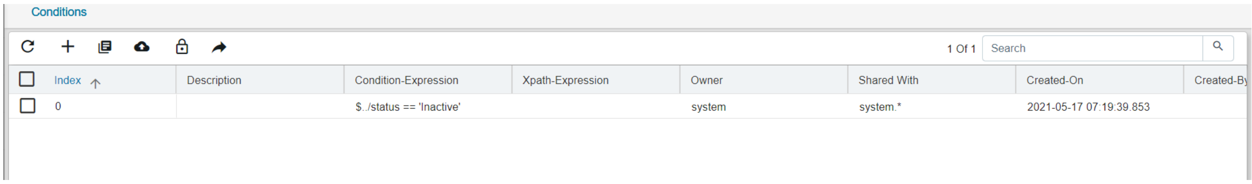


Name	Rule-Type	Enable	Description
action-dto-change-executioninfo-slack	UNCATEGORIZED	✓	Changes in ActionDto
action-dto-change-rule	UNCATEGORIZED	✓	Changes in ActionDto
action-filter-change-rule	UNCATEGORIZED	✓	Changes in ActionFilter
agent-down-alarm-rule	UNCATEGORIZED	✓	Raise alarm when Agent is down
agent-up-alarm-rule	UNCATEGORIZED	✓	Clear alarm when Agent is Up
alerts-repeat-interval-time	UNCATEGORIZED	✓	AlertManager alerts repeat interval time
amqp-listener-notification-rule	UNCATEGORIZED	✓	Amqp Listener Async Notification
assign-general-settings-to-tenant	UNCATEGORIZED	✓	Create general settings for tenant
basicinv.complete.job	UNCATEGORIZED	✓	
capacity.delete.firewallzone	UNCATEGORIZED	✓	Dellocate capacity when firewall zone is deleted fr
capacity.delete.fwcontext	UNCATEGORIZED	✓	Dellocate capacity when fwcontext is deleted from

This rule comes to effect when any of the ATOM Agents goes OFFLINE and the status is set to INACTIVE.



Index	Description	Rpc-Name	Rpc-Payload	Event-Name	Synchronous	Owner	Shared Wi
0				event.raise.alarm		system	system.*



Index	Description	Condition-Expression	Xpath-Expression	Owner	Shared With	Created-On	Created-By
0		$../status == 'Inactive'		system	system.*	2021-05-17 07:19:39.853	

In addition to the rules that are available by default, you can create a custom rule as per your requirement as described in the following section.

Rule

Rules are conditional statements that govern the conduct of business processes. A rule consists of a condition and a set of actions. If that condition is met, and is evaluated as true then the rule engine initiates one or more actions.

A rule is composed of three parts:

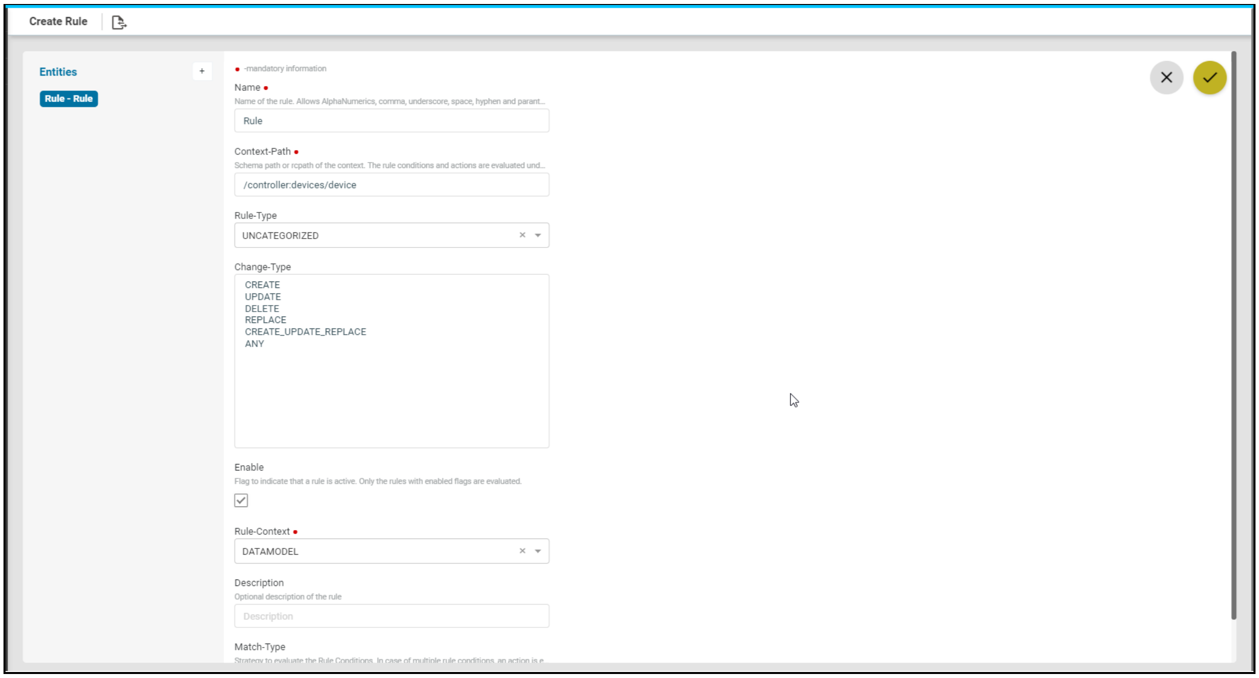
1. **Condition** - The condition part is a logical test that, if satisfied or evaluates to true, causes the action to be carried out
2. **Action** - The action part consists of one or more actions that need to be performed when the condition is met.
3. **Event** - The event part specifies the signal that triggers the invocation of the rule.

Create Rule:

1. Navigate to **Administration** > **System** > **Rule Engine** > **Rules**

2. Click **Add Rule** and fill the following fields:
    - **Name**: Enter a string that will be used to identify the rule.
    - **Rule Type**: Select the category that the rule should belong to.

      There are two types of categories available now:
        - UNCATEGORIZED
        - COMPLIANCE
    - **Enable**: Select this option if the rule should be enabled.
    - **Rule Context**: Enter the context in which the rule has to be triggered:



• -mandatory information

Name •
Name of the rule. Allows AlphaNumerics, comma, underscore, space, hyphen and parant...
Rule

Context-Path •
Schema path or rcpath of the context. The rule conditions and actions are evaluated und...
/controller:devices/device

Rule-Type
UNCATEGORIZED

Change-Type
CREATE
UPDATE
DELETE
REPLACE
CREATE_UPDATE_REPLACE
ANY

Enable
Flag to indicate that a rule is active. Only the rules with enabled flags are evaluated.
☑

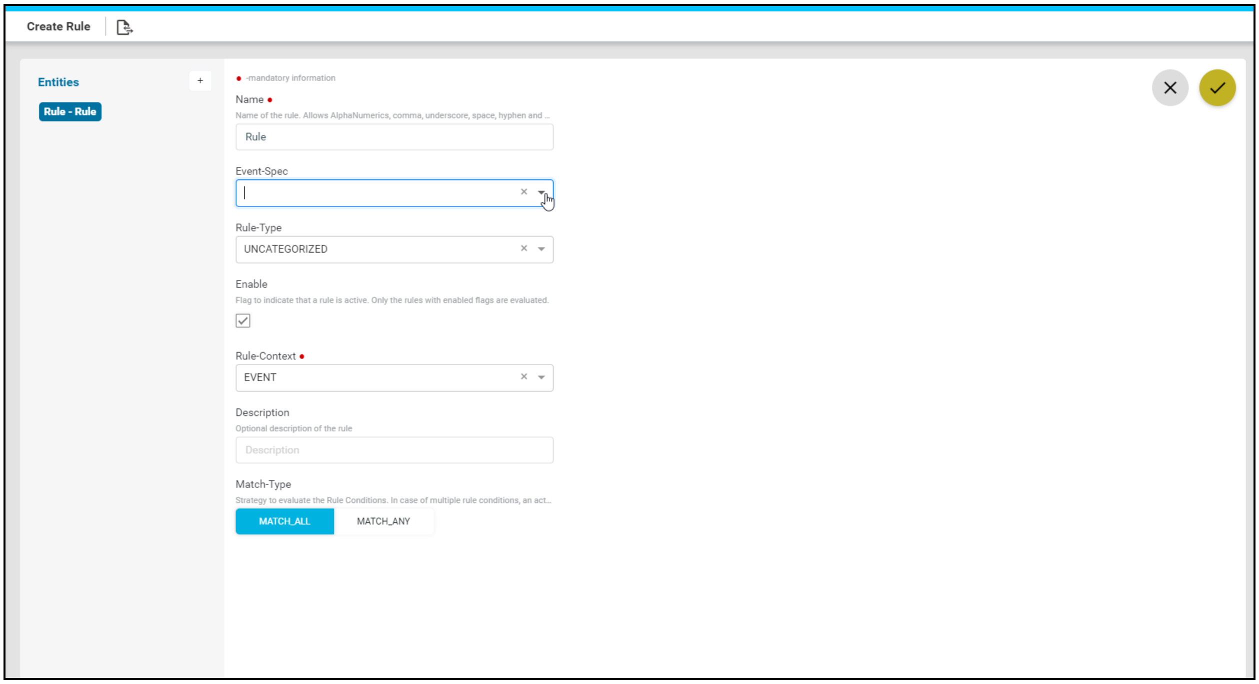
Rule-Context •
DATAMODEL

Description
Optional description of the rule
Description

Match-Type
Strategy to evaluate the Rule Conditions. In case of multiple rule conditions, an action is e...

- DATAMODEL: Select this option if the rule should be triggered on a ATOM managed entity.
    - Context path: Example: For this rule to be applicable on the devices, enter the context path as /controller:devices
- EVENT: Select this option if the rule should be triggered in the case of an event generated in ATOM.

- Event Spec: Select from the available event specs in ATOM:



Create Rule

● -mandatory information

Name ●
Name of the rule. Allows AlphaNumerics, comma, underscore, space, hyphen and ...
Rule

Event-Spec

Rule-Type
UNCATEGORIZED

Enable
Flag to indicate that a rule is active. Only the rules with enabled flags are evaluated.
☑

Rule-Context ●
EVENT

Description
Optional description of the rule
Description

Match-Type
Strategy to evaluate the Rule Conditions. In case of multiple rule conditions, an act...
MATCH_ALL | MATCH_ANY

- Description: Enter descriptive text for the rule
- Change type The rule engine will check for the conditions defined in the rule when one of the following scenarios listed below:

  Change -Type Description

  - CREATE A component is created in ATOM
  - UPDATE A component is updated in ATOM
  - DELETE A component is deleted from ATOM

- Match-Type The conditions can be evaluated on an ANY or ALL basis.

  Match-All: . All the conditions will be matched before executing the action.

- Match-Any: Any condition of the condition-set will be matched before executing the action.

Create conditions?

Conditions are statements that should be qualified by the system before subsequent actions can take place. In other words, conditions are what the rule is looking for to trigger an action.

1. Navigate to **Administration** > **System** > **Rule Engine** > **Add Rule**
2. In the **Create Rule** > Select **Entity >** click on **+** > **conditions** >click on **+** > **rule-condition**
3. In the right pane, enter values in the following fields:

   - **Index**: Enter a unique number as an identifier

- **Condition-Expression**: Enter an expression that should be checked by the rule engine for the condition to be true.

  Example: To check for a condition when the device is ONLINE, enter an expression: /controller:devices/device/status == 'ONLINE'

NOTE: Condition expression * means that the rule is triggered on all the conditions as defined in the context path.

- **Description**: Enter some text describing the condition.

Create actions?

Actions are operations that will be performed on the entities managed by ATOM once that the condition is evaluated as true by the Rule Engine.

1. Navigate to **Administration** > **System** > **Rule Engine** > **Add Rule**

2. In the **Create Rule** > Select **Entity >** click on **+** > **Actions**

3. In the right pane, enter values in the following fields:

- **Index**: Enter a unique number that will be used as an identifier and also setting the priority
- **Type**: Select the type of the component that should be acted upon, once the set condition is true.
- **Description**: Enter a description for the rule-action
- **Event-Name**: Select the appropriate event-name from the drop-down menu

Licensing & Entitlements

Usage limits in ATOM are enforced through a license file issued by Anuta Networks.

ATOM in Dedicated Mode

License File can be applied at System Level or at Each Tenant. This is applicable to ATOM Cloud Customers using a Silo/Dedicated Instance or an On-Premises instance. Following are the Admin & Tenant privileges:

1. Anuta Networks will issue the License
2. For On-Premises Deployment - Customer will apply the License
3. For ATOM Cloud Deployment - ATOM Cloud Administrator will apply the License
4. System Admin will have full access (View, Apply & Usage) to System and Tenant License Files

5. Tenant Admin/User will be able to view Available licenses and Usage for Tenant they are assigned to

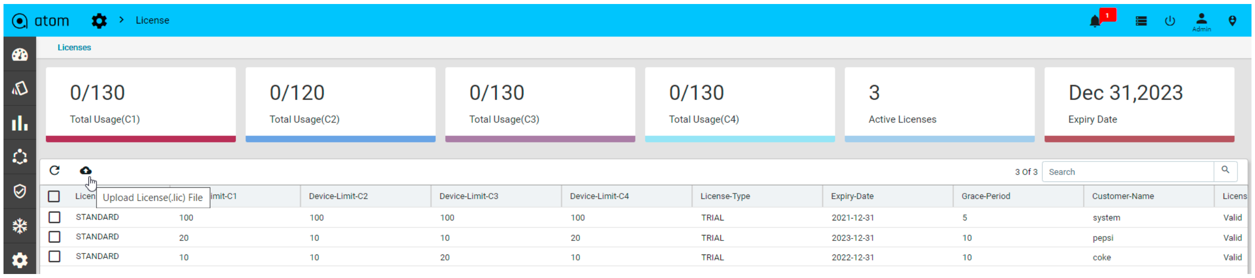
ATOM in Multi-Tenant or Shared Mode

This is applicable only in ATOM Cloud Following are the Admin & Tenant privileges:

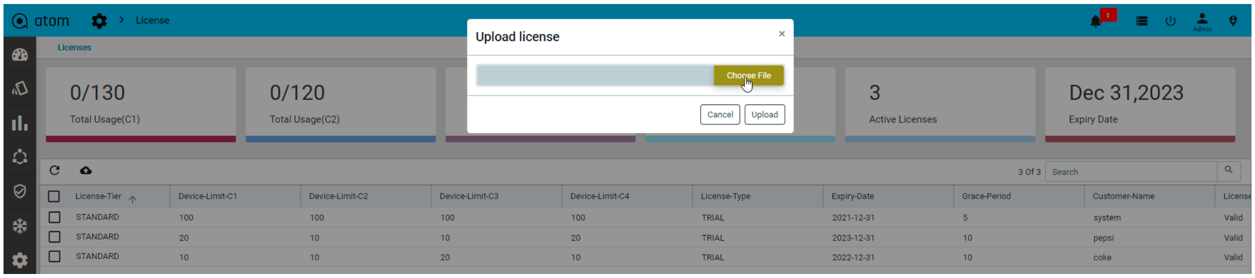
1. Anuta Networks will issue the License
2. Anuta Cloud Administrator will issue & Apply the License for each Tenant
3. System Admin will have full (View, Apply & Usage) access to System and Tenant License Files
4. Tenant Admin/User will be able to view Available licenses and Usage for Tenant they are assigned to

Uploading a License

We can upload the license using the upload button. Multiple license files can be uploaded to ATOM. Usage limits are cumulative of all License Files.



□	Licen	imit-C1	Device-Limit-C2	Device-Limit-C3	Device-Limit-C4	License-Type	Expiry-Date	Grace-Period	Customer-Name	Licens
□	STANDARD	100	100	100	100	TRIAL	2021-12-31	5	system	Valid
□	STANDARD	20	10	10	20	TRIAL	2023-12-31	10	pepsi	Valid
□	STANDARD	10	10	20	10	TRIAL	2022-12-31	10	coke	Valid

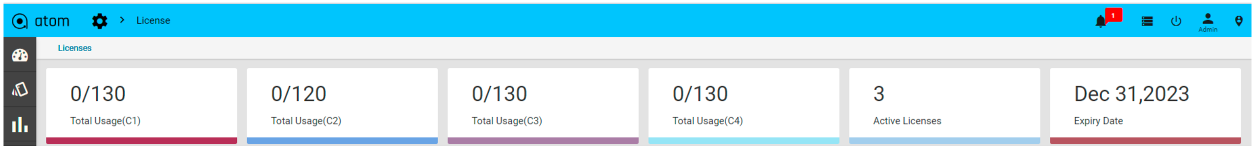


□	License-Tier	Device-Limit-C1	Device-Limit-C2	Device-Limit-C3	Device-Limit-C4	License-Type	Expiry-Date	Grace-Period	Customer-Name	License
□	STANDARD	100	100	100	100	TRIAL	2021-12-31	5	system	Valid
□	STANDARD	20	10	10	20	TRIAL	2023-12-31	10	pepsi	Valid
□	STANDARD	10	10	20	10	TRIAL	2022-12-31	10	coke	Valid

License Summary

To view the License Summary & Details - Navigate to **Administration > License**

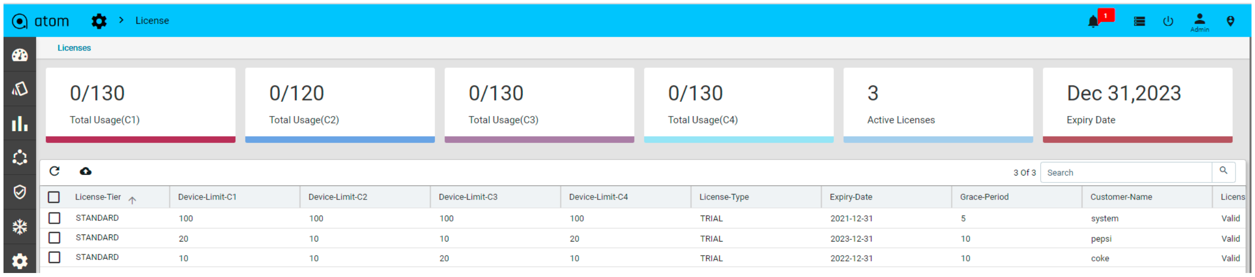
License Summary will show the overall summary across all the License Files.



Total Usage(C1): C1 Category Licenses Used vs Allowed
Total Usage(C2): C2 Category Licenses Used vs Allowed

Total Usage(C3): C3 Category Licenses Used vs Allowed
Total Usage(C4): C4 Category Licenses Used vs Allowed
Active licenses: Number of licenses which are active will be shown under active licenses
Expiry date: Farthest expiry date among all the License Files

Below the License Summary, all available License File details are shown as below:

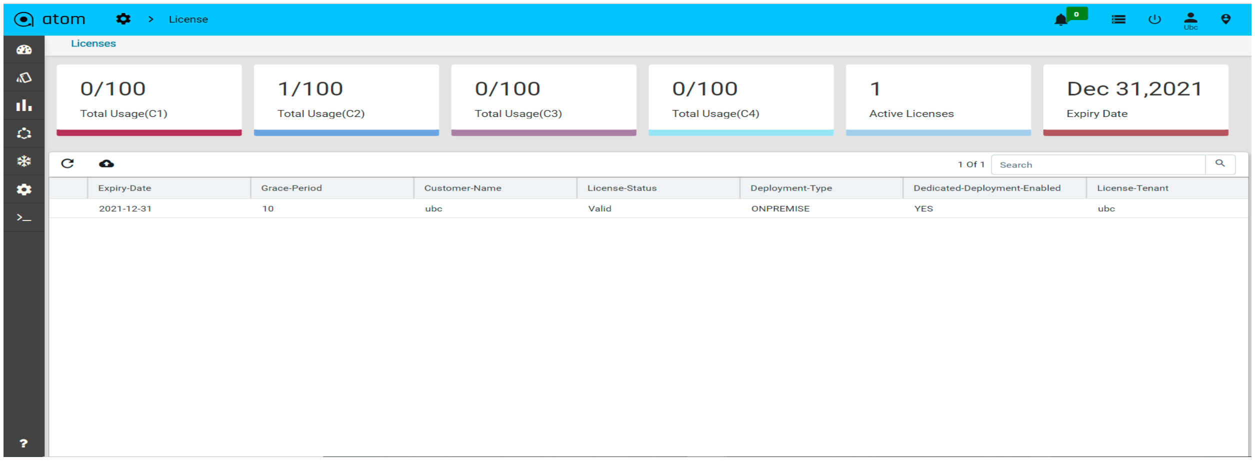


0/130 Total Usage(C1)
0/120 Total Usage(C2)
0/130 Total Usage(C3)
0/130 Total Usage(C4)
3 Active Licenses
Dec 31,2023 Expiry Date

3 Of 3

	License-Tier	Device-Limit-C1	Device-Limit-C2	Device-Limit-C3	Device-Limit-C4	License-Type	Expiry-Date	Grace-Period	Customer-Name	Licens
□	STANDARD	100	100	100	100	TRIAL	2021-12-31	5	system	Valid
□	STANDARD	20	10	10	20	TRIAL	2023-12-31	10	pepsi	Valid
□	STANDARD	10	10	20	10	TRIAL	2022-12-31	10	coke	Valid

Tenant admin license



0/100 Total Usage(C1)
1/100 Total Usage(C2)
0/100 Total Usage(C3)
0/100 Total Usage(C4)
1 Active Licenses
Dec 31,2021 Expiry Date

1 Of 1

Expiry-Date	Grace-Period	Customer-Name	License-Status	Deployment-Type	Dedicated-Deployment-Enabled	License-Tenant
2021-12-31	10	ubc	Valid	ONPREMISE	YES	ubc

General Settings

You can edit and save the change the configuration parameters for each module in ATOM and these global changes are applicable to all the resources contained in each module.

1. Go to **Administration** > **System** > **General Settings**
2. In the **General Settings** panel, you can review the default settings of the following options and modify them.
3. Click **Edit** to modify the parameters arranged for each module.

URL Management

1. **Base URL**: This option enables the administrator to set the address (Base URL) for the third-party clients to make API request calls to ATOM server. The format of the Base URL

is http[s]://ip|hostname, where ip is the IP address of the ATOM server and the hostname is the host name of the ATOM server.

2. **Support URL**: Enter the URL of the support to login to the support portal of Anuta Networks
3. **User Session Timeout**: This is the time that you can set for the ATOM server to timeout if no activity takes place in the browser for a specified period of time. The user will be automatically logged out of the session, after the expiry of the specified time.

Alert Monitoring

1.**Unwanted-alertlabel-keys:** Each alert consists of multiple labels like alert name, app, collections_name etc, out of which some may not be persisted in Atom.

Chart-setting

1.**Chart-theme:** Select the chart theme from drop down,it should show in the monitoring custom chart.

2.**Chart-refresh-interval:** To set the default refresh interval,it should refresh the chart based on the given interval time in this global set.

Device Management

1. **Configuration Retrieval**: This option enables the server to retrieve configurations from the devices after each operation. By default, this option is selected.
2. **Syslog Configuration**: This option enables ATOM to configure the device to send syslog events. By default, this option is selected.
3. **Persist Configuration**: This option enables the configurations to persist in the NVRAM of the device after each provisioning.
4. **Dry Run**: This option enables ATOM to push the commands to the device or not. When selected the commands are pushed to the device..
5. **Auto Retry**: Select this option to enable ATOM to try establishing the connection with the device in case the connection is lost initially
    a. **Number of Retries**: Enter the number of times that ATOM should try establishing the connection with the device in case of failure.
    b. **Retry Wait Time**: Enter the time period that ATOM should wait between subsequent retries.
6. **Configuration Parsing**: This option enables ATOM to parse the configuration retrieved from the device and store the configuration data in the data model maintained in ATOM.
7. **Configuration Pull Type**: This option determines how the mode of retrieving the running configuration from the device

- TFTP_EXPORT - The running configurations are obtained from the TFTP server
- SHOW_COMMAND - The current configuration on the device are obtained by ATOM

8. **Log Running Config**: This option enables ATOM to dump the retrieved configurations from the device in the logs obtained for the Config Retrieval Jobs.
9. **Run-extended-inventory:** TConfiguration settings on disabling the extended inventory when device is added
10. **Generate-config-inventory-event**: This option allows ATOM to enable or disable the config inventory event

Service now

1.**Snow-instance :** To enable service now option to perform the service now workflow

2.**Snow-url :** To provide the instance id for service-now

3.**Snow-username :** User name for service now

4.**Snow-password :** Password for service now

Service Management

1. **Service Auto Retry**: Select this option if ATOM should retry pushing the configurations to the device in the event of a service failure.
    a. **Service Number of retries**: Enter the number of times ATOM should retry sending the configuration after initial failure of the service.
    b. **Service Retry Wait Time**: Enter the duration of the time that ATOM should wait before trying to establish a connection with the device again.
2. **Auto Delete Stale Inv Data**: Select this option if all the available “stale” entries should be deleted from ATOM. Stale entries are the configurations that are available in the device and not seen in ATOM. These differences are not due to the service configurations created by ATOM and pushed to the device.
3. Delayed Event Buffer Time:

TSDB

1.**Retention-period:** Retention period of prometheus db

2.**Retention-size:** Retention period of prometheus db

3.**Namespace:** Namespace to get the stateful sets and config map

4.**Tsdb-url:** Url to get metrics

5.**Workflow-url:**The url to get workflow

6.**Tsdb-config-map-name:**The name of the tsdb config map

7.**Tsdb-stats-name:**The statefulset name of the tsdb server

8.**Tsdb-infra-alert-config-map-name:**The name of the tsdb config map for system alert

9.**Alert-repeat-interval:**The repeat interval time of the alerts

10.**Tsdb-alert-manager-config-map-name:**The name of the alert manager config map

SNMP v2 Configurations

1. **Enable Device Audit Trail Mode**: Select this option to view all the events generated in ATOM while communicating with the device using the SNMP protocol. SNMP events such as SNMP WALK, GET, DEVICE_LOGIN and DEVICE_COMMAND EXECUTION are captured in ATOM as Events.
2. **Enable Multi Tenancy**: Select this option to enable ownership of the resource. Once this option is enabled, the fields “Owner & Sharedwith” are displayed
3. **SNMP Configuration Contact**: Enter the mailing ID for contacting the admin (support) managing the SNMP server.
4. **SNMP Configuration Location**: Enter the location of SNMP server
5. **SNMP Community string**: Enter the community string required for authentication in SNMPv2 sessions..

SMTP Configurations

You may have to configure an external email server to send email notifications to the ATOM users.

SMTP Mail From: You can set up an external SMTP email server to send email notifications to the ATOM users. To do so, enter values in the fields described below:

1. **SMTP Host**: Enter the name of the server that will send the email.
2. **SMTP Port**: Enter the number of the port that is used to connect to the SMTP host
3. **SMTP Auth Required**: Enable this option is authentication is required to connect to the SMTP Host
4. **SMTP User Name**: Enter the name of SMTP user
5. **SMTP Password**: Enter the password to retrieve the email.
6. **SMTP Encryption SSL**: Select this option if the connection to the SMTP server should use SSL as the authentication method.
7. **SMTP Encryption TLS**: Select this option if the connection to the SMTP server should use TLS as the authentication method

Notification

Email Notifications: Select this option if you wish to be notified via email about changes taking place in the system.

License Expiry Threshold (days): Set the number of days to notify the user that the license is about to expire.

Python Remote Debug

Python Remote Debug: Select this option if you want to allow debugging of the logs in ATOM remotely.

Debug Server Port: Enter the port number of the remote debug server.

Developer Options

Enable Developer Mode: Select this option for the Developer Options to be visible in ATOM.

Using the Developer Options, the admin can view the all the ATOM entities represented in the data model tree, figure out the xpaths of the objects , all the device and service ATOM SDK

System Maintenance

Enable Maintenance Mode: Select this option if the system needs to be suspended for some time during which no operation can be performed on the ATOM VM. All the TASKS running in ATOM should be in "COMPLETE" state before enabling this option.

View Actions

Show Module Prefixes: Enable this option if the module prefixes for child entities on Profile and Action items should be made visible.

Request Sanitization

As an administrator , you can protect the data entered in ATOM from malicious attacks in the form of HTML tags. These tags when injected into the application's HTML code can make ATOM vulnerable to these attacks and have a large impact as any user of the application can be a target.

The data entered in ATOM can be sanitized based on the

1. **Security Sanitizer Enabled**: Select this option if the sanitization filter should be enabled in ATOM.
2. **Sanitizer Exclude URL**: Enter the tags that should be excluded from filtering. The patterns mentioned here are allowed as values in the text fields in any of the HTML forms used in ATOM. For example, These tags can be added in the exclusion list -/login,/initialize,/logout,/*.js,/controller:admin-settings$
3. **Sanitizer Patterns**: Enter the patterns that will be used to sanitize the data and should not be allowed as values in any of the fields in any of the text fields in the HTML forms of ATOM.

An appropriate error message is displayed in the webpage when the user inputted data matches with the sanitizer pattern mentioned above.

Password Profile

The parameters required for a password that is used to authenticate logging into ATOM can be

1. **Password Expiry Days**: Enter the number of days for which the set password is valid.
2. **Password Pattern**:
3. **Password Min Length**: Enter the minimum number of characters that should be contained in the password used to authenticate the logging into ATOM.
4. **Password Max Length**: Enter the maximum number of characters that should be contained in a password used to authenticate the logging into ATOM.

Primary container load limit

1.Set the range of container load limit

Workflow

1.If true both delete both active and historical instances on package unload,if false, history will be maintained but unload will fail if active instances are there.

Look and Feel

You can change the "look and feel" of ATOM’s GUI by uploading images of your choice to ATOM.

1. Navigate to **Administration** > **UI Customizations** > **Look & Feel**
   - **Product Logo**: Select the image that you should be displayed as the product logo, visible on all the screens.
   - **Login Screen Logo**: Select the image that should be displayed on the login screen.
2. Click **Update** for the uploaded images to come into effect on the UI

   or
3. Click **Defaults** to revert to the default images.

Event Summary

ATOM generated events are grouped into different categories, (Alarm, Services and System) with an assigned severity to each category. ATOM maintains an event catalog and decides how and when an event is created and whether to associate an alarm with the event. Events are generated in ATOM through notifications received via the syslog and trap messages, inventory changes, discovery of the devices, changes in the ATOM server itself.

The severity of events can be classified into:

- **CRITICAL** - Events that demand the immediate attention of the system administrator. They are generally directed at the global (system-wide) level, such as System or

Application. They can also be used to indicate that an application or system has failed or stopped responding.

- **WARNING** - A warning indicates that a component or application is not in an ideal state and that some further actions could result in a critical error. These can be treated as forewarning of a problem that might occur.
- **ERROR** - Events that indicate problems, but in a category that does not require immediate attention.
- **INFORMATIONAL** - Events that pass noncritical information to the administrator.

Not all Events are associated with Alarms. Multiple events can be mapped to the same alarm. All Alarm Events are associated with an alarm that can be either state, CLEARED or ACTIVE.

Notifications

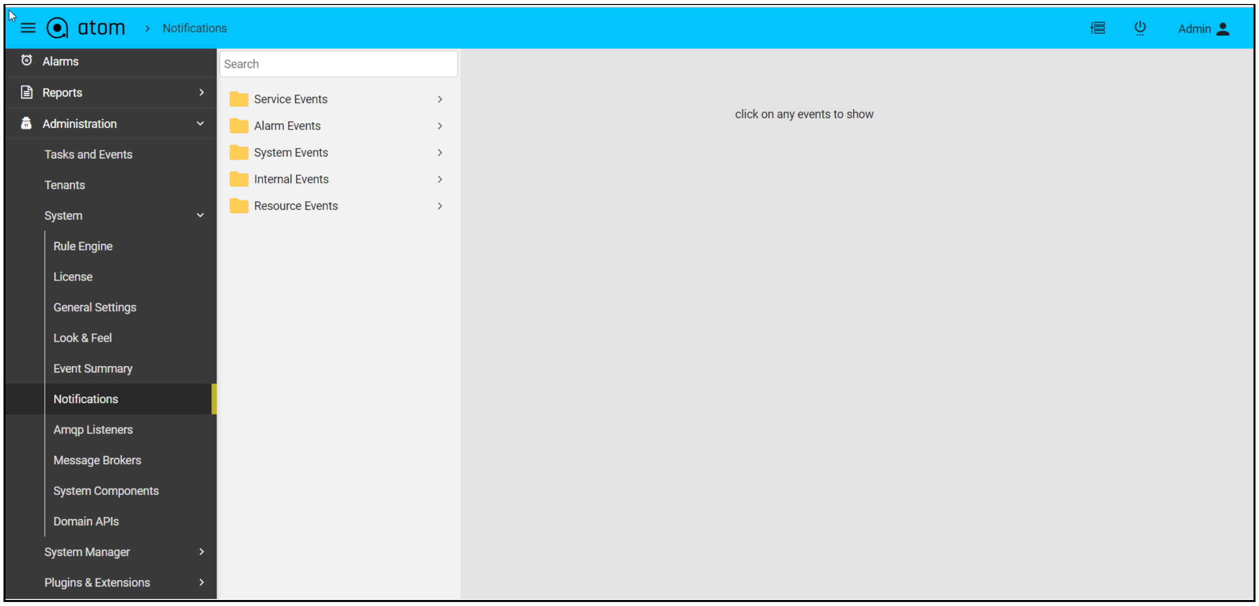
All the events that are triggered in ATOM due to various reasons such as change in the component state, device unreachability, high CPU usage of the system and so on can be notified to subscribers. As an administrator, you can create notifications such that users, message brokers can be notified when an event is triggered.

Subscribers can be added to the events falling in any of these categories:

- Alarm Events
- Internal Events
- System Events
- Resource Events
- Service Events

Each of these categories contain many Events, pre-defined in ATOM. You can create subscribers or the recipients of a particular notification.

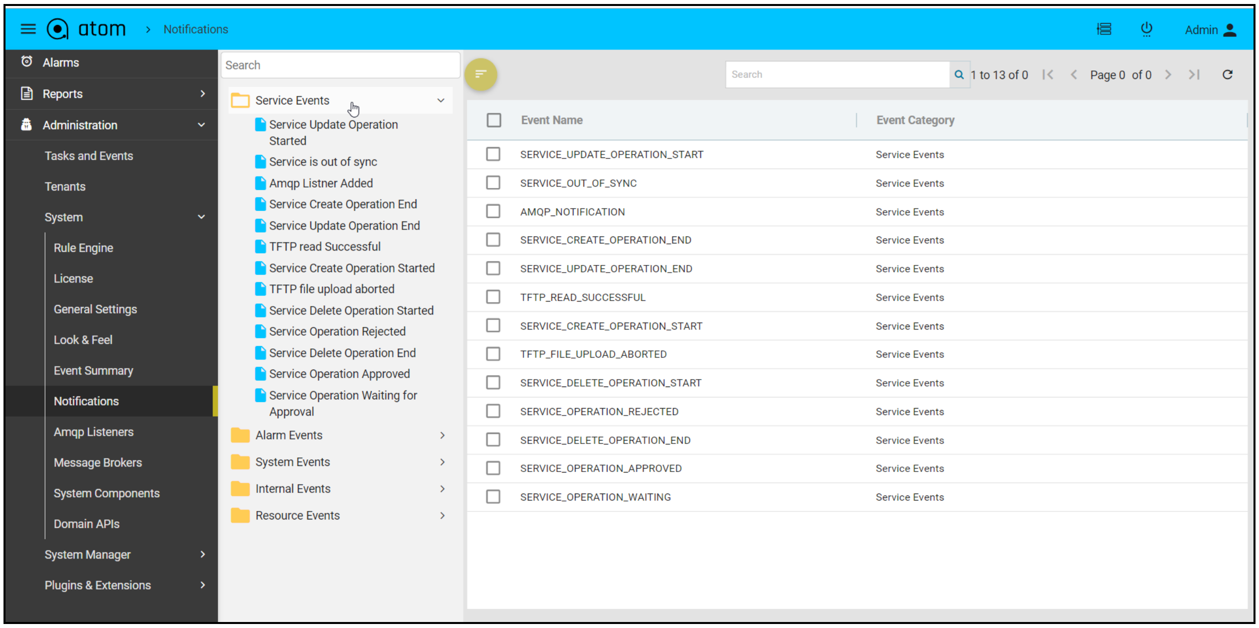
1. Navigate to **Administration** > **System** > **Notifications**



click on any events to show

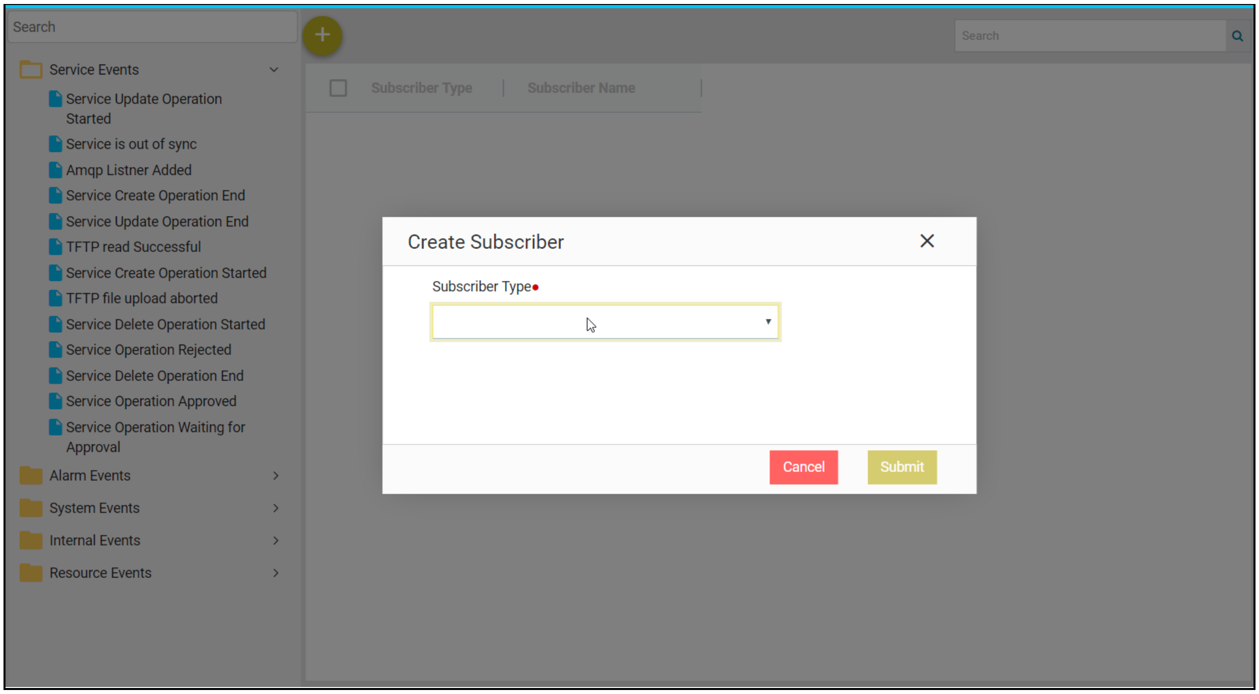
2. In the left pane, click a folder (of your choice). All the events are grouped into different categories

3. In the expanded view of the folder, select an Event as shown below:



□	Event Name	Event Category
□	SERVICE_UPDATE_OPERATION_START	Service Events
□	SERVICE_OUT_OF_SYNC	Service Events
□	AMQP_NOTIFICATION	Service Events
□	SERVICE_CREATE_OPERATION_END	Service Events
□	SERVICE_UPDATE_OPERATION_END	Service Events
□	TFTP_READ_SUCCESSFUL	Service Events
□	SERVICE_CREATE_OPERATION_START	Service Events
□	TFTP_FILE_UPLOAD_ABORTED	Service Events
□	SERVICE_DELETE_OPERATION_START	Service Events
□	SERVICE_OPERATION_REJECTED	Service Events
□	SERVICE_DELETE_OPERATION_END	Service Events
□	SERVICE_OPERATION_APPROVED	Service Events
□	SERVICE_OPERATION_WAITING	Service Events

4. In the **Events Subscribers** pane, click **Add** to the subscriber to the ATOM generated event.


Search
Service Events
Service Update Operation Started
Service is out of sync
Amqp Listner Added
Service Create Operation End
Service Update Operation End
TFTP read Successful
Service Create Operation Started
TFTP file upload aborted
Service Delete Operation Started
Service Operation Rejected
Service Delete Operation End
Service Operation Approved
Service Operation Waiting for Approval
Alarm Events
System Events
Internal Events
Resource Events
Search
Subscriber Type
Subscriber Name
Create Subscriber
Subscriber Type
Cancel
Submit

5. In the **Create Subscriber (s)** screen, choose the type of the Subscriber:
   - **User**
     - These users are the users created in ATOM . See the section, Creating Users in ATOM
   - **AMQP Broker**
     - These are the message brokers where the events generated in ATOM are published. See the section, Creating Message Brokers for more information.

Message Brokers

As an administrator, you can configure a message broker to publish the events generated by ATOM. A message broker can be notified of all events or an event belonging to a specific event type.

In the current implementation of ATOM message brokers, RabbitMQ is the supported AMQP server where ATOM publishes the events and from where any AMQP listener consumes them.

Prerequisites:

Before creating Message Brokers in ATOM, check whether a virtual host exists in RabbitMQ.

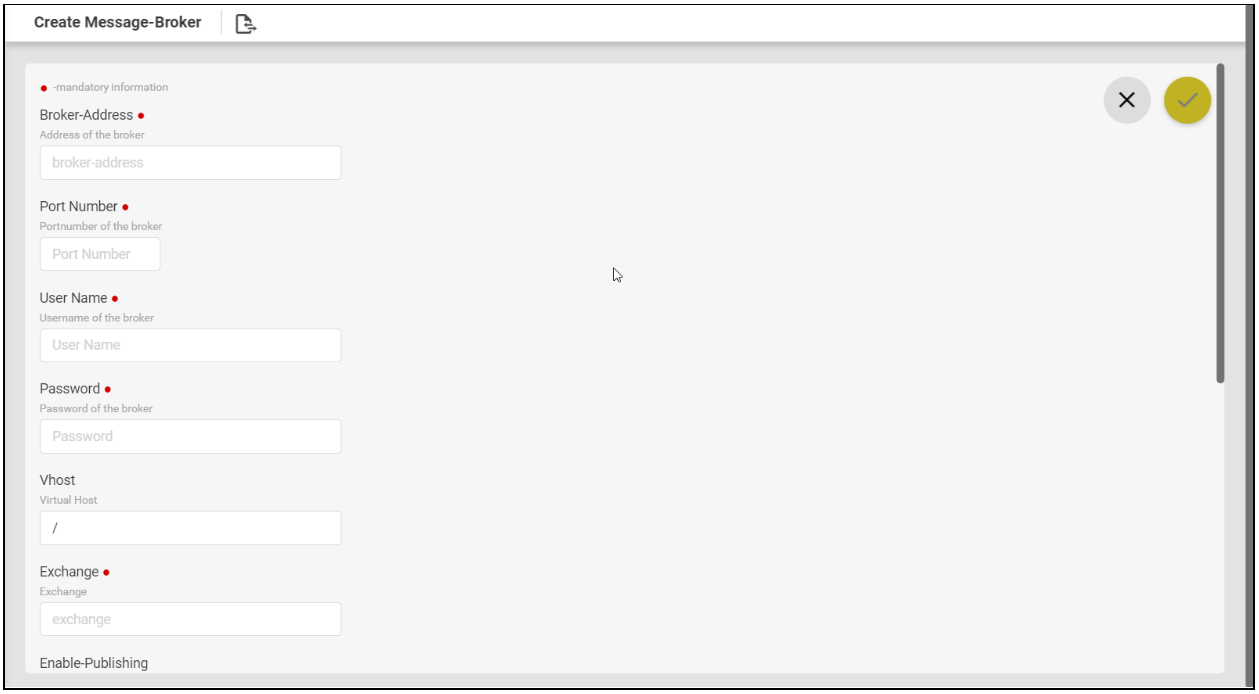
If there is no existing vHost, create a new virtual host as shown below:

1. Login to RabbitMQ and go to the Virtual Hosts tab to add a new vHost

2. Add users for the created virtual host
3. Create users with required permissions in the vHost

Creating Message Brokers in ATOM:

1. Navigate to **Administration** > **System** > **Message Brokers** > click Add
2. In the **Create message broker** screen, enter the following fields as described below:



Create Message-Broker

● -mandatory information

Broker-Address ●
Address of the broker
broker-address

Port Number ●
Portnumber of the broker
Port Number

User Name ●
Username of the broker
User Name

Password ●
Password of the broker
Password

Vhost
Virtual Host
/

Exchange ●
Exchange
exchange

Enable-Publishing

- **Broker Address**: Enter the IP address of the message broker (AMQP server which in our case is RabbitMQ).
- **Port Number**: This is the port number used to communicate with ATOM. By default, it is 5673.
- **Username and Password**: Enter the credentials for logging into the message broker.
- **vHost**: Enter the virtual host name that was created in RabbitMQ. Refer "Prerequisites" section.
- **Exchange**: Enter the name of the exchange in the message broker where the events generated in ATOM should be published. The default name is “ATOMNotifications”.
- **Enable Publishing**: This option enables the administrator to enable or disable sending notifications from ATOM to the exchange. By default, the checkbox is selected, which means that the events can be sent to the broker.

- **Connection Status**: After saving the Message Broker, this field will be updated to True/False based on the success or failure of connectivity to RabbitMQ
- Click **Add** to select the events that should be sent to the message broker.

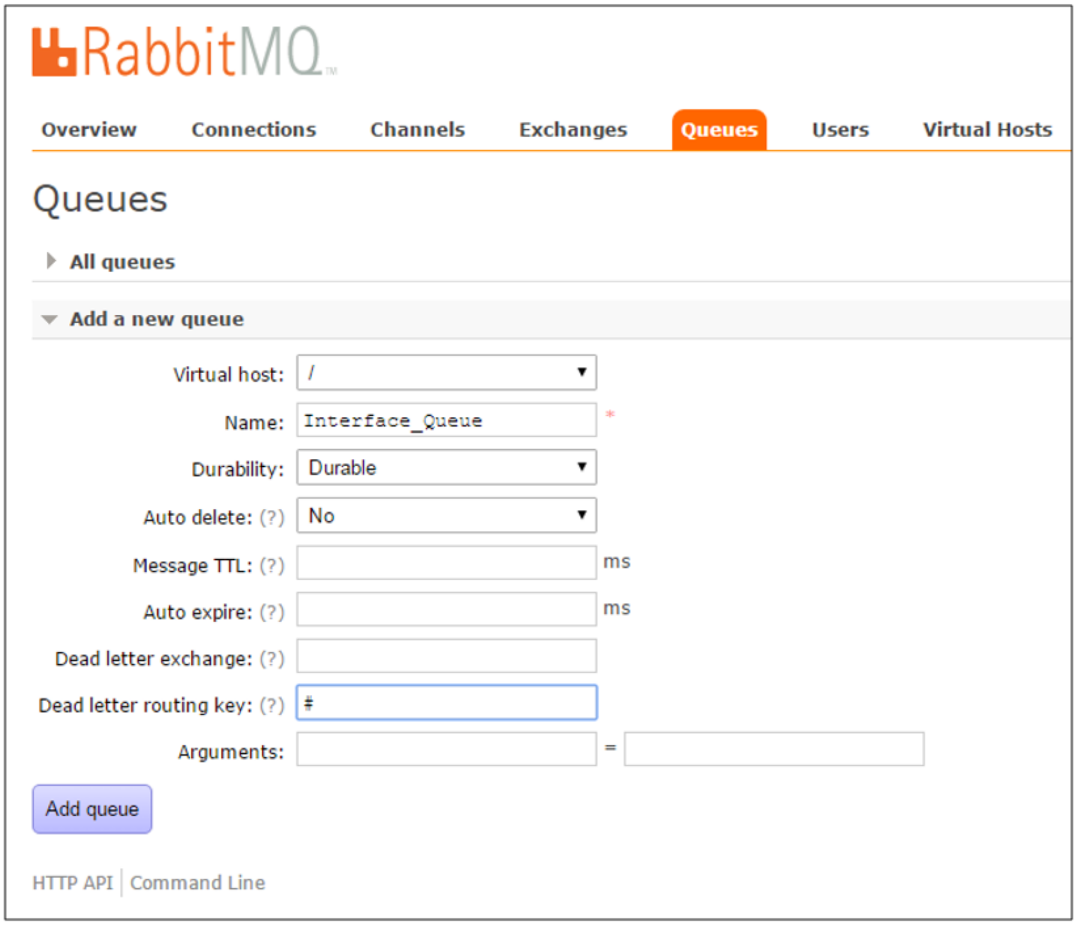
AMQP Listeners

You can create AMQP listeners in ATOM so that the messages (events) published in ATOM can be consumed by them.

In the current implementation of ATOM message brokers, RabbitMQ is the supported AMQP server where ATOM publishes the events and from where any AMQP listener consumes them.

Prerequisites:

1. Login to RabbitMQ Message Broker using the appropriate credentials
2. Create Queues in RabbitMQ
    a. Login to RabbitMQ and go to the Queues tab.
    b. Add a new queue as shown below:



Virtual host: /

Name: Interface_Queue *

Durability: Durable

Auto delete: (?) No

Message TTL: (?) ms

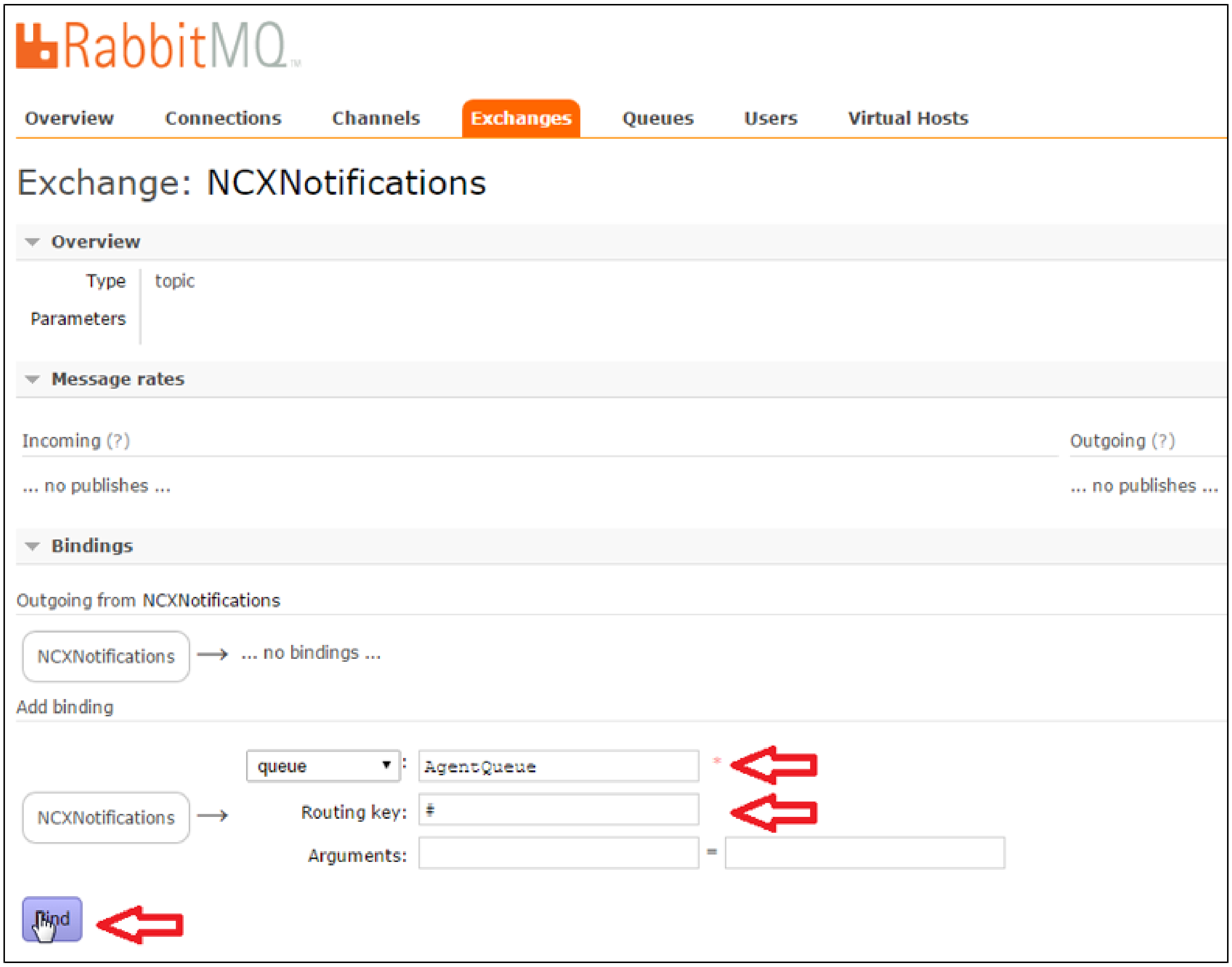
Auto expire: (?) ms

Dead letter exchange: (?)

Dead letter routing key: (?) #

Arguments: =

3. Bind the Queue with the Exchange in RabbitMQ
   i. In RabbitMQ, navigate to **Exchanges**
   ii. An Exchange entry is created in RabbitMQ and connection with ATOM is established
   iii. Select the Exchange, “**ATOMNotifications**”, created in ATOM and bind the created Queue to the same as follows:



Exchange: NCXNotifications

Overview

Type	topic
Parameters	

Message rates

Incoming (?) ... no publishes ...

Outgoing (?) ... no publishes ...

Bindings

Outgoing from NCXNotifications

NCXNotifications → ... no bindings ...

Add binding

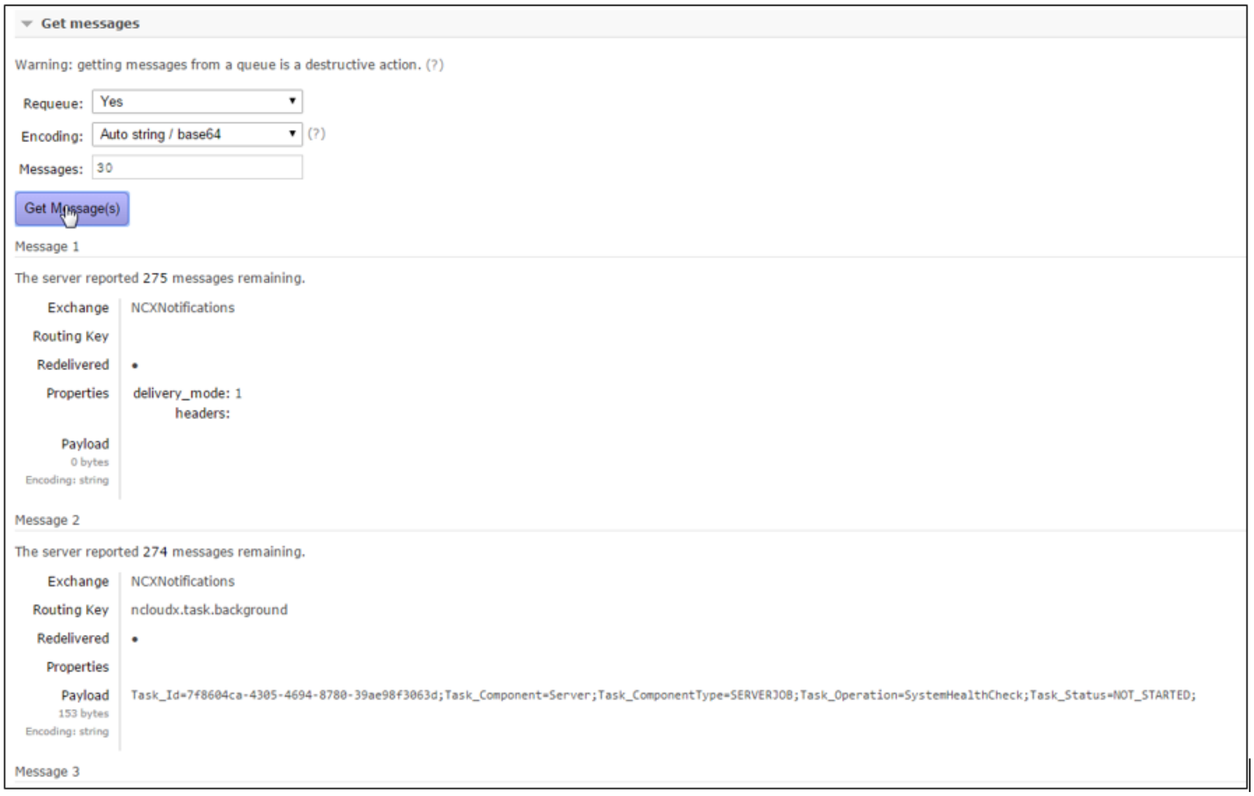
NCXNotifications →

queue : AgentQueue *

Routing key: #

Arguments: =

4. Verify the messages in RabbitMQ
   i. Go to **Queue** > **Get messages**
   ii. In the **Messages** field, enter a number for the messages that you want to be displayed.
   iii. Click **Get Messages** as shown below:



Get messages

Warning: getting messages from a queue is a destructive action. (?)

Requeue: Yes

Encoding: Auto string / base64 (?)

Messages: 30

Message 1

The server reported 275 messages remaining.

Exchange	NCXNotifications
Routing Key	
Redelivered	•
Properties	delivery_mode: 1 headers:
Payload 0 bytes Encoding: string	

Message 2

The server reported 274 messages remaining.

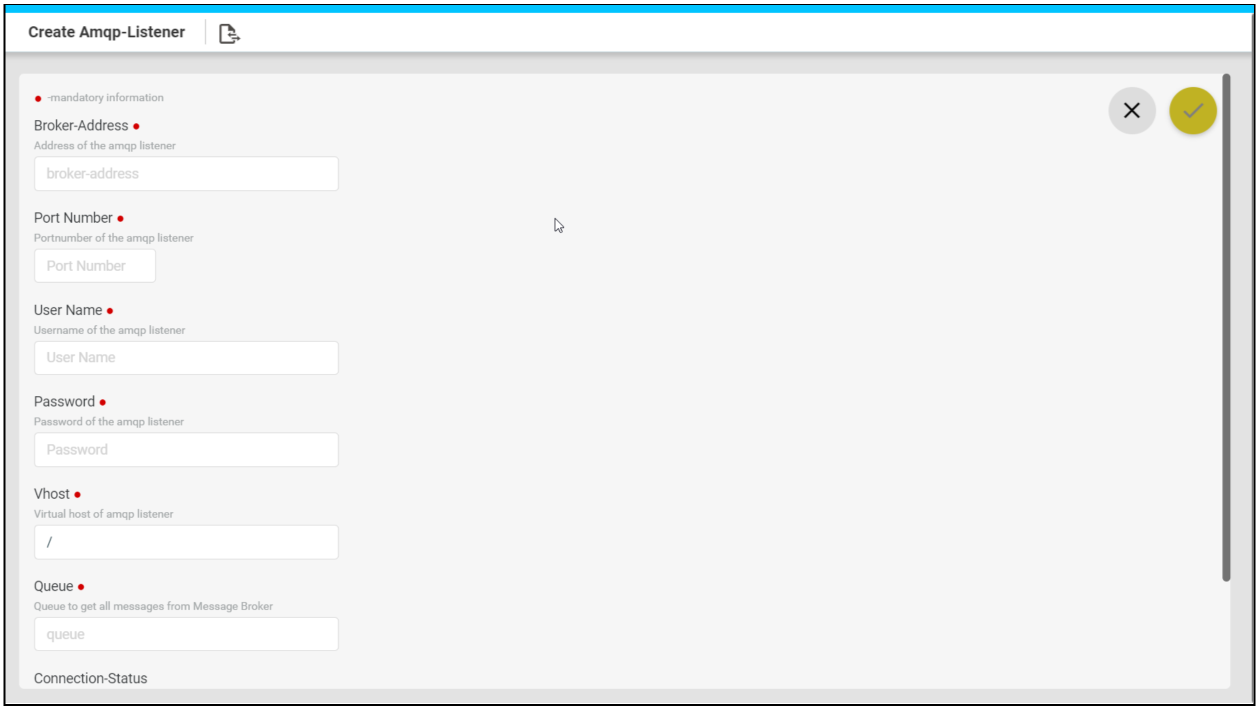
Exchange	NCXNotifications
Routing Key	ncloudx.task.background
Redelivered	•
Properties	
Payload 153 bytes Encoding: string	Task_Id=7f8604ca-4305-4694-8780-39ae98f3063d;Task_Component=Server;Task_ComponentType=SERVERJOB;Task_Operation=SystemHealthCheck;Task_Status=NOT_STARTED;

Message 3

To create the AMQP listener in ATOM, do the following:

1. Navigate to **Administration** > **System** > **AMQP Listeners**
2. Click **Add AMQP Listener** in the right pane to create a listener in ATOM

   Enter values in the fields in the Create AMQP Listener screen as described below:



Create Amqp-Listener

● -mandatory information

Broker-Address ●
Address of the amqp listener
broker-address

Port Number ●
Portnumber of the amqp listener
Port Number

User Name ●
Username of the amqp listener
User Name

Password ●
Password of the amqp listener
Password

Vhost ●
Virtual host of amqp listener
/

Queue ●
Queue to get all messages from Message Broker
queue

Connection-Status

- **Broker Address**: Enter the IP address of the AMQP server that will receive the notifications from ATOM.
- **Port Number**: This is the port number that needs to be configured on the message broker to listen into the ATOM notifications.
- **Username**: Enter the username of the AMQP listener.
- **Password**: Enter the password to authenticate the AMQP listener.
- **vHost**: Enter the virtual host name that was created in RabbitMQ
- **Queue**: Enter the name of the Queue created in the AMQP server (example, RabbitMQ)
- **Agent Name**: Select the ATOM agent from which the ATOM notifications are generated on a given set of devices. All the notifications created on the device managed by the ATOM agent will be published in the queue.

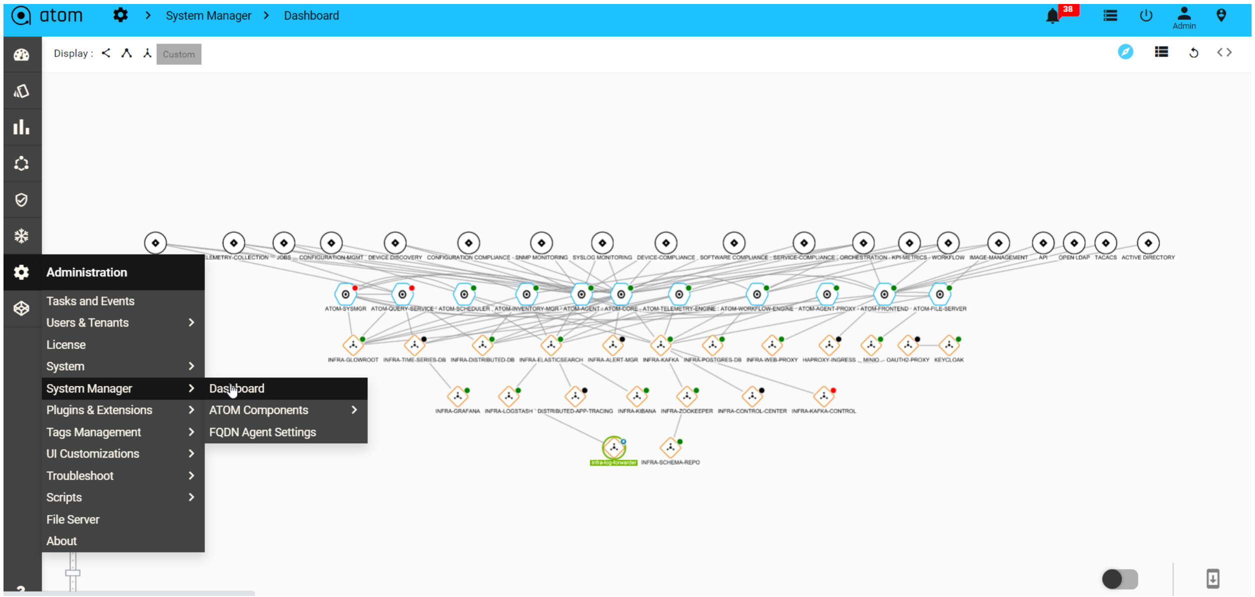
System Manager

To view the components, microservices and the applications managed by ATOM, navigate to **Administration** > **System Manager**

Dashboard:

View the graphical representation of the connection between the Applications, Components, and the underlying microservices.

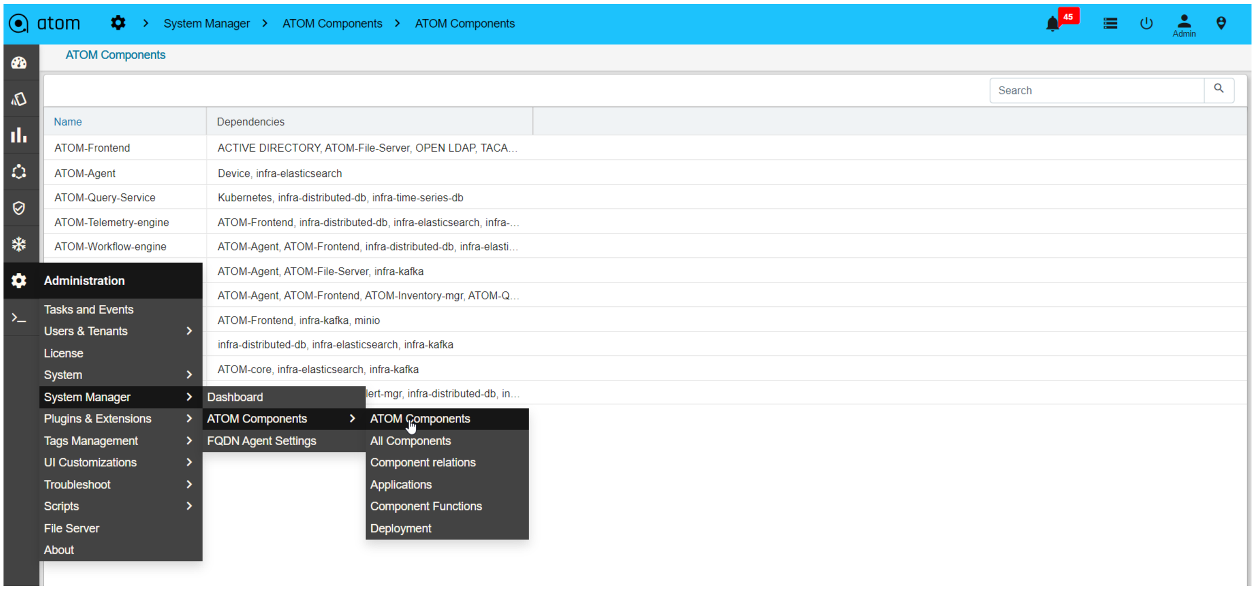
Navigate > Administration > **System Manager > Dashboard**



ATOM Components:

Navigate > Administration > **System Manager > Atom components > Atom components**

The components, of ATOM, along with their dependencies are displayed as follows:

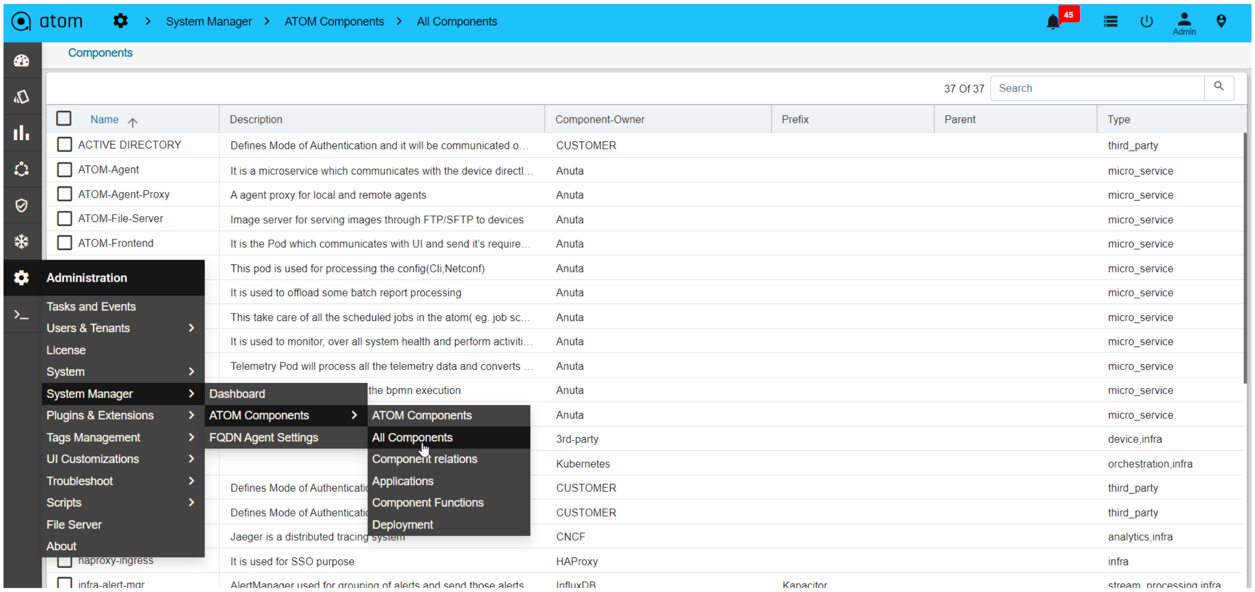


Name	Dependencies
ATOM-Frontend	ACTIVE DIRECTORY, ATOM-File-Server, OPEN LDAP, TACA…
ATOM-Agent	Device, infra-elasticsearch
ATOM-Query-Service	Kubernetes, infra-distributed-db, infra-time-series-db
ATOM-Telemetry-engine	ATOM-Frontend, infra-distributed-db, infra-elasticsearch, infra-…
ATOM-Workflow-engine	ATOM-Agent, ATOM-Frontend, infra-distributed-db, infra-elasti…
	ATOM-Agent, ATOM-File-Server, infra-kafka
	ATOM-Agent, ATOM-Frontend, ATOM-Inventory-mgr, ATOM-Q…
	ATOM-Frontend, infra-kafka, minio
	infra-distributed-db, infra-elasticsearch, infra-kafka
	ATOM-core, infra-elasticsearch, infra-kafka
	lert-mgr, infra-distributed-db, in…

All Components:

Navigate > Administration > **System Manager > Atom components > All components**

The components of the Kubernetes cluster that are not owned by Anuta are displayed as follows:

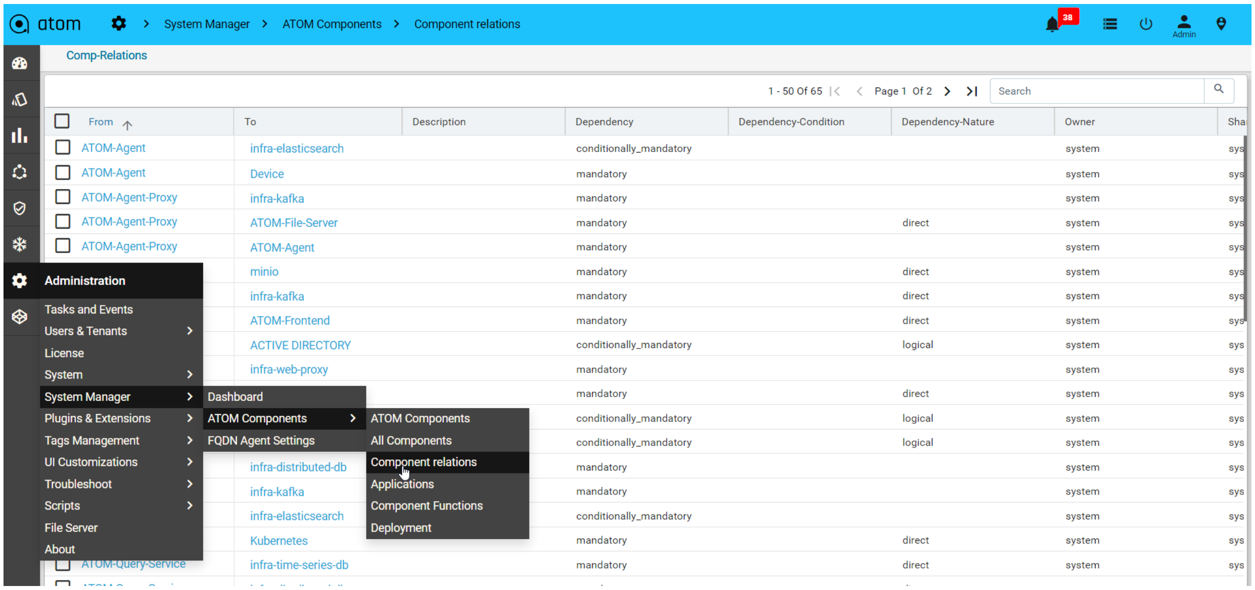


Name	Description	Component-Owner	Prefix	Parent	Type
ACTIVE DIRECTORY	Defines Mode of Authentication and it will be communicated o…	CUSTOMER			third_party
ATOM-Agent	It is a microservice which communicates with the device directl…	Anuta			micro_service
ATOM-Agent-Proxy	A agent proxy for local and remote agents	Anuta			micro_service
ATOM-File-Server	Image server for serving images through FTP/SFTP to devices	Anuta			micro_service
ATOM-Frontend	It is the Pod which communicates with UI and send it's require…	Anuta			micro_service
	This pod is used for processing the config(Cli,Netconf)	Anuta			micro_service
	It is used to offload some batch report processing	Anuta			micro_service
	This take care of all the scheduled jobs in the atom(eg. job sc…	Anuta			micro_service
	It is used to monitor, over all system health and perform activiti…	Anuta			micro_service
	Telemetry Pod will process all the telemetry data and converts …	Anuta			micro_service
	the bpmn execution	Anuta			micro_service
		Anuta			micro_service
		3rd-party			device,infra
		Kubernetes			orchestration,infra
	Defines Mode of Authenticati	CUSTOMER			third_party
	Defines Mode of Authenticati	CUSTOMER			third_party
	Jaeger is a distributed tracing system	CNCF			analytics,infra
haproxy-ingress	It is used for SSO purpose	HAProxy			infra
infra-alert-mgr	AlertManager used for grouping of alerts and send those alerts	InfluxDB	Kapacitor		stream_processing,infra

Component Relations:

Navigate > Administration > System Manager > Atom components > Component Relations

All the dependencies between the components can be visualized as follows:



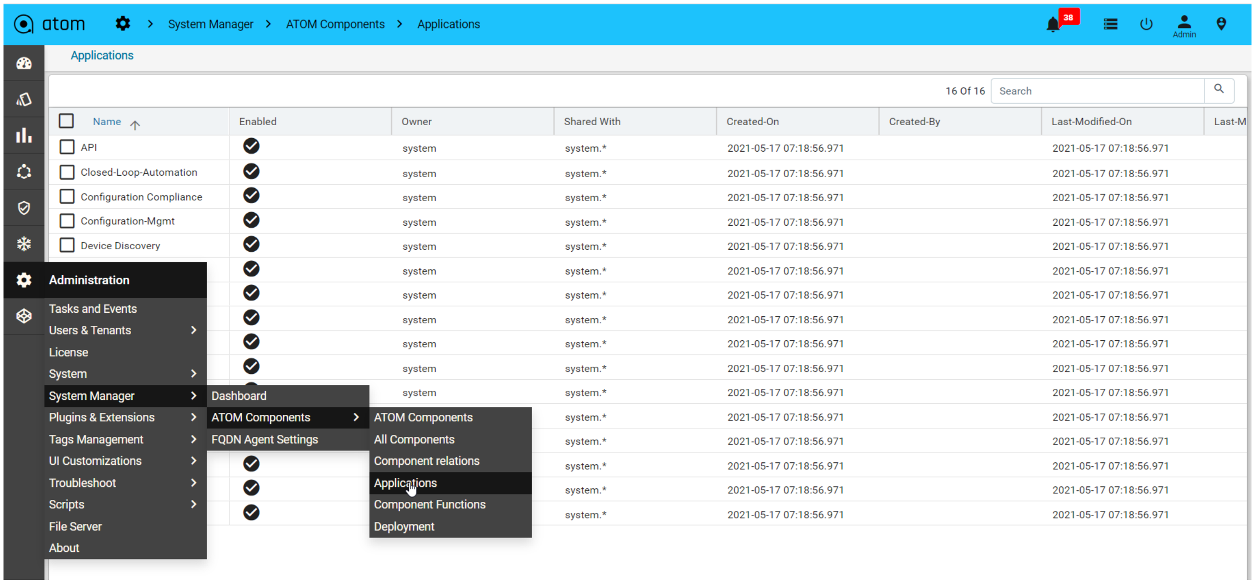
1 - 50 Of 65 Page 1 Of 2 Search

From	To	Description	Dependency	Dependency-Condition	Dependency-Nature	Owner	Sha
☐ ATOM-Agent	infra-elasticsearch		conditionally_mandatory			system	sys
☐ ATOM-Agent	Device		mandatory			system	sys
☐ ATOM-Agent-Proxy	infra-kafka		mandatory			system	sys
☐ ATOM-Agent-Proxy	ATOM-File-Server		mandatory		direct	system	sys
☐ ATOM-Agent-Proxy	ATOM-Agent		mandatory			system	sys
	minio		mandatory		direct	system	sys
	infra-kafka		mandatory		direct	system	sys
	ATOM-Frontend		mandatory		direct	system	sys
	ACTIVE DIRECTORY		conditionally_mandatory		logical	system	sys
	infra-web-proxy		mandatory			system	sys
			mandatory		direct	system	sys
			conditionally_mandatory		logical	system	sys
			conditionally_mandatory		logical	system	sys
	infra-distributed-db		mandatory			system	sys
	infra-kafka		mandatory			system	sys
	infra-elasticsearch		conditionally_mandatory			system	sys
	Kubernetes		mandatory		direct	system	sys
☐ ATOM-Query-Service	infra-time-series-db		mandatory		direct	system	sys

Applications:

Navigate > Administration > System Manager > Atom components > Applications

All the applications served by the underlying Components are displayed as follows:



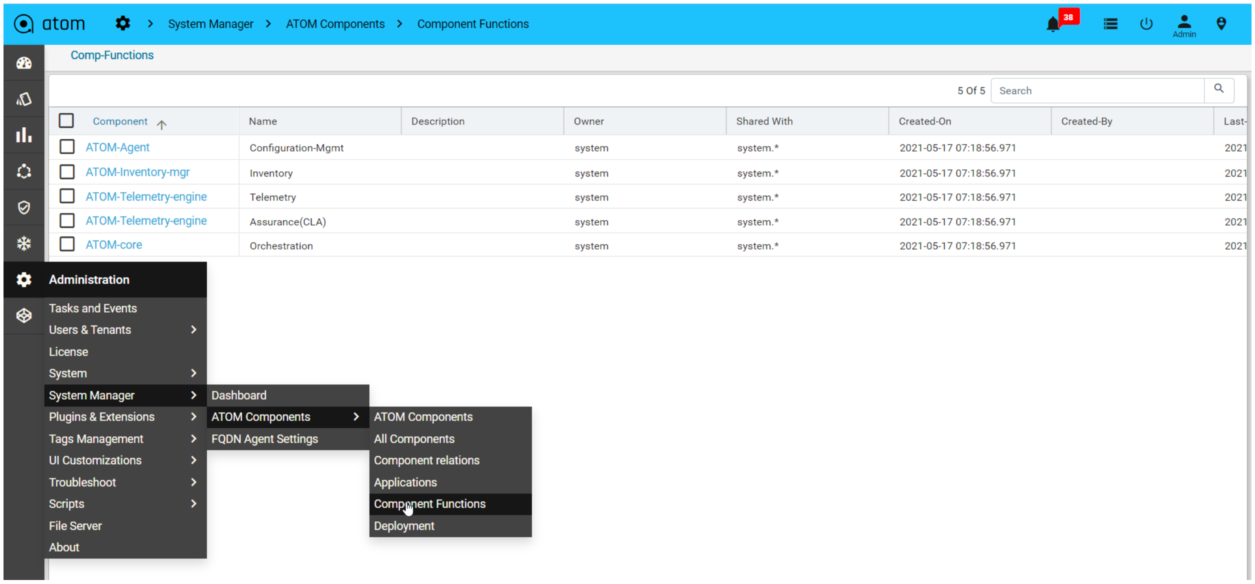
16 Of 16 Search

Name	Enabled	Owner	Shared With	Created-On	Created-By	Last-Modified-On	Last-M
☐ API	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
☐ Closed-Loop-Automation	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
☐ Configuration Compliance	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
☐ Configuration-Mgmt	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
☐ Device Discovery	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓	system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
		system	system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
			system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
			system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓		system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓		system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	
	✓		system.*	2021-05-17 07:18:56.971		2021-05-17 07:18:56.971	

Component Functions:

Navigate > Administration > **System Manager > Atom components > Component Functions**

The association of the components between the applications can be visualized as follows:

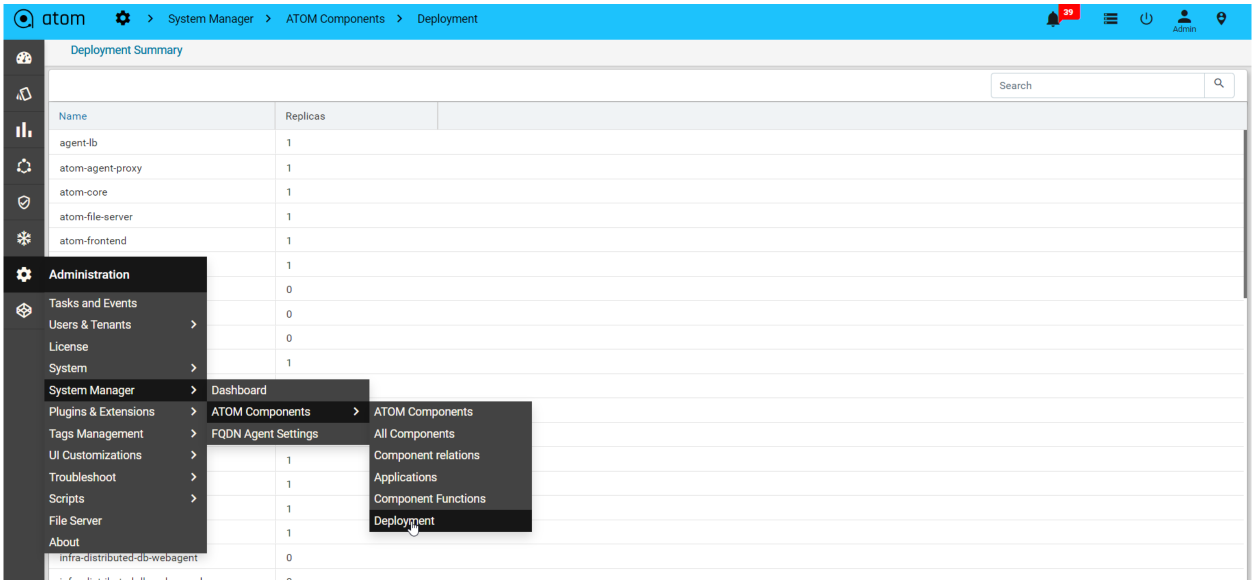


Component	Name	Description	Owner	Shared With	Created-On	Created-By	Last-
□ ATOM-Agent	Configuration-Mgmt		system	system.*	2021-05-17 07:18:56.971		2021
□ ATOM-Inventory-mgr	Inventory		system	system.*	2021-05-17 07:18:56.971		2021
□ ATOM-Telemetry-engine	Telemetry		system	system.*	2021-05-17 07:18:56.971		2021
□ ATOM-Telemetry-engine	Assurance(CLA)		system	system.*	2021-05-17 07:18:56.971		2021
□ ATOM-core	Orchestration		system	system.*	2021-05-17 07:18:56.971		2021

Deployment Functions:

Navigate > Administration > **System Manager > Atom components > Deployment Functions**

The following deployment summaries to be displayed



Name	Replicas
agent-lb	1
atom-agent-proxy	1
atom-core	1
atom-file-server	1
atom-frontend	1
	1
	0
	0
	0
	1
	1
	1
	1
	1
infra-distributed-db-webagent	0

FQDN Agent Settings

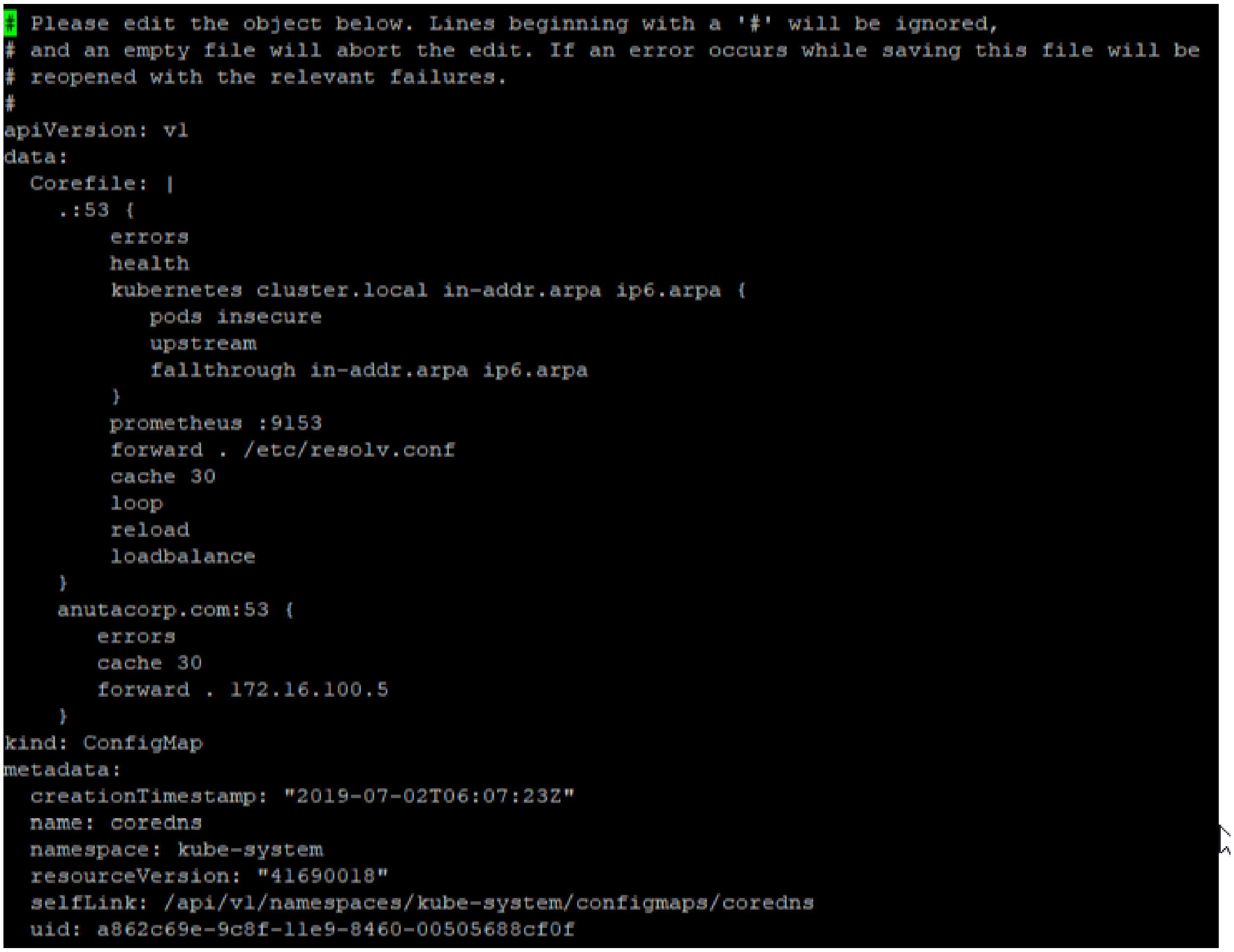
Navigate > Administration > **System Manager > FQDN Agent Settings**

1.No need to restart any pod, it should discover any endpoints.

Command : kubectl edit cm -n kube-system coredns

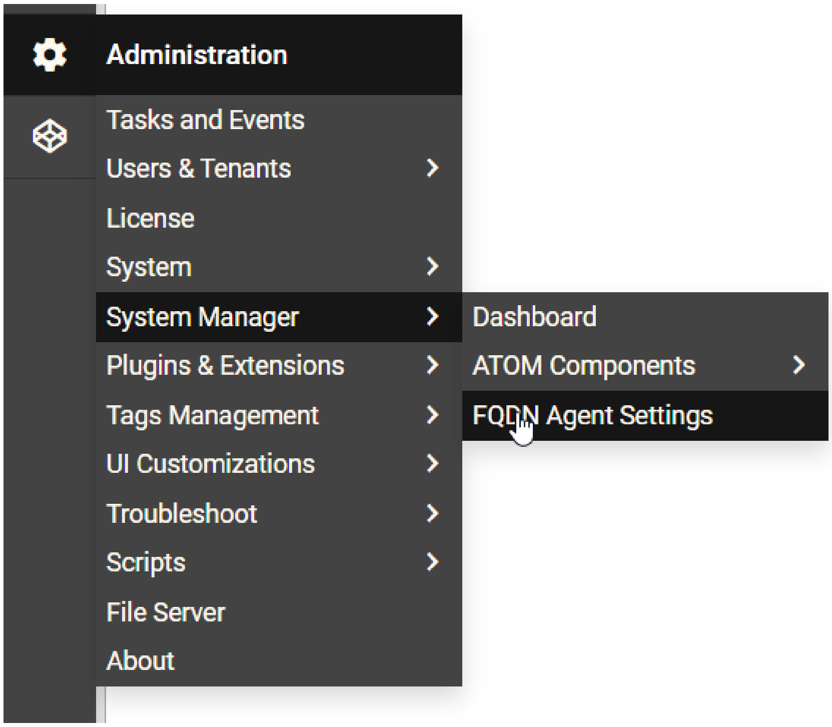
2.Content added as below:

```
anutacorp.com:53 {
    errors
    cache 30
    forward . 172.16.100.5
  }
```

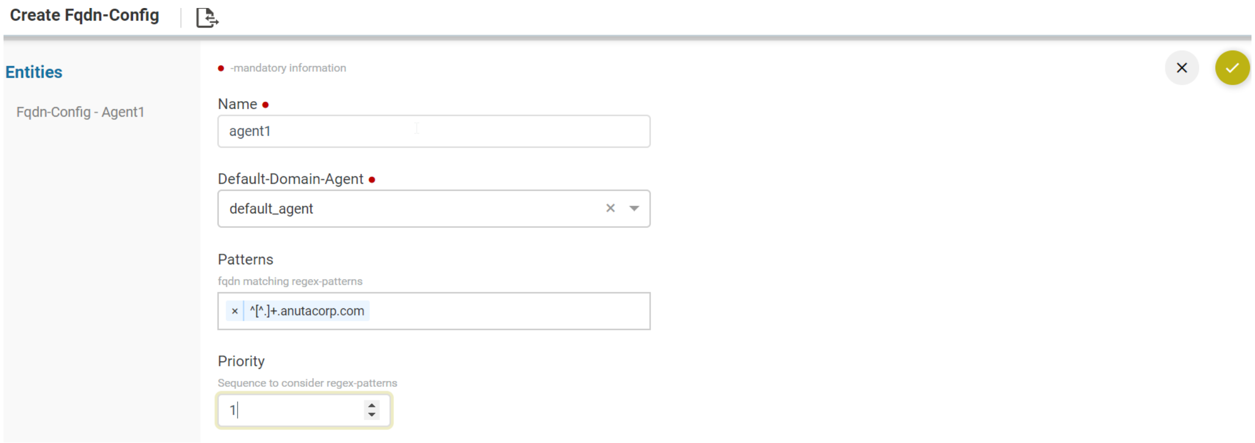


```
# Please edit the object below. Lines beginning with a '#' will be ignored,
# and an empty file will abort the edit. If an error occurs while saving this file will be
# reopened with the relevant failures.
#
apiVersion: v1
data:
  Corefile: |
    .:53 {
        errors
        health
        kubernetes cluster.local in-addr.arpa ip6.arpa {
           pods insecure
           upstream
           fallthrough in-addr.arpa ip6.arpa
        }
        prometheus :9153
        forward . /etc/resolv.conf
        cache 30
        loop
        reload
        loadbalance
    }
    anutacorp.com:53 {
       errors
       cache 30
       forward . 172.16.100.5
    }
kind: ConfigMap
metadata:
  creationTimestamp: "2019-07-02T06:07:23Z"
  name: coredns
  namespace: kube-system
  resourceVersion: "41690018"
  selfLink: /api/v1/namespaces/kube-system/configmaps/coredns
  uid: a862c69e-9c8f-11e9-8460-00505688cf0f
```

Go to Administration/System Manager/FQDN Agent setting for pattern



Click Add Symbol and Select **Default-Domain-Agent** and give proper **Pattern & Priority**


Create Fqdn-Config

Entities

Fqdn-Config - Agent1

● -mandatory information

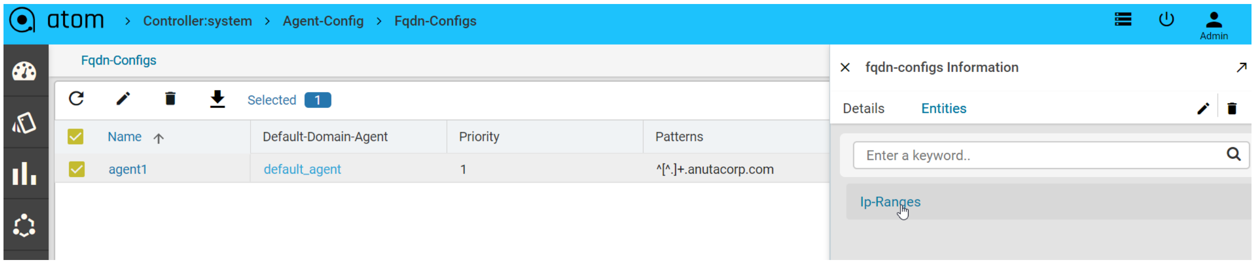
Name ●
agent1

Default-Domain-Agent ●
default_agent

Patterns
fqdn matching regex-patterns
^[^.]+.anutacorp.com

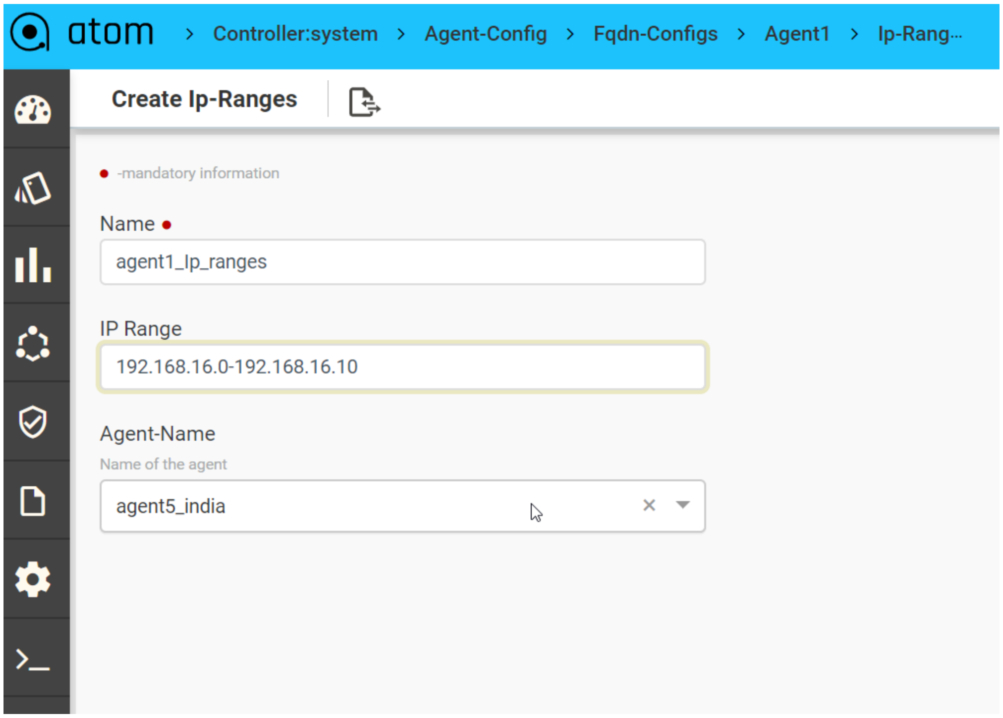
Priority
Sequence to consider regex-patterns
1

After creating FQDN then go to Entities/Ip-Ranges as shown.



Name	Default-Domain-Agent	Priority	Patterns
agent1	default_agent	1	^[^.]+.anutacorp.com

Provide valid IP Ranges and select agent


atom
Controller:system > Agent-Config > Fqdn-Configs > Agent1 > Ip-Rang...
Create Ip-Ranges

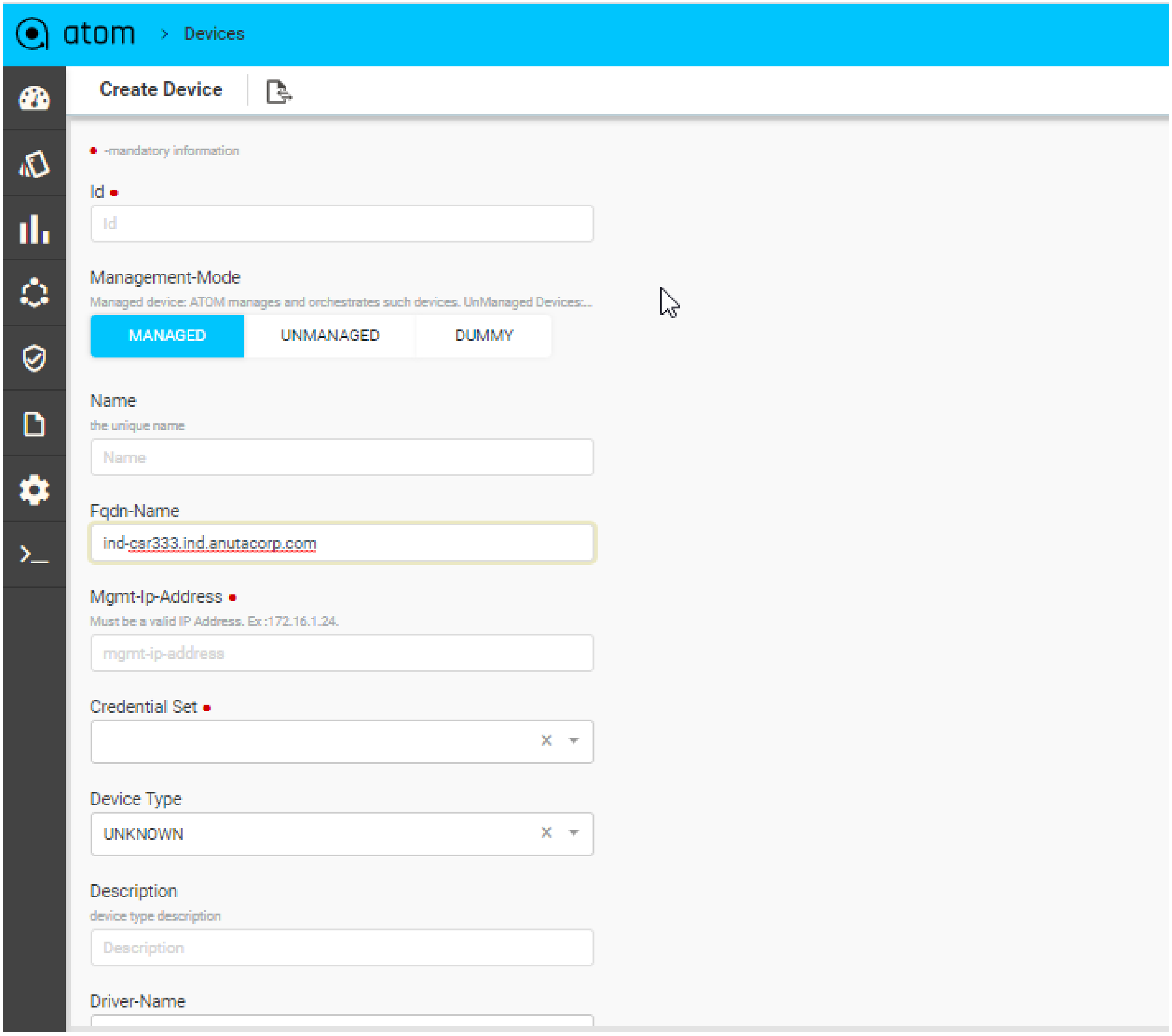
● -mandatory information

Name ●
agent1_Ip_ranges

IP Range
192.168.16.0-192.168.16.10

Agent-Name
Name of the agent
agent5_india

Go to Devices and click add symbol and Provide **FQDN-Name** to resolve **FQDN**



● -mandatory information

Id ●

Id

Management-Mode

Managed device: ATOM manages and orchestrates such devices. UnManaged Devices:...

Name

the unique name

Name

Fqdn-Name

ind-csr333.ind.anutacorp.com

Mgmt-Ip-Address ●

Must be a valid IP Address. Ex :172.16.1.24.

mgmt-ip-address

Credential Set ●

Device Type

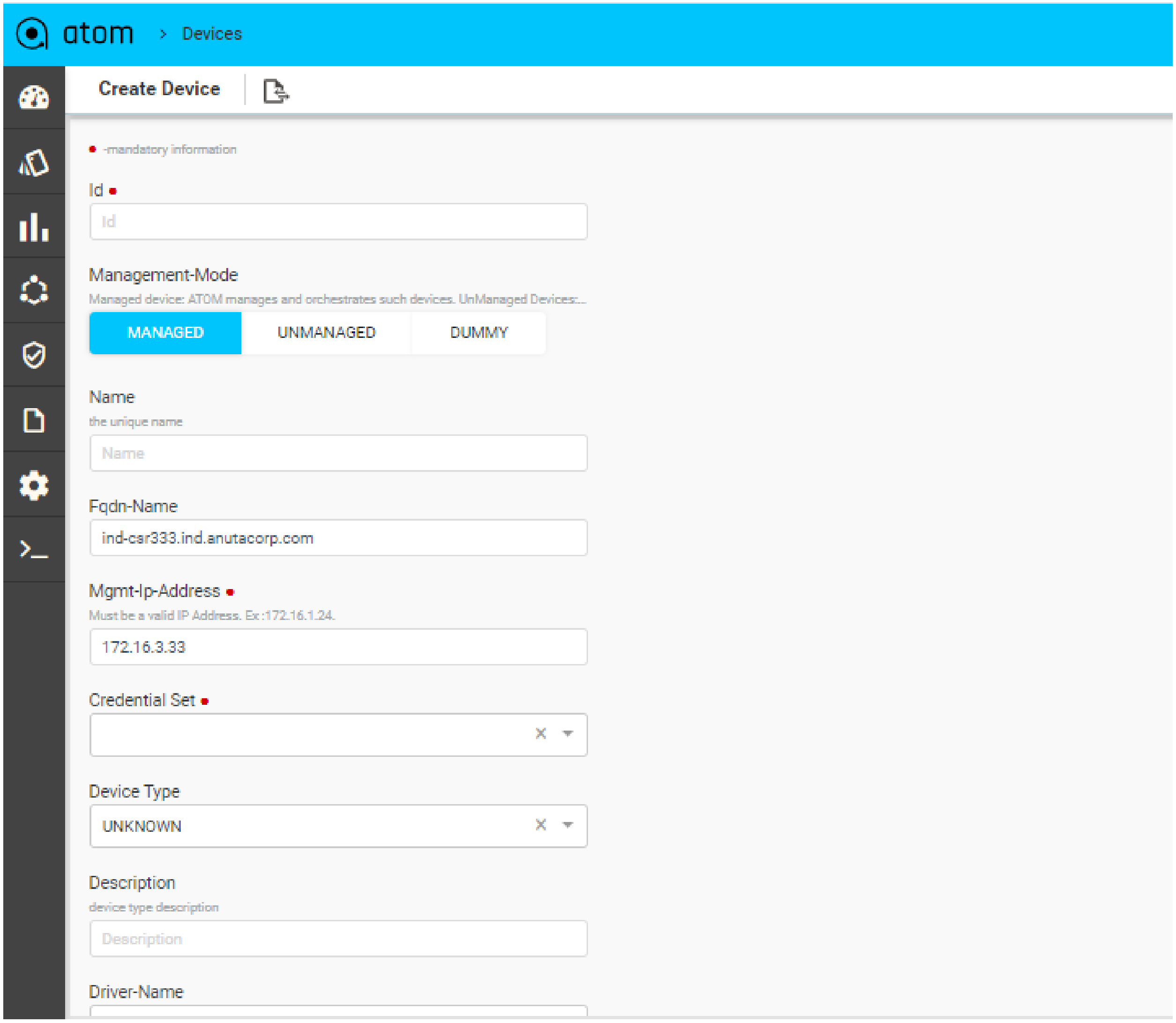
UNKNOWN

Description

device type description

Description

Driver-Name



● -mandatory information

Id ●

Id

Management-Mode

Managed device: ATOM manages and orchestrates such devices. UnManaged Devices:...

MANAGED | UNMANAGED | DUMMY

Name

the unique name

Name

Fqdn-Name

ind-csr333.ind.anutacorp.com

Mgmt-Ip-Address ●

Must be a valid IP Address. Ex :172.16.1.24.

172.16.3.33

Credential Set ●

Device Type

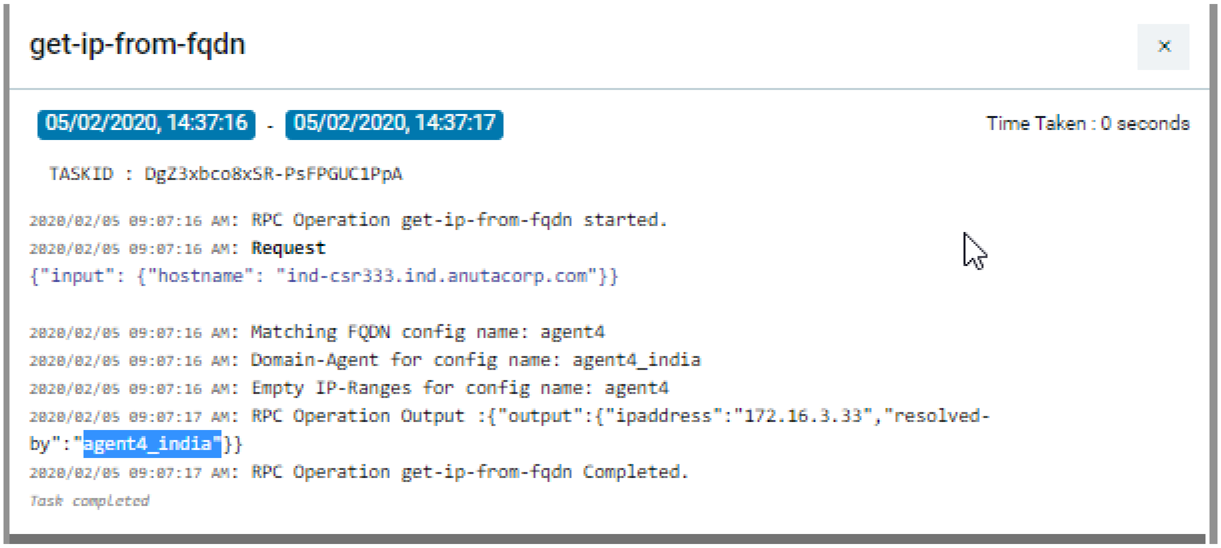
UNKNOWN

Description

device type description

Description

Driver-Name


get-ip-from-fqdn

05/02/2020, 14:37:16 - 05/02/2020, 14:37:17 Time Taken : 0 seconds

```
 TASKID : DgZ3xbco8xSR-PsFPGUC1PpA

2020/02/05 09:07:16 AM: RPC Operation get-ip-from-fqdn started.
2020/02/05 09:07:16 AM: Request
{"input": {"hostname": "ind-csr333.ind.anutacorp.com"}}

2020/02/05 09:07:16 AM: Matching FQDN config name: agent4
2020/02/05 09:07:16 AM: Domain-Agent for config name: agent4_india
2020/02/05 09:07:16 AM: Empty IP-Ranges for config name: agent4
2020/02/05 09:07:17 AM: RPC Operation Output :{"output":{"ipaddress":"172.16.3.33","resolved-
by":"agent4_india"}}
2020/02/05 09:07:17 AM: RPC Operation get-ip-from-fqdn Completed.
Task completed
```

Plugins and Extensions

By utilizing the normalized device abstractions maintained in data stores written in YANG maintained in ATOM, the customers can write their own device models and applications to meet their specific operational needs, thereby utilizing the extensibility of ATOM.

The device and service packages are loaded as bundles or plugins to the ATOM container thereby making them modular. The packages can be installed, updated, or deleted without disrupting the operation of the device.

In addition to modeling the devices and service, you can model the features or network functions required to build a network service. These features thus modeled appear as icons in the feature palette of Service Designer pane of ATOM. The newly added features along with the included associated services can now be used to design the service in ATOM.

Packages

ATOM is packaged with many predefined device packages to enable you to work with many vendor devices. ATOM also provides capability to update the existing device packages and ability to add new device packages

A Device Model contains inventory models, communication model, and notification model that are packaged and uploaded to ATOM. A device package consists of models, a vendor -specific configuration data for all the different devices.

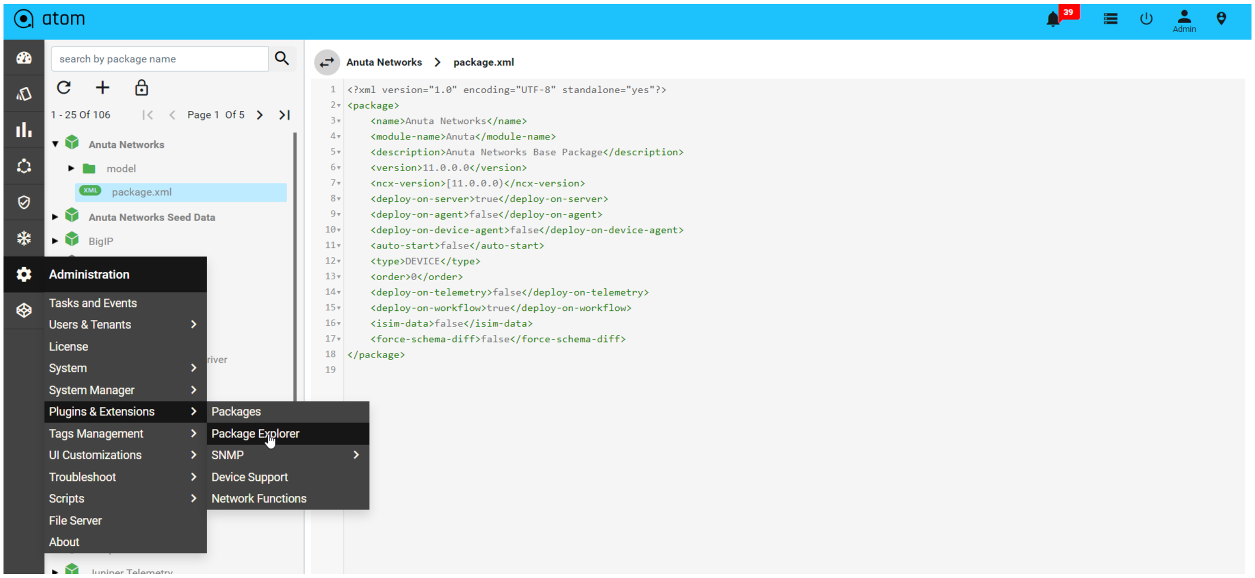
For details about what constitutes a device package and how to write it, refer to examples cited in the guide, “*ATOM Platform Guide*”.

A Service package contains the services models, service yang files and metadata information. For more information about Service Modeling, refer to examples cited in the guide, “*ATOM Platform Guide*”.

Package Explorer

Users can manage and get the information of the packages that are currently available in the system. The packages that were uploaded and loaded can be viewed in minio UI.

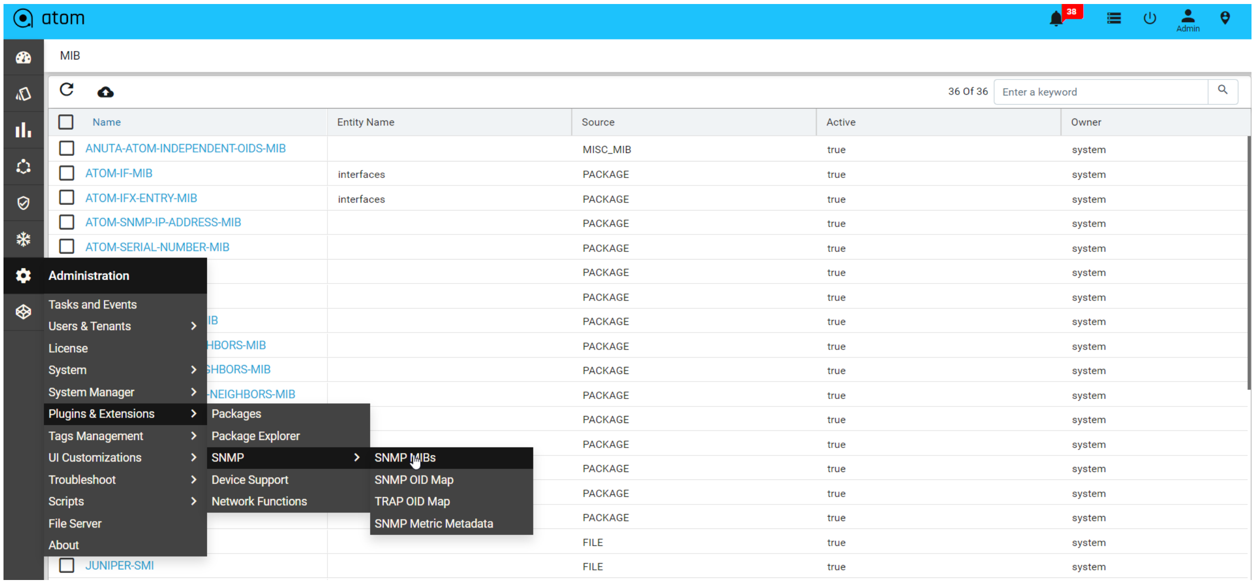
Navigate to Administration > Plugins & Extensions > Package Explorer



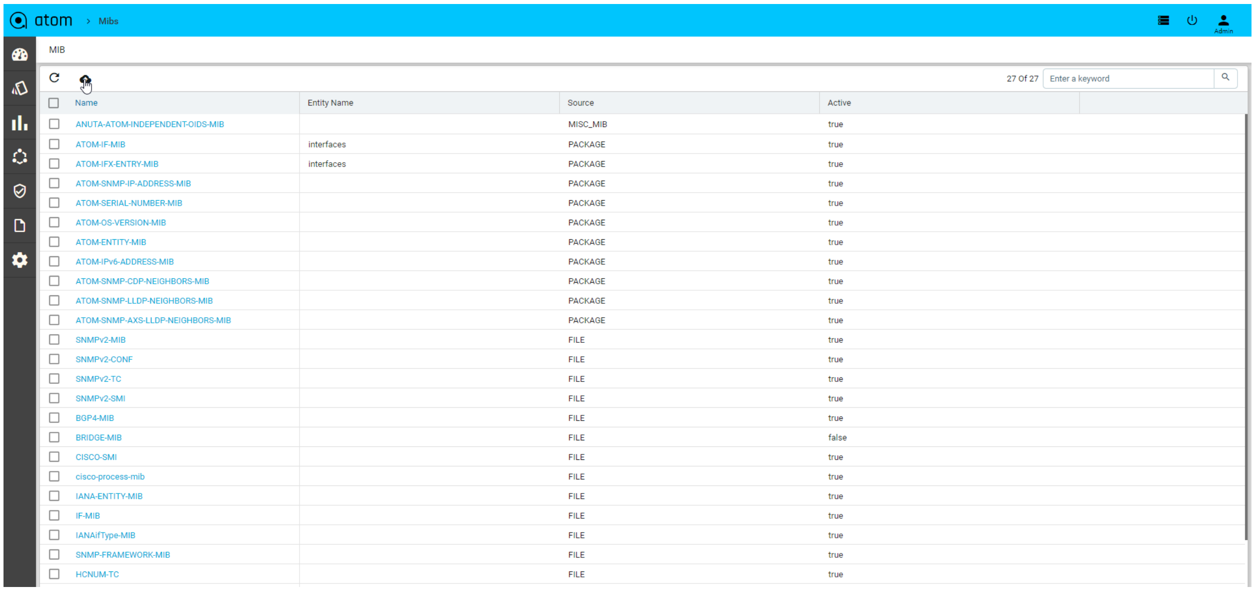
```xml
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<package>
    <name>Anuta Networks</name>
    <module-name>Anuta</module-name>
    <description>Anuta Networks Base Package</description>
    <version>11.0.0.0</version>
    <ncx-version>[11.0.0.0)</ncx-version>
    <deploy-on-server>true</deploy-on-server>
    <deploy-on-agent>false</deploy-on-agent>
    <deploy-on-device-agent>false</deploy-on-device-agent>
    <auto-start>false</auto-start>
    <type>DEVICE</type>
    <order>0</order>
    <deploy-on-telemetry>false</deploy-on-telemetry>
    <deploy-on-workflow>true</deploy-on-workflow>
    <isim-data>false</isim-data>
    <force-schema-diff>false</force-schema-diff>
</package>
```

SNMP

Navigate > Administration > Plugins & Extensions > Package > SNMP > SNMP Mibs >Upload

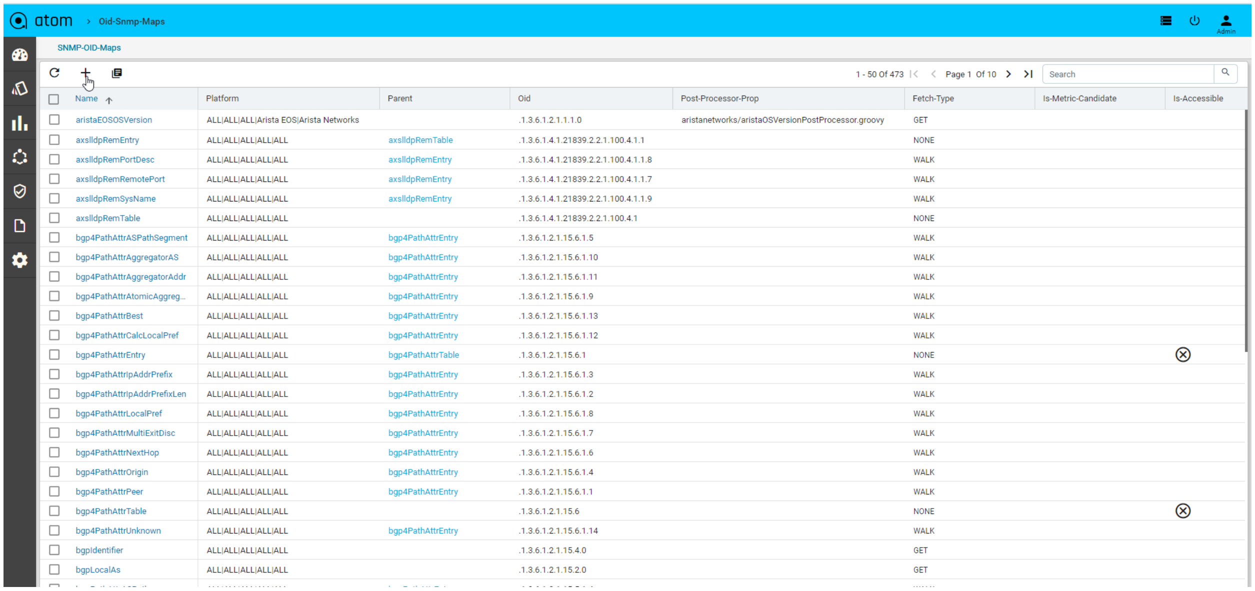


Name	Entity Name	Source	Active	Owner
ANUTA-ATOM-INDEPENDENT-OIDS-MIB		MISC_MIB	true	system
ATOM-IF-MIB	interfaces	PACKAGE	true	system
ATOM-IFX-ENTRY-MIB	interfaces	PACKAGE	true	system
ATOM-SNMP-IP-ADDRESS-MIB		PACKAGE	true	system
ATOM-SERIAL-NUMBER-MIB		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
IB		PACKAGE	true	system
HBORS-MIB		PACKAGE	true	system
GHBORS-MIB		PACKAGE	true	system
-NEIGHBORS-MIB		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
		PACKAGE	true	system
		FILE	true	system
JUNIPER-SMI		FILE	true	system

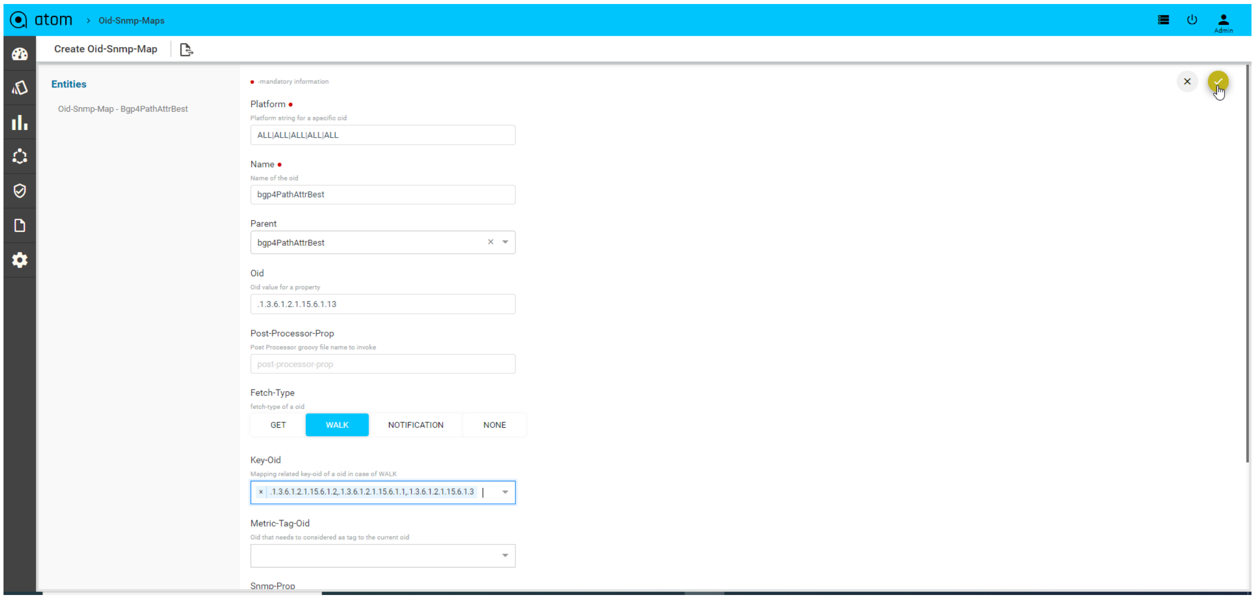


☐	Name	Entity Name	Source	Active
☐	ANUTA-ATOM-INDEPENDENT-OIDS-MIB		MISC_MIB	true
☐	ATOM-IF-MIB	interfaces	PACKAGE	true
☐	ATOM-IFX-ENTRY-MIB	interfaces	PACKAGE	true
☐	ATOM-SNMP-IP-ADDRESS-MIB		PACKAGE	true
☐	ATOM-SERIAL-NUMBER-MIB		PACKAGE	true
☐	ATOM-OS-VERSION-MIB		PACKAGE	true
☐	ATOM-ENTITY-MIB		PACKAGE	true
☐	ATOM-IPv6-ADDRESS-MIB		PACKAGE	true
☐	ATOM-SNMP-CDP-NEIGHBORS-MIB		PACKAGE	true
☐	ATOM-SNMP-LLDP-NEIGHBORS-MIB		PACKAGE	true
☐	ATOM-SNMP-AXS-LLDP-NEIGHBORS-MIB		PACKAGE	true
☐	SNMPv2-MIB		FILE	true
☐	SNMPv2-CONF		FILE	true
☐	SNMPv2-TC		FILE	true
☐	SNMPv2-SMI		FILE	true
☐	BGP4-MIB		FILE	true
☐	BRIDGE-MIB		FILE	false
☐	CISCO-SMI		FILE	true
☐	cisco-process-mib		FILE	true
☐	IANA-ENTITY-MIB		FILE	true
☐	IF-MIB		FILE	true
☐	IANAifType-MIB		FILE	true
☐	SNMP-FRAMEWORK-MIB		FILE	true
☐	HCNUM-TC		FILE	true

Navigate > Administration > Plugins & Extensions > Package > SNMP > SNMP OID Maps > Add



☐	Name	Platform	Parent	Oid	Post-Processor-Prop	Fetch-Type	Is-Metric-Candidate	Is-Accessible
☐	aristaEOSOSVersion	ALL|ALL|ALL|Arista EOS|Arista Networks		.1.3.6.1.2.1.1.1.0	aristanetworks/aristaOSVersionPostProcessor.groovy	GET		
☐	axslldpRemEntry	ALL|ALL|ALL|ALL|ALL	axslldpRemTable	.1.3.6.1.4.1.21839.2.2.1.100.4.1.1		NONE		
☐	axslldpRemPortDesc	ALL|ALL|ALL|ALL|ALL	axslldpRemEntry	.1.3.6.1.4.1.21839.2.2.1.100.4.1.1.8		WALK		
☐	axslldpRemRemotePort	ALL|ALL|ALL|ALL|ALL	axslldpRemEntry	.1.3.6.1.4.1.21839.2.2.1.100.4.1.1.7		WALK		
☐	axslldpRemSysName	ALL|ALL|ALL|ALL|ALL	axslldpRemEntry	.1.3.6.1.4.1.21839.2.2.1.100.4.1.1.9		WALK		
☐	axslldpRemTable	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.4.1.21839.2.2.1.100.4.1		NONE		
☐	bgp4PathAttrASPathSegment	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.5		WALK		
☐	bgp4PathAttrAggregatorAS	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.10		WALK		
☐	bgp4PathAttrAggregatorAddr	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.11		WALK		
☐	bgp4PathAttrAtomicAggreg...	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.9		WALK		
☐	bgp4PathAttrBest	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.13		WALK		
☐	bgp4PathAttrCalcLocalPref	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.12		WALK		
☐	bgp4PathAttrEntry	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrTable	.1.3.6.1.2.1.15.6.1		NONE		⊗
☐	bgp4PathAttrIpAddrPrefix	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.3		WALK		
☐	bgp4PathAttrIpAddrPrefixLen	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.2		WALK		
☐	bgp4PathAttrLocalPref	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.8		WALK		
☐	bgp4PathAttrMultiExitDisc	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.7		WALK		
☐	bgp4PathAttrNextHop	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.6		WALK		
☐	bgp4PathAttrOrigin	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.4		WALK		
☐	bgp4PathAttrPeer	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.1		WALK		
☐	bgp4PathAttrTable	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.15.6		NONE		⊗
☐	bgp4PathAttrUnknown	ALL|ALL|ALL|ALL|ALL	bgp4PathAttrEntry	.1.3.6.1.2.1.15.6.1.14		WALK		
☐	bgpIdentifier	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.15.4.0		GET		
☐	bgpLocalAs	ALL|ALL|ALL|ALL|ALL		.1.3.6.1.2.1.15.2.0		GET		



atom > Oid-Snmp-Maps

Create Oid-Snmp-Map

Entities

Oid-Snmp-Map - Bgp4PathAttrBest

● -mandatory information

Platform ●
Platform string for a specific oid
ALL|ALL|ALL|ALL|ALL

Name ●
Name of the oid
bgp4PathAttrBest

Parent
bgp4PathAttrBest

Oid
Oid value for a property
.1.3.6.1.2.1.15.6.1.13

Post-Processor-Prop
Post Processor groovy file name to invoke
post-processor-prop

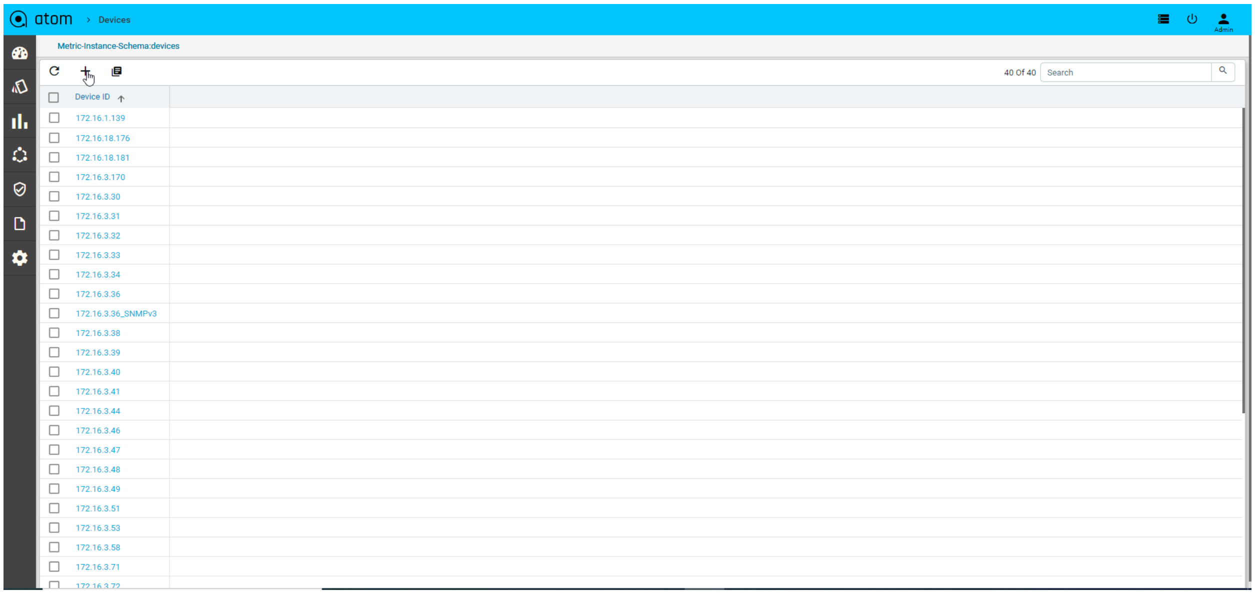
Fetch-Type
fetch-type of a oid
GET | WALK | NOTIFICATION | NONE

Key-Oid
Mapping related key-oid of a oid in case of WALK
× .1.3.6.1.2.1.15.6.1.2,.1.3.6.1.2.1.15.6.1.1,.1.3.6.1.2.1.15.6.1.3

Metric-Tag-Oid
Oid that needs to considered as tag to the current oid

Snmp-Prop

Navigate > Administration > Plugins & Extensions > Package > SNMP > SNMP Metric Metadata > Add

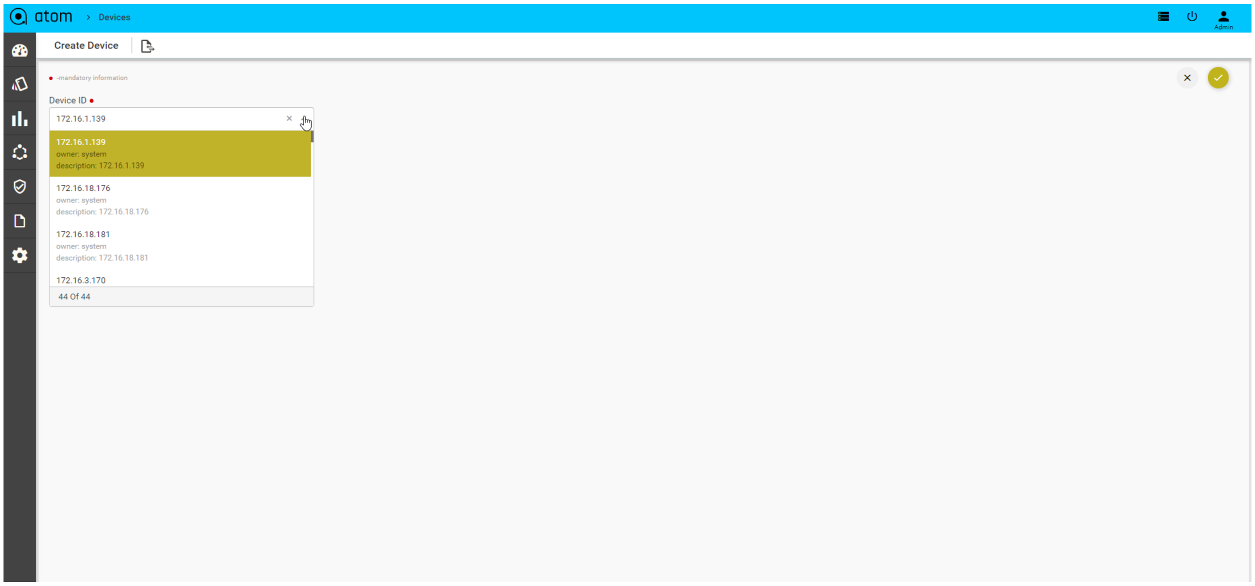


atom > Devices

Metric-Instance-Schema:devices

40 Of 40 Search

□	Device ID ↑
□	172.16.1.139
□	172.16.18.176
□	172.16.18.181
□	172.16.3.170
□	172.16.3.30
□	172.16.3.31
□	172.16.3.32
□	172.16.3.33
□	172.16.3.34
□	172.16.3.36
□	172.16.3.36_SNMPv3
□	172.16.3.38
□	172.16.3.39
□	172.16.3.40
□	172.16.3.41
□	172.16.3.44
□	172.16.3.46
□	172.16.3.47
□	172.16.3.48
□	172.16.3.49
□	172.16.3.51
□	172.16.3.53
□	172.16.3.58
□	172.16.3.71
□	172.16.3.72



● -mandatory information

Device ID ●

172.16.1.139

172.16.1.139
owner: system
description: 172.16.1.139

172.16.18.176
owner: system
description: 172.16.18.176

172.16.18.181
owner: system
description: 172.16.18.181

172.16.3.170

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Device Support

Device Support view allows users to create a new Vendor, Device Type, Device Family, OS Type, Device Capabilities, Terminal Handling Properties etc.,

Managing Tenants

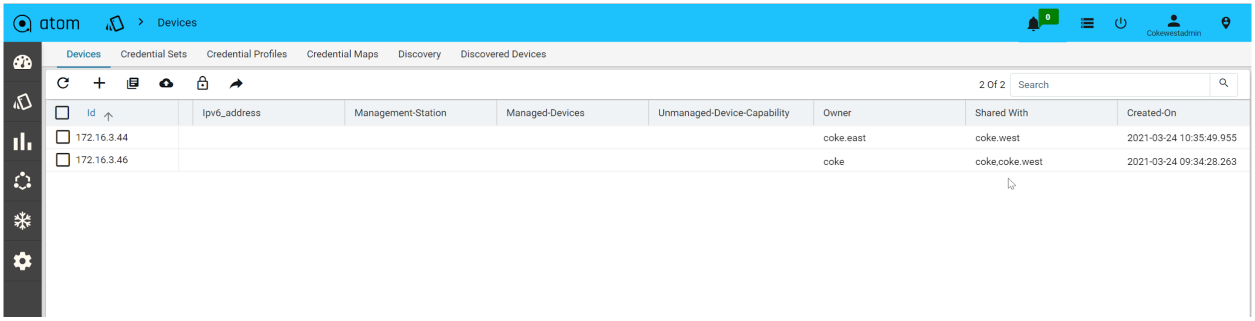
The administrator can make use of ATOM's multi-tenancy capability to share IT resources cost-efficiently and securely by creating Tenants. The Tenants share common infrastructure, yet utilize a defined set of highly secure services, with complete isolation from other tenants. The resources managed by ATOM can be securely shared among multiple applications and tenants (businesses, organizations, etc.) that use the resources of the datacenter.

Overview of Multi Tenancy

- Multi-Tenancy - Supported on ATOM On-Premises & ATOM Silo/Dedicated Deployment on ATOM Cloud.
  - Tenants (Coke, Pepsi etc.,) are completely isolated from each other.
- Sub-Tenancy - Supported on All ATOM Deployments - On-Premises, ATOM Cloud Silo/Dedicated and also ATOM Cloud Shared.
  - Data sharing across sub-tenants (Coke.east, Coke.west, Coke.it etc.,) is controlled by Tenant Admin.
  - By Default Data at a higher Level Tenant is Visible to the Sub-Tenants.
  - By Default, Data under a sub-tenant is visible to the Tenant
  - By Default, Data under a sub-tenant is not visible to other Sub-tenant
  - Example - Coke.east owns a resource (credential set or device etc.) and wants to share with sub tenants (Coke.west but not with Coke.it). In this case, ATOM Multi Tenancy Infrastructure provides a facility to share a resource with particular sub-tenants. Upon sharing the resources as required, each individual ATOM User

interface will provide information on Resource sharing as shown below. ***This behaviour will be the same across all the resources in ATOM and will not be discussed specifically across features in the user guide.***

Sample View of Resource being shared from Coke.east to Coke.west



Id	Ipv6_address	Management-Station	Managed-Devices	Unmanaged-Device-Capability	Owner	Shared With	Created-On
172.16.3.44					coke.east	coke.west	2021-03-24 10:35:49.955
172.16.3.46					coke	coke,coke.west	2021-03-24 09:34:28.263

Mulltitenancy feature is enabled in the system as a result of which every object managed by ATOM can be owned by an admin and shared with multiple users (tenants) simultaneously.

Aided by rules and roles that can be created in ATOM, the administrator can either assign or restrict access to the resources (resource pools, sites, locations, IPAM, devices) managed by ATOM.

All the created resources in ATOM are allocated to the system, the default admin user who is the owner of the resources. These resources managed by ATOM are available to all the Tenants in the system. The administrator can now share the system resources with the required tenant or tenants. From then on, all the resources that are created in each Tenant (parent) are available to only the users (child nodes) of a particular parent.

Root Tenant

'System' is the root tenant. Every other tenant is a child or in the child hierarchy of this root. There may be few objects which are kept 'private' to the system, meaning, those are not 'shared' to child tenants.

Top Level Tenants

Top Level Tenants (referred 'tenants' for simplicity) are the immediate children of system nodes. For ex;

System

Company-1
Company-2
Company-3

In the above example, company-1, 2, 3 are top level tenants.

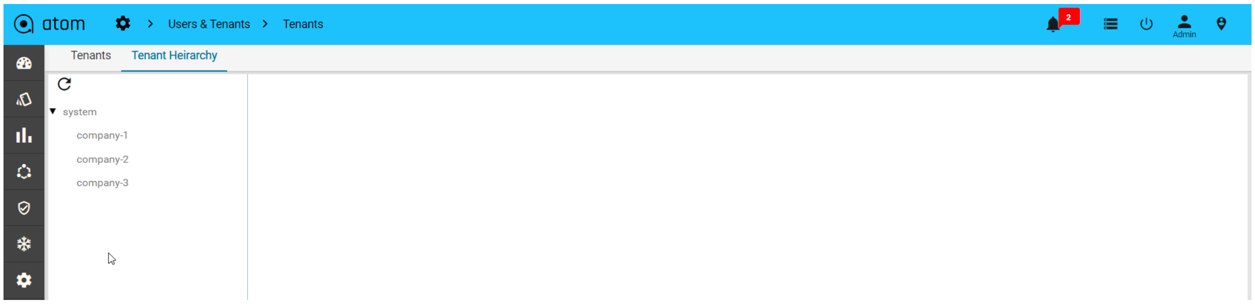
Simple Multi Tenancy

ATOM supports Sub tenancy where a tenant can subdivide their resources into a sub hierarchy. But, when there are no sub tenants in the deployment, it is referred to as 'Simple Multi Tenancy'.

For ex;

System
Company-1
Company-2
Company-3

In On-Prem deployment, it is up to the customer how they treat the root tenant.
If they don't create any child tenants to the system, then, system and customer are synonymous.



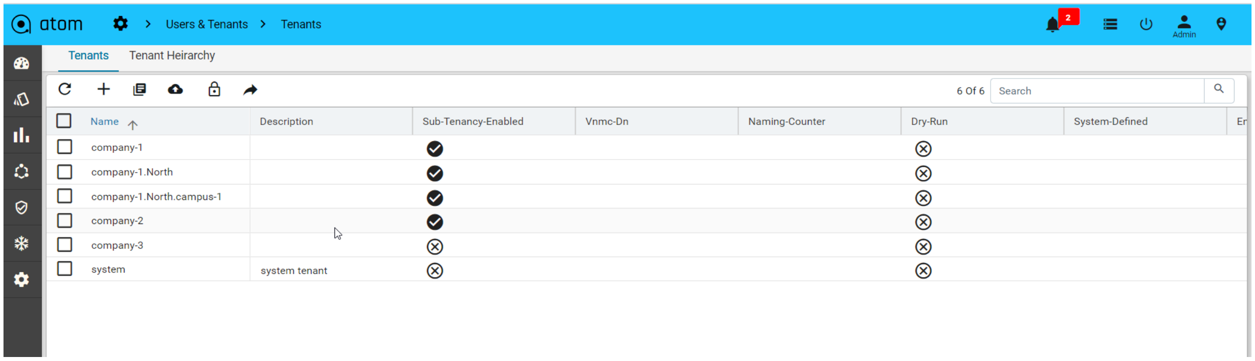
Hierarchical Multi Tenancy

Sub Tenant

A sub tenant is a child [directly or indirectly] of a Top Level [Not root] tenant.

System
Company-1
North
South
Campus-1
Company-2
Company-3

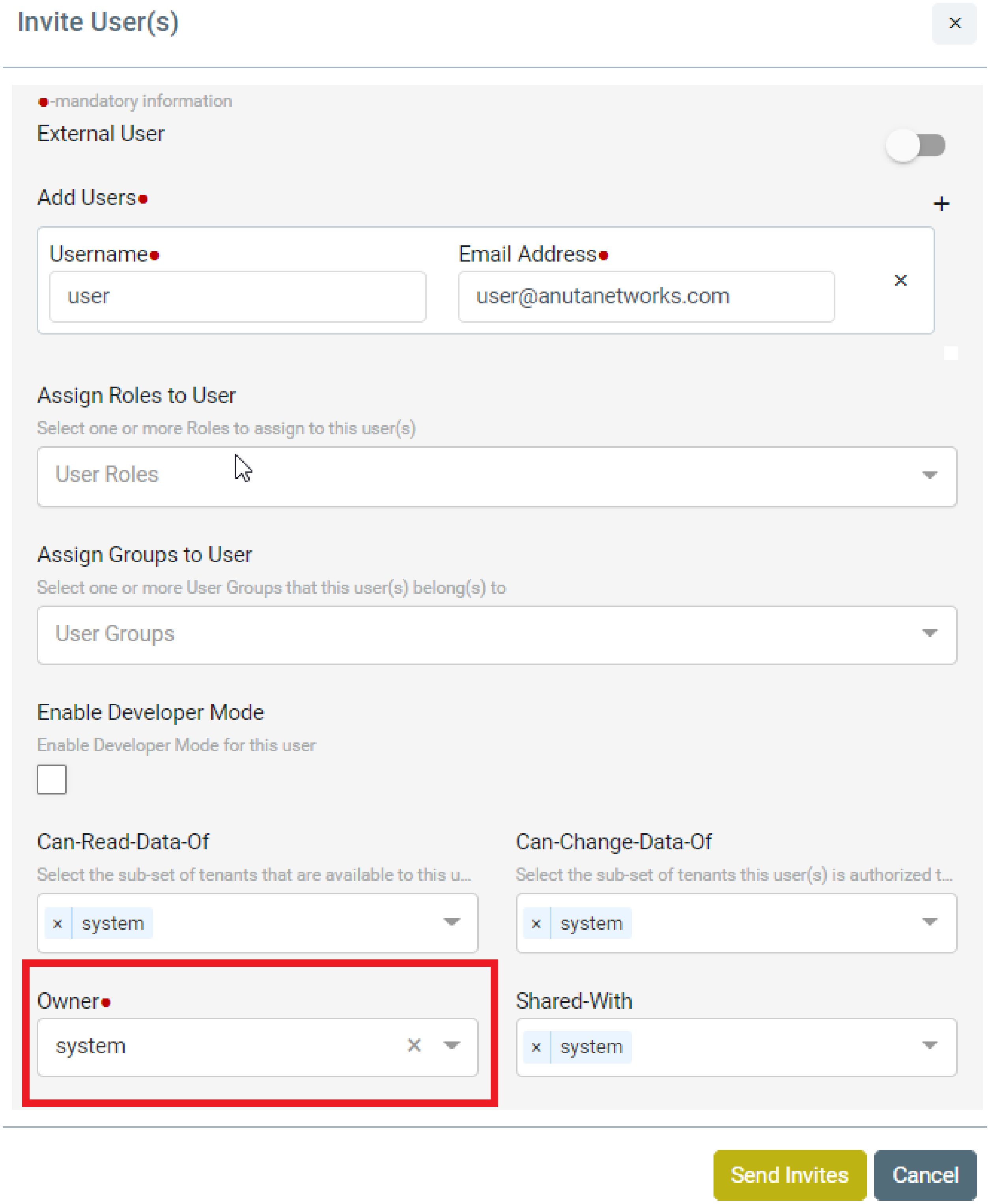
In the above example,
'System' is the root tenant
Company-1, Company-2, Company-3 are top level tenants
Company-1.north, Company-1.south are sub tenants of Company-1.
Company-1.south.campus-1 is a sub tenant of acme.south



□	Name	Description	Sub-Tenancy-Enabled	Vmnc-Dn	Naming-Counter	Dry-Run	System-Defined	Er
□	company-1		✓			⊗		
□	company-1.North		✓			⊗		
□	company-1.North.campus-1		✓			⊗		
□	company-2		✓			⊗		
□	company-3		⊗			⊗		
□	system	system tenant	⊗			⊗		

System users

System is the root tenant. System users are those, whose User.owner = ‘system’.



Invite User(s)

●-mandatory information

External User

Add Users●

Username●: user

Email Address●: user@anutanetworks.com

Assign Roles to User

Select one or more Roles to assign to this user(s)

User Roles

Assign Groups to User

Select one or more User Groups that this user(s) belong(s) to

User Groups

Enable Developer Mode

Enable Developer Mode for this user

□

Can-Read-Data-Of

Select the sub-set of tenants that are available to this u...

× system

Can-Change-Data-Of

Select the sub-set of tenants this user(s) is authorized t...

× system

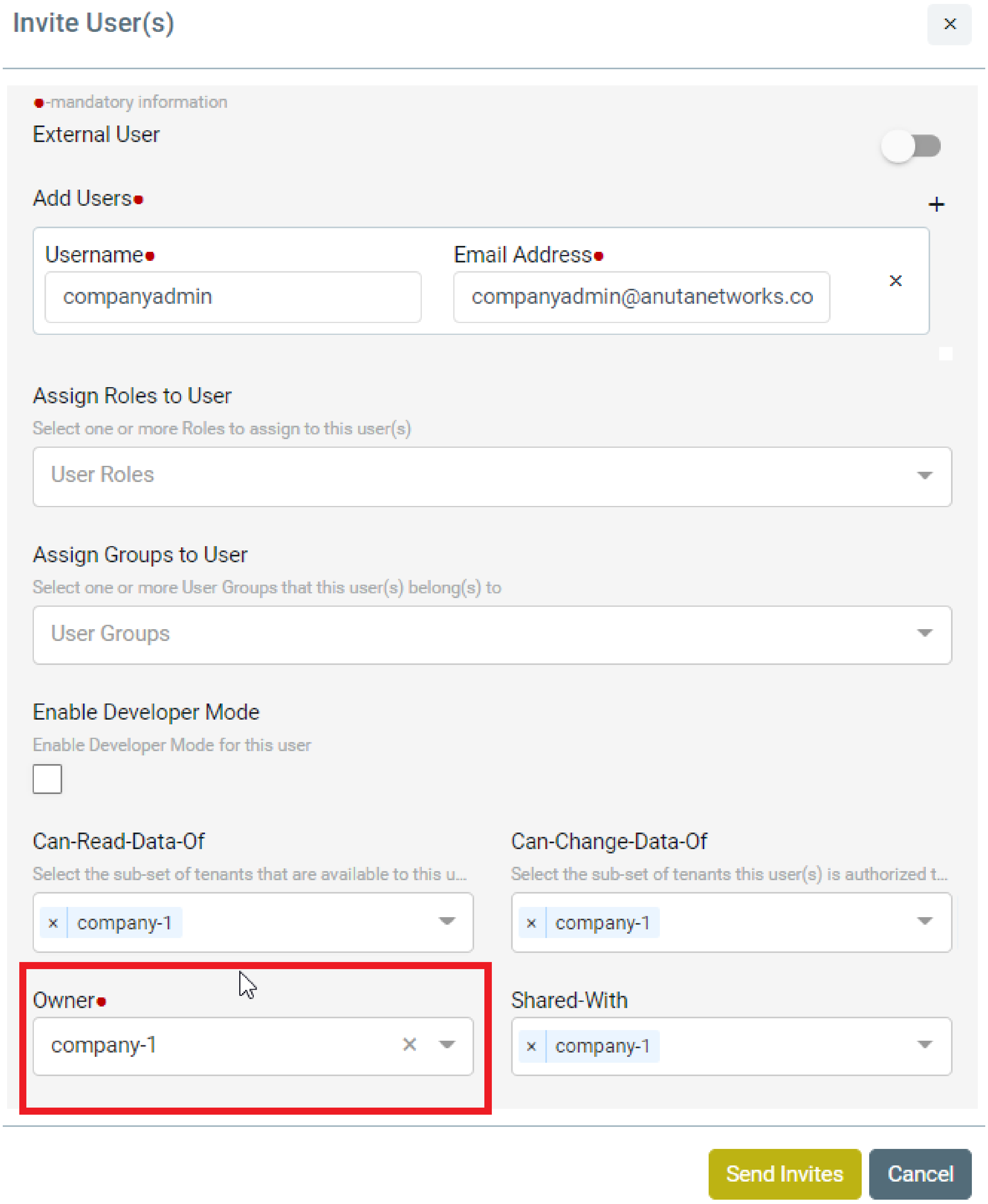
Owner●: system

Shared-With

× system

Tenant Users

Tenant users are customer users owned by individual tenants. User.owner != ‘system’



Invite User(s)

●-mandatory information

External User

Add Users●

Username●: companyadmin

Email Address●: companyadmin@anutanetworks.co

Assign Roles to User

Select one or more Roles to assign to this user(s)

User Roles

Assign Groups to User

Select one or more User Groups that this user(s) belong(s) to

User Groups

Enable Developer Mode

Enable Developer Mode for this user

□

Can-Read-Data-Of

Select the sub-set of tenants that are available to this u...

× company-1

Can-Change-Data-Of

Select the sub-set of tenants this user(s) is authorized t...

× company-1

Owner●: company-1

Shared-With

× company-1

Owner:

Owner is a tenant. And, we use ‘tenant-id’ to identify a tenant.

Tenant-id uses fully qualified names separated with dots, such as, Company-1.south.campus-1.

Multi Tenancy is all about keeping data private to a tenant. This means, data identified by a key can have one copy for each tenant. Suppose, 2 tenants want to bring in the same device-1 ? That counts to 2 instances with the same key. Clearly object id by itself is not sufficient. Hence, objects are identified by their id and ‘owner’. Object key is formed by object id and owner.

Shared-with:

A resource can be shared with multiple tenants or kept private to the owner.
Sharing of resources applies only when a resource owned by one tenant is to be used by another tenant.
For example, a device owned by tenant-1 is used by a ‘network service’ created by a tenant-2.
Sharing across tenants is not supported. but, within a tenant sub hierarchy is supported.

For example, no data is ever shared among the 3 companies of the following hierarchy
System

Company-1
Company-2
Company-3

But there is, down the hierarchy sharing allowed. Such as, ‘system’ resources are shared to all the three [and sub tenants, if exist].

If Resource is shared-with system then it is private to system
If Resource is shared-with system.* then it is shared with all the sub tenants.

Concept Of Visibility And Usability

Visibility is the same as ‘Readability’; Whether a resource is visible to a user.
Usability of a resource is with respect to another resource and it is about whether a resource-1 can be referred (in a relation for example) by another resource.
For example,
device-1.credential-set = ‘cred-1’

#	resource	Owner	
1	device-1	Univ.Engg	
2	cred-1	Univ.Phy	

Device-1 wants to use ‘cred-1’ in a ‘device.credential-set’ relation.

Currently, to make cred-1 available (visible, usable) to resources of Univ.Engg, you have to share it with that tenant.

#	resource	Owner	shared-with
1	device-1	Univ.Engg	
2	cred-1	Univ.Phy	Univ.Engg

Shared With Variations

- System
  - Company-1
    - Campus-1
      - Department-1
      - Department-2
    - Campus-2

Owner	Resource	Shared With	Details
Company-1	R1	Company-1	R1 becomes a private object
Company-1	R1	Company-1, system	A Tenant Resource shared with system [there are a few scenarios where this is useful]
Campus-2	R1	company1.Campus-1, company1.Campus-2	Sharing with other tenants [in the sub hierarchy]
Campus-1	R1	Campus-1.*	Using wildcards in sharing-with. R1 will be shared with all sub tenants. Since sub

			tenants can be added or removed during the life cycle of a deployment, sharing is spread to all the sub tenants available at the time of invocation.

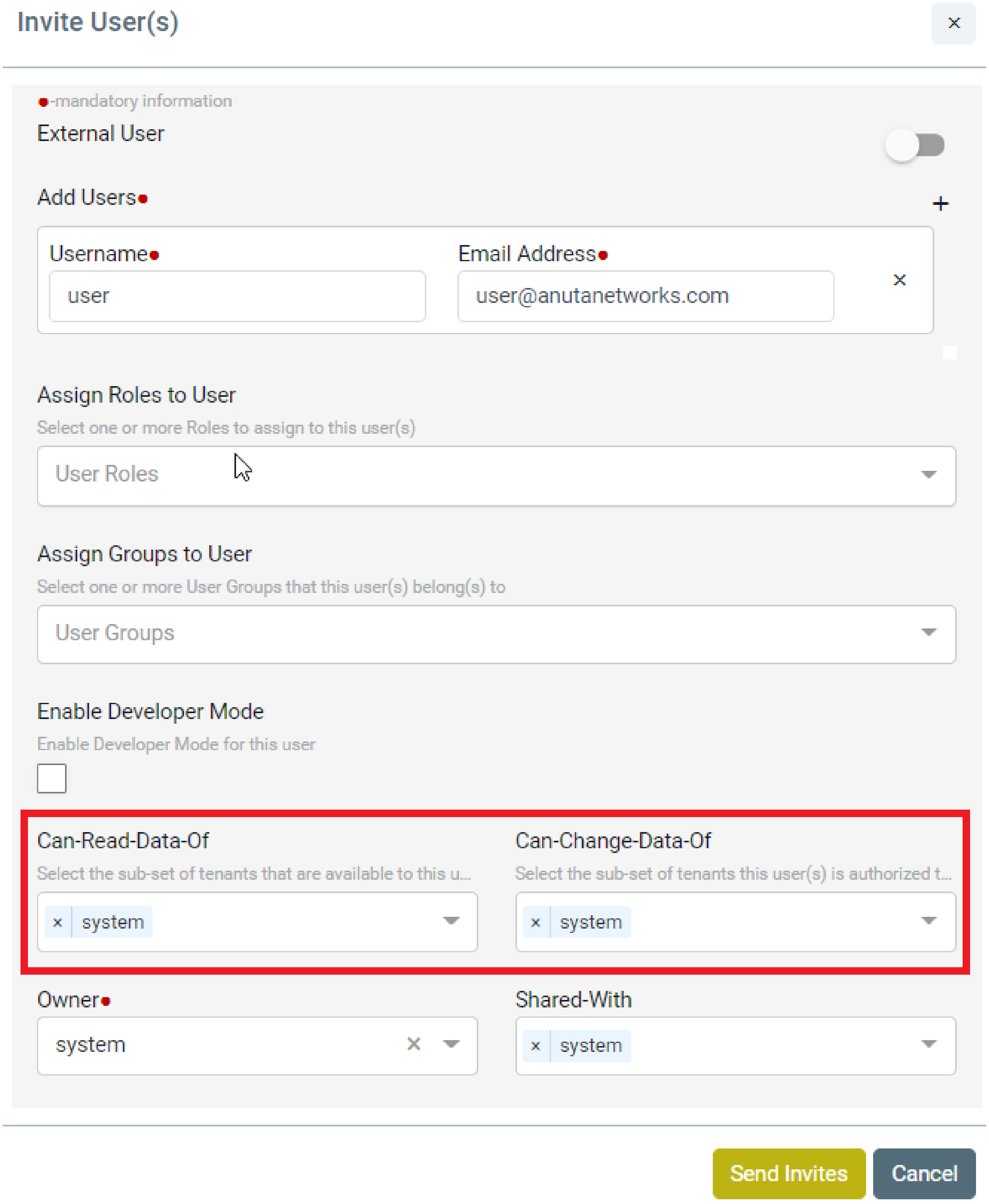
User.Owner:

User object has an ‘owner’ property, just like any other resource.
But, there is a special meaning to ‘user.owner’.
Users need to be authenticated in the system.
Authentication is done with an ‘Identity Provider’, such as an LDAP.
Identity Providers are associated with tenants.
So, a user is authenticated against the provider traced via User.owner

User.can-read-data-of And User.can-change-data-of:

A user could be created at a higher level (user.owner) but to limit the user to a subset of tenants there are two properties.
‘can-read-data-of’ controls which tenant data a user can read.
‘can-change-data-of’ controls which tenant data a user can change.

When a top level tenant does not have sub-tenants, user.can-read-data-of will be fixed to the tenant. User.can-change-data-of can be used to disable writes [by omitting a value]. If decided to allow writes , the value will be fixed to the tenant.



Invite User(s)

●-mandatory information

External User

Add Users●

Username●: user

Email Address●: user@anutanetworks.com

Assign Roles to User

Select one or more Roles to assign to this user(s)

User Roles

Assign Groups to User

Select one or more User Groups that this user(s) belong(s) to

User Groups

Enable Developer Mode

Enable Developer Mode for this user

□

Can-Read-Data-Of

Select the sub-set of tenants that are available to this u...

× system

Can-Change-Data-Of

Select the sub-set of tenants this user(s) is authorized t...

× system

Owner●: system

Shared-With: × system

NOTE: Except Monitoring and Alerts all other components are MT Enabled.

Creating Tenants

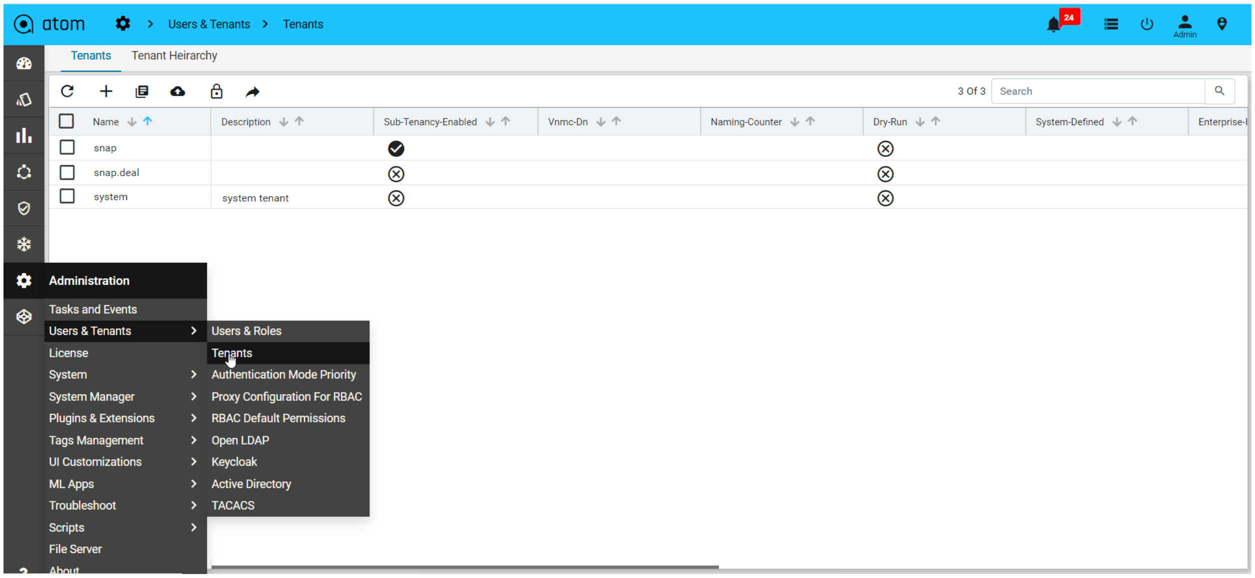
Before instantiating a service, there should be at least a single Tenant created in ATOM.

1. Navigate to **Administration > Tenants**
2. Select the Tenants folder > click **Add**
3. In the **Create Tenant** screen, enter the following:
    - **Name**: Enter an alphanumeric string of not more than 32 characters
    - **Description**: Enter a description for the Tenant
    - **TenantId**: Enter a unique identifier for the Tenant
    - **Dry Run**: This option does not allow ATOM to send the configurations to the devices while creating services. By default, this option is unselected.
        - Select the checkbox to allow ATOM to push the commands on to the devices.

Onboarding Tenants through Keycloak scripts

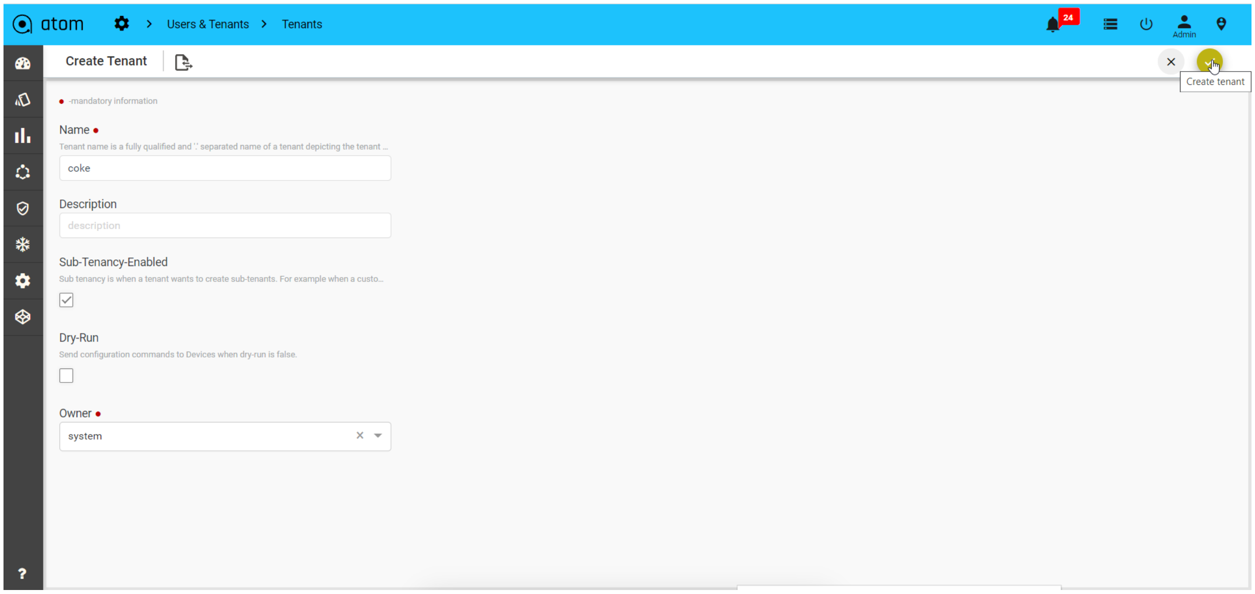
Before creating a tenant admin, We need to create a tenant manually in system admin(Ex:Coke).

Navigate->Administration->Users and tenants->Tenants:



□	Name	Description	Sub-Tenancy-Enabled	Vnmc-Dn	Naming-Counter	Dry-Run	System-Defined	Enterprise-I
□	snap		✓			⊗		
□	snap.deal		⊗			⊗		
□	system	system tenant	⊗			⊗		

Creating a tenant in Atom UI.



Create Tenant

● -mandatory information

Name ●
Tenant name is a fully qualified and '.' separated name of a tenant depicting the tenant ...
coke

Description
description

Sub-Tenancy-Enabled
Sub tenancy is when a tenant wants to create sub-tenants. For example when a custo...
☑

Dry-Run
Send configuration commands to Devices when dry-run is false.
☐

Owner ●
system

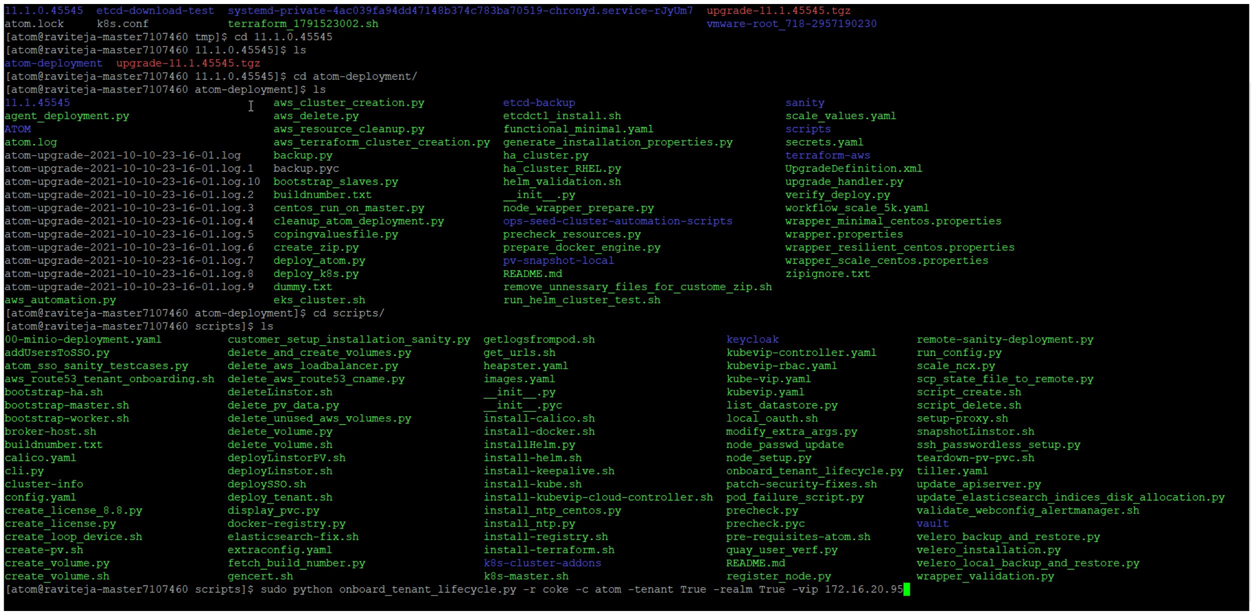
SSH into Master ip of ATOM to run onboard_tenant_lifecycle.py.

Configure like below in master ip.

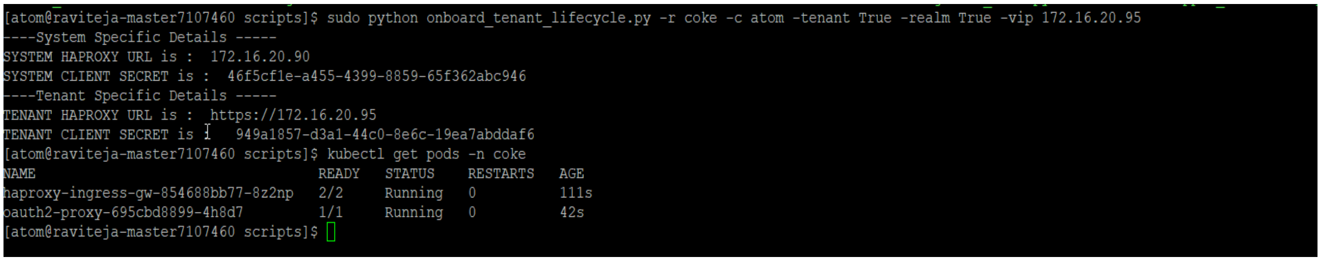
```
sudo python onboard_tenant_lifecycle.py -r <tenant name> -c atom -tenant True -realm True -vip <tenant ip>
```

```
EX : sudo python onboard_tenant_lifecycle.py -r coke -c atom -tenant True -realm True -vip 172.16.5.65
```

Note:: tenant ip which is not pingable.



```
11.1.0.45545  etcd-download-test  systemd-private-4ac039fa94dd47148b374c783ba70519-chronyd.service-rJyUm7  upgrade-11.1.45545.tgz
atom.lock     k8s.conf            terraform_1791523002.sh                                                  vmware-root_718-2957190230
[atom@raviteja-master7107460 tmp]$ cd 11.1.0.45545
[atom@raviteja-master7107460 11.1.0.45545]$ ls
atom-deployment  upgrade-11.1.45545.tgz
[atom@raviteja-master7107460 11.1.0.45545]$ cd atom-deployment/
[atom@raviteja-master7107460 atom-deployment]$ ls
11.1.45545                               aws_cluster_creation.py            etcd-backup                                sanity
agent_deployment.py                      aws_delete.py                      etcdctl_install.sh                         scale_values.yaml
ATOM                                     aws_resource_cleanup.py            functional_minimal.yaml                    scripts
atom.log                                 aws_terraform_cluster_creation.py  generate_installation_properties.py        secrets.yaml
atom-upgrade-2021-10-10-23-16-01.log     backup.py                          ha_cluster.py                              terraform-aws
atom-upgrade-2021-10-10-23-16-01.log.1   backup.pyc                         ha_cluster_RHEL.py                         UpgradeDefinition.xml
atom-upgrade-2021-10-10-23-16-01.log.10  bootstrap_slaves.py                helm_validation.sh                         upgrade_handler.py
atom-upgrade-2021-10-10-23-16-01.log.2   buildnumber.txt                    __init__.py                                verify_deploy.py
atom-upgrade-2021-10-10-23-16-01.log.3   centos_run_on_master.py            node_wrapper_prepare.py                    workflow_scale_5k.yaml
atom-upgrade-2021-10-10-23-16-01.log.4   cleanup_atom_deployment.py         ops-seed-cluster-automation-scripts        wrapper_minimal_centos.properties
atom-upgrade-2021-10-10-23-16-01.log.5   copingvaluesfile.py                precheck_resources.py                      wrapper.properties
atom-upgrade-2021-10-10-23-16-01.log.6   create_zip.py                      prepare_docker_engine.py                   wrapper_resilient_centos.properties
atom-upgrade-2021-10-10-23-16-01.log.7   deploy_atom.py                     pv-snapshot-local                          wrapper_scale_centos.properties
atom-upgrade-2021-10-10-23-16-01.log.8   deploy_k8s.py                      README.md                                  zipignore.txt
atom-upgrade-2021-10-10-23-16-01.log.9   dummy.txt                          remove_unnessary_files_for_custome_zip.sh
aws_automation.py                        eks_cluster.sh                     run_helm_cluster_test.sh
[atom@raviteja-master7107460 atom-deployment]$ cd scripts/
[atom@raviteja-master7107460 scripts]$ ls
00-minio-deployment.yaml          customer_setup_installation_sanity.py  getlogsfrompod.sh                    keycloak                     remote-sanity-deployment.py
addUsersToSSO.py                  delete_and_create_volumes.py           get_urls.sh                          kubevip-controller.yaml      run_config.py
atom_sso_sanity_testcases.py      delete_aws_loadbalancer.py             heapster.yaml                        kubevip-rbac.yaml            scale_ncx.py
aws_route53_tenant_onboarding.sh  delete_aws_route53_cname.py            images.yaml                          kube-vip.yaml                scp_state_file_to_remote.py
bootstrap-ha.sh                   deleteLinstor.sh                       __init__.py                          kubevip.yaml                 script_create.sh
bootstrap-master.sh               delete_pv_data.py                      __init__.pyc                         list_datastore.py            script_delete.sh
bootstrap-worker.sh               delete_unused_aws_volumes.py           install-calico.sh                    local_oauth.sh               setup-proxy.sh
broker-host.sh                    delete_volume.py                       install-docker.sh                    modify_extra_args.py         snapshotLinstor.sh
buildnumber.txt                   delete_volume.sh                       installHelm.py                       node_passwd_update           ssh_passwordless_setup.py
calico.yaml                       deployLinstorPV.sh                     install-helm.sh                      node_setup.py                teardown-pv-pvc.sh
cli.py                            deployLinstor.sh                       install-keepalive.sh                 onboard_tenant_lifecycle.py  tiller.yaml
cluster-info                      deploySSO.sh                           install-kube.sh                      patch-security-fixes.sh      update_apiserver.py
config.yaml                       deploy_tenant.sh                       install-kubevip-cloud-controller.sh  pod_failure_script.py        update_elasticsearch_indices_disk_allocation.py
create_license_8.8.py             display_pvc.py                         install_ntp_centos.py                precheck.py                  validate_webconfig_alertmanager.sh
create_license.py                 docker-registry.py                     install_ntp.py                       precheck.pyc                 vault
create_loop_device.sh             elasticsearch-fix.sh                   install-registry.sh                  pre-requisites-atom.sh       velero_backup_and_restore.py
create-pv.sh                      extraconfig.yaml                       install-terraform.sh                 quay_user_verf.py            velero_installation.py
create_volume.py                  fetch_build_number.py                  k8s-cluster-addons                   README.md                    velero_local_backup_and_restore.py
create_volume.sh                  gencert.sh                             k8s-master.sh                        register_node.py             wrapper_validation.py
[atom@raviteja-master7107460 scripts]$ sudo python onboard_tenant_lifecycle.py -r coke -c atom -tenant True -realm True -vip 172.16.20.95
```

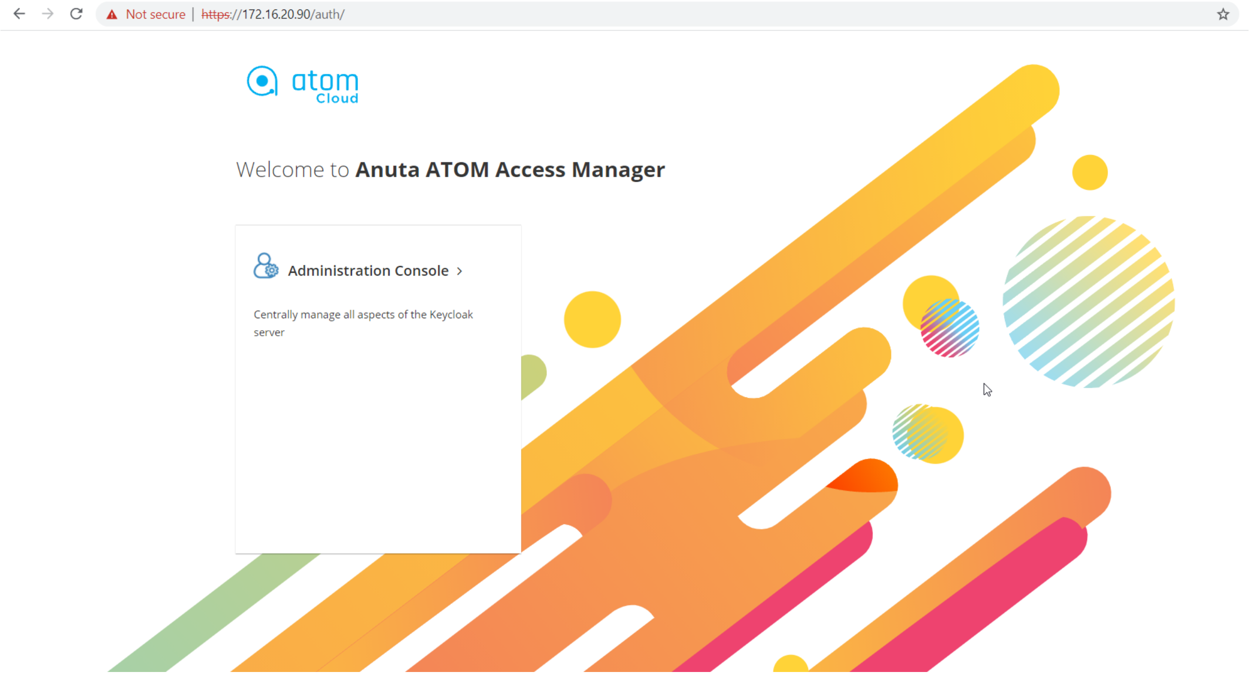


```
[atom@raviteja-master7107460 scripts]$ sudo python onboard_tenant_lifecycle.py -r coke -c atom -tenant True -realm True -vip 172.16.20.95
----System Specific Details -----
SYSTEM HAPROXY URL is :  172.16.20.90
SYSTEM CLIENT SECRET is :  46f5cf1e-a455-4399-8859-65f362abc946
----Tenant Specific Details -----
TENANT HAPROXY URL is :  https://172.16.20.95
TENANT CLIENT SECRET is :   949a1857-d3a1-44c0-8e6c-19ea7abddaf6
[atom@raviteja-master7107460 scripts]$ kubectl get pods -n coke
NAME                                  READY   STATUS    RESTARTS   AGE
haproxy-ingress-gw-854688bb77-8z2np   2/2     Running   0          111s
oauth2-proxy-695cbd8899-4h8d7         1/1     Running   0          42s
[atom@raviteja-master7107460 scripts]$ 
```

After running the commands, need to copy the Tenant login URL from `TENANT HAPROXY URL : https://172.16.20.95`.

After getting the tenant haproxy url , need to connect the keycloak as:

`https://172.16.20.90/auth`

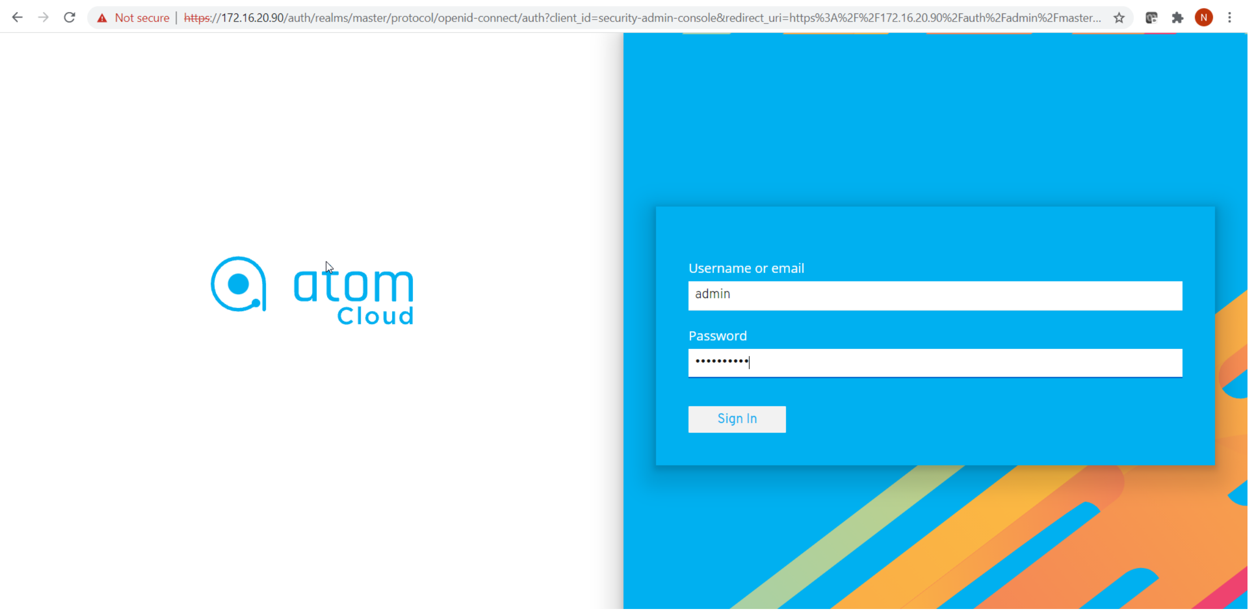


Welcome to **Anuta ATOM Access Manager**

Administration Console ›

Centrally manage all aspects of the Keycloak server

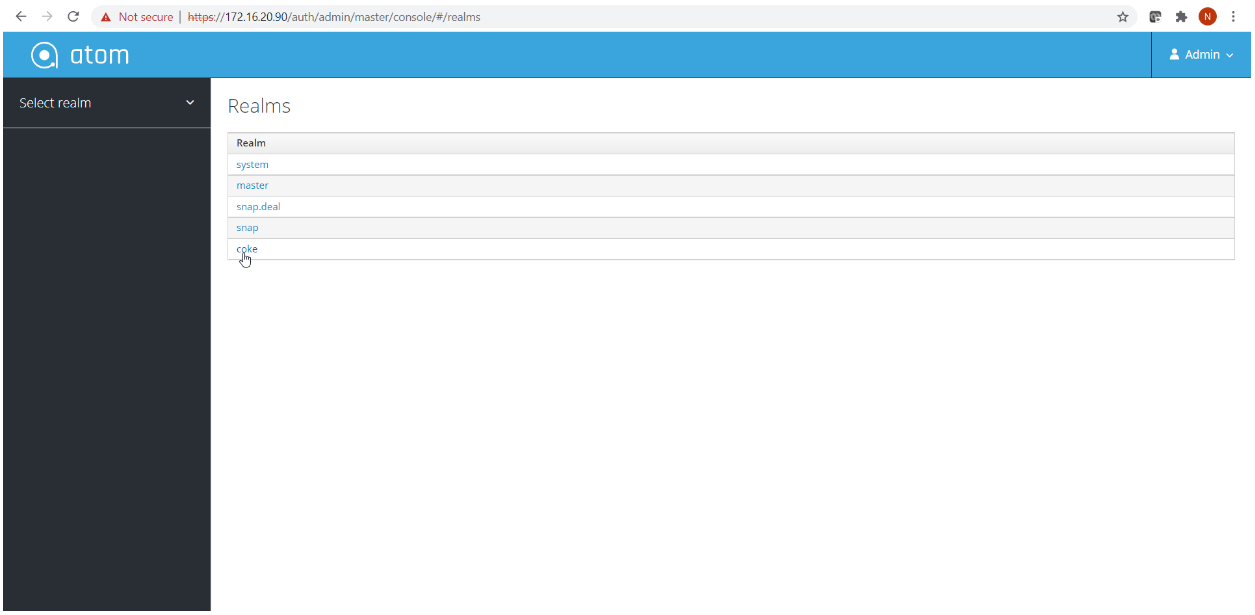
Login to keycloak using user/password : **admin/Secret@123**



Not secure | https://172.16.20.90/auth/realms/master/protocol/openid-connect/auth?client_id=security-admin-console&redirect_uri=https%3A%2F%2F172.16.20.90%2Fauth%2Fadmin%2Fmaster...

Username or email: admin

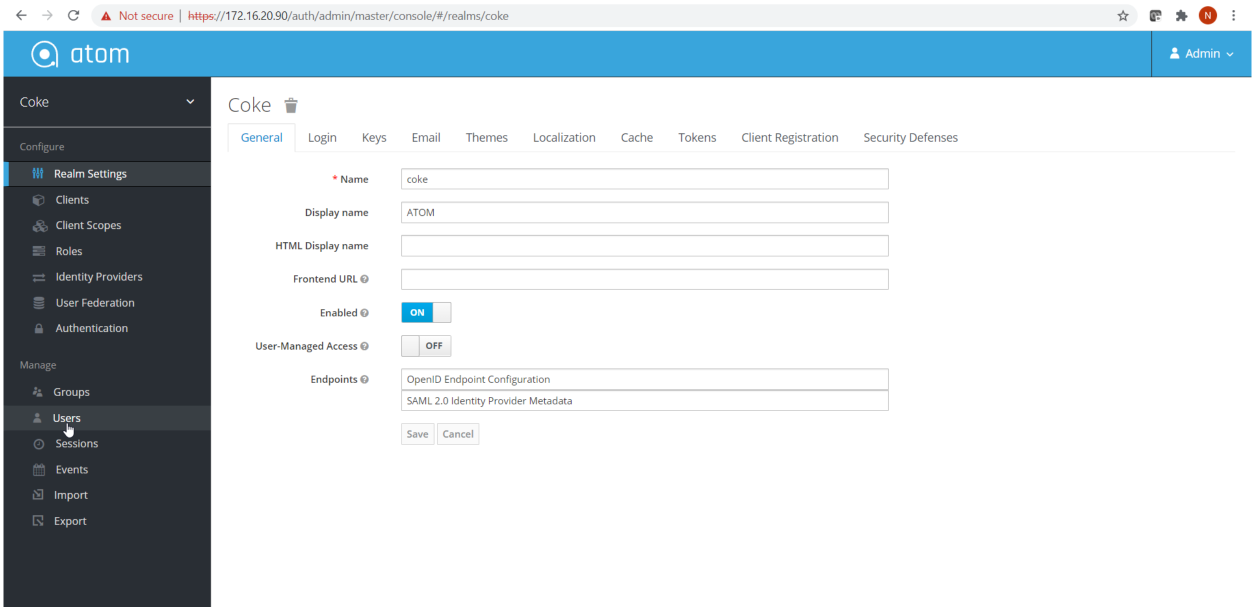
Password: ••••••••••



Not secure | https://172.16.20.90/auth/admin/master/console/#/realms

Realms

Realm
system
master
snap.deal
snap
coke

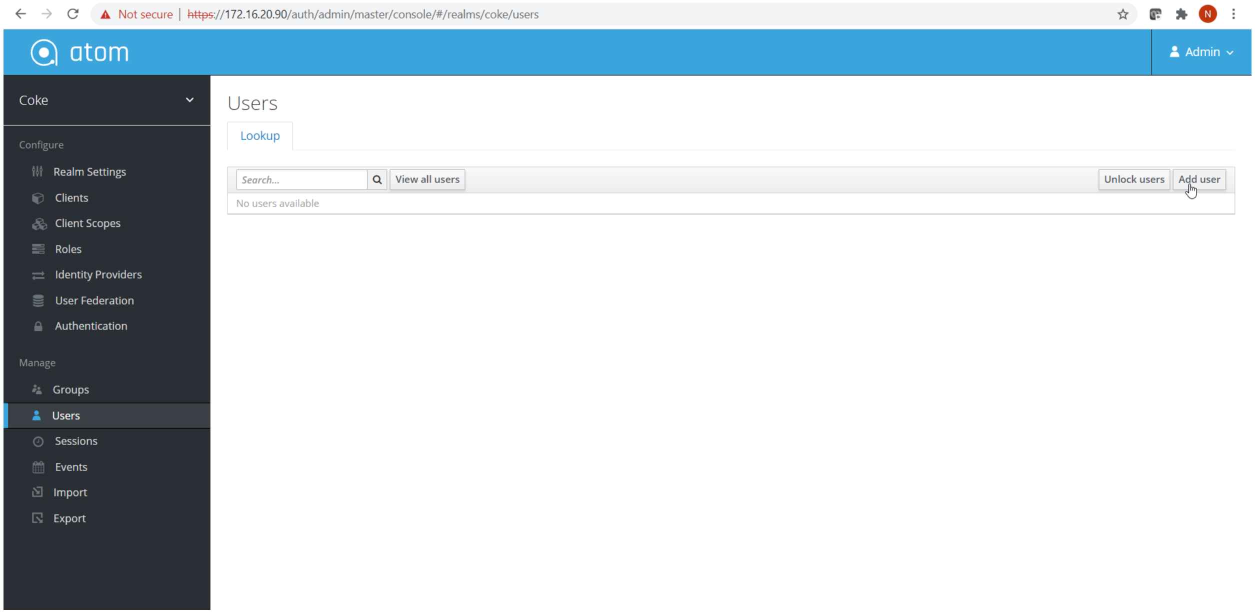


Not secure | https://172.16.20.90/auth/admin/master/console/#/realms/coke

Coke

General | Login | Keys | Email | Themes | Localization | Cache | Tokens | Client Registration | Security Defenses

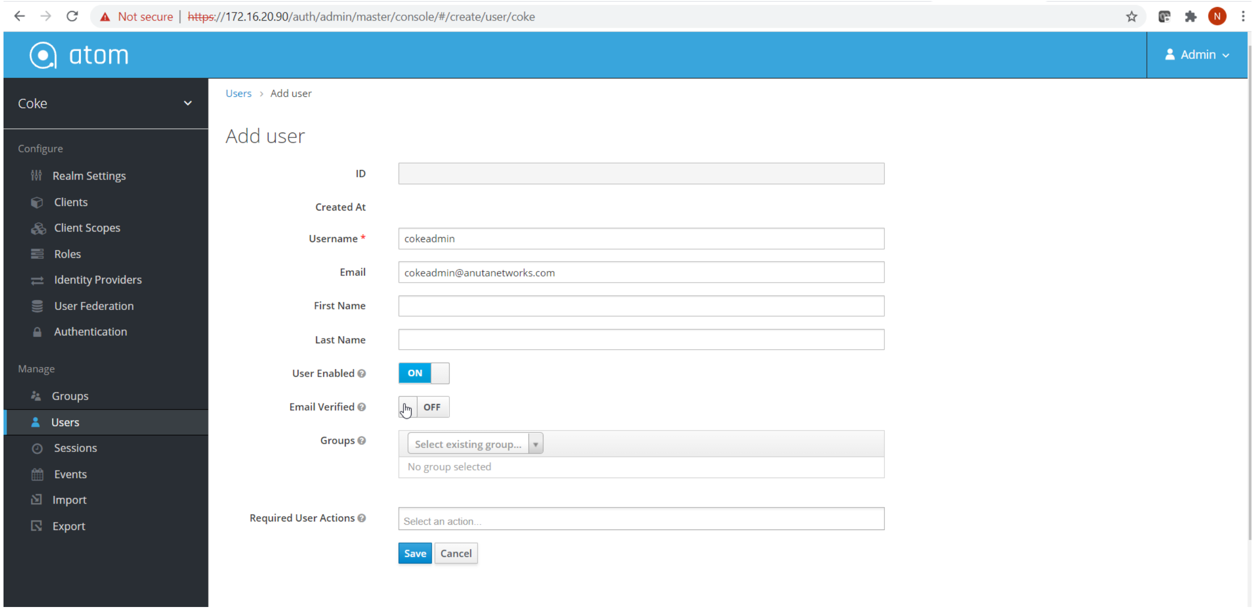
* Name	coke
Display name	ATOM
HTML Display name	
Frontend URL	
Enabled	ON
User-Managed Access	OFF
Endpoints	OpenID Endpoint Configuration SAML 2.0 Identity Provider Metadata



Not secure | https://172.16.20.90/auth/admin/master/console/#/realms/coke/users

No users available

Create tenant admin



Add user

ID

Created At

Username * cokeadmin

Email cokeadmin@anutanetworks.com

First Name

Last Name

User Enabled ON

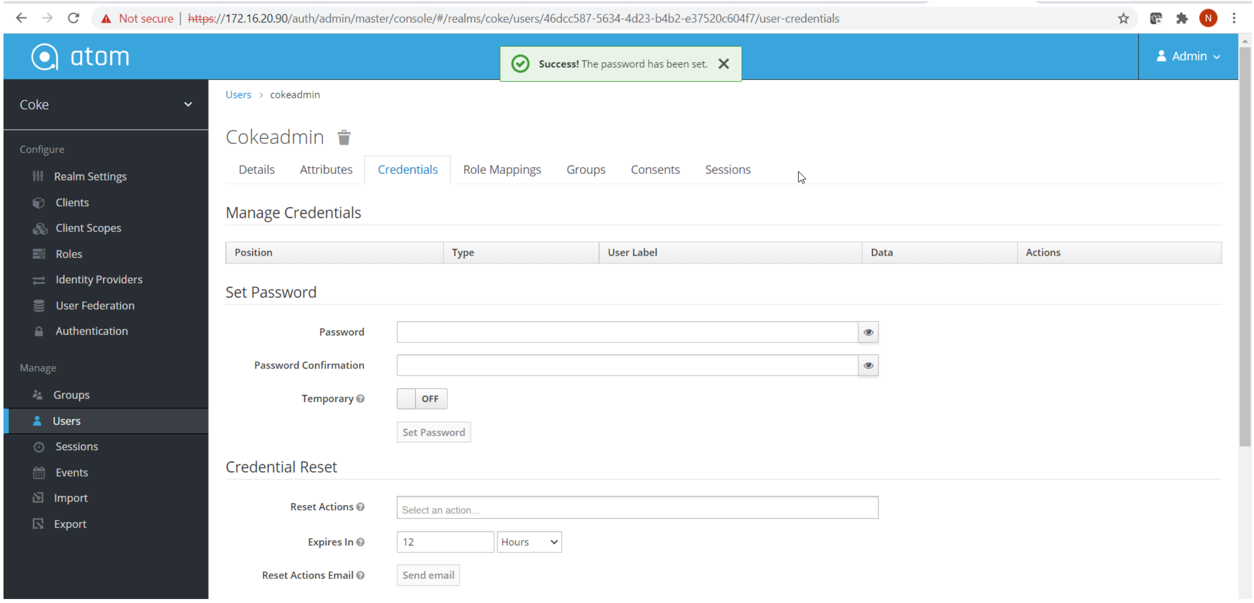
Email Verified OFF

Groups Select existing group...

No group selected

Required User Actions Select an action...

Set the password



Success! The password has been set.

Cokeadmin

Manage Credentials

Position	Type	User Label	Data	Actions

Set Password

Password

Password Confirmation

Temporary OFF

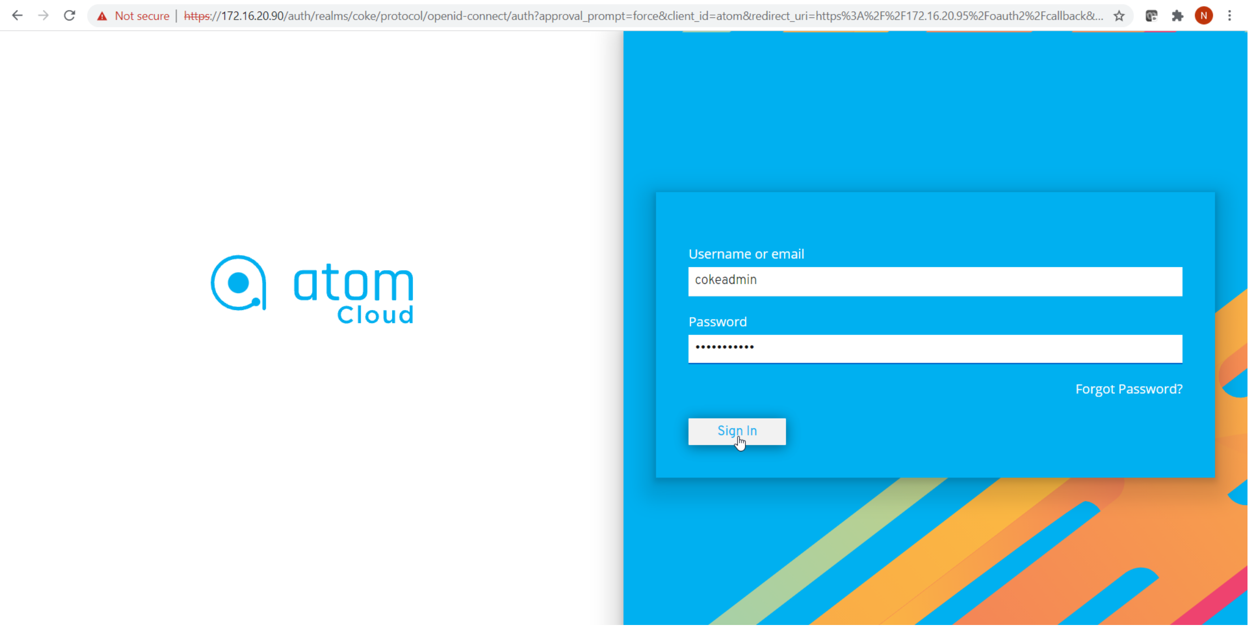
Credential Reset

Reset Actions Select an action...

Expires In 12 Hours

Reset Actions Email

Login with tenant admin user

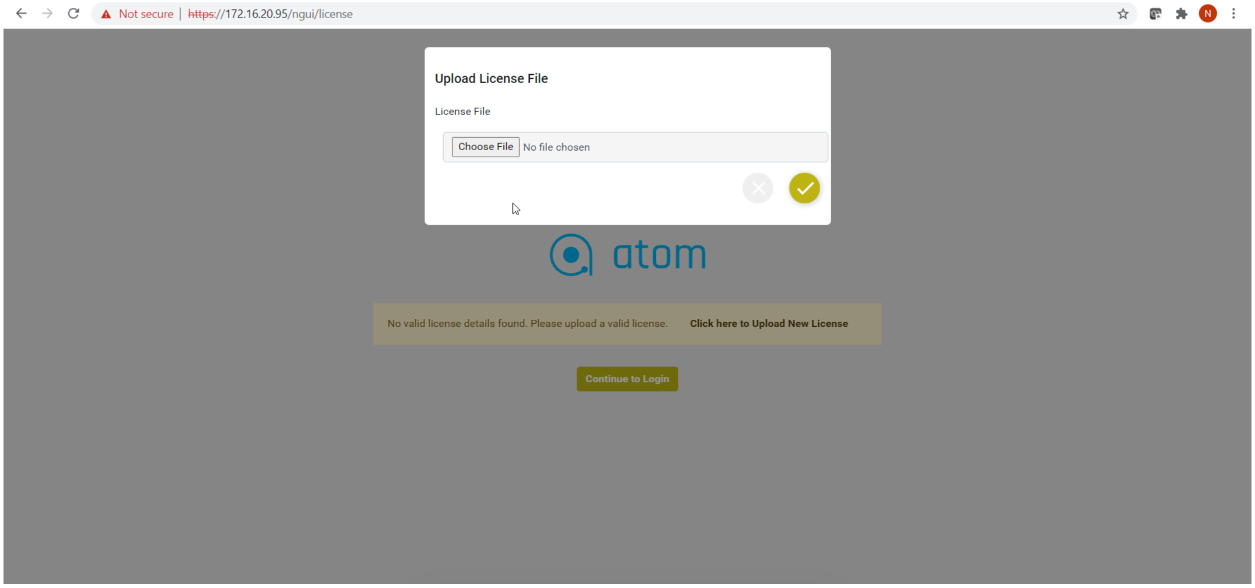


Not secure | https://172.16.20.90/auth/realms/coke/protocol/openid-connect/auth?approval_prompt=force&client_id=atom&redirect_uri=https%3A%2F%2F172.16.20.95%2Foauth2%2Fcallback&...

Username or email: cokeadmin

Password: •••••••••••

Upload the tenant license in atom

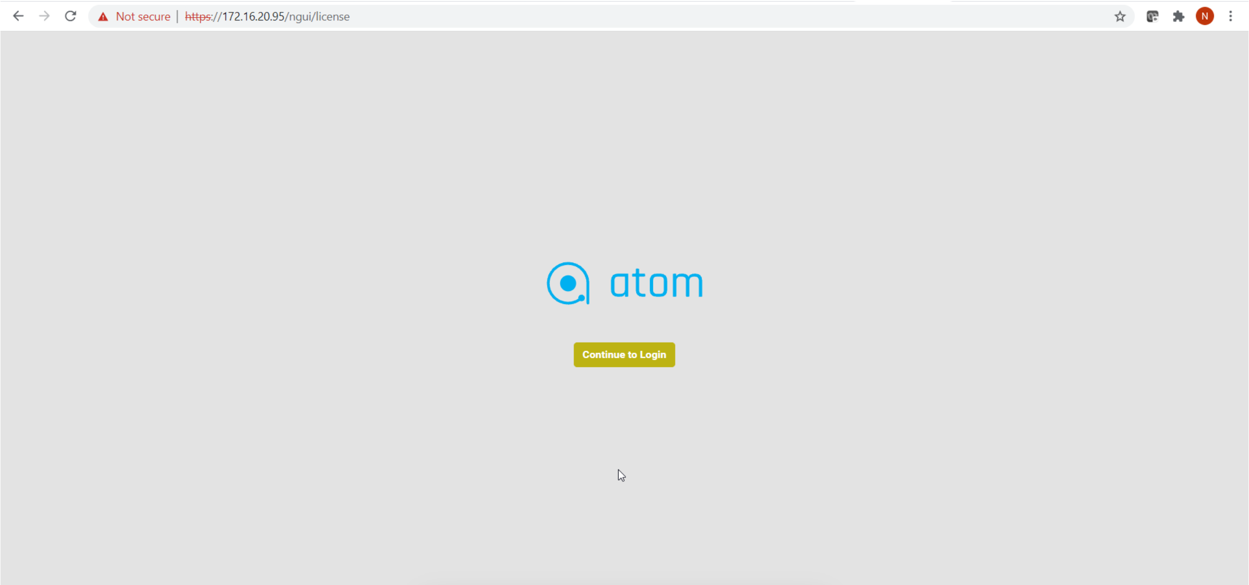


Not secure | https://172.16.20.95/ngui/license

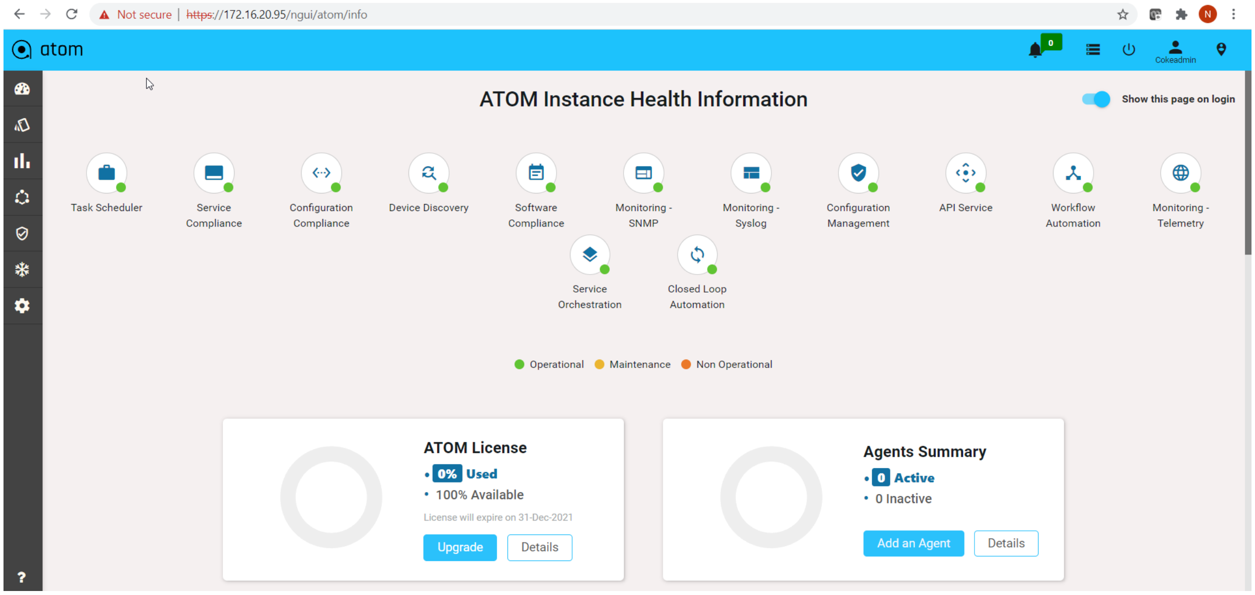
Upload License File

License File: Choose File No file chosen

No valid license details found. Please upload a valid license. Click here to Upload New License



Check the tenant admin UI.

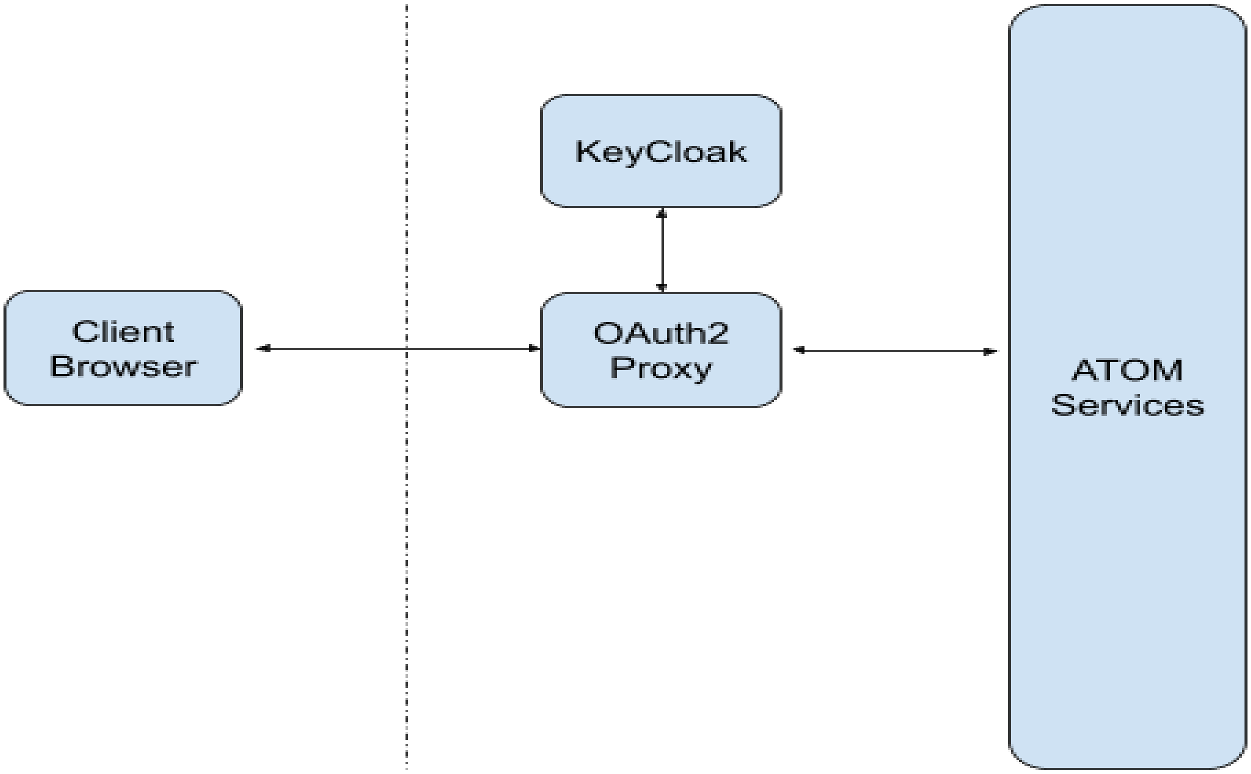


User Management

The control of users and groups is a core element of ATOM system administration.Users can also be grouped (based on the function) to have read permissions, write permissions, execute permissions or any combination of read/write/execute permissions for files owned by that group.

Managing Users in ATOM not only covers creating users but also configuring or assigning the privileges for each user or similar group of users to perform tasks in ATOM. Apart from creating the access or deny permissions in ATOM locally, you can import existing LDAP or AD users into ATOM and extend the necessary permissions to them too.

User management and Authentication works in ATOM as shown in the diagram below. The user information is saved in KeyCloak. OAuth Proxy acts as a gatekeeper checking all the incoming requests and ensuring the requests are coming from an authenticated client. If the proxy sees an non-authentic call, it redirects the request to a login screen served by the identity provider, which is KeyCloak.



User management in ATOM includes the following:

- "Roles"
- "Creating Authentication Mode Priority"
- "Managing Users"
- "Configuring Access Control"
- "Managing OpenLDAP Users"
- "Managing Active Directory Users"
- "Managing TACACS Users"

Roles

A set of system-defined permissions are grouped into roles and are available in ATOM by default. These roles can be assigned to a user during the creation of users in ATOM.

- **ROLE_SYSTEM_ADMIN**: Administrator of the root tenant ('system'). Every other tenant is either a direct child of the system or a sub tenant (descendent) of a top level tenant. System admin is given permission to onboard tenants and manage 'system' tenant resources.
- **ROLE_TENANT_ADMIN:** Is the equivalent of ROLE_SYSTEM_ADMIN (gets blanket permissions on all resources) but limited to resources of the specific tenant (‘user.owner)’ .
- **ROLE_USER_ADMIN**: Gives all access to user mgmt objects (users, Groups, rbac rules [rule list and everything down] etc), but limited to user.owner.
- **ROLE_WORKFLOW_ADMIN**: Allows a user all permissions on all workflow resources.

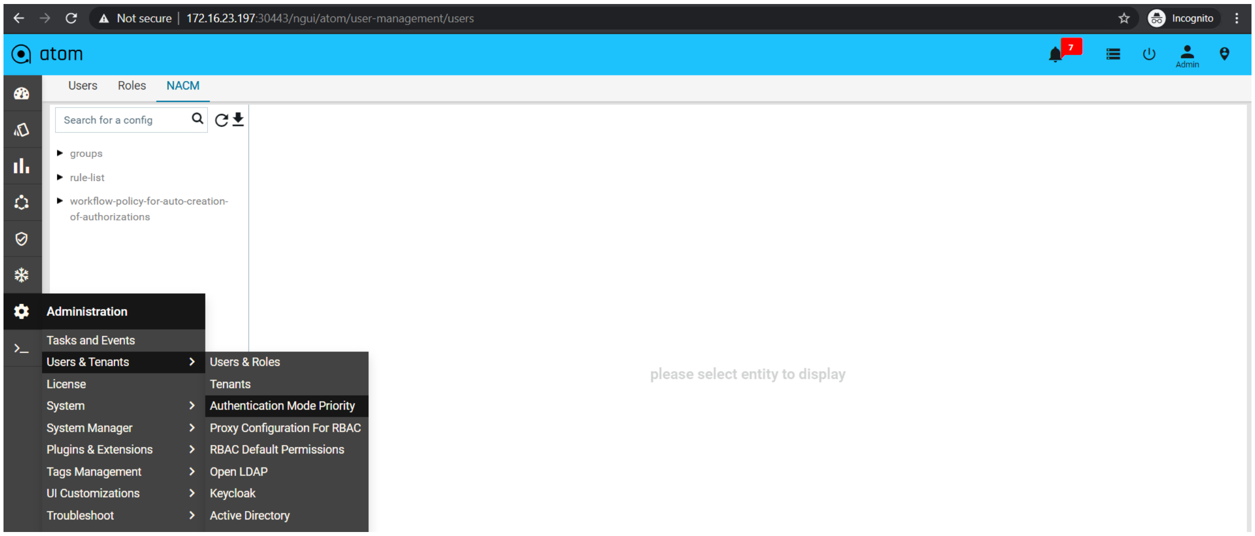
  This avoids having to create individual workflow permissions.
  Note that other permissions (rpc, data node etc) are still needed to be given explicitly, because this role only covers ‘Workflow resources’ only.

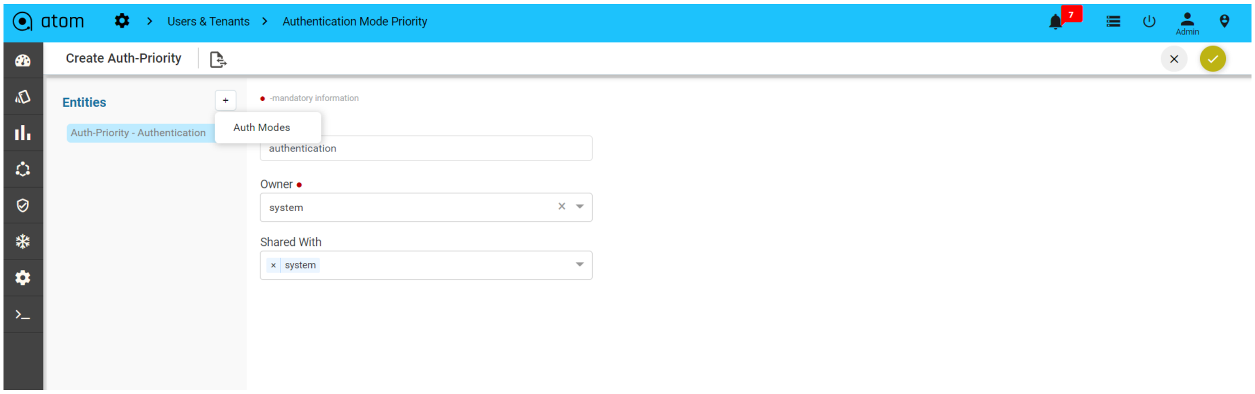
Creating Authentication Mode Priority

Starting from the 5.8.7 release, the admin can set the priority of the authentication modes in ATOM. By setting the priority of the authentication modes, the admin can enable the login failover to another authentication mode, if the first authentication mode (as arranged in the order of priority) fails. ATOM fails to the local authentication mode, if all the authentication modes as defined in the priority list fail.

To create the authentication mode priority in ATOM, do the following:

1. Navigate to **Administration** > **Users & Tenants**> **Authentication Mode Priority** in the left pane.
2. In the right pane click **Add Auth Priority** and in the **Create Auth Priority** screen, click **Entities** > **auth-modes**
3. Enter values in the fields as described below:
   i. **Priority**: Set the priority for the authentication mode. (1 is the highest priority)
   ii. **Authentication Mode** - Select the authentication mode from the available authentication modes (TACACS, OpenLDAP, Active Directory and Local)





authentication

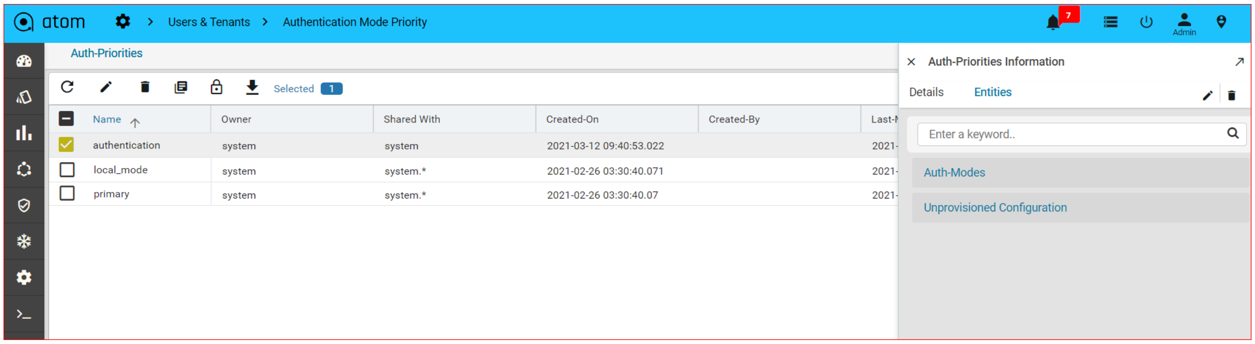
Owner ●

system

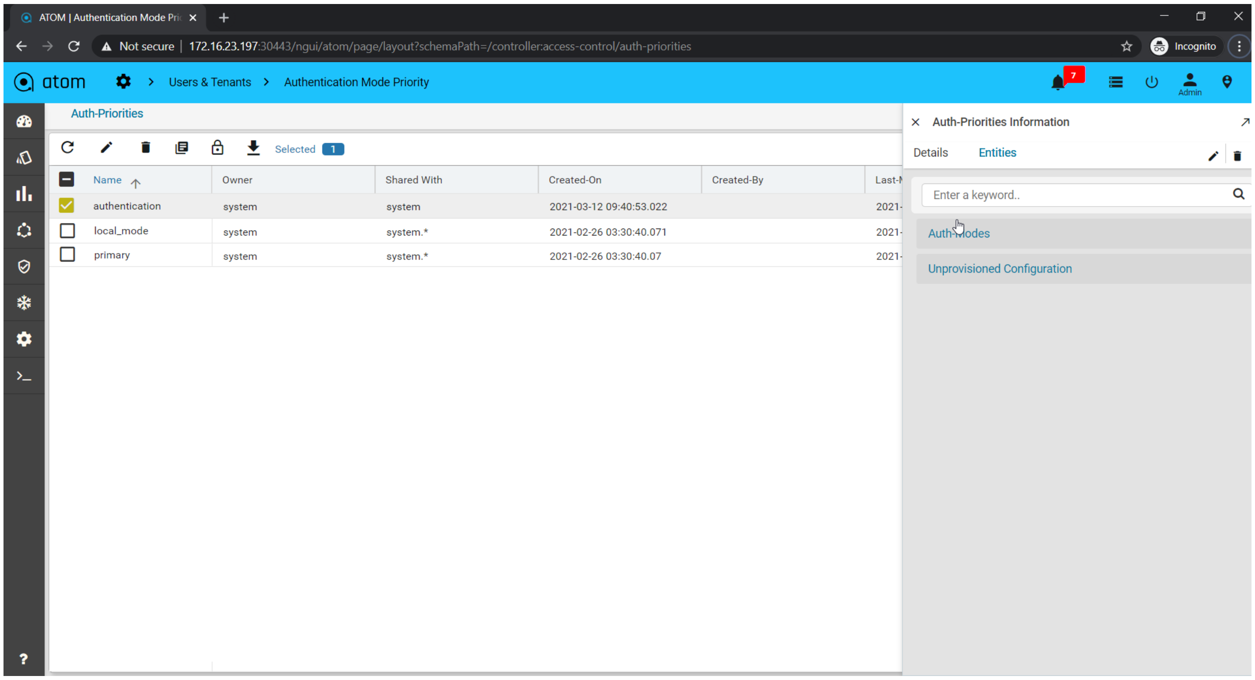
Shared With

× system

After setting the priority for each of the authentication modes, you can view the list as shown below:



	Name	Owner	Shared With	Created-On	Created-By	Last-M
☑	authentication	system	system	2021-03-12 09:40:53.022		2021-
□	local_mode	system	system.*	2021-02-26 03:30:40.071		2021-
□	primary	system	system.*	2021-02-26 03:30:40.07		2021-


ATOM | Authentication Mode Pri

Not secure | 172.16.23.197:30443/ngui/atom/page/layout?schemaPath=/controller:access-control/auth-priorities

atom > Users & Tenants > Authentication Mode Priority

Auth-Priorities

Selected 1

	Name	Owner	Shared With	Created-On	Created-By	Last-M
☑	authentication	system	system	2021-03-12 09:40:53.022		2021-
□	local_mode	system	system.*	2021-02-26 03:30:40.071		2021-
□	primary	system	system.*	2021-02-26 03:30:40.07		2021-

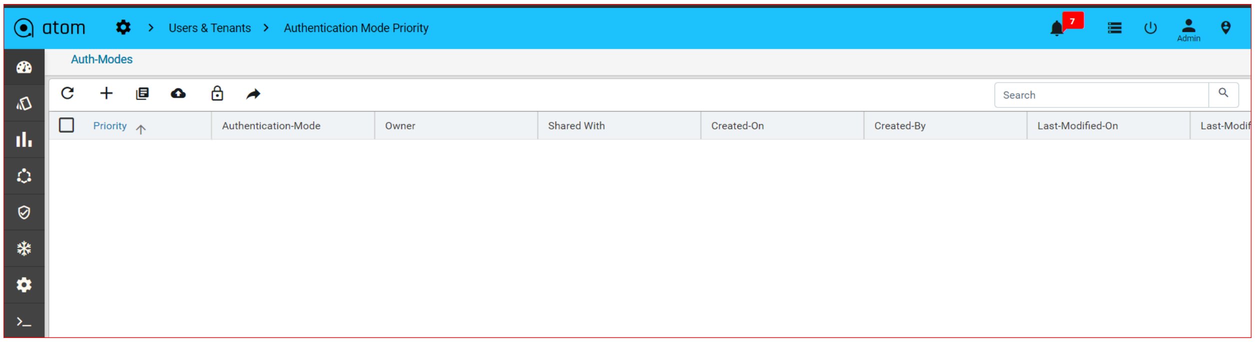
Auth-Priorities Information

Details Entities

Enter a keyword..

Auth-Modes

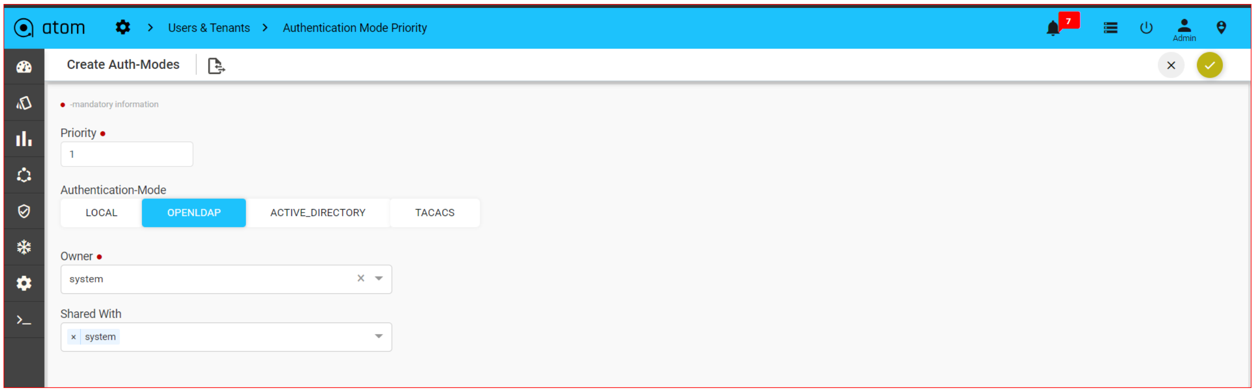
Unprovisioned Configuration


atom > Users & Tenants > Authentication Mode Priority

Auth-Modes

Search

□	Priority	Authentication-Mode	Owner	Shared With	Created-On	Created-By	Last-Modified-On	Last-Modif


atom > Users & Tenants > Authentication Mode Priority

Create Auth-Modes

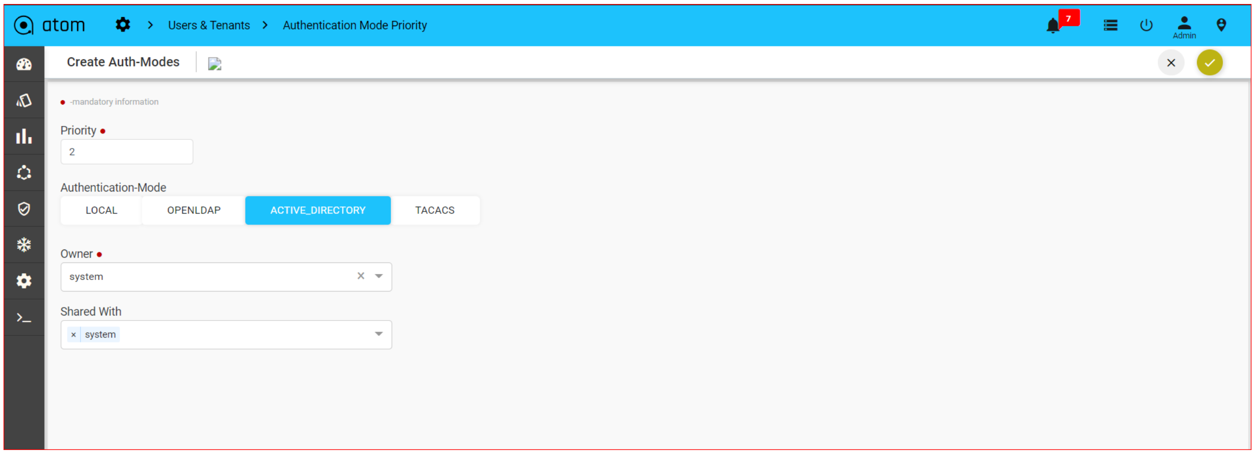
● -mandatory information

Priority ●
1

Authentication-Mode
LOCAL | OPENLDAP | ACTIVE_DIRECTORY | TACACS

Owner ●
system

Shared With
× system



Create Auth-Modes

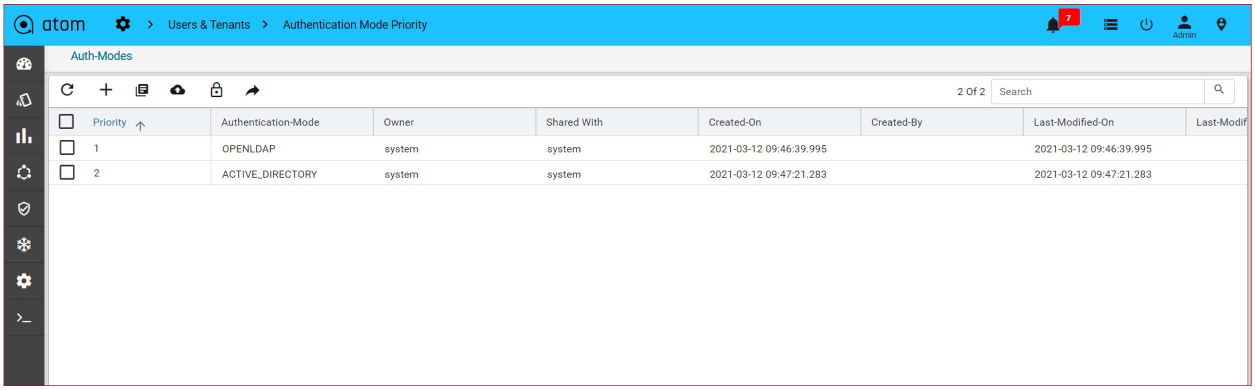
● -mandatory information

Priority ●: 2

Authentication-Mode: LOCAL | OPENLDAP | ACTIVE_DIRECTORY | TACACS (ACTIVE_DIRECTORY selected)

Owner ●: system

Shared With: system



Priority	Authentication-Mode	Owner	Shared With	Created-On	Created-By	Last-Modified-On	Last-Modif
1	OPENLDAP	system	system	2021-03-12 09:46:39.995		2021-03-12 09:46:39.995	
2	ACTIVE_DIRECTORY	system	system	2021-03-12 09:47:21.283		2021-03-12 09:47:21.283	

The authentication mode priority thus set can be assigned to a user at the time of creation of the user in ATOM

Managing Users

An Administrator can add local users to ATOM and configure their email accounts to receive notifications from ATOM. Apart from local users, ATOM lets its customers integrate their central authentication servers to streamline the user login process and automate administrative tasks such as user creation and role assignment. User data is synchronized from customer authentication servers into ATOM.

Prerequisite of Adding New User:

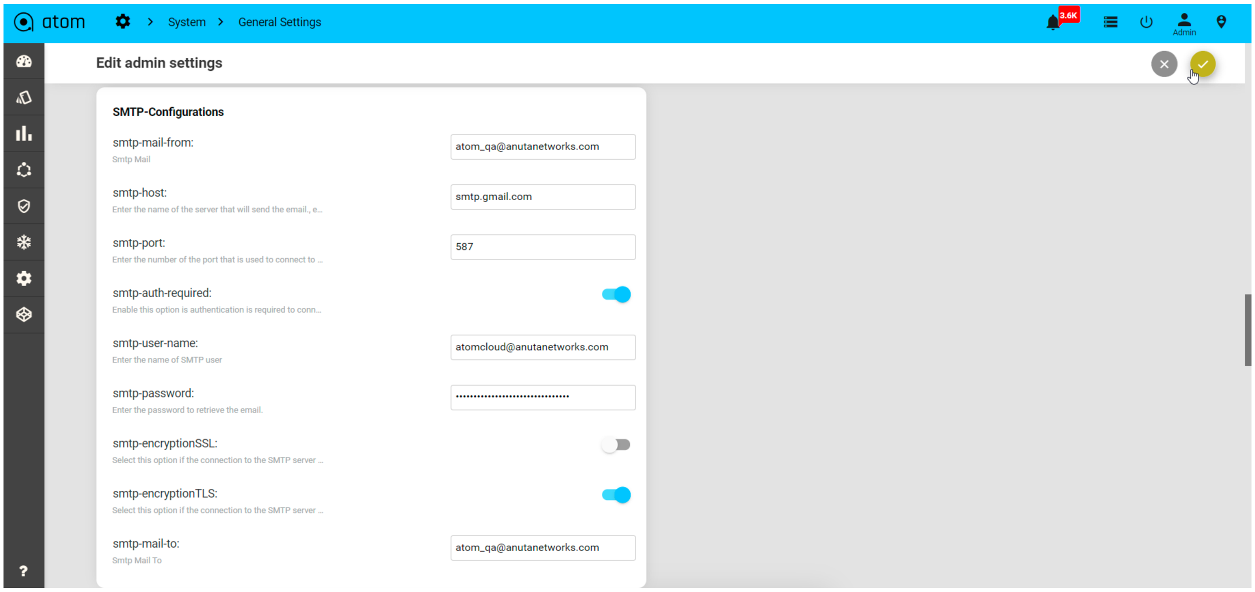
Before adding user need to follow the below required steps
Navigate to Administration->System->General setting->Edit->Smtp configuration:

You have to configure an email server to send email notifications to the ATOM users.

SMTP Mail From: You can set up an external SMTP email server to send email notifications to the ATOM users. To do so, enter values in the fields described below:

1. **SMTP-MAIL-FROM :** Sample value like atomdev@anutanetworks.com

2. **SMTP Host**: Sample value like smtp.gmail.com
3. **SMTP Port**: Example 587
4. **SMTP Auth Required**: Enable this option if authentication is required to connect to the SMTP Host
5. **SMTP User Name**: Example atomcloud@anutanetworks.com
6. **SMTP Password**: xxxxxx
7. **SMTP Encryption SSL**: Disable/Enable this option according to your SMTP.
8. **SMTP Encryption TLS**: Select this option if the connection to the SMTP server should use TLS as the authentication method
9. **SMTP-MAIL-TO:** Example atom_qa@anutanetworks.com



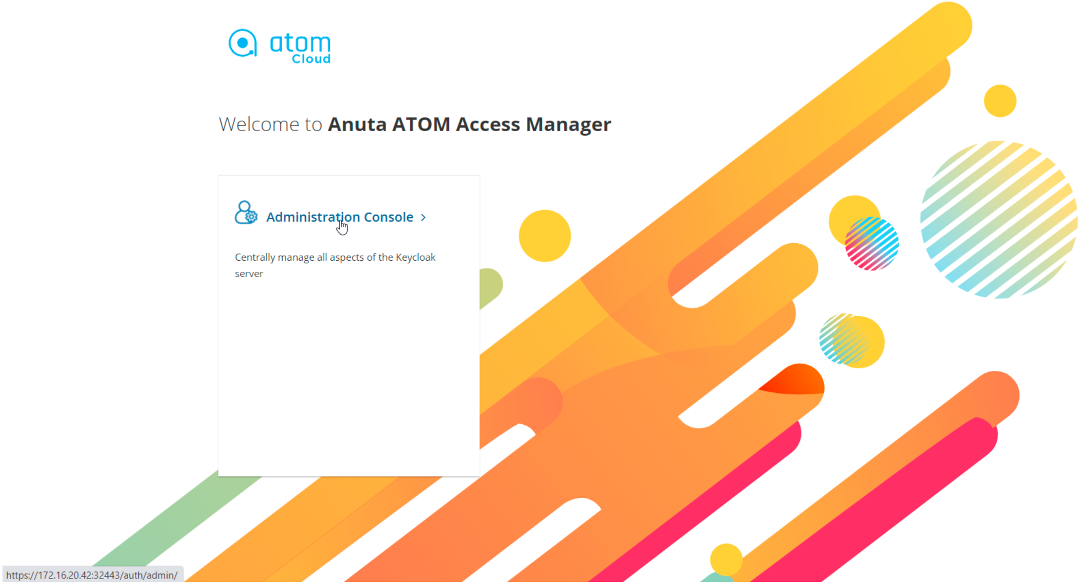
Edit admin settings

SMTP-Configurations

smtp-mail-from: Smtp Mail	atom_qa@anutanetworks.com
smtp-host: Enter the name of the server that will send the email., e...	smtp.gmail.com
smtp-port: Enter the number of the port that is used to connect to ...	587
smtp-auth-required: Enable this option is authentication is required to conn...	●
smtp-user-name: Enter the name of SMTP user	atomcloud@anutanetworks.com
smtp-password: Enter the password to retrieve the email.	••••••••••••••••••••••••••••••••
smtp-encryptionSSL: Select this option if the connection to the SMTP server ...	○
smtp-encryptionTLS: Select this option if the connection to the SMTP server ...	●
smtp-mail-to: Smtp Mail To	atom_qa@anutanetworks.com

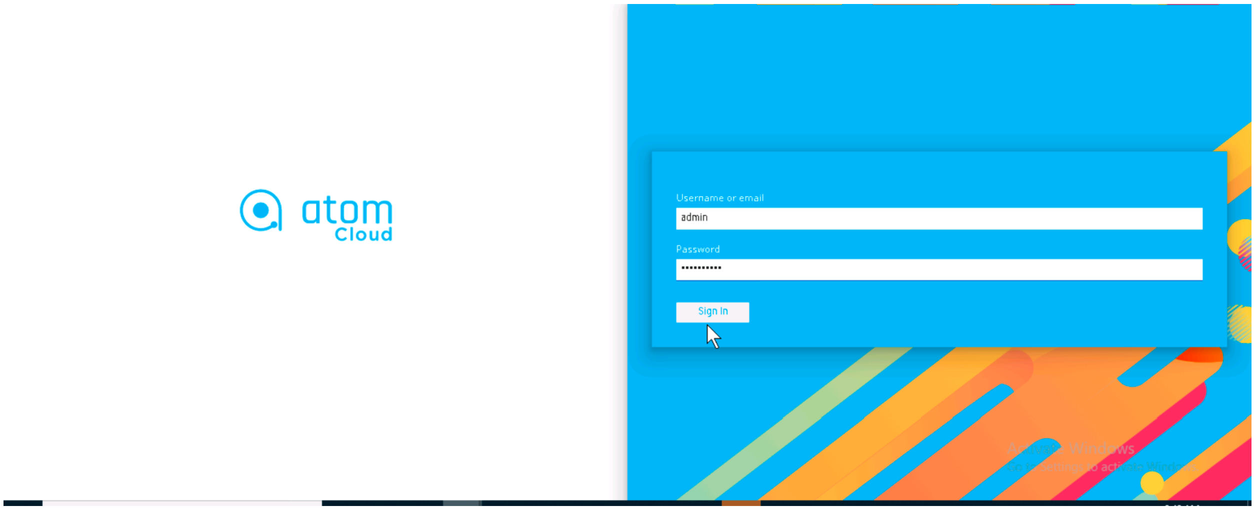
In keycloak admin has to update the smtp settings following the below steps.

1. Navigate to keycloak url https://<ATOM-Master-IP>:32443/auth/:

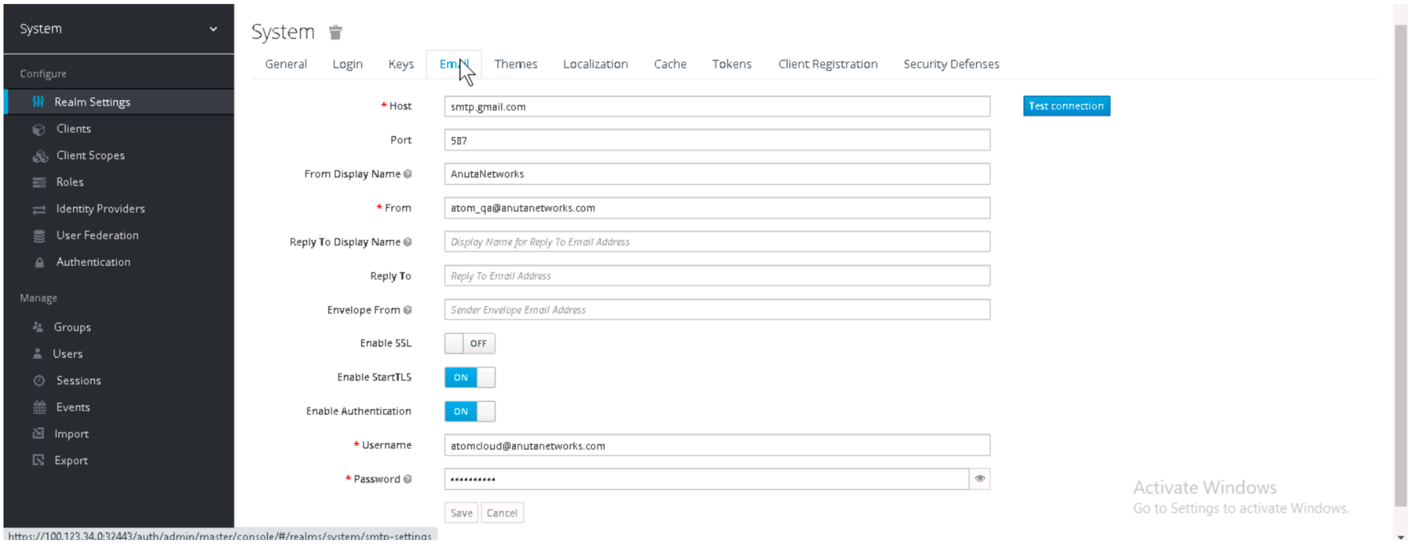


atom
Cloud
Welcome to **Anuta ATOM Access Manager**
Administration Console ›
Centrally manage all aspects of the Keycloak server
https://172.16.20.42:32443/auth/admin/

2. Click On the administration console and it goes to the login page if not given earlier. Enter the user name/password (admin/Secret@123)



3. Navigate to **Keycloak->System->Realm setting->Emails:** Configure the below smtp setting in realm setting and save it.

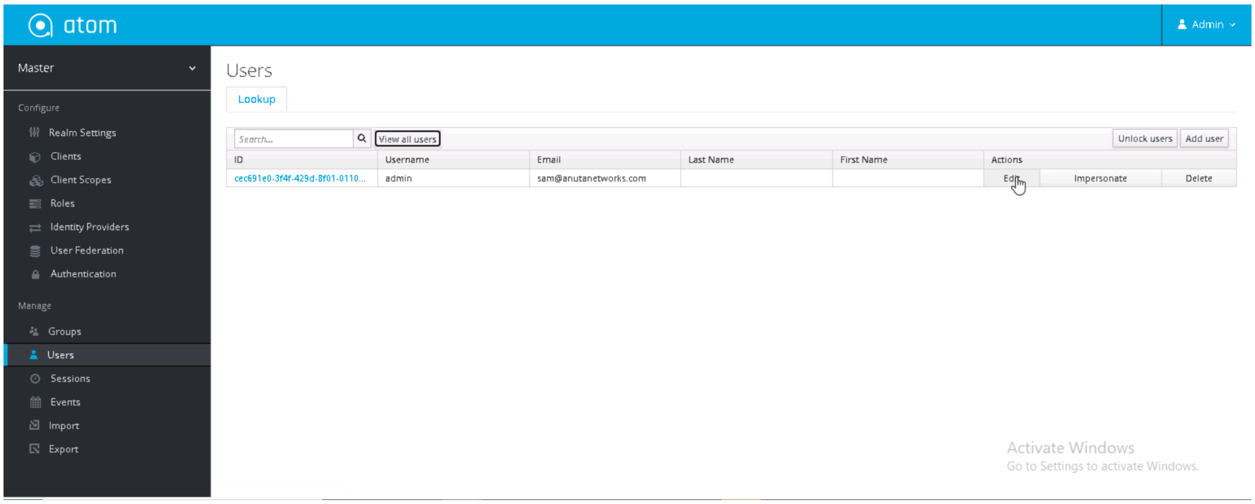


System

* Host: smtp.gmail.com
Port: 587
From Display Name: AnutaNetworks
* From: atom_qa@anutanetworks.com
Reply To Display Name: Display Name for Reply To Email Address
Reply To: Reply To Email Address
Envelope From: Sender Envelope Email Address
Enable SSL: OFF
Enable StartTLS: ON
Enable Authentication: ON
* Username: atomcloud@anutanetworks.com
* Password: **********

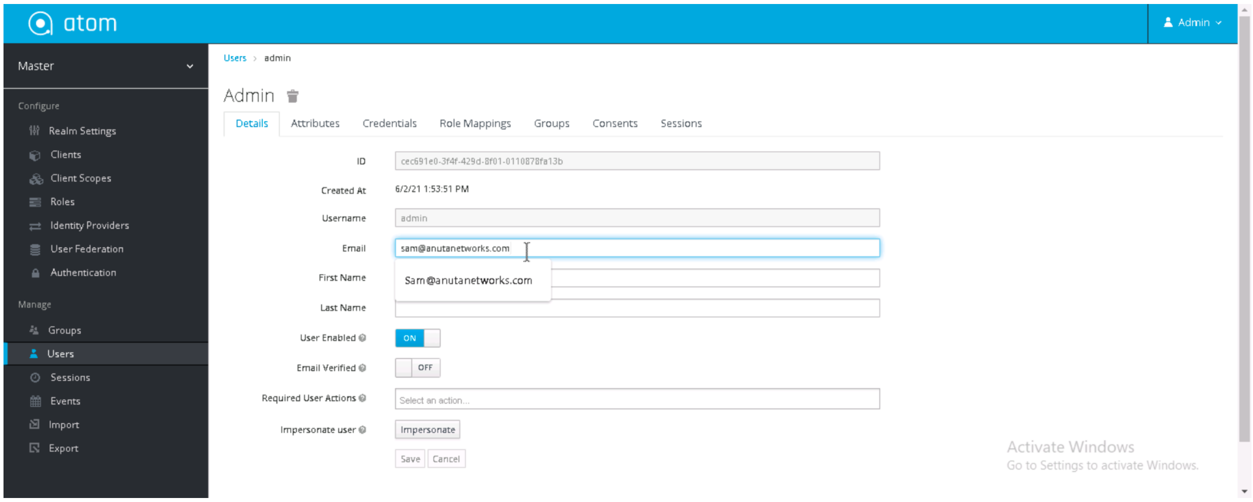
https://100.123.34.0:32443/auth/admin/master/console/#/realms/system/smtp-settings

4. Navigate to **keycloak->Master->Users->View All Users->Edit admin user:** Provide any dummy Email if needed, turn on the flag for “User enabled” and save it.



Users

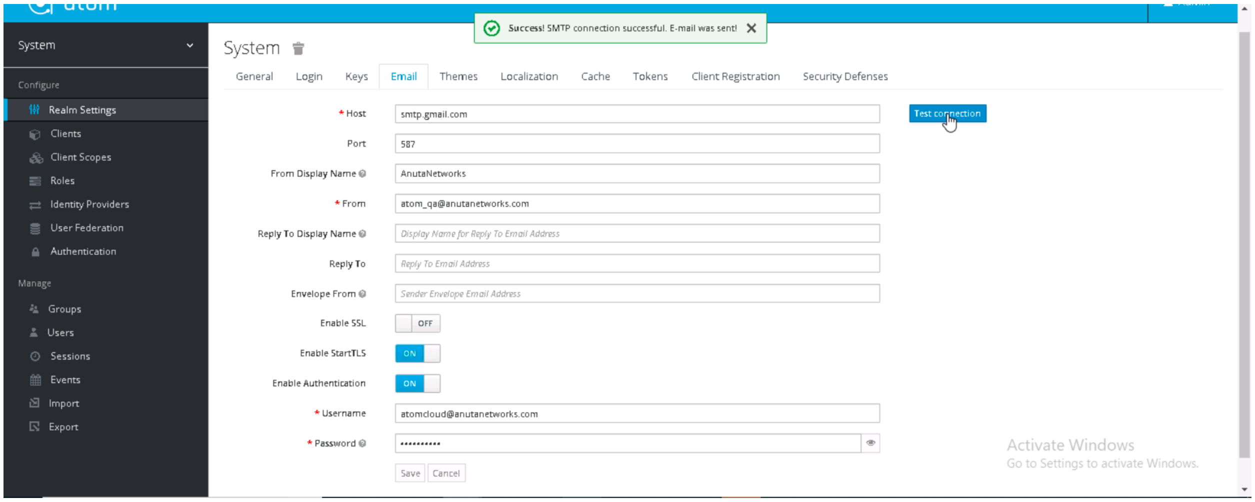
ID	Username	Email	Last Name	First Name	Actions		
cec691e0-3f4f-429d-8f01-0110...	admin	sam@anutanetworks.com			Edit	Impersonate	Delete



Admin

ID: cec691e0-3f4f-429d-8f01-0110878fa13b
Created At: 6/2/21 1:53:51 PM
Username: admin
Email: sam@anutanetworks.com
Sam@anutanetworks.com
First Name:
Last Name:
User Enabled: ON
Email Verified: OFF
Required User Actions: Select an action...
Impersonate user: Impersonate

5. Navigate to **Keycloak->System->Realm Settings->Emails:** If we click on test connectivity it should be successful.



Success! SMTP connection successful. E-mail was sent!

* Host: smtp.gmail.com
Port: 587
From Display Name: AnutaNetworks
* From: atom_qa@anutanetworks.com
Reply To Display Name: Display Name for Reply To Email Address
Reply To: Reply To Email Address
Envelope From: Sender Envelope Email Address
Enable SSL: OFF
Enable StartTLS: ON
Enable Authentication: ON
* Username: atomcloud@anutanetworks.com
* Password: ••••••••••

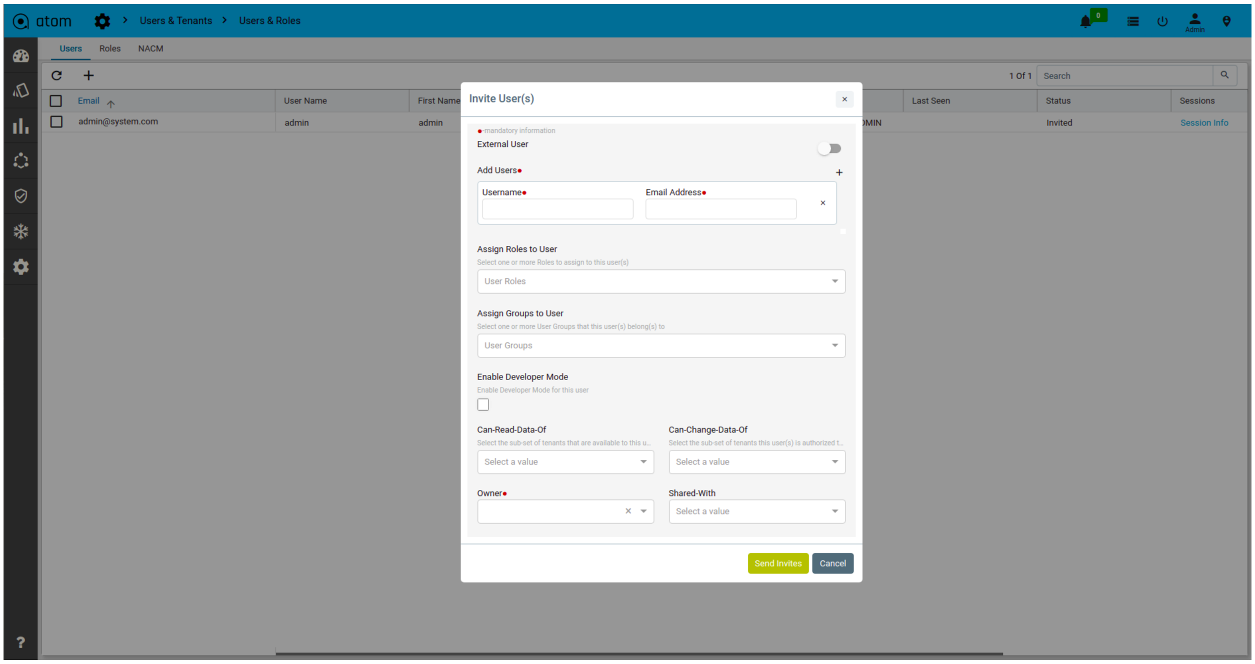
Adding a New User:

To add Users in ATOM, do the following:

1. Navigate to **Administration** > **Users & Tenants** > **Users & Roles** and click **Add**.
2. In the User Invitation screen, enter the values in the following fields:
   a. **External User**: Enable this button to create AD, LDAP, or TACACS users in ATOM. When this button is not enabled, a local user is created in ATOM.

   > **Note**: A local user will be required to reset his account password on the first login attempt. An external user can directly login to ATOM using the link in their invitation email.

   b. **Add User**: The administrator can invite one or more users to ATOM at once. To add more than one user, click on the **+** button.



i. **Username**: Enter an alphanumeric string of not more than 36 characters.

> **Note**: While creating AD, LDAP, or TACACS users in ATOM, the name entered in the Username field should be the same as that created in the respective authentication server.

ii. **Email Address**: Enter a valid email ID. Invitation emails to join ATOM Cloud will be sent to this address.

c. **Assign Roles to User**: User can be assigned relevant Role(s) from the list of system-defined Roles. Each Role is a set of system-defined permissions given to the user.

d. **Assign Groups to User**: Users can be put into pre-defined Group(s) to apply the access control privileges on them as a whole.

e. **Enable Developer Mode**: In developer mode users have access to many tools to work with Atom platforms.

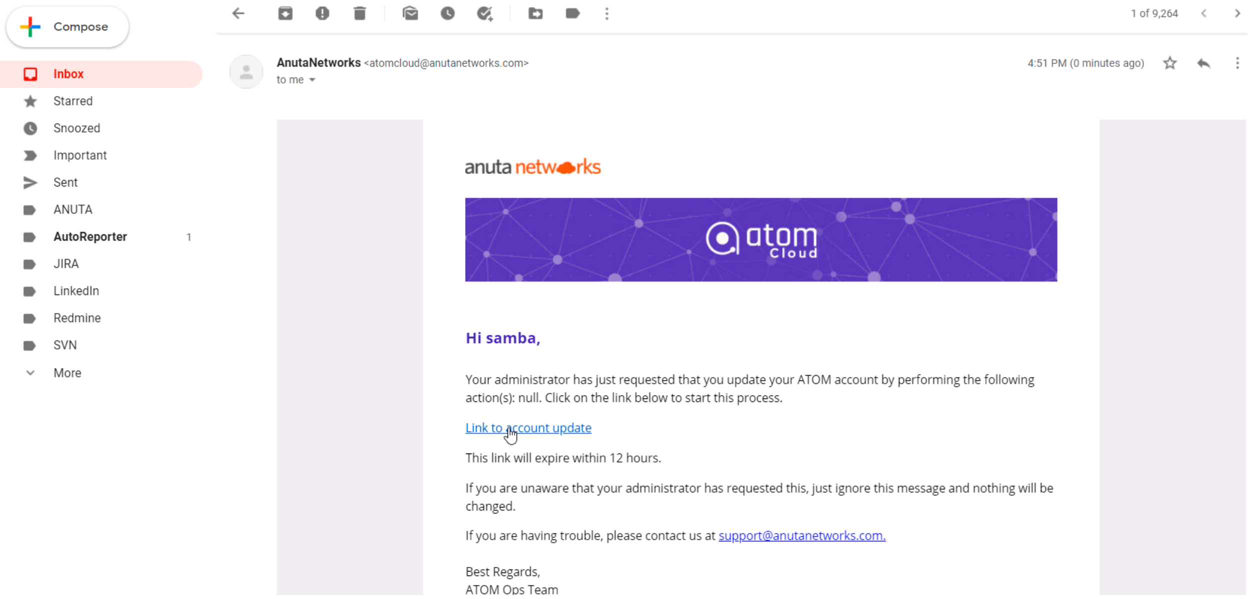
f. **Can-Read-Data-Of**: Select the tenants, whose data this user can read.

g. **Can-Change-Data-Of**: Select the tenants, whose data this user can change.

h. **Owner**: Select the owner of this user.

i. **Shared-With**: Select the tenants with whom this user should be shared.

3. If user creation is done, then check the mail sent to the given mail id of the new user created in ATOM for account update**.**



AnutaNetworks <atomcloud@anutanetworks.com>
to me

4:51 PM (0 minutes ago)

Hi samba,

Your administrator has just requested that you update your ATOM account by performing the following action(s): null. Click on the link below to start this process.

Link to account update

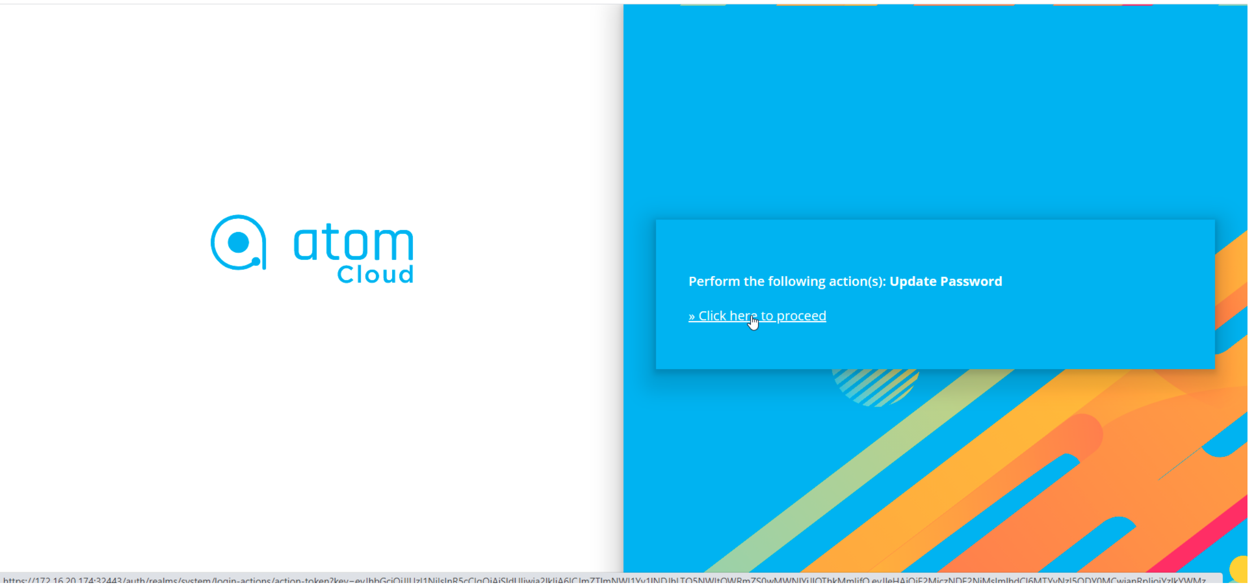
This link will expire within 12 hours.

If you are unaware that your administrator has requested this, just ignore this message and nothing will be changed.

If you are having trouble, please contact us at support@anutanetworks.com.

Best Regards,
ATOM Ops Team

4. Click on here will take to atom page and it should show new update password options

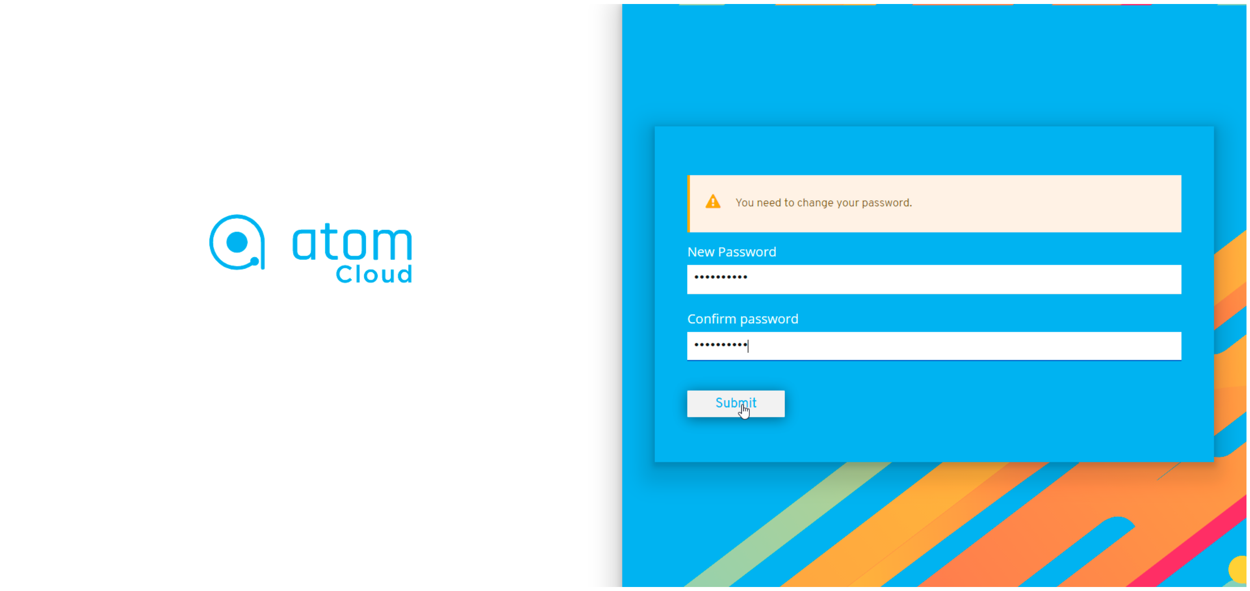


Perform the following action(s): **Update Password**

» Click here to proceed

https://172.16.20.174:32443/auth/realms/system/login-actions/action-token?key=

5. Set the new password.

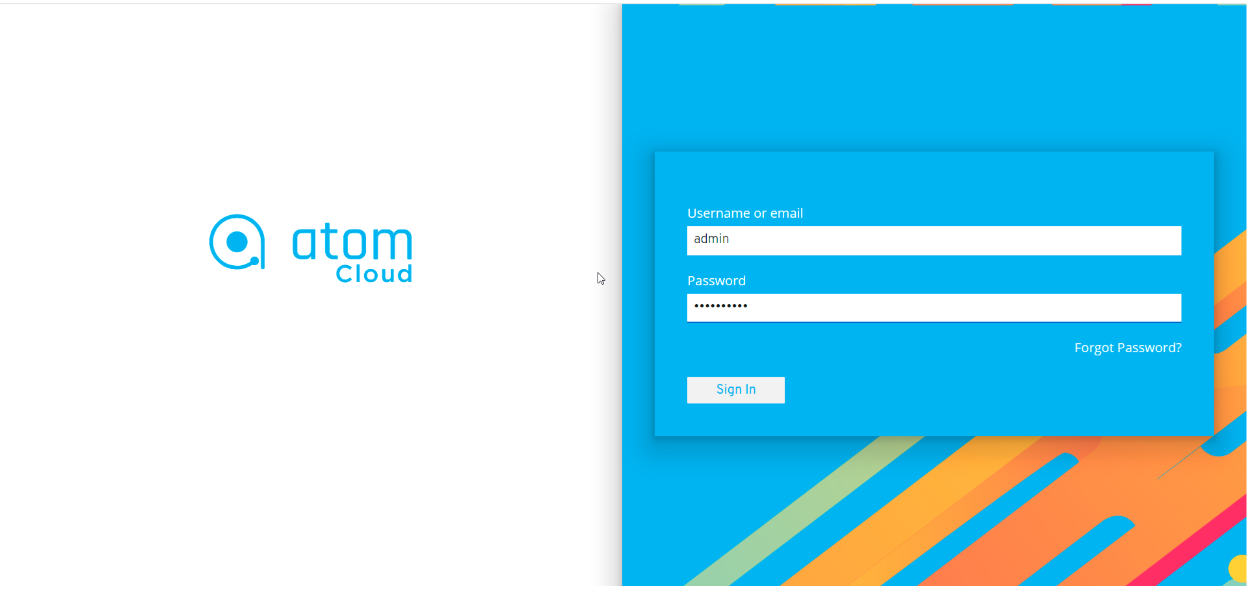


You need to change your password.

New Password: ••••••••••

Confirm password: ••••••••••

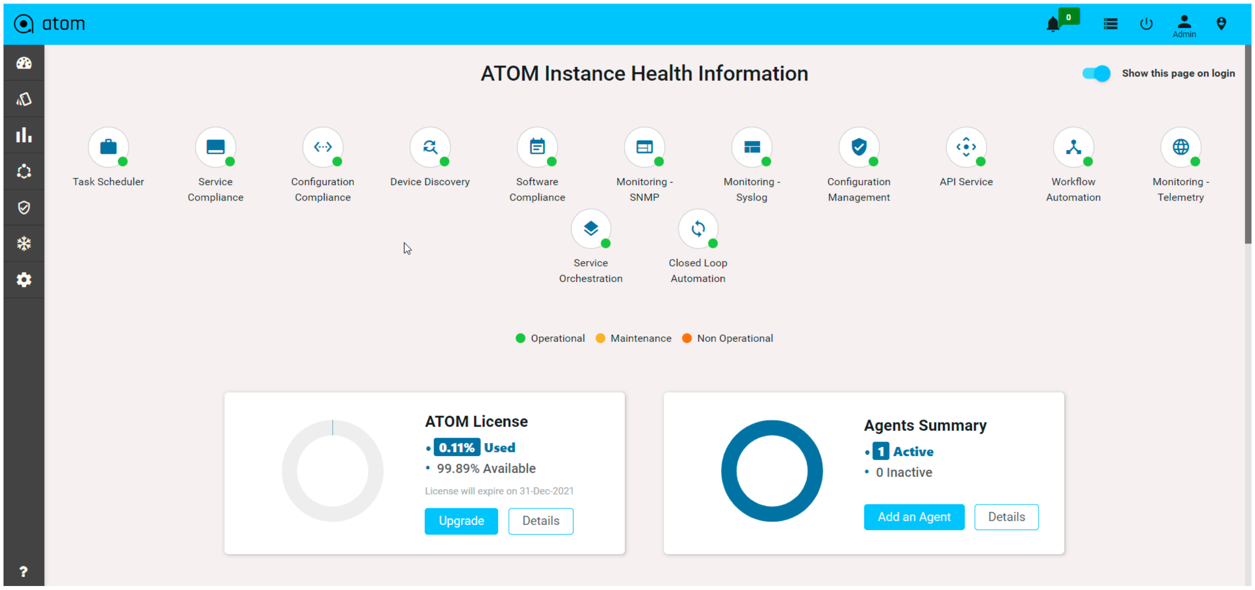
6. Now new ATOM user login can login to atom UI with username/password



Username or email: admin

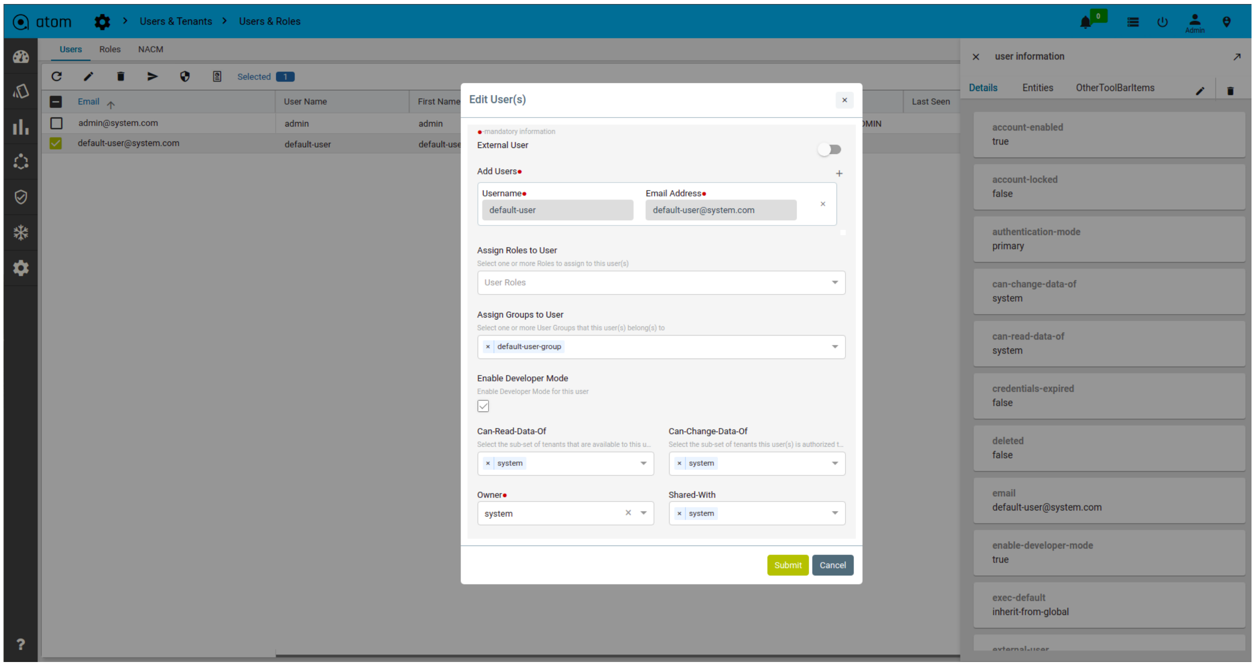
Password: ••••••••••

7. Access to the ATOM UI page possible after login with username/password.



Editing an Existing User:

User details can be edited by selecting an user. When a user is edited, the user is taken to the same form seen for adding a user. However, fields such as **Username**, **Email Address** and **External User** are non-editable as these form the fundamental identifiers for the user.



	Email	User Name	First Name		Last Seen
□	admin@system.com	admin	admin	ADMIN	
☑	default-user@system.com	default-user	default-use		

Edit User(s)

●-mandatory information

External User

Add Users●

Username●: default-user

Email Address●: default-user@system.com

Assign Roles to User

Select one or more Roles to assign to this user(s)

User Roles

Assign Groups to User

Select one or more User Groups that this user(s) belong(s) to

default-user-group

Enable Developer Mode

Enable Developer Mode for this user

☑

Can-Read-Data-Of

Select the sub-set of tenants that are available to this u...

system

Can-Change-Data-Of

Select the sub-set of tenants this user(s) is authorized t...

system

Owner●: system

Shared-With: system

Submit Cancel

user information

Details Entities OtherToolBarItems

account-enabled
true

account-locked
false

authentication-mode
primary

can-change-data-of
system

can-read-data-of
system

credentials-expired
false

deleted
false

email
default-user@system.com

enable-developer-mode
true

exec-default
inherit-from-global

external-user

Resend User Invite:

If the invitation to ATOM Cloud needs to be resent to the user's email address, the administrator can select the user and click on the resend invite icon.

Block/Unblock User:

At any instance, the administrator can **Enable** or **Disable** a user account by this option. When blocked, the user will not be allowed to login to ATOM.

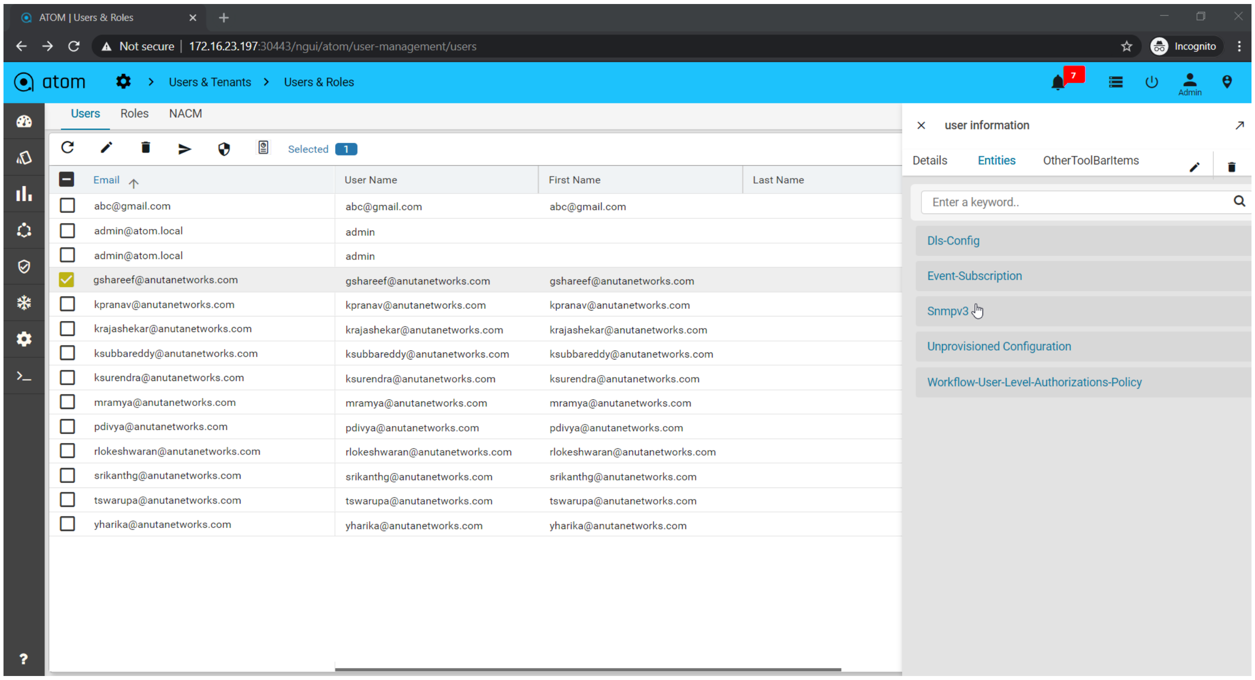
Assigning Role to the User

From the drop-down menu, select the role that should be assigned to the user. These roles are defined earlier as in the section, "Creating Roles".

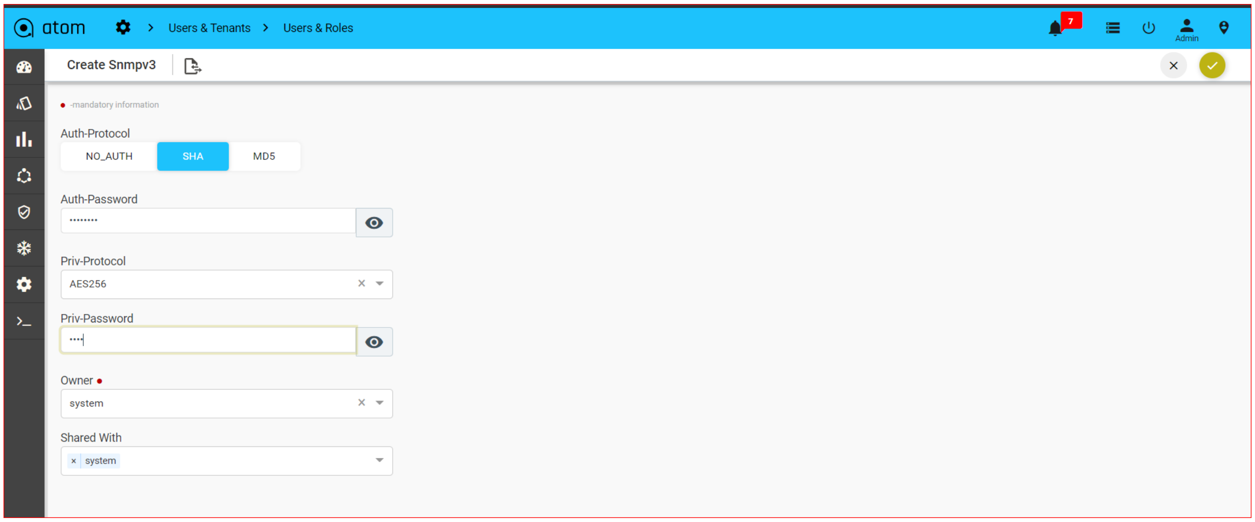
Creating SNMPv3 users

SNMPv3 users are required when the users or third party applications require additional authentication and access control provided by SNMPv3.

1. Navigate to **Administration** > **Users & Tenants** > **Add User**
2. In the Create user screen, click **user** >**entities**> **snmpv3** in the right pane.
3. In the right pane, enter values in the following fields:


ATOM | Users & Roles
Not secure | 172.16.23.197:30443/ngui/atom/user-management/users
Incognito
atom
Users & Tenants > Users & Roles
7
Admin
Users
Roles
NACM
Selected 1
user information
Details
Entities
OtherToolBarItems
Enter a keyword..
Dls-Config
Event-Subscription
Snmpv3
Unprovisioned Configuration
Workflow-User-Level-Authorizations-Policy
?

	Email	User Name	First Name	Last Name
□	abc@gmail.com	abc@gmail.com	abc@gmail.com	
□	admin@atom.local	admin		
□	admin@atom.local	admin		
☑	gshareef@anutanetworks.com	gshareef@anutanetworks.com	gshareef@anutanetworks.com	
□	kpranav@anutanetworks.com	kpranav@anutanetworks.com	kpranav@anutanetworks.com	
□	krajashekar@anutanetworks.com	krajashekar@anutanetworks.com	krajashekar@anutanetworks.com	
□	ksubbareddy@anutanetworks.com	ksubbareddy@anutanetworks.com	ksubbareddy@anutanetworks.com	
□	ksurendra@anutanetworks.com	ksurendra@anutanetworks.com	ksurendra@anutanetworks.com	
□	mramya@anutanetworks.com	mramya@anutanetworks.com	mramya@anutanetworks.com	
□	pdivya@anutanetworks.com	pdivya@anutanetworks.com	pdivya@anutanetworks.com	
□	rlokeshwaran@anutanetworks.com	rlokeshwaran@anutanetworks.com	rlokeshwaran@anutanetworks.com	
□	srikanthg@anutanetworks.com	srikanthg@anutanetworks.com	srikanthg@anutanetworks.com	
□	tswarupa@anutanetworks.com	tswarupa@anutanetworks.com	tswarupa@anutanetworks.com	
□	yharika@anutanetworks.com	yharika@anutanetworks.com	yharika@anutanetworks.com	



● -mandatory information

Auth-Protocol: NO_AUTH | SHA (selected) | MD5

Auth-Password: ••••••••

Priv-Protocol: AES256

Priv-Password: ••••

Owner ●: system

Shared With: × system

a. **Authentication Protocol**: Enter the mode of authentication when SNMPv3 is enabled.

b. **Privacy Protocol**: Enter the requisite privacy protocol depending on the selected authentication protocol.

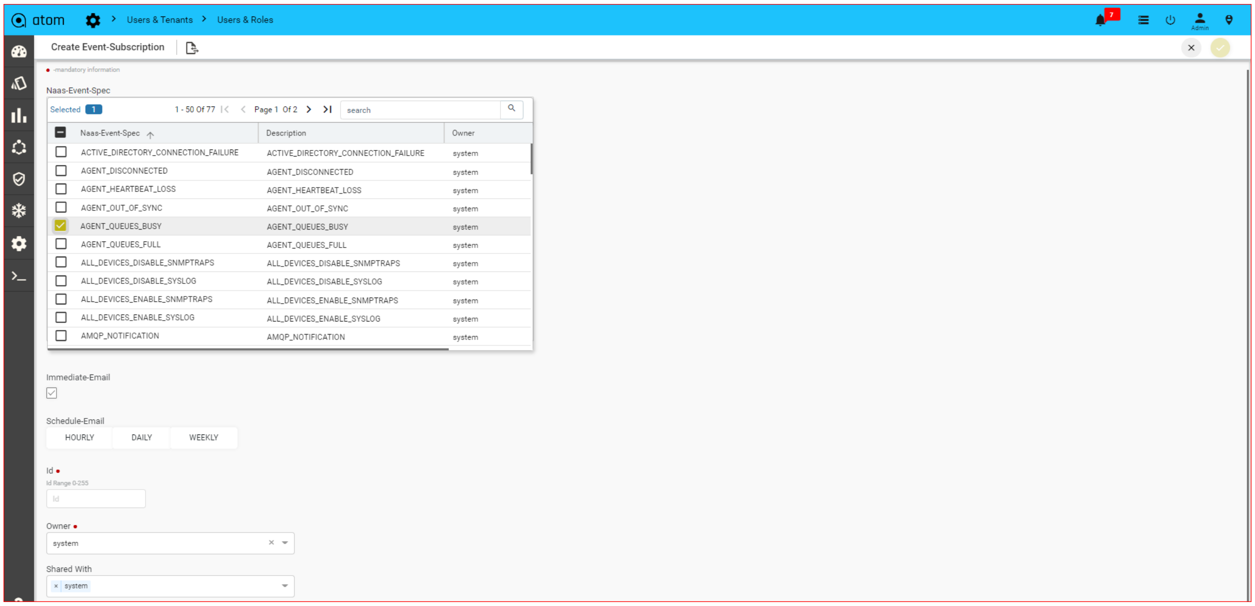
Subscribing to Events

Email notifications can be configured to be sent to the created user when a specific event or events occur in ATOM.

1. Navigate to **Administration** > **Users & Tenants** > **Add User**
2. In the Create user screen, click **user** >**entitie**s> **event subscription** in the right pane.
3. Fill the values in the fields described below:
4. Click **Add** to subscribe to a specific event or click **Add all** to add all the events available in ATOM.

   An email is triggered and sent to the user when any of the events occur in ATOM.

   You can configure the mail to be sent immediately after the occurence of the event or schedule the mail notifications to be sent at periodic intervals as illustrated in the screenshot below:



Create Event-Subscription

● -mandatory information

Naas-Event-Spec

Selected 1   1 - 50 Of 77   Page 1 Of 2   search

	Naas-Event-Spec	Description	Owner
□	ACTIVE_DIRECTORY_CONNECTION_FAILURE	ACTIVE_DIRECTORY_CONNECTION_FAILURE	system
□	AGENT_DISCONNECTED	AGENT_DISCONNECTED	system
□	AGENT_HEARTBEAT_LOSS	AGENT_HEARTBEAT_LOSS	system
□	AGENT_OUT_OF_SYNC	AGENT_OUT_OF_SYNC	system
☑	AGENT_QUEUES_BUSY	AGENT_QUEUES_BUSY	system
□	AGENT_QUEUES_FULL	AGENT_QUEUES_FULL	system
□	ALL_DEVICES_DISABLE_SNMPTRAPS	ALL_DEVICES_DISABLE_SNMPTRAPS	system
□	ALL_DEVICES_DISABLE_SYSLOG	ALL_DEVICES_DISABLE_SYSLOG	system
□	ALL_DEVICES_ENABLE_SNMPTRAPS	ALL_DEVICES_ENABLE_SNMPTRAPS	system
□	ALL_DEVICES_ENABLE_SYSLOG	ALL_DEVICES_ENABLE_SYSLOG	system
□	AMQP_NOTIFICATION	AMQP_NOTIFICATION	system

Immediate-Email
☑

Schedule-Email
HOURLY DAILY WEEKLY

Id ●
Id Range 0-255
Id

Owner ●
system

Shared With
× system

Workflow-User-Level-Authorization

If it is decided to have user level permissions what should be the default permissions? That question is answered by the global configuration at /controller:nacm/workflow-policy-for-auto-creation-of-authorization

If it is needed to customize those permissions for a specific user? That question is answered by this model

Using this model you can use

1.enable the user level permissions

2.choose to use the global default or customize

Here three options are there

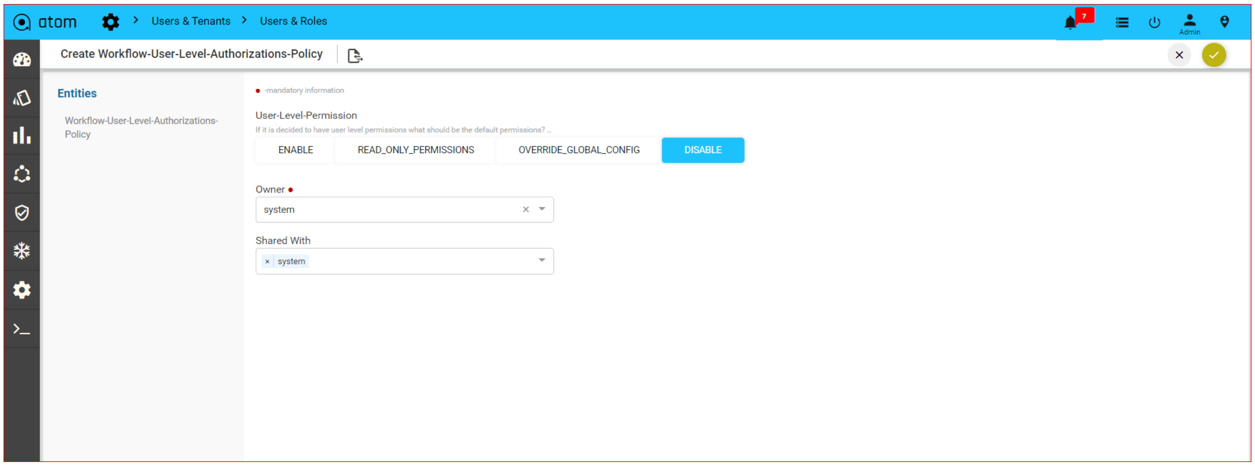
DISABLE:: Is the default selection.Using this option you can explicitly disable the auto creation of permission for this user.

ENABLE:Enables global defaults for this user.

READ-ONLY-PERMISSION:Enables the read only permissions out of the global defaults

OVERRIDE-GLOBAL-CONFIG:Enables user level permission creation for this user,and, for those permissions you're going to specify here, explicitly.

1. Navigate to **Administration** > **Users & Tenants** > **Add User**
2. In the Create user screen, click **user** >**entities**> **workflow-user-level-permission-authorization** in the right pane.
3. By default workflow-user-level- authorization is disabled it.



Create Workflow-User-Level-Authorizations-Policy

Entities

Workflow-User-Level-Authorizations-Policy

● -mandatory information

User-Level-Permission

If it is decided to have user level permissions what should be the default permissions? ...

ENABLE | READ_ONLY_PERMISSIONS | OVERRIDE_GLOBAL_CONFIG | [✓ DISABLE]

Owner ●

system

Shared With

system

Configuring NACM

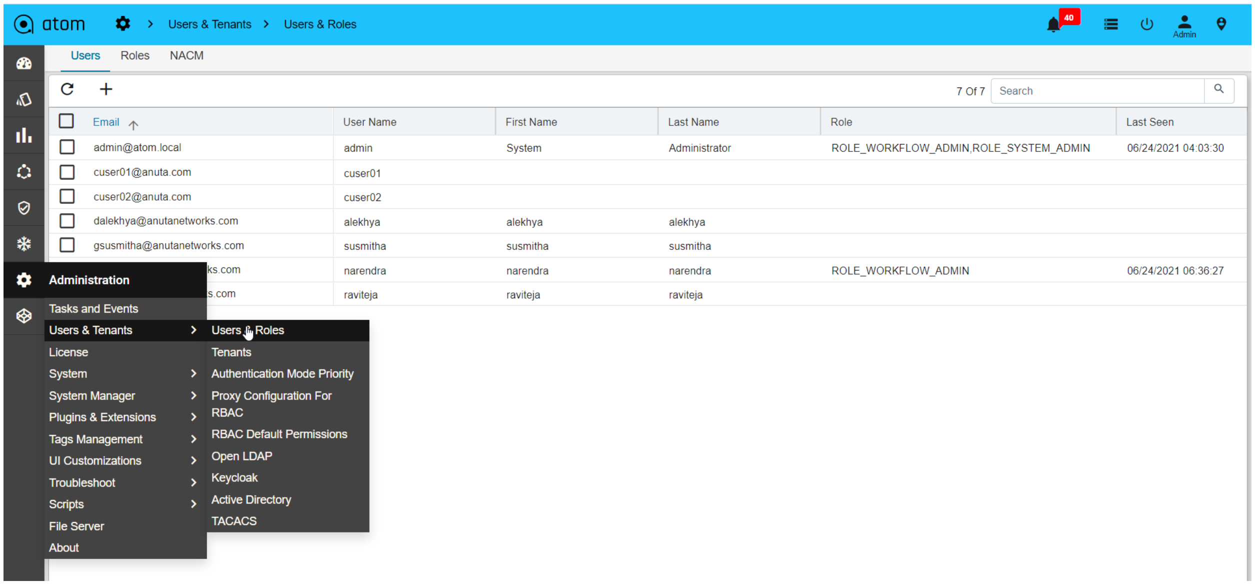
By implementing NACM developed by NETCONF, ATOM enables administrators to allow or deny access to protocol operations and data to a set of users. Access Control in ATOM is achieved by a combination of “Rule-list” and “User Groups”. Rules are grouped into Rule-list and users are assigned to User Groups to control access to resources managed by ATOM.

To set the global access control settings in ATOM, do the following:

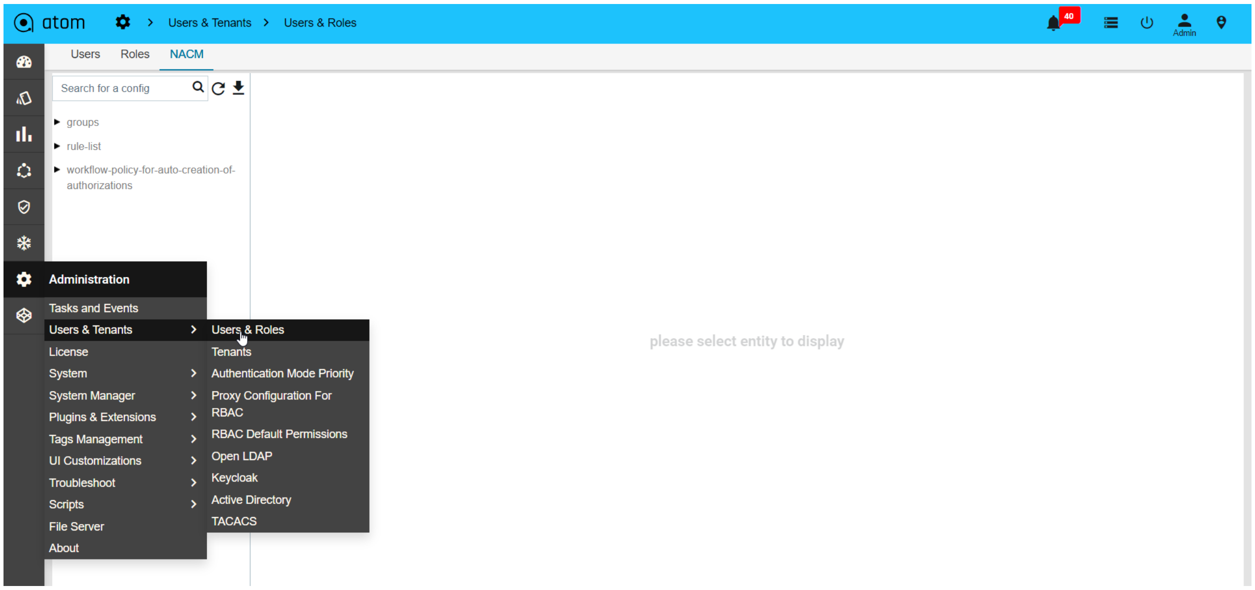
1. Navigate to **Administration** > **Users & Tenants** > **Users & Roles**
2. Click Edit to modify the global settings for access control.

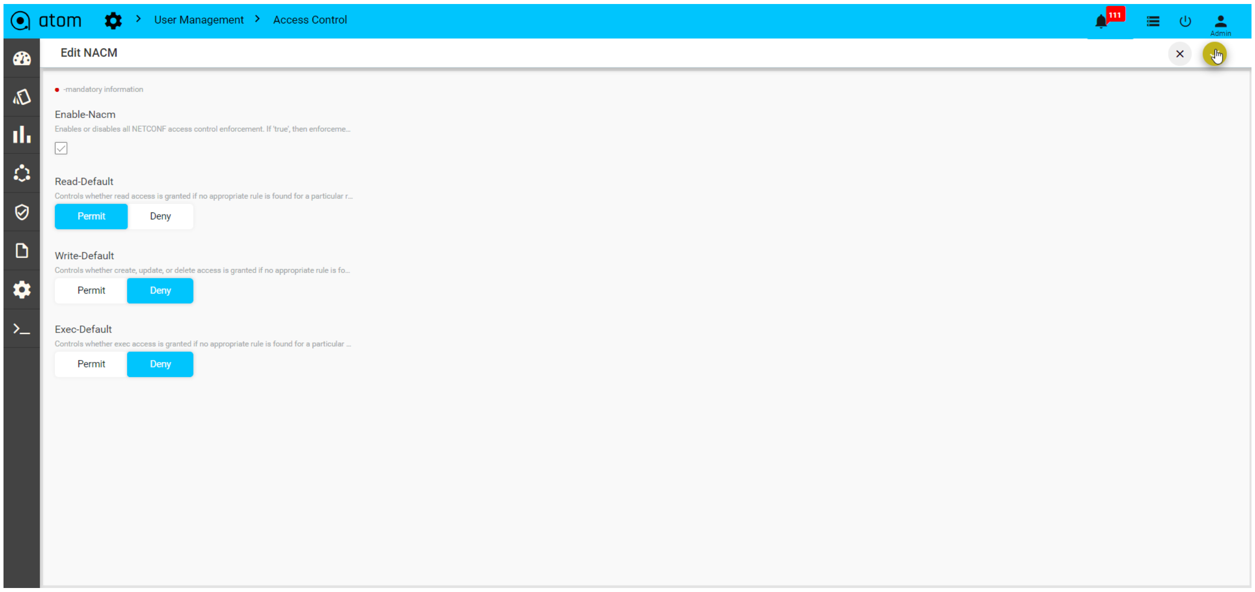
   As an administrator, you can set the default access control settings which are applicable to all entities in ATOM

   - **Enable NACM**: Select this option to set a group of read, write, and execute options that should be applicable by default to all the entities in ATOM.
   - **Read Default**: The default value is “permit” for all the operations/objects(Controls whether read access is granted if no appropriate rule is found particular read request)
   - **Write Default**: The default value is “deny” for all the operations/objects(Controls whether create,update or delete access is granted if no appropriate rule is found particular write request)
   - **Exec Default**: The default value is “permit” for all the operations/objects(Controls whether exec access is granted if no appropriate rule is found particular protocol operation request)



Email	User Name	First Name	Last Name	Role	Last Seen
admin@atom.local	admin	System	Administrator	ROLE_WORKFLOW_ADMIN,ROLE_SYSTEM_ADMIN	06/24/2021 04:03:30
cuser01@anuta.com	cuser01				
cuser02@anuta.com	cuser02				
dalekhya@anutanetworks.com	alekhya	alekhya	alekhya		
gsusmitha@anutanetworks.com	susmitha	susmitha	susmitha		
ks.com	narendra	narendra	narendra	ROLE_WORKFLOW_ADMIN	06/24/2021 06:36:27
s.com	raviteja	raviteja	raviteja		





• -mandatory information

Enable-Nacm
Enables or disables all NETCONF access control enforcement. If 'true', then enforceme...
☑

Read-Default
Controls whether read access is granted if no appropriate rule is found for a particular r...
[✓ Permit] Deny

Write-Default
Controls whether create, update, or delete access is granted if no appropriate rule is fo...
Permit [✓ Deny]

Exec-Default
Controls whether exec access is granted if no appropriate rule is found for a particular ...
Permit [✓ Deny]

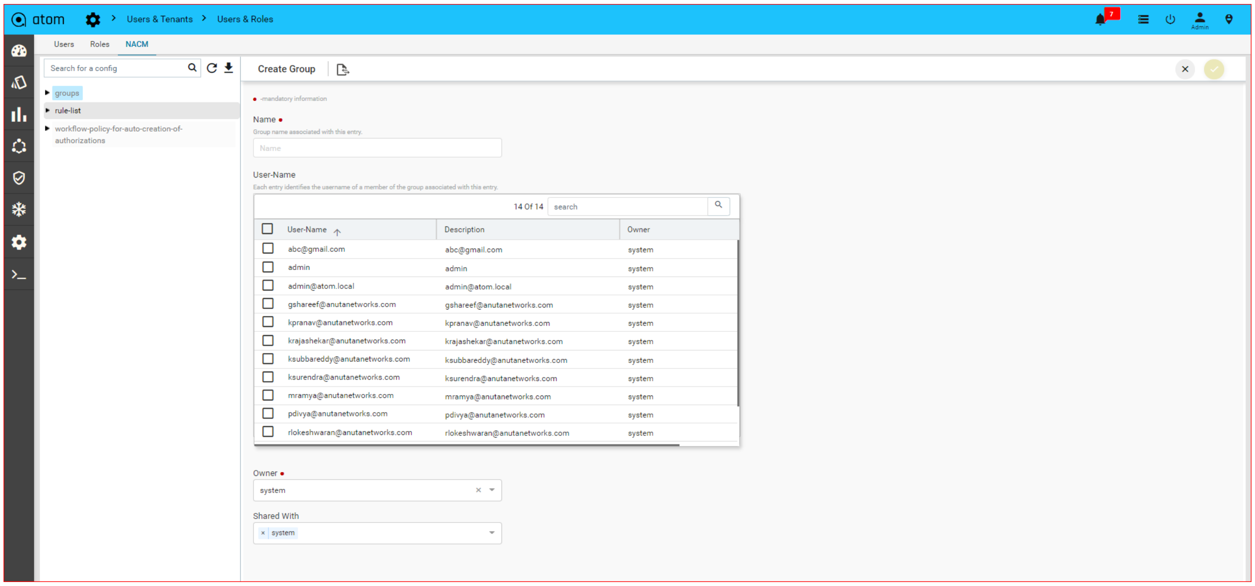
> **Note**: These default settings that are entered in the above screen can be overridden by the values set by a specific rule created for an entity.

Adding User Groups

You can organize users to groups and apply the access control privileges on them as a whole.

To create a User Group:

1. Navigate to **Administration** >**Users & Tenants** >**Users & Roles**> click **NACM**
2. In the **Details** pane, on the right, click **Groups** > **Add Group**


atom
Users & Tenants > Users & Roles
7
Admin
Users
Roles
NACM
Search for a config
groups
rule-list
workflow-policy-for-auto-creation-of-authorizations
Create Group

• -mandatory information

Name •
Group name associated with this entry.
Name

User-Name
Each entry identifies the username of a member of the group associated with this entry.

14 Of 14 search

□	User-Name	Description	Owner
□	abc@gmail.com	abc@gmail.com	system
□	admin	admin	system
□	admin@atom.local	admin@atom.local	system
□	gshareef@anutanetworks.com	gshareef@anutanetworks.com	system
□	kpranav@anutanetworks.com	kpranav@anutanetworks.com	system
□	krajashekar@anutanetworks.com	krajashekar@anutanetworks.com	system
□	ksubbareddy@anutanetworks.com	ksubbareddy@anutanetworks.com	system
□	ksurendra@anutanetworks.com	ksurendra@anutanetworks.com	system
□	mramya@anutanetworks.com	mramya@anutanetworks.com	system
□	pdivya@anutanetworks.com	pdivya@anutanetworks.com	system
□	rlokeshwaran@anutanetworks.com	rlokeshwaran@anutanetworks.com	system

Owner •
system

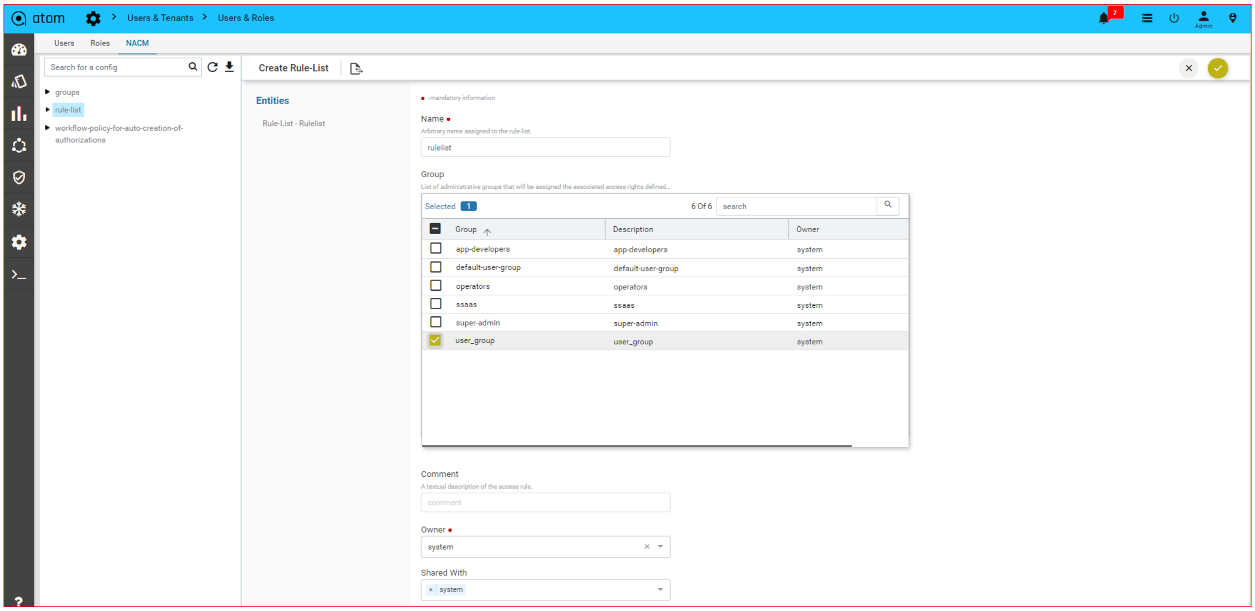
Shared With
system

- **Name**: Enter the name for the User Group
- Select a user to this group.

Creating Rule lists

Rule lists are an aggregated list of rules created in ATOM.

1. Navigate to **Administration** > **Users & Tenants** >**Users & Roles**> click **NACM**
2. In the **Entities** pane, on the right, click **Rule-list** > **Add(+)**
3. **Name:** Enter the text that will be used as a name for the rule list.
4. Select a group (user group) to which the created rules in the Rule list should be assigned.



● -mandatory information

Name ●
Arbitrary name assigned to the rule-list.
rulelist

Group
List of administrative groups that will be assigned the associated access rights defined...

Selected 1 6 Of 6 search

☐	Group	Description	Owner
☐	app-developers	app-developers	system
☐	default-user-group	default-user-group	system
☐	operators	operators	system
☐	ssaas	ssaas	system
☐	super-admin	super-admin	system
☑	user_group	user_group	system

Comment
A textual description of the access rule.
comment

Owner ●
system

Shared With
system

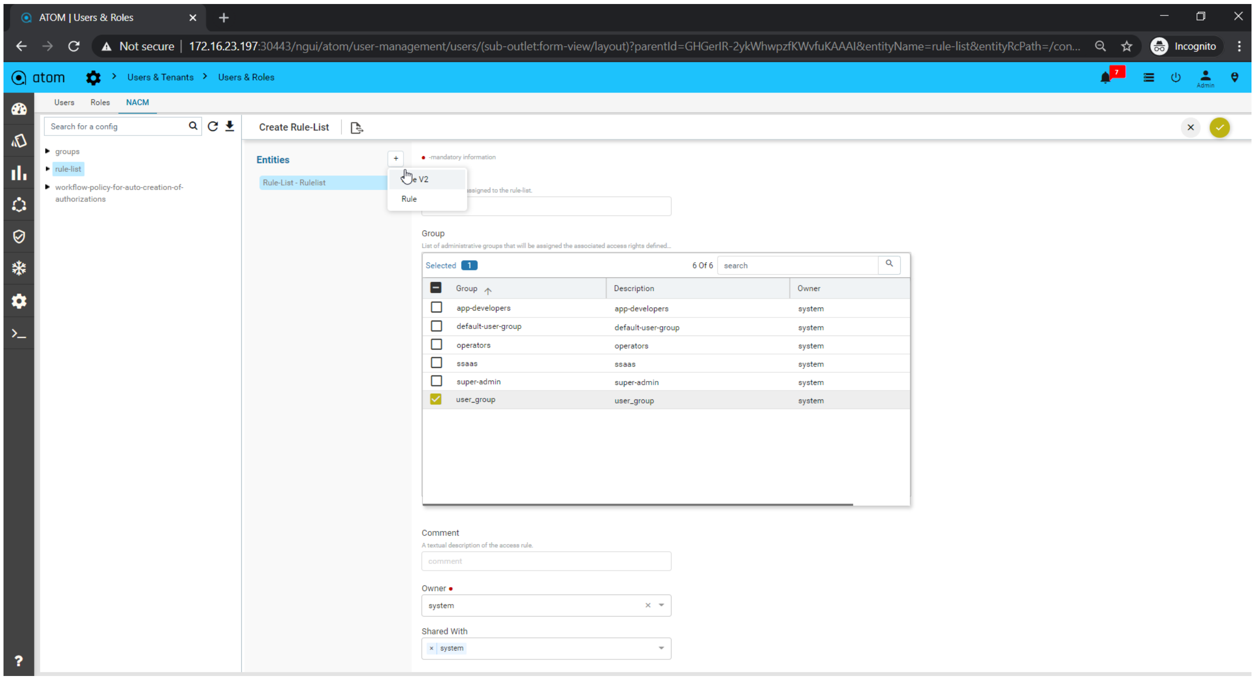
Creating Rule V2:

Rules are the conditions that identify individual objects in the system. Rules also capture whether a user of a network object should be “granted” or “denied” RPC permission.

RPC : Choose a remote procedure call (RPC) on which the access control needs to be applied.

1. Click the created **Rule-list** > **Entities** > **Rule V2** > **Add(+)**
2. In the **Create rule** screen, enter values in the fields explained below:

Create a Rule v2, “rulev2” to be given the multiple RPCs in drop down Permit-RPC-Exec(Ex:Run device inventory, Extended inventory are etc) and Deny-RPC-Exec(Ex:Topology inventory, run dsl are etc)


ATOM | Users & Roles
Not secure | 172.16.23.197:30443/ngui/atom/user-management/users/(sub-outlet:form-view/layout)?parentId=GHGerIR-2ykWhwpzfKWvfuKAAAI&entityName=rule-list&entityRcPath=/con...
Incognito
atom
Users & Tenants
Users & Roles
Users
Roles
NACM
Search for a config
groups
rule-list
workflow-policy-for-auto-creation-of-authorizations
Create Rule-List
Entities
Rule-List - Rulelist
+
e V2
Rule

● -mandatory information

...ssigned to the rule-list.

Group

List of administrative groups that will be assigned the associated access rights defined...

Selected 1 6 Of 6 search

	Group	Description	Owner
□	app-developers	app-developers	system
□	default-user-group	default-user-group	system
□	operators	operators	system
□	ssaas	ssaas	system
□	super-admin	super-admin	system
☑	user_group	user_group	system

Comment

A textual description of the access rule.

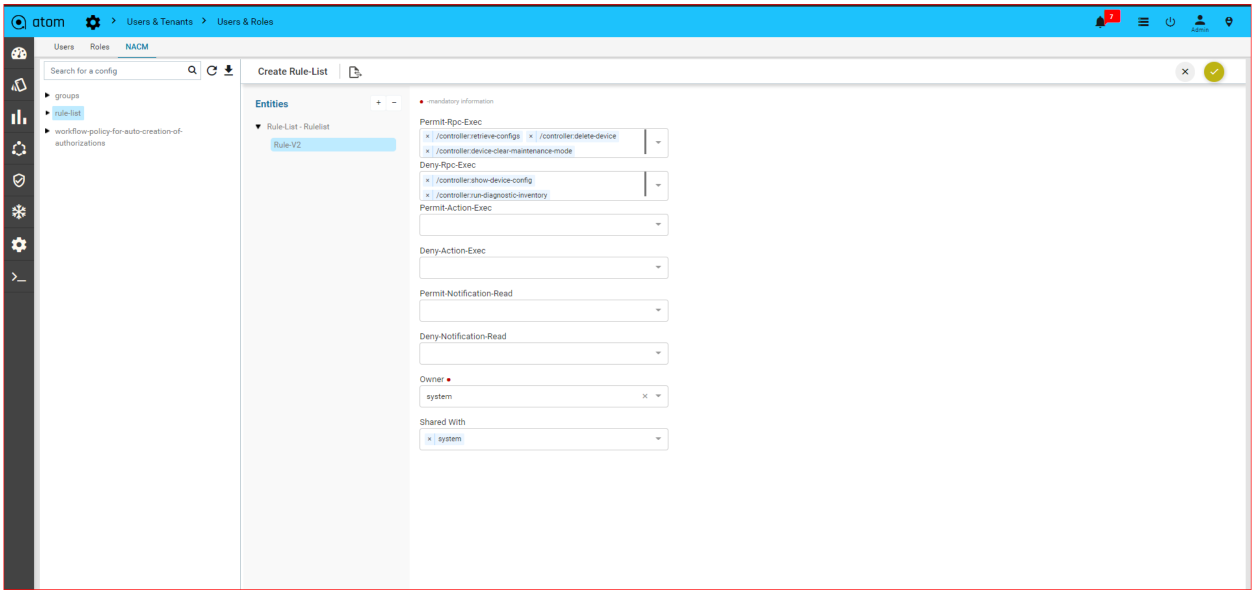
comment

Owner ●

system

Shared With

× system



● -mandatory information

Permit-Rpc-Exec

× /controller:retrieve-configs × /controller:delete-device × /controller:device-clear-maintenance-mode

Deny-Rpc-Exec

× /controller:show-device-config × /controller:run-diagnostic-inventory

Permit-Action-Exec

Deny-Action-Exec

Permit-Notification-Read

Deny-Notification-Read

Owner ●

system

Shared With

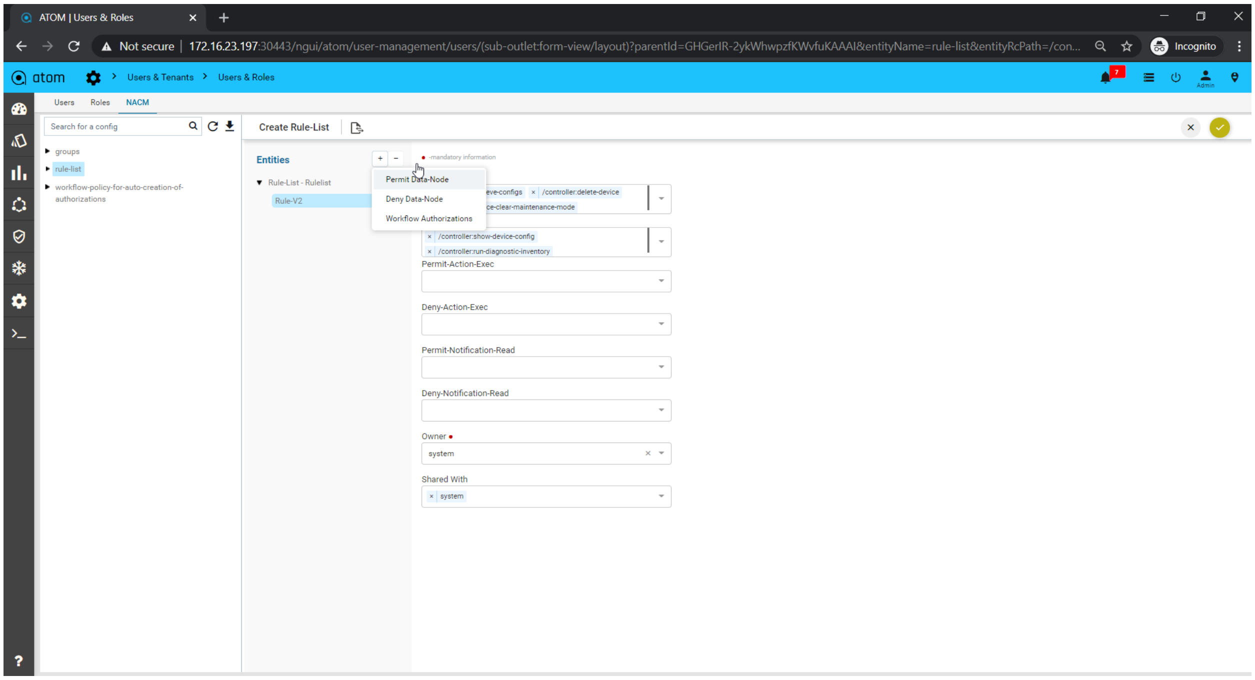
× system

- Select a rule v2 that will be shown the below permit and deny data node,to grant either allow or deny access to the rule determined to match a particular request.
  - Permit datanode
  - Deny datanode

Click on rule v2 to add(+) permit data node to fill the below details:

- **Id** :Enter string or number(Ex:2)

- **Path** : Enter the path of the object in the data tree on which the rule should be applied. This is applicable only for the rule type, ‘data-node’ Select the single or multiple Data node paths
- **Access operations** : Select any of the operations on the ATOM entity that needs to be controlled.
  - ***** [This symbol indicates all the operations (Create, Update, Delete, Read) are included]
  - Create read update delete
  - Read create
  - Read update
  - Read delete
  - Various operation to be tested


ATOM | Users & Roles
Not secure | 172.16.23.197:30443/ngui/atom/user-management/users/(sub-outlet:form-view/layout)?parentId=GHGerIR-2ykWhwpzfKWvfuKAAAI&entityName=rule-list&entityRcPath=/con...
Incognito
atom
Users & Tenants
Users & Roles
Users
Roles
NACM
Search for a config
groups
rule-list
workflow-policy-for-auto-creation-of-authorizations
Create Rule-List
Entities
Rule-List - Rulelist
Rule-V2
Permit Data-Node
Deny Data-Node
Workflow Authorizations

● -mandatory information

eve-configs × /controller:delete-device ce-clear-maintenance-mode

× /controller:show-device-config × /controller:run-diagnostic-inventory

Permit-Action-Exec

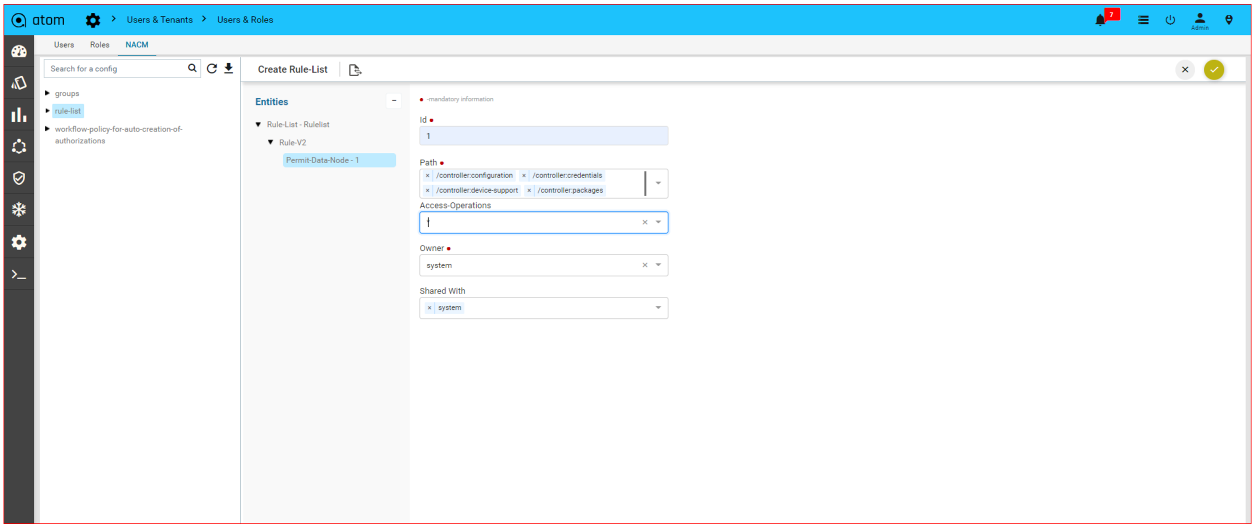
Deny-Action-Exec

Permit-Notification-Read

Deny-Notification-Read

Owner ●: system

Shared With: × system



● -mandatory information

Id ● 1

Path ● /controller:configuration, /controller:credentials, /controller:device-support, /controller:packages

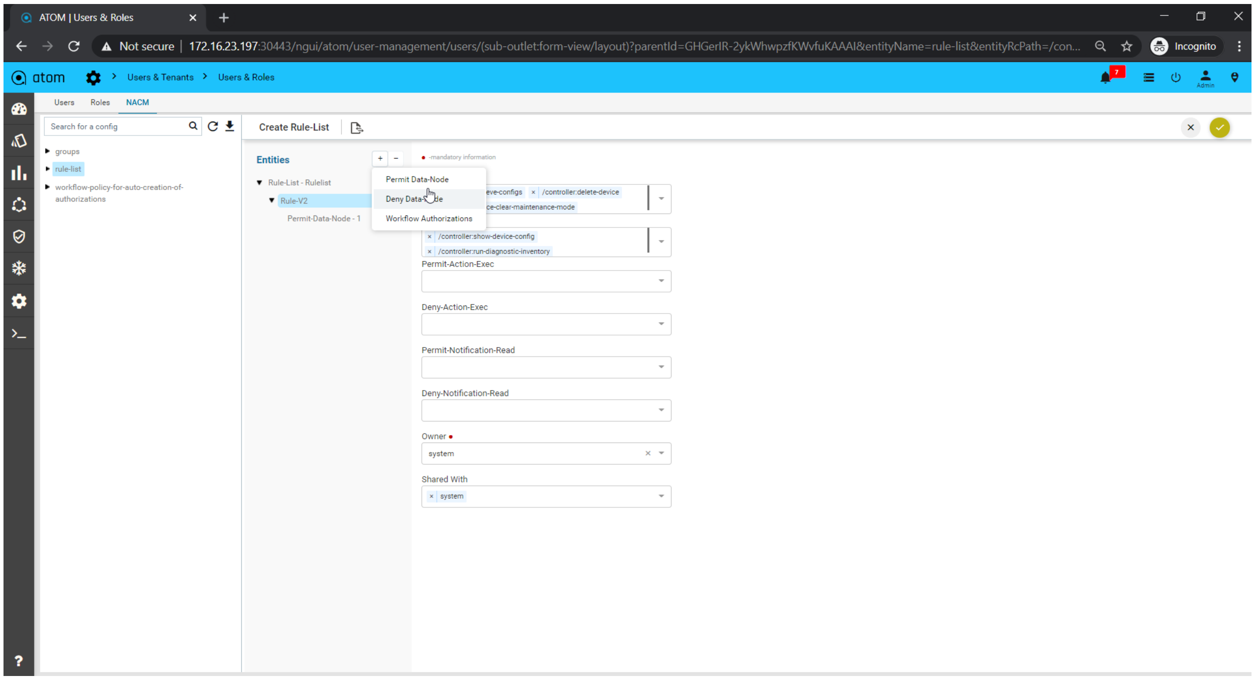
Access-Operations

Owner ● system

Shared With system

Click on rule v2 to add(+) deny data node to fill the below details:

- **Id** :Enter string or number(Ex:3)
- **Path** : Enter the path of the object in the data tree on which the rule should be applied. This is applicable only for the rule type, ‘data-node’ Select the single or multiple Data node paths
- **Access operations** : Select any of the operations on the ATOM entity that needs to be controlled.
  - ***** [This symbol indicates all the operations (Create, Update, Delete, Read) are included]
  - Create read update delete
  - Read create
  - Read update
  - Read delete
  - Various operation to be tested


ATOM | Users & Roles
Not secure | 172.16.23.197:30443/ngui/atom/user-management/users/(sub-outlet:form-view/layout)?parentId=GHGerIR-2ykWhwpzfKWvfuKAAAI&entityName=rule-list&entityRcPath=/con...
Incognito
atom
Users & Tenants
Users & Roles
Users
Roles
NACM
Search for a config
groups
rule-list
workflow-policy-for-auto-creation-of-authorizations
Create Rule-List
Entities
+
−
Permit Data-Node
Deny Data-Node
Workflow Authorizations

Rule-List - Rulelist
Rule-V2
Permit-Data-Node - 1

● -mandatory information

eve-configs × /controller:delete-device
ce-clear-maintenance-mode

× /controller:show-device-config
× /controller:run-diagnostic-inventory

Permit-Action-Exec

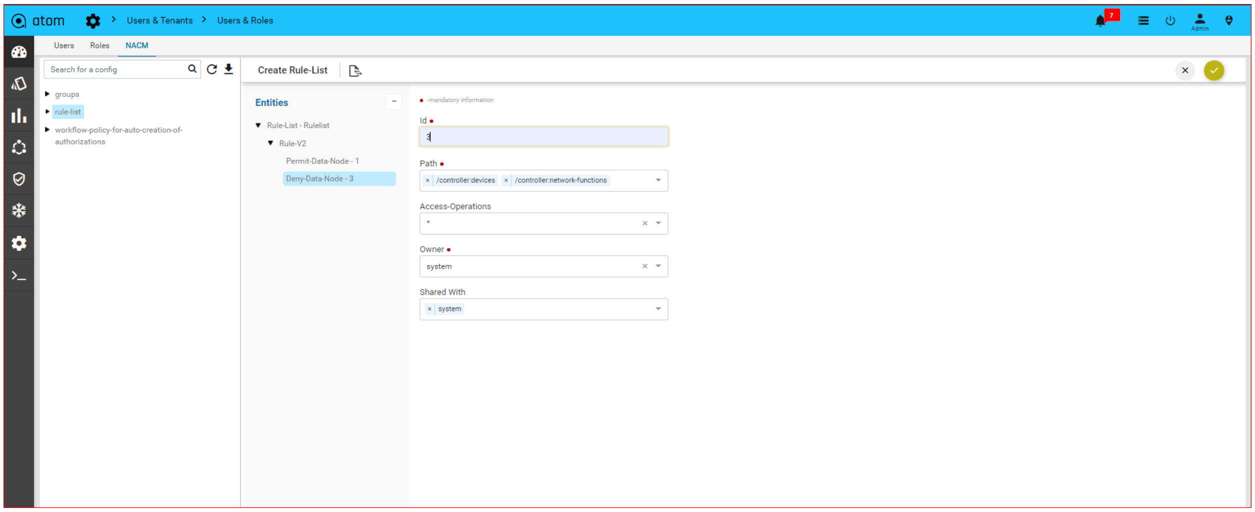
Deny-Action-Exec

Permit-Notification-Read

Deny-Notification-Read

Owner ●
system

Shared With
× system



Rule-List - Rulelist
Rule-V2
Permit-Data-Node - 1
Deny-Data-Node - 3

● -mandatory information

Id ●
3

Path ●
× /controller:devices × /controller:network-functions

Access-Operations
*

Owner ●
system

Shared With
× system

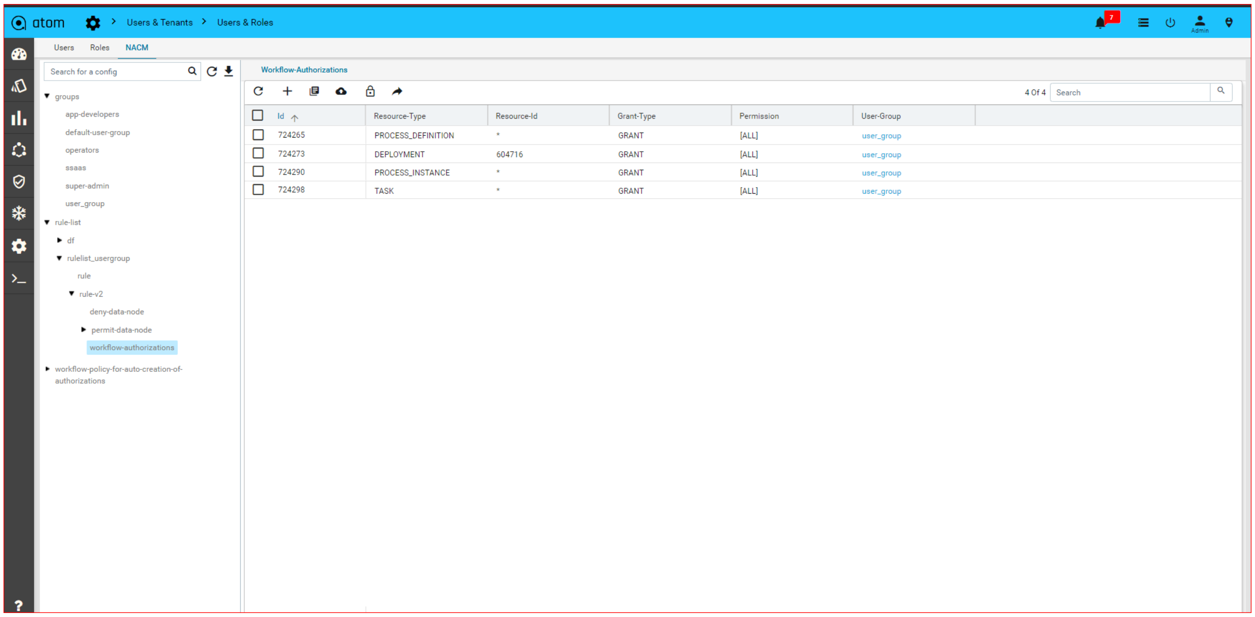
Workflow Authorization under rule v2:

Camunda allows users to authorize access to the data it manages. This makes it possible to configure which user can access which process instances, tasks, etc…If it is needed to customize those permissions for a specific workflow user

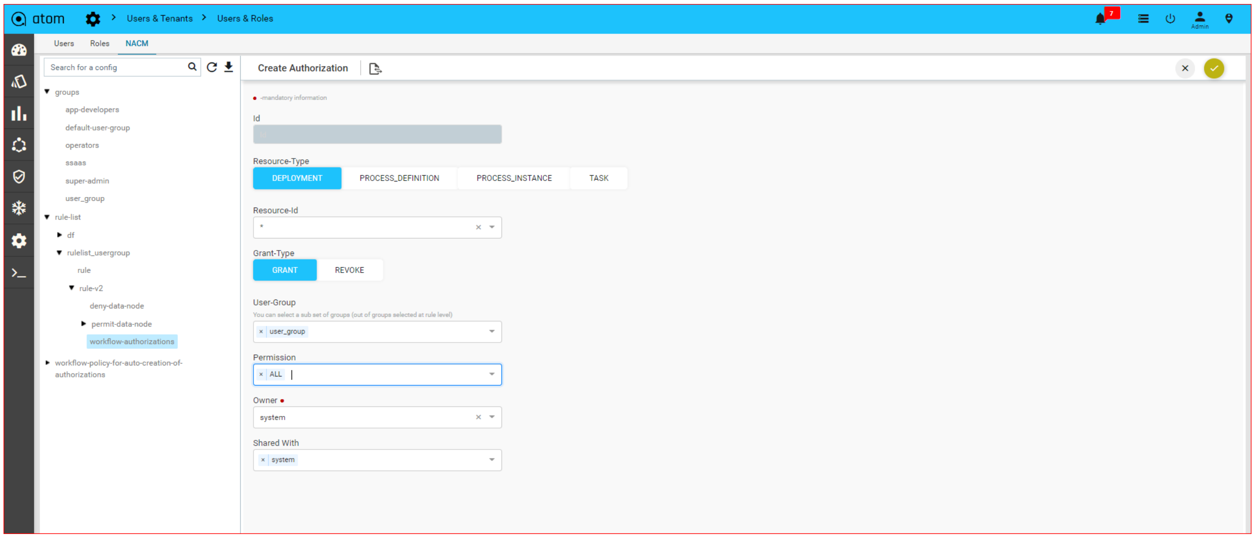
Deployment: The option is weather package is upload/load/unload and delete the package

Click on Workflow authorization to add(+) to fill the below details for Deployment:

- **Id** :Id is the hardcoded
- **Resource type** : Select the resource type is **Deployment**
- **Resource id** : Select (*) from resource id drop down to be accessed by all packages or any specific package resource id.
- **Grant type:**
- **Grant**:Ranges over users and groups and grants a set of permissions. Grant authorizations are commonly used for adding permissions to a user or group that the global authorization revoked.
- **Revoke**::Ranges over users and groups and revokes a set of permissions. Revoke authorizations are commonly used for revoking permissions to a user or group that the global authorization grants.
- **User group:** You can select a subset of groups to mapped it.
- **Permissions:** A Permission defines the way an identity is allowed to interact with a certain resource. (ALL,Create, Read, Delete)



☐	Id	Resource-Type	Resource-Id	Grant-Type	Permission	User-Group
☐	724265	PROCESS_DEFINITION	*	GRANT	[ALL]	user_group
☐	724273	DEPLOYMENT	604716	GRANT	[ALL]	user_group
☐	724290	PROCESS_INSTANCE	*	GRANT	[ALL]	user_group
☐	724298	TASK	*	GRANT	[ALL]	user_group



Create Authorization

● -mandatory information

Id

Resource-Type: DEPLOYMENT | PROCESS_DEFINITION | PROCESS_INSTANCE | TASK

Resource-Id: *

Grant-Type: GRANT | REVOKE

User-Group
You can select a sub set of groups (out of groups selected at rule level)
user_group

Permission: ALL

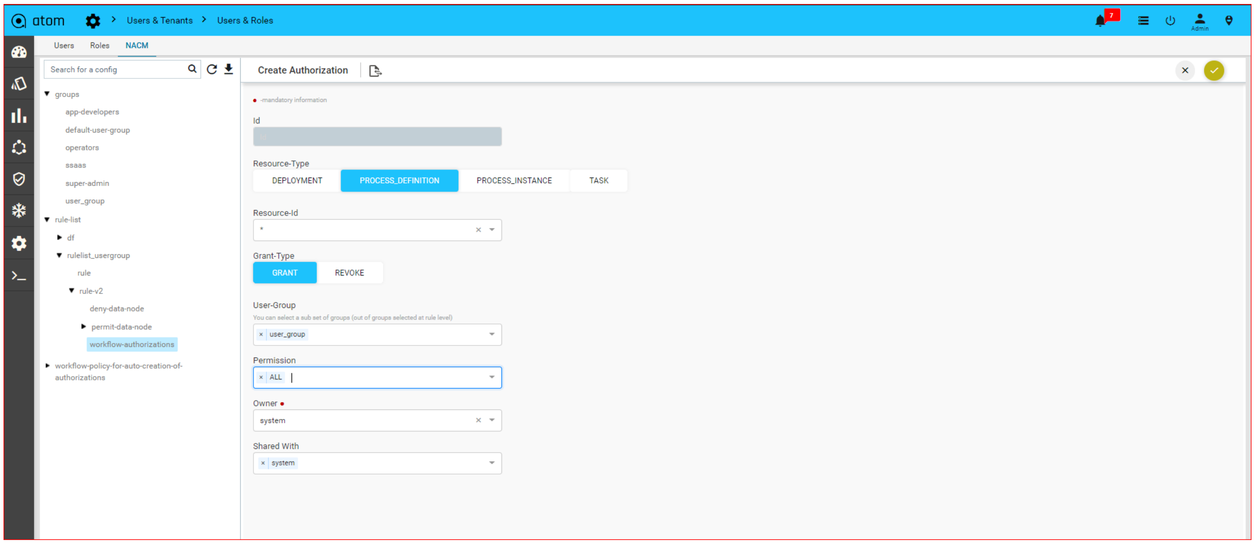
Owner ●: system

Shared With: system

Process definition: This option is access the workflow grid with specific workflow or all based on given process definition

Click on Workflow authorization to add(+) to fill the below details for process definition:

- **Id** :Id is the hardcoded
- **Resource type** : Select the resource type is **process definition**
- **Resource id** : Select (*) from resource id drop down to be accessed by all workflows or give any specific workflow of resource id.
- **Grant type:**
- **Grant**:Ranges over users and groups and grants a set of permissions. Grant authorizations are commonly used for adding permissions to a user or group that the global authorization revoked.
- **Revoke**::Ranges over users and groups and revokes a set of permissions. Revoke authorizations are commonly used for revoking permissions to a user or group that the global authorization grants.
- **User group:** You can select a subset of groups to mapped it.
- **Permissions:** A Permission defines the way an identity is allowed to interact with a certain resource.Choose the various permission (ALL,Create instance, Read, Delete-instance,Update-instance,update-history,Migrate-instance,Update-task-variable, Update-task)



● -mandatory information

Id

Resource-Type: PROCESS_DEFINITION

Resource-Id: *

Grant-Type: GRANT

User-Group
You can select a sub set of groups (out of groups selected at rule level)
user_group

Permission: ALL

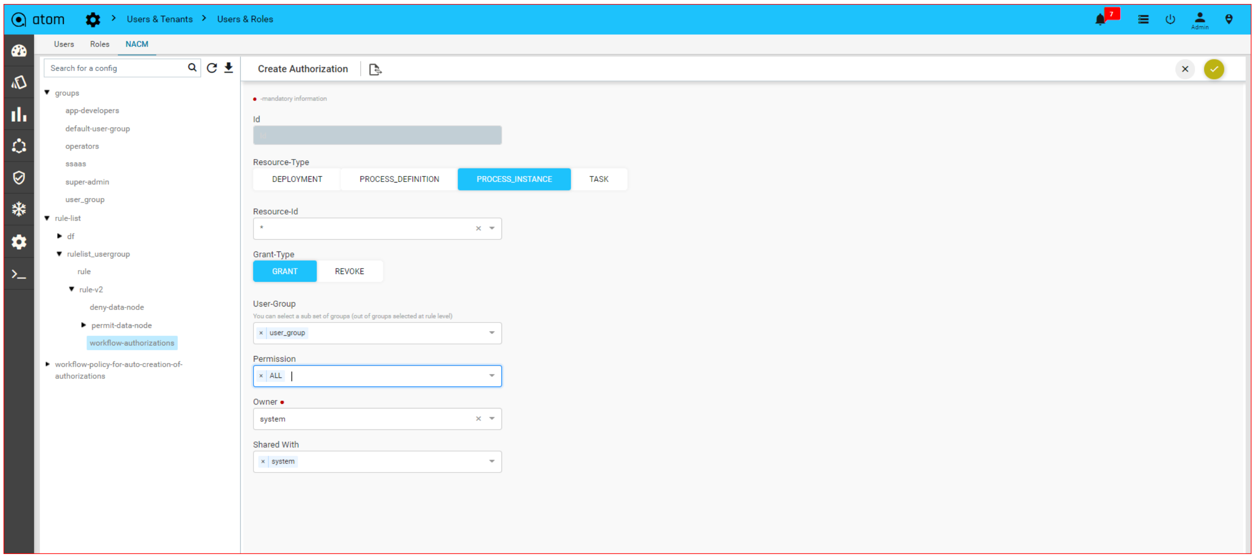
Owner ●: system

Shared With: system

Workflow instance: This option is a workflow instance and is a running instance of a workflow definition.

Click on Workflow authorization to add(+) to fill the below details for Workflow instance

- **Id** :Id is the hardcoded
- **Resource type** : Select the resource type is **Workflow instance**
- **Resource id** : Select (*) from resource id drop down to be accessed by all workflow instances or any specific workflow instance of resource id.
- **Grant type:**
- **Grant**:Ranges over users and groups and grants a set of permissions. Grant authorizations are commonly used for adding permissions to a user or group that the global authorization revoked.
- **Revoke**::Ranges over users and groups and revokes a set of permissions. Revoke authorizations are commonly used for revoking permissions to a user or group that the global authorization grants.
- **User group:** You can select a subset of groups to mapped it.
- **Permissions:** A Permission defines the way an identity is allowed to interact with a certain resource. Choose the various permission(ALL,Create, Update,Read, Delete)



Create Authorization

● -mandatory information

Id

Resource-Type: PROCESS_INSTANCE

Resource-Id: *

Grant-Type: GRANT

User-Group: user_group

You can select a sub set of groups (out of groups selected at rule level)

Permission: ALL

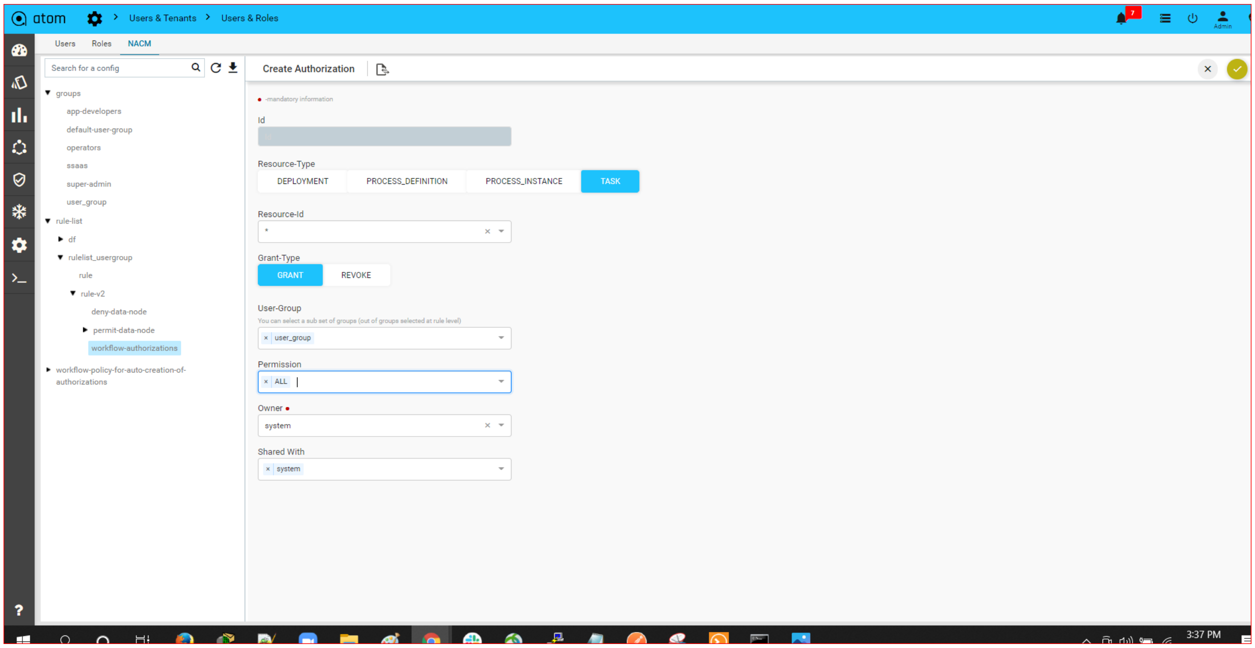
Owner ●: system

Shared With: system

Tasks: This option is a user can perform different actions on a task, like assigning the task, claiming the task or completing the task. If a user has “Update” permission on a task (or “Update Task” permission on the corresponding process definition) then the user is authorized to perform all these task actions

Click on Workflow authorization to add(+) to fill the below details for Task

- **Id** :Id is the hardcoded
- **Resource type** : Select the resource type is **Task**
- **Resource id** : Select (*) from resource id drop down to be accessed by all workflow tasks or any specific workflow task of resource id.
- **Grant type:**
- **Grant**:Ranges over users and groups and grants a set of permissions. Grant authorizations are commonly used for adding permissions to a user or group that the global authorization revoked.
- **Revoke**::Ranges over users and groups and revokes a set of permissions. Revoke authorizations are commonly used for revoking permissions to a user or group that the global authorization grants.
- **User group:** You can select a subset of groups to mapped it.
- **Permissions:** A Permission defines the way an identity is allowed to interact with a certain resource.Choose the various permission(ALL,Create, Update,Read, Delete,Read-History,Task-Assign,Task-Work)



Create Authorization

● -mandatory information

Id

Resource-Type: TASK

Resource-Id: *

Grant-Type: GRANT

User-Group
You can select a sub set of groups (out of groups selected at rule level)
user_group

Permission: ALL

Owner ●: system

Shared With: system

Note:: Need to be given the permit rpc exec in rule v2 based on given workflows & follow the workflow payload

```
<output>
  <user-summary>
    <username>srikanth</username>
    <write-default>inherit-from-global</write-default>
    <read-default>inherit-from-global</read-default>
    <exec-default>inherit-from-global</exec-default>
    <roles/>
    <user-group>
      <name>group_disney</name>
      <rule-list>
        <name>rulelist_disney</name>
        <group>group_disney</group>
        <rule-v2>
          <permit-rpc-exec>/controller:retrieve-configs</permit-rpc-exec>
          <permit-rpc-exec>/controller:run-device-inventory</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_api:get-neighbor-devices</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_api:ipv6-junos-routing</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_api:isis-routing</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_api:servicemodel_update</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_config:append-task-details</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_config:execute-command</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_config:ipv6-addition</permit-rpc-exec>
          <permit-rpc-exec>/disney_ipv6_config:ipv6-routing</permit-rpc-exec>
          <permit-rpc-exec>/configarchive:config-diff</permit-rpc-exec>
          <workflow-authorizations/>
          <permit-data-node>
            <id>1</id>
            <access-operations>read create update delete</access-operations>
            <path>/ipam:ipv6-pools</path>
          </permit-data-node>
          <permit-data-node>
            <path>/controller:devices</path>
            <id>2</id>
            <access-operations>*</access-operations>
          </permit-data-node>
        </rule-v2>
      </rule-list>
      <group-level-workflow-authorizations>
        <authorization>ID:3585112 GRANT PROCESS_DEFINITION ipv6_configs
[ALL]</authorization>
        <authorization>ID:3591653 GRANT PROCESS_DEFINITION
interface_ipv6_configuration [ALL]</authorization>
        <authorization>ID:3610357 GRANT PROCESS_DEFINITION
ipv6_routing_configuration [ALL]</authorization>
        <authorization>ID:3611232 GRANT PROCESS_DEFINITION bgp_peer_configuration
[ALL]</authorization>
        <authorization>ID:3585054 GRANT PROCESS_INSTANCE * [ALL]</authorization>
```

```
         </group-level-workflow-authorizations>
      </user-group>
      <user-level-workflow-authorizations/>
   </user-summary>
</output>
```

Integrating ATOM with Central Authentication Systems

By integrating with central authentication systems such as LDAP, AD or TACACS, the users created in these servers can login to ATOM using their credentials created in their respective servers.

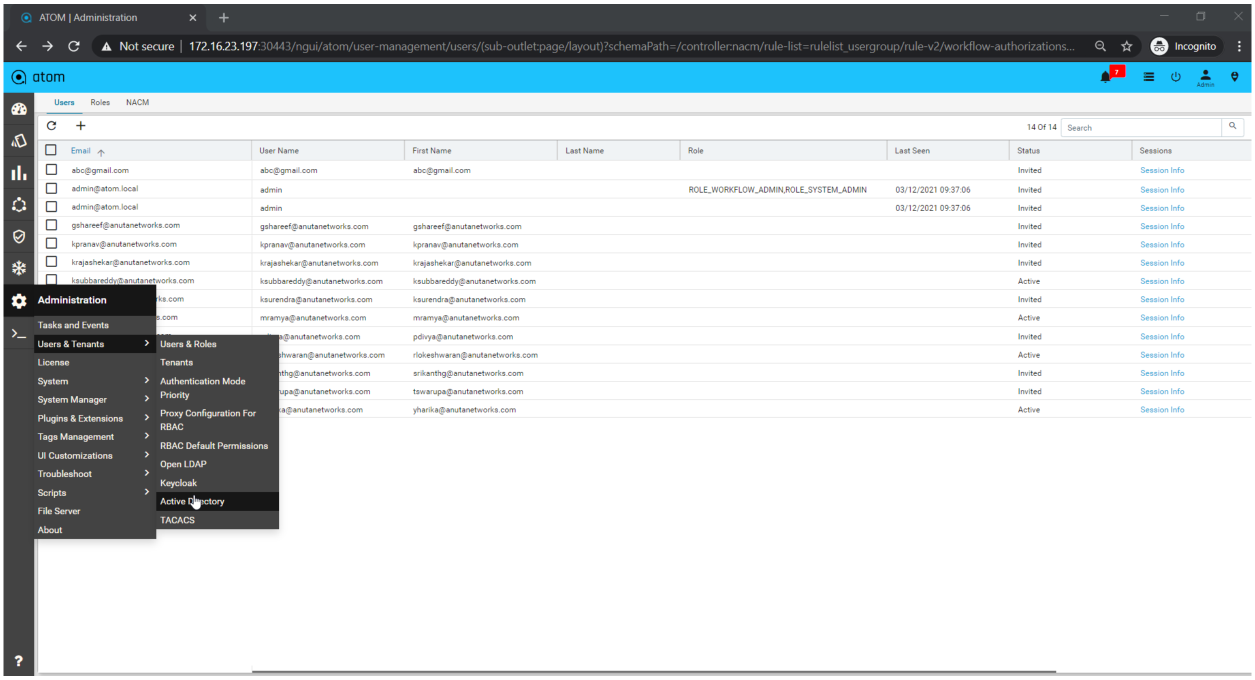
Managing Active Directory Users()

You can import users of Active Directory into ATOM and manage them as other users of ATOM.

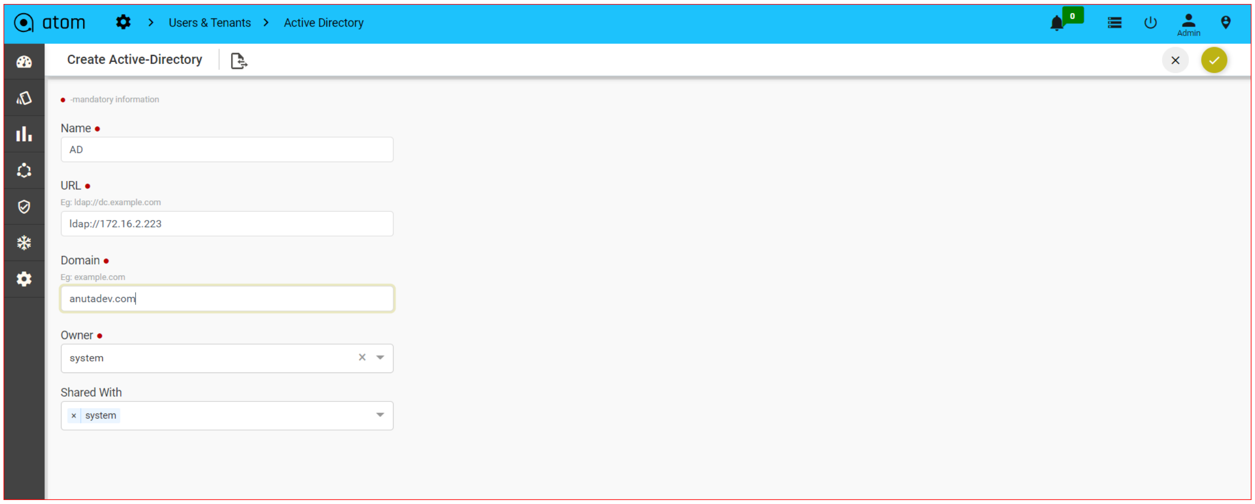
For secure communication between the AD server and ATOM, import the security certificate into ATOM.

1. Navigate to **Administration** >**Users & Tenants** > **Active Directory**
2. In the **Create Active Directory** screen, enter the following:
   ○ **URL**: Enter the URL address of the Active Directory(Ex:ldap://172.16.2.223)

   ○ **Domain**: Enter the name of the domain(Ex:anutadev.com)



Email	User Name	First Name	Last Name	Role	Last Seen	Status	Sessions
abc@gmail.com	abc@gmail.com	abc@gmail.com				Invited	Session Info
admin@atom.local	admin			ROLE_WORKFLOW_ADMIN,ROLE_SYSTEM_ADMIN	03/12/2021 09:37:06	Invited	Session Info
admin@atom.local	admin				03/12/2021 09:37:06	Invited	Session Info
gshareef@anutanetworks.com	gshareef@anutanetworks.com	gshareef@anutanetworks.com				Invited	Session Info
kpranav@anutanetworks.com	kpranav@anutanetworks.com	kpranav@anutanetworks.com				Invited	Session Info
krajashekar@anutanetworks.com	krajashekar@anutanetworks.com	krajashekar@anutanetworks.com				Invited	Session Info
ksubbareddy@anutanetworks.com	ksubbareddy@anutanetworks.com	ksubbareddy@anutanetworks.com				Active	Session Info
ks.com	ksurendra@anutanetworks.com	ksurendra@anutanetworks.com				Invited	Session Info
s.com	mramya@anutanetworks.com	mramya@anutanetworks.com				Active	Session Info
	a@anutanetworks.com	pdivya@anutanetworks.com				Invited	Session Info
	shwaran@anutanetworks.com	rlokeshwaran@anutanetworks.com				Active	Session Info
	nthg@anutanetworks.com	srikanthg@anutanetworks.com				Invited	Session Info
	upa@anutanetworks.com	tswarupa@anutanetworks.com				Invited	Session Info
	a@anutanetworks.com	yharika@anutanetworks.com				Active	Session Info



Create Active-Directory

● -mandatory information

Name ●
AD

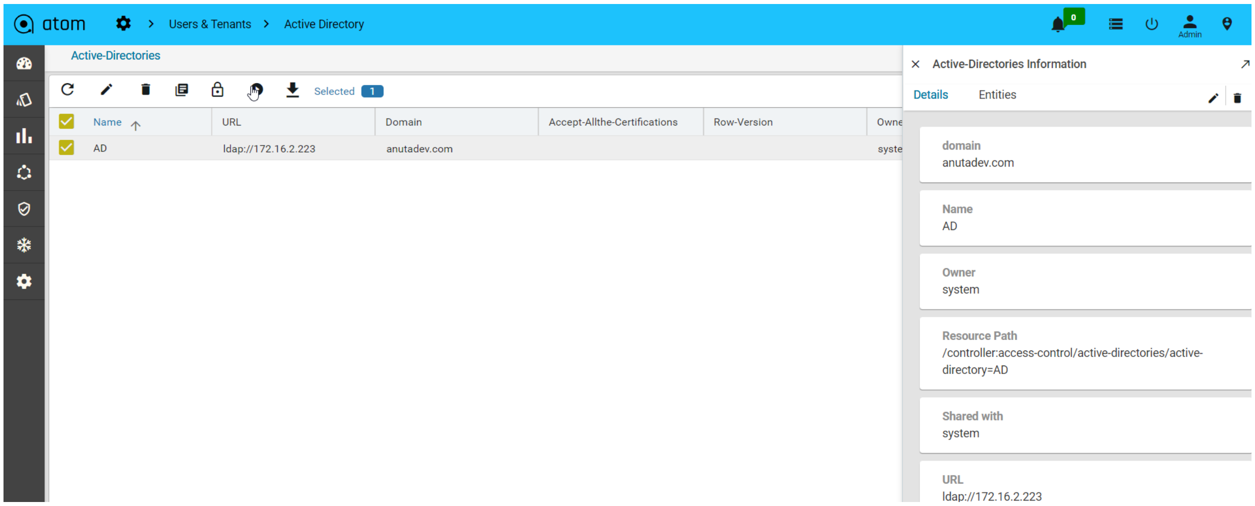
URL ●
Eg: ldap://dc.example.com
ldap://172.16.2.223

Domain ●
Eg: example.com
anutadev.com

Owner ●
system

Shared With
× system

- ○ Click **Test Connectivity** to test the connection between the ATOM and the AD servers.


atom
Users & Tenants > Active Directory
Active-Directories
Selected 1
Active-Directories Information
Details
Entities
Admin

Name	URL	Domain	Accept-Allthe-Certifications	Row-Version	Owne
AD	ldap://172.16.2.223	anutadev.com			syste

domain
anutadev.com

Name
AD

Owner
system

Resource Path
/controller:access-control/active-directories/active-directory=AD

Shared with
system

URL
ldap://172.16.2.223

Managing OpenLDAP Users

You can import the existing LDAP users and user groups of a tenant, thus enabling the tenant users to login to ATOM using their LDAP credentials.

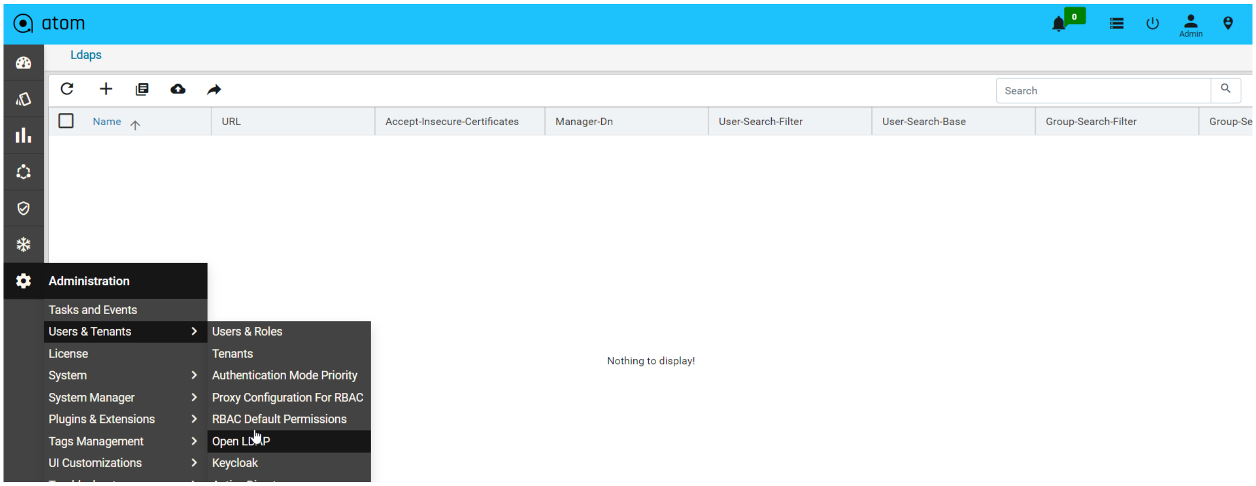
Importing OpenLDAP Users:

Before you begin, ensure that the following conditions are met with:

1. Users and groups are created in the LDAP server
2. OpenLDAP users are created as Tenants in ATOM

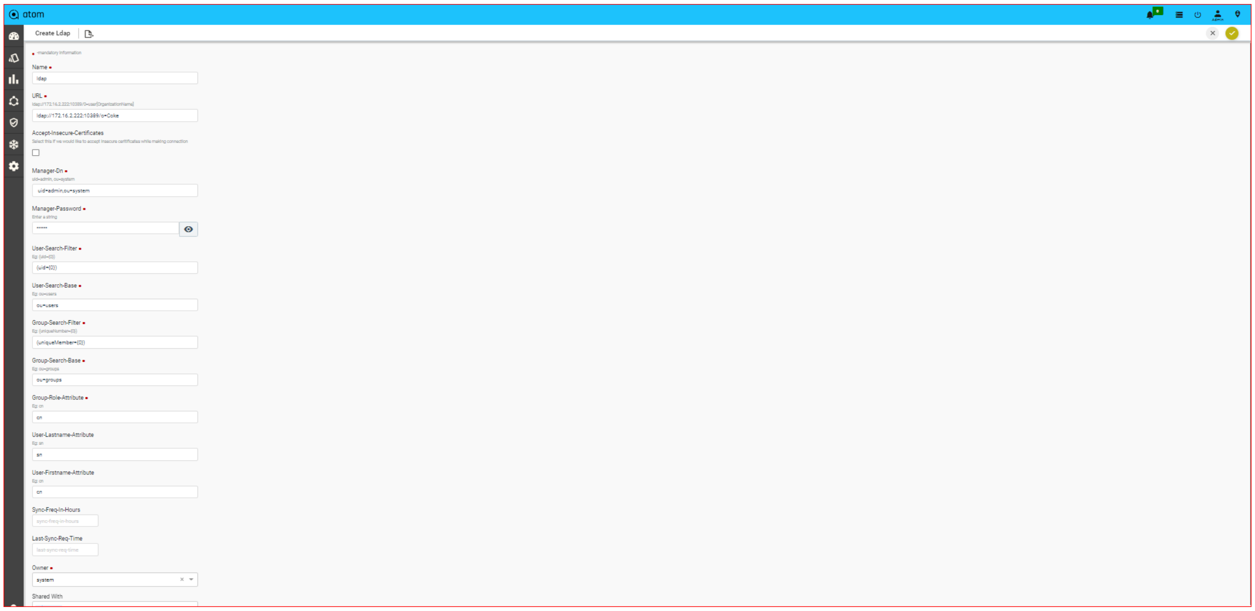
To create LDAP users in ATOM:

1. Navigate to **Administration** > **Users & Tenants** > **OpenLDAP**
2. Click **Add**



Name	URL	Accept-Insecure-Certificates	Manager-Dn	User-Search-Filter	User-Search-Base	Group-Search-Filter	Group-Se

Nothing to display!



- -mandatory Information

Name: ldap

URL: ldap://172.16.2.222:10389/0=user[OrganizationName]
ldap://172.16.2.222:10389/o=Coke

Accept-Insecure-Certificates
Select this if we would like to accept insecure certificates while making connection
□

Manager-Dn: uid=admin, ou=system
uid=admin,ou=system

Manager-Password: Enter a string
••••••

User-Search-Filter: Eg: (uid={0})
(uid={0})

User-Search-Base: Eg: ou=users
ou=users

Group-Search-Filter: Eg: (uniqueNumber={0})
(uniqueMember={0})

Group-Search-Base: Eg: ou=groups
ou=groups

Group-Role-Attribute: Eg: cn
cn

User-Lastname-Attribute: Eg: sn
sn

User-Firstname-Attribute: Eg: cn
cn

Sync-Freq-In-Hours: sync-freq-in-hours

Last-Sync-Req-Time: last-sync-req-time

Owner: system

Shared With

3. In the **Create OpenLDAP** screen, enter the values in the following fields:

   i. **URL**: Enter the LDAP URL of the tenant. Include port number and base distinguished name (DN)

      Example: "ldap://localhost:10389/o=nCloud"

   ii. **Manager Dn**: Type the distinguished name (DN) of LDAP manager. This manager should have at least read permission.

      Example: “uid=admin, ou=system"

   iii. **Manager Password**: Type a password for the entered DN. Example: secret

   iv. **User Search Filter**: Specify a search filter. This field determines the query to be run to identify the user record. Always include a query in brackets '(' ')'. Example: “(uid={0})”

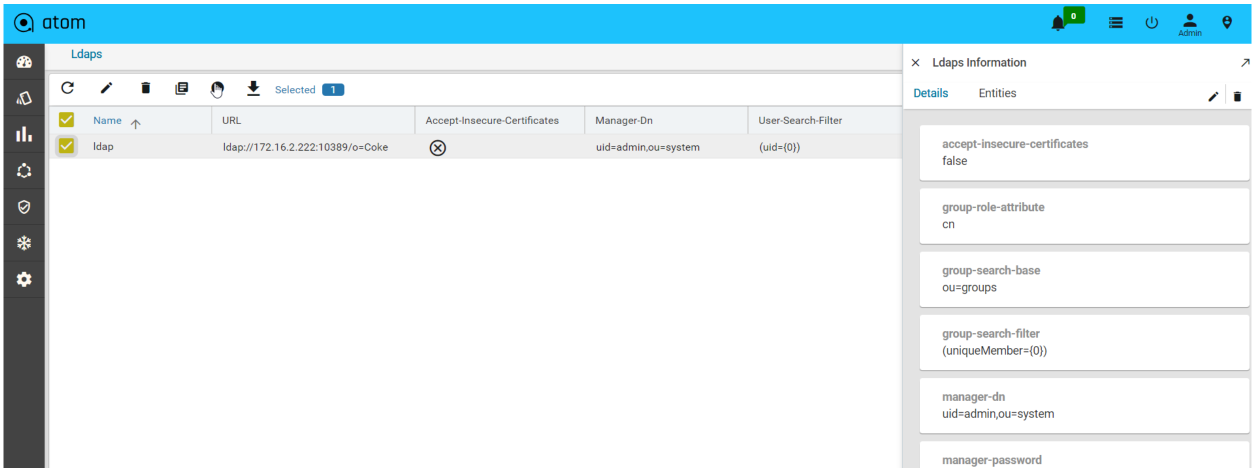
   v. **User Search Base:** Specify a relative DN (from the root/base DN) where users are located. Example: “ou=users”

      NOTE: In LDAP, {0} is a placeholder (token) for login user ID.

   - **Group Search Filter**: This field determines the query to be run to identify the user in a group. Always include a query in brackets '(' ')'. Example: “(uniqueMember={0})”
   - **Group Search Base**: Specify a relative DN (from the root/base DN) where user groups are located. Example: “ou=groups”
   - **Group Role Attribute**: Specify the attribute name of role in a group. Example: “cn”

- **User-Lastname Attribute**: Attribute that contains user's last name. Example: “sn”
- **User- Firstname Attribute**: Attribute that contains user's first name. Example: “cn”
- **Sync-Freq-in-Hours:** Type the interval, in hours, at which ATOM should query the AD/LDAP directory to schedule an automatic update.
- **Last-Syn-Req-Time:** The timestamp of the last successful synchronization with the LDAP server is displayed.

After adding the LDAP user in ATOM, click **Test Connectivity** to check the connectivity between the ATOM server and LDAP server.



☑	Name	URL	Accept-Insecure-Certificates	Manager-Dn	User-Search-Filter
☑	ldap	ldap://172.16.2.222:10389/o=Coke	⊗	uid=admin,ou=system	(uid={0})

accept-insecure-certificates
false

group-role-attribute
cn

group-search-base
ou=groups

group-search-filter
(uniqueMember={0})

manager-dn
uid=admin,ou=system

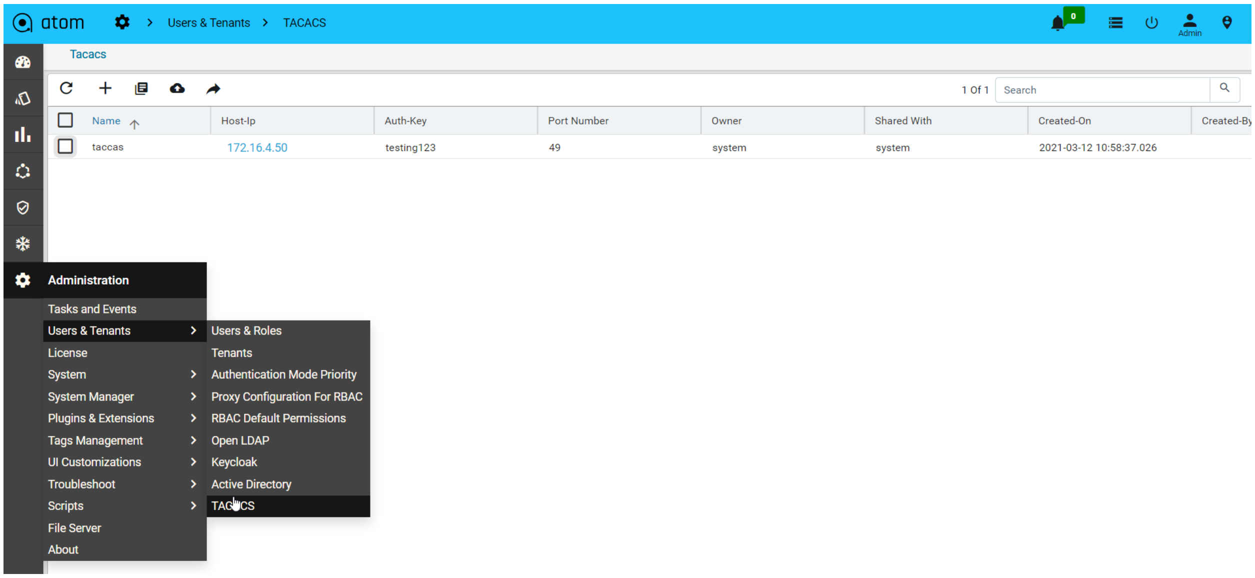
manager-password

Managing TACACS Users

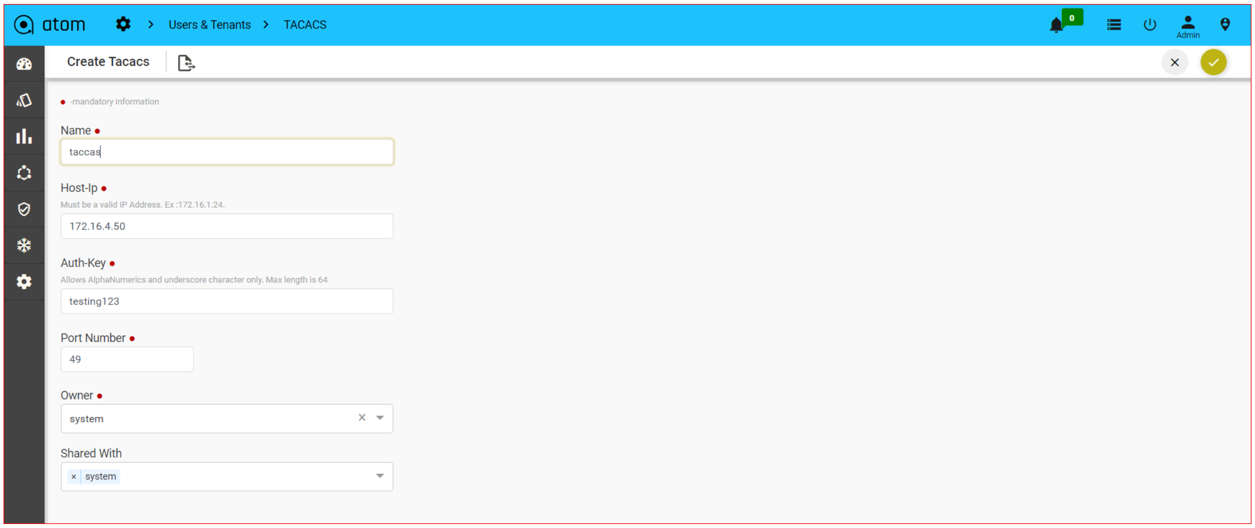
By integrating TACACS with ATOM, you can achieve a unified authentication system so that the same login credentials (username and password) can be used to access not only for managing network devices but for UNIX and Linux servers too. Therefore, the permissions and privileges to access the devices can be assigned and delegated through ATOM as systems rights.

To integrate the ATOM with TACACS, do the following:

1. Navigate to **Administration > Users & Tenants > TACACS > Add**



Name	Host-Ip	Auth-Key	Port Number	Owner	Shared With	Created-On	Created-By
taccas	172.16.4.50	testing123	49	system	system	2021-03-12 10:58:37.026	



● -mandatory information

Name ●
taccas

Host-Ip ●
Must be a valid IP Address. Ex :172.16.1.24.
172.16.4.50

Auth-Key ●
Allows AlphaNumerics and underscore character only. Max length is 64
testing123

Port Number ●
49

Owner ●
system

Shared With
× system

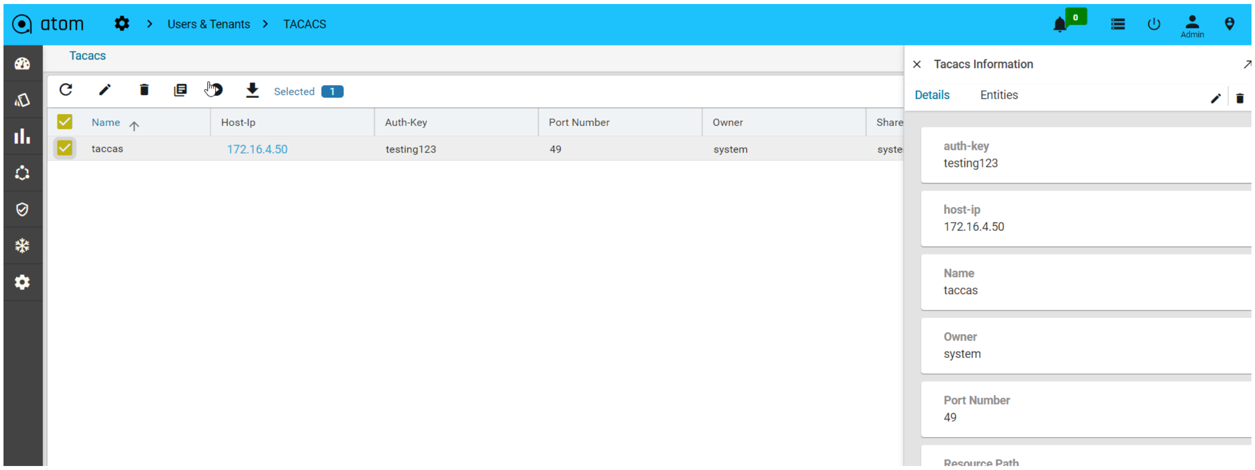
2. In the Create TACACS screen, enter values in the following fields:

   i. Host Name: Enter the IP address of the host, which is hosting the TACACS server(172.16.4.50)

   ii. Auth Key: Enter the key used to specify an encryption key for encrypting and decrypting all traffic between the ATOM server and the TACACS server(testing123)

   iii. Port Number: Enter the TCP port number to be used when making connections to the TACACS+ daemon. The default port number is 49.

3. Click the Test Connectivity button to test the connection between the ATOM and the TACACS servers(enter the name and the password to validate this connection).



Name	Host-Ip	Auth-Key	Port Number	Owner	Share
taccas	172.16.4.50	testing123	49	system	syste

auth-key
testing123

host-ip
172.16.4.50

Name
taccas

Owner
system

Port Number
49

Resource Path

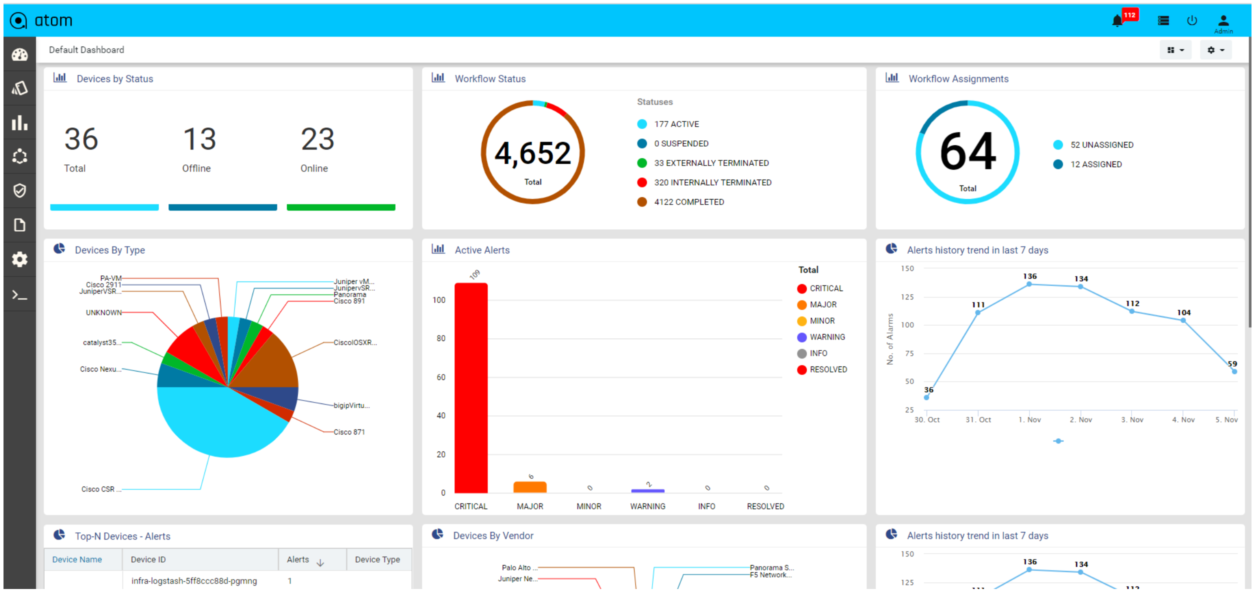
Customizing the Dashboard using DSL

DSL, Domain Specific Language, developed by Anuta can be used for representation and visualization of data derived from the devices managed by ATOM. DSL taps into YANG models, platform or third-party APIs to express code for model pre and post condition specification, rule expressions, rule logic, and RPC implementation logic. Some of the advantages that you can enjoy by implementing DSL are no more manual JAVA or Python code to carry out simple validations, side effect processing, ability to offer richer expressions than xpath 1.0 used by YANG, static analysis of business logic, side- effect analysis, advanced user experience, and ability to change logic on a live system.

Starting from the 7.x release, **Dashboard**, the landing page of ATOM, is organized into dashlets.

A dashlet is an individual component that can be added to or removed from a dashboard. Each dashlet is a reusable unit of functionality, providing a summary of the feature or the function supported by ATOM and is rendered as a result of the custom queries written in DSL.

You can customize the look of the Dashboard, by adding the dashlets of your choice, and dragging and dropping (the extreme right corner of the dashlet) to the desired location on the dashboard.



Each dashlet contains the summary or the overview of the feature or the functionality supported by ATOM.

For example, the dashlet "Device" displays the summary of devices managed by ATOM.

Some of the statistics that can be of the interest in this dashlet could be as follows:

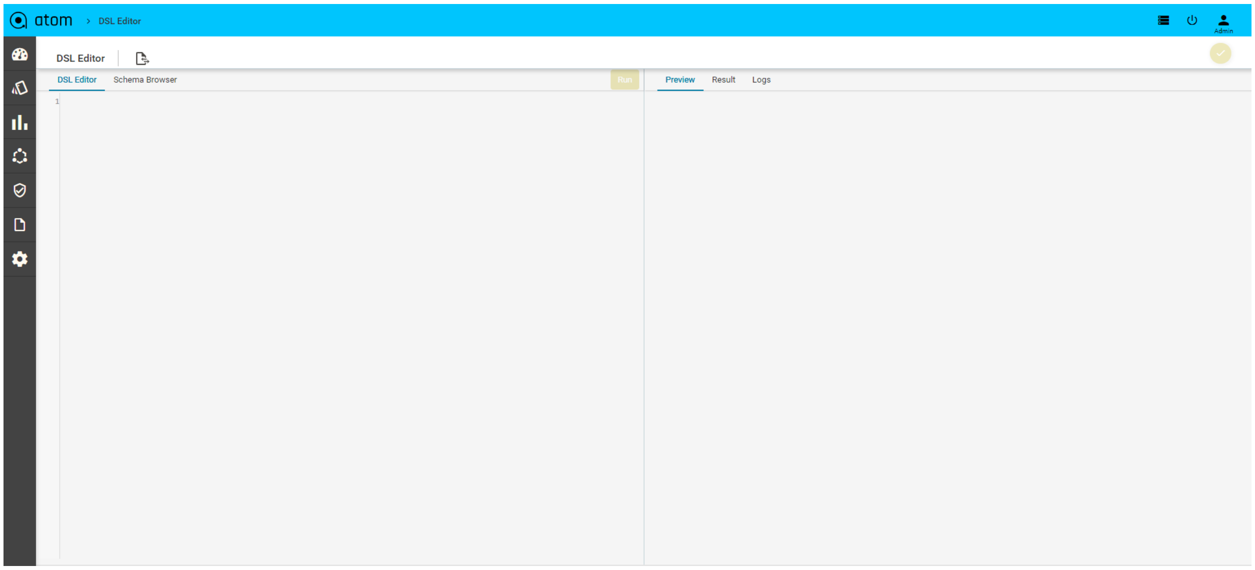
- Total number of devices
- Number of online devices
- Number of offline devices

These statistics can be gathered by ATOM and displayed in the corresponding dashlet depending on the DSL query written for each of them. For information about writing DSL queries, refer the section, "Writing DSL Queries"

You can save the layout containing the dashlets of your choice and set in a particular order.

Writing DSL Queries

1. For writing any new DSL query in the editor, browse to **Developer Tools** **> DSL** **> DSL Editor**.

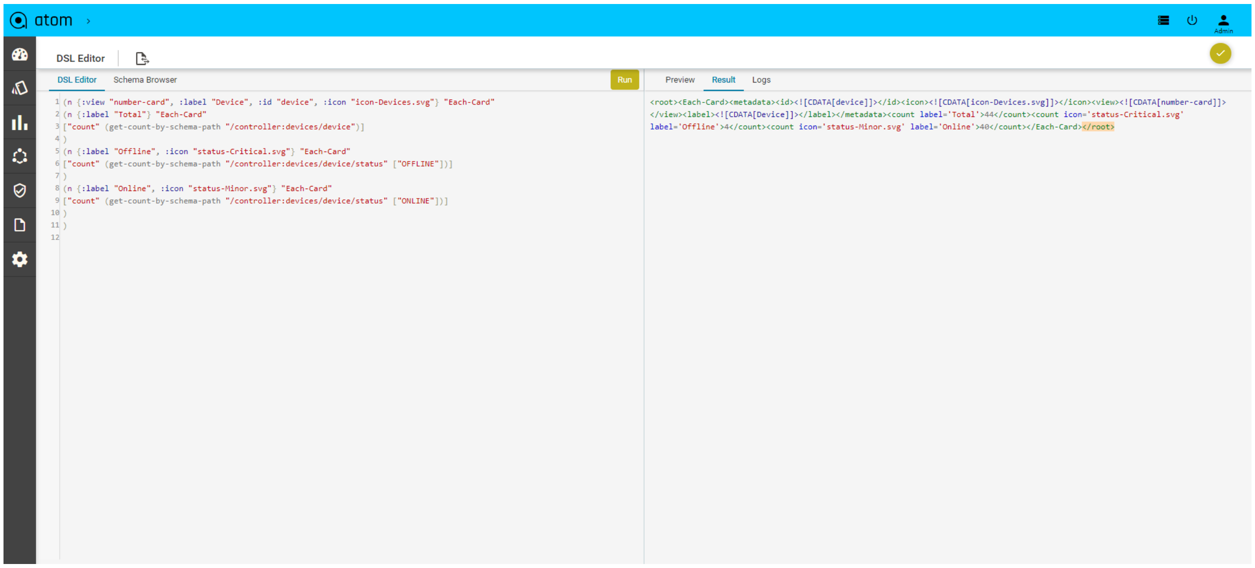


Sample DSL Query

Below is a sample DSL which will display Total/Offline/Online devices in ATOM as a card layout

```
(n {:view "number-card", :label "Device", :id "device", :icon "icon-Devices.svg"} "Each-Card"
(n {:label "Total"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device")]
)
(n {:label "Offline", :icon "status-Critical.svg"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device/status" ["OFFLINE"])]
)
(n {:label "Online", :icon "status-Minor.svg"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device/status" ["ONLINE"])]
)
)
```

2. Click to **Run** button on the top of the editor to check if DSL is working as expected.



```
(n {:view "number-card", :label "Device", :id "device", :icon "icon-Devices.svg"} "Each-Card"
(n {:label "Total"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device")]
)
(n {:label "Offline", :icon "status-Critical.svg"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device/status" ["OFFLINE"])]
)
(n {:label "Online", :icon "status-Minor.svg"} "Each-Card"
["count" (get-count-by-schema-path "/controller:devices/device/status" ["ONLINE"])]
)
)
```

```
<root><Each-Card><metadata><id><![CDATA[device]]></id><icon><![CDATA[icon-Devices.svg]]></icon><view><![CDATA[number-card]]>
</view><label><![CDATA[Device]]></label></metadata><count label='Total'>44</count><count icon='status-Critical.svg'
label='Offline'>4</count><count icon='status-Minor.svg' label='Online'>40</count></Each-Card></root>
```

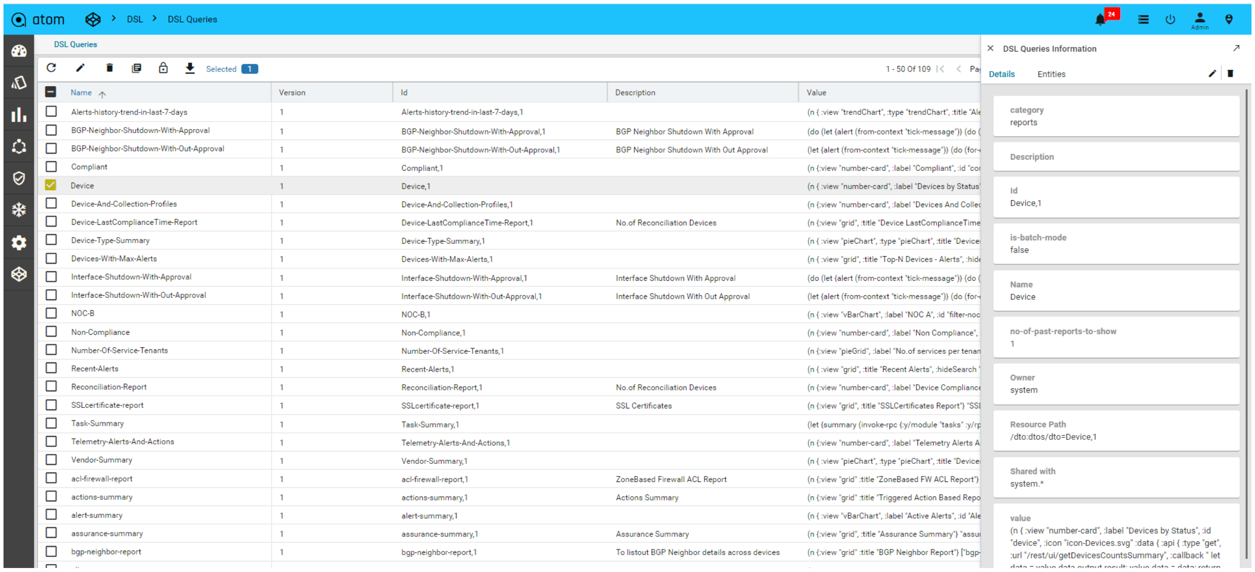
Go to the right pane to view the result.There are three tabs in the right side panel **Preview**, **Result** and **Logs**

- Check the **Preview** of layout (Card,Grid,Pie Grid,Pie Chart) for the DSL in Preview tab.
- XML output of the DSL will be shown in the **Result** tab
- All errors of the DSL will be listed in the **Logs** tab in case of any failures.

After the successful execution of a DSL query, you can save and use this as a new Report or incorporate it into Dashboard view. All DSL queries will be saved in **Administration > DSL Queries**.

Customizing the Dashboard

After the successful execution of DSL query, if you want to incorporate the DSL into Dashboard, browse to **Developer Tools > DSL < DSL Queries** to view all the queries as shown below:



DSL Queries

	Name	Version	Id	Description	Value
☐	Alerts-history-trend-in-last-7-days	1	Alerts-history-trend-in-last-7-days,1		(n { :view "trendChart", :type "trendChart", :title "Ale
☐	BGP-Neighbor-Shutdown-With-Approval	1	BGP-Neighbor-Shutdown-With-Approval,1	BGP Neighbor Shutdown With Approval	(do (let {alert (from-context "tick-message")} (do (
☐	BGP-Neighbor-Shutdown-With-Out-Approval	1	BGP-Neighbor-Shutdown-With-Out-Approval,1	BGP Neighbor Shutdown With Out Approval	(let {alert (from-context "tick-message")} (do (for-
☐	Compliant	1	Compliant,1		(n {:view "number-card", :label "Compliant", :id "co
☑	Device	1	Device,1		(n { :view "number-card", :label "Devices by Status"
☐	Device-And-Collection-Profiles	1	Device-And-Collection-Profiles,1		(n {:view "number-card", :label "Devices And Collec
☐	Device-LastComplianceTime-Report	1	Device-LastComplianceTime-Report,1	No.of Reconciliation Devices	(n {:view "grid", :title "Device LastComplianceTime
☐	Device-Type-Summary	1	Device-Type-Summary,1		(n { :view "pieChart", :type "pieChart", :title "Device
☐	Devices-With-Max-Alerts	1	Devices-With-Max-Alerts,1		(n { :view "grid", :title "Top-N Devices - Alerts", :hide
☐	Interface-Shutdown-With-Approval	1	Interface-Shutdown-With-Approval,1	Interface Shutdown With Approval	(do (let {alert (from-context "tick-message")} (do (
☐	Interface-Shutdown-With-Out-Approval	1	Interface-Shutdown-With-Out-Approval,1	Interface Shutdown With Out Approval	(let {alert (from-context "tick-message")} (do (for-
☐	NOC-B	1	NOC-B,1		(n { :view "vBarChart", :label "NOC A", :id "filter-noc
☐	Non-Compliance	1	Non-Compliance,1		(n {:view "number-card", :label "Non Compliance",
☐	Number-Of-Service-Tenants	1	Number-Of-Service-Tenants,1		(n {:view "pieGrid", :label "No.of services per tenan
☐	Recent-Alerts	1	Recent-Alerts,1		(n { :view "grid", :title "Recent Alerts", :hideSearch "
☐	Reconciliation-Report	1	Reconciliation-Report,1	No.of Reconciliation Devices	(n {:view "number-card", :label "Device Compliance
☐	SSLcertificate-report	1	SSLcertificate-report,1	SSL Certificates	(n {:view "grid", :title "SSLCertificates Report"} "SSL
☐	Task-Summary	1	Task-Summary,1		(let {summary (invoke-rpc {:y/module "tasks" :y/rp
☐	Telemetry-Alerts-And-Actions	1	Telemetry-Alerts-And-Actions,1		(n {:view "number-card", :label "Telemetry Alerts A
☐	Vendor-Summary	1	Vendor-Summary,1		(n { :view "pieChart", :type "pieChart", :title "Device
☐	acl-firewall-report	1	acl-firewall-report,1	ZoneBased Firewall ACL Report	(n {:view "grid" :title "ZoneBased FW ACL Report"}
☐	actions-summary	1	actions-summary,1	Actions Summary	(n {:view "grid" :title "Triggered Action Based Repo
☐	alert-summary	1	alert-summary,1		(n { :view "vBarChart", :label "Active Alerts", :id "Ale
☐	assurance-summary	1	assurance-summary,1	Assurance Summary	(n {:view "grid", :title "Assurance Summary"} "assu
☐	bgp-neighbor-report	1	bgp-neighbor-report,1	To listout BGP Neighbor details across devices	(n {:view "grid" :title "BGP Neighbor Report"} ["bgp-

category
reports

Description

Id
Device,1

is-batch-mode
false

Name
Device

no-of-past-reports-to-show
1

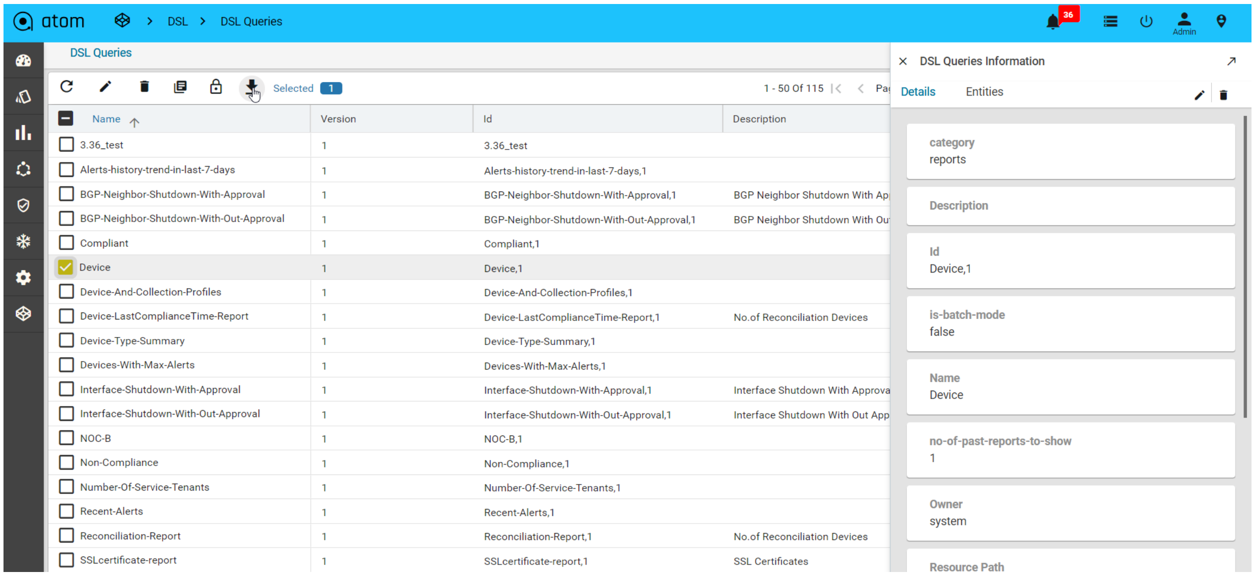
Owner
system

Resource Path
/dto:dtos/dto=Device,1

Shared with
system.*

value
(n { :view "number-card", :label "Devices by Status", :id "device", :icon "icon-Devices.svg" :data { :api { :type "get", :url "/rest/ui/getDevicesCountsSummary", :callback " let

Click on view/download option in dsl query, it can be shown as xml/json/csv/form template.



DSL Queries

	Name	Version	Id	Description
☐	3.36_test	1	3.36_test	
☐	Alerts-history-trend-in-last-7-days	1	Alerts-history-trend-in-last-7-days,1	
☐	BGP-Neighbor-Shutdown-With-Approval	1	BGP-Neighbor-Shutdown-With-Approval,1	BGP Neighbor Shutdown With Ap
☐	BGP-Neighbor-Shutdown-With-Out-Approval	1	BGP-Neighbor-Shutdown-With-Out-Approval,1	BGP Neighbor Shutdown With Ou
☐	Compliant	1	Compliant,1	
☑	Device	1	Device,1	
☐	Device-And-Collection-Profiles	1	Device-And-Collection-Profiles,1	
☐	Device-LastComplianceTime-Report	1	Device-LastComplianceTime-Report,1	No.of Reconciliation Devices
☐	Device-Type-Summary	1	Device-Type-Summary,1	
☐	Devices-With-Max-Alerts	1	Devices-With-Max-Alerts,1	
☐	Interface-Shutdown-With-Approval	1	Interface-Shutdown-With-Approval,1	Interface Shutdown With Approva
☐	Interface-Shutdown-With-Out-Approval	1	Interface-Shutdown-With-Out-Approval,1	Interface Shutdown With Out App
☐	NOC-B	1	NOC-B,1	
☐	Non-Compliance	1	Non-Compliance,1	
☐	Number-Of-Service-Tenants	1	Number-Of-Service-Tenants,1	
☐	Recent-Alerts	1	Recent-Alerts,1	
☐	Reconciliation-Report	1	Reconciliation-Report,1	No.of Reconciliation Devices
☐	SSLcertificate-report	1	SSLcertificate-report,1	SSL Certificates

category
reports

Description

Id
Device,1

is-batch-mode
false

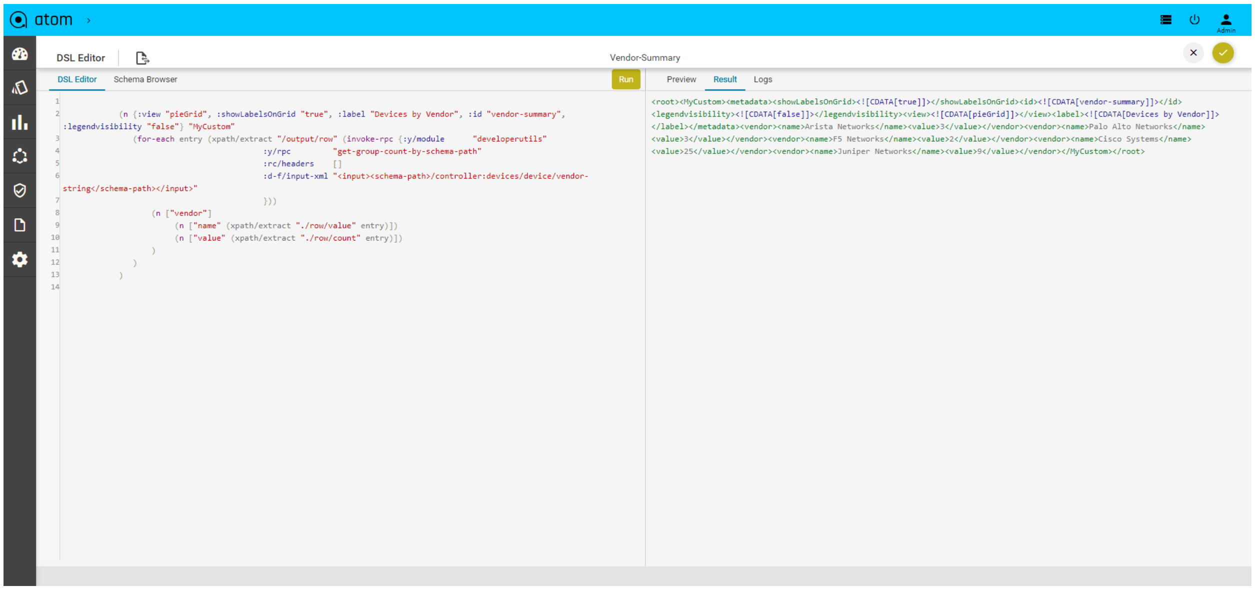
Name
Device

no-of-past-reports-to-show
1

Owner
system

Resource Path

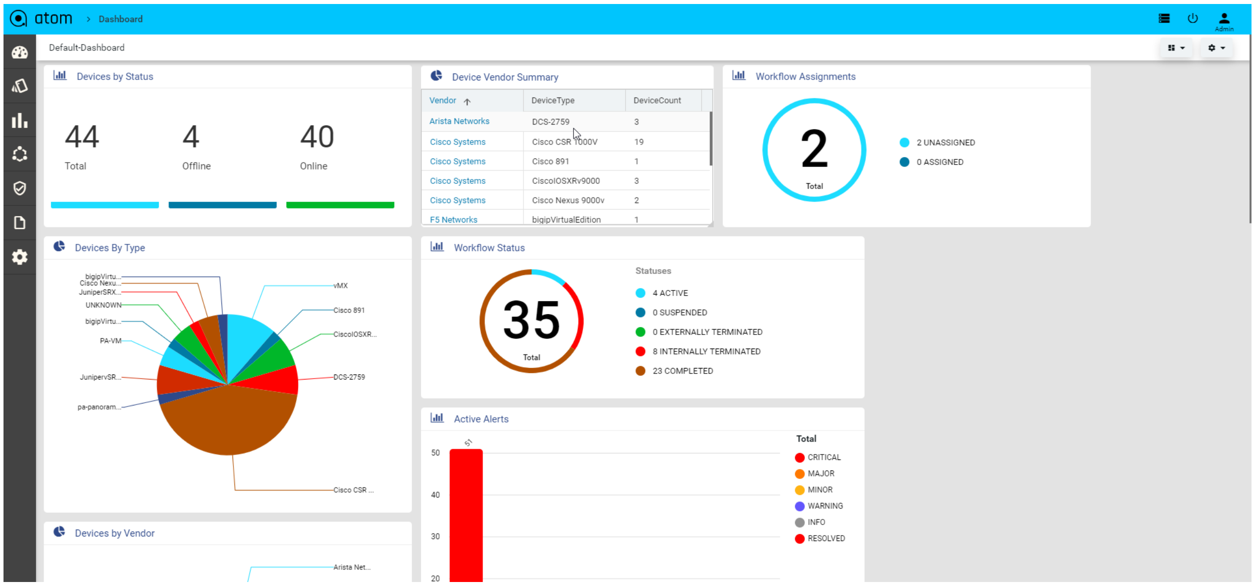
Include your new DSL and click the **Save** button on the right side panel of the Editor.



```
            (n {:view "pieGrid", :showLabelsOnGrid "true", :label "Devices by Vendor", :id "vendor-summary",
:legendvisibility "false"} "MyCustom"
               (for-each entry (xpath/extract "/output/row" (invoke-rpc {:y/module      "developerutils"
                                             :y/rpc         "get-group-count-by-schema-path"
                                             :rc/headers    []
                                             :d-f/input-xml "<input><schema-path>/controller:devices/device/vendor-
string</schema-path></input>"
                                             }))
                   (n ["vendor"]
                        (n ["name" (xpath/extract "./row/value" entry)])
                        (n ["value" (xpath/extract "./row/count" entry)])
                   )
               )
            )
```

```
<root><MyCustom><metadata><showLabelsOnGrid><![CDATA[true]]></showLabelsOnGrid><id><![CDATA[vendor-summary]]></id>
<legendvisibility><![CDATA[false]]></legendvisibility><view><![CDATA[pieGrid]]></view><label><![CDATA[Devices by Vendor]]>
</label></metadata><vendor><name>Arista Networks</name><value>3</value></vendor><vendor><name>Palo Alto Networks</name>
<value>3</value></vendor><vendor><name>F5 Networks</name><value>2</value></vendor><vendor><name>Cisco Systems</name>
<value>25</value></vendor><vendor><name>Juniper Networks</name><value>9</value></vendor></MyCustom></root>
```

Now you can browse to Dashboard to view the report that has been included (due to the new DSL query that was added) in the Dashboard DSL.



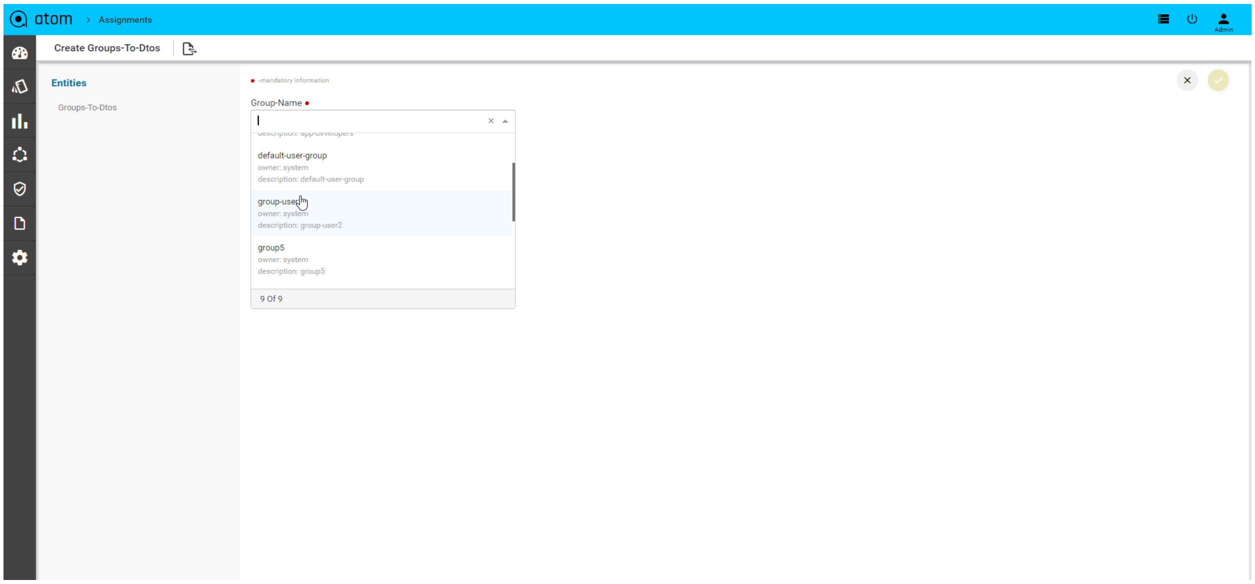
Device Vendor Summary

Vendor	DeviceType	DeviceCount
Arista Networks	DCS-2759	3
Cisco Systems	Cisco CSR 1000V	19
Cisco Systems	Cisco 891	1
Cisco Systems	CiscoIOSXRv9000	3
Cisco Systems	Cisco Nexus 9000v	2
F5 Networks	bigipVirtualEdition	1

DSL Assignment

The define the dsl assignment is associated with the group and dto is a transfer of the object(to get the navigation menu items after login user).

Navigate > Developer Tools > DSL > DSL Assignment > Add



Group-Name •

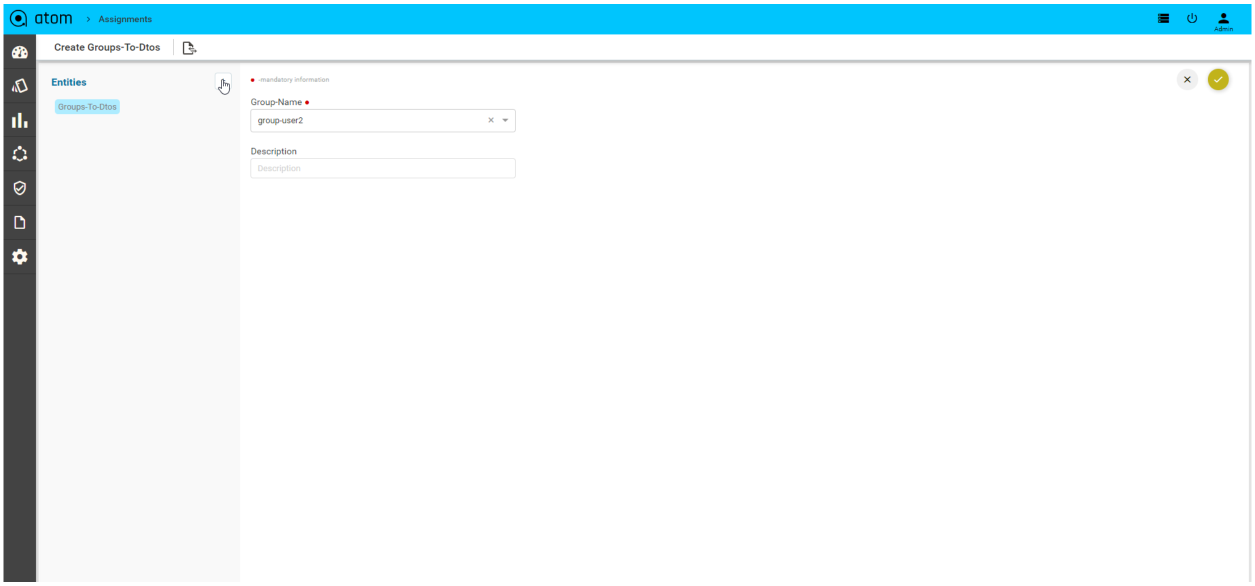
description: app-developers

default-user-group
owner: system
description: default-user-group

group-user2
owner: system
description: group-user2

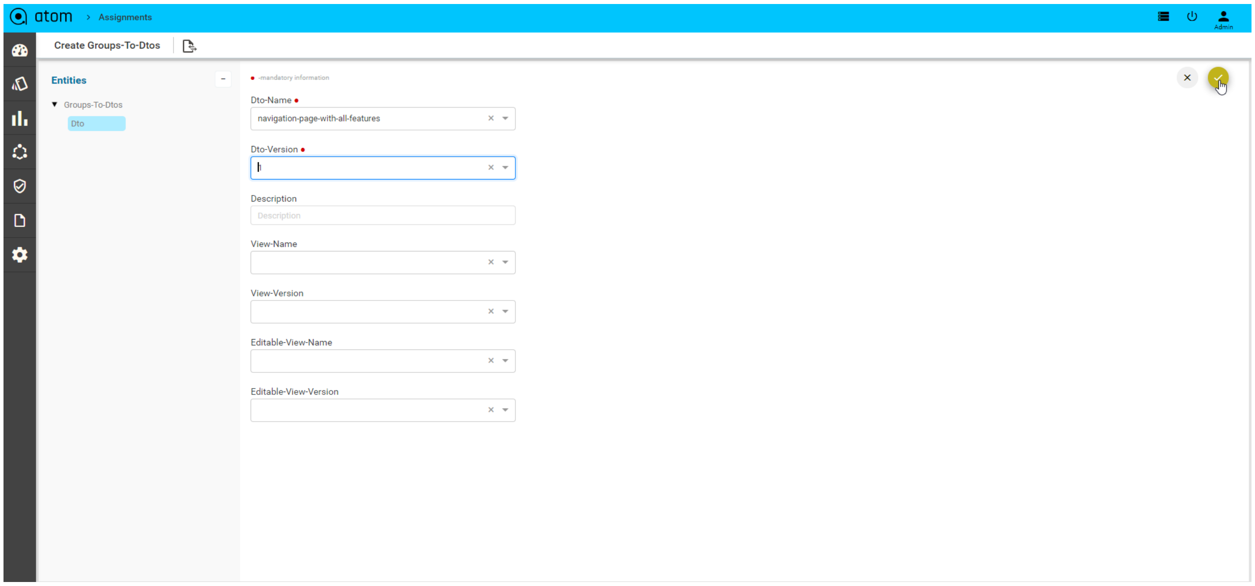
group5
owner: system
description: group5

9 Of 9



Group-Name •
group-user2

Description
Description



Dto-Name •
navigation-page-with-all-features

Dto-Version •

Description
Description

View-Name

View-Version

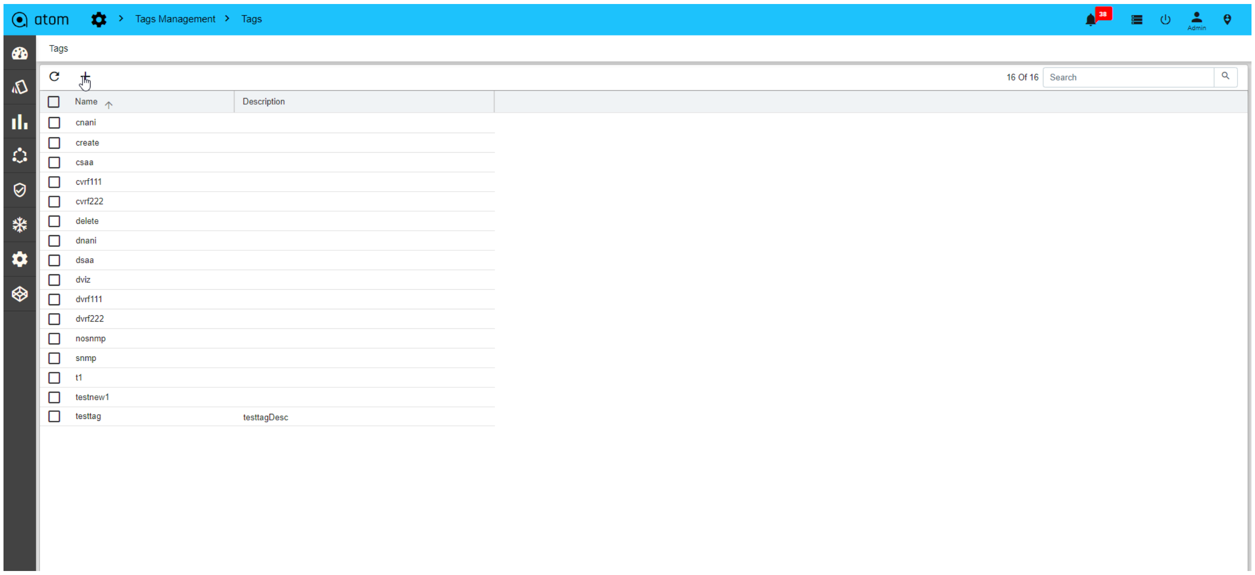
Editable-View-Name

Editable-View-Version

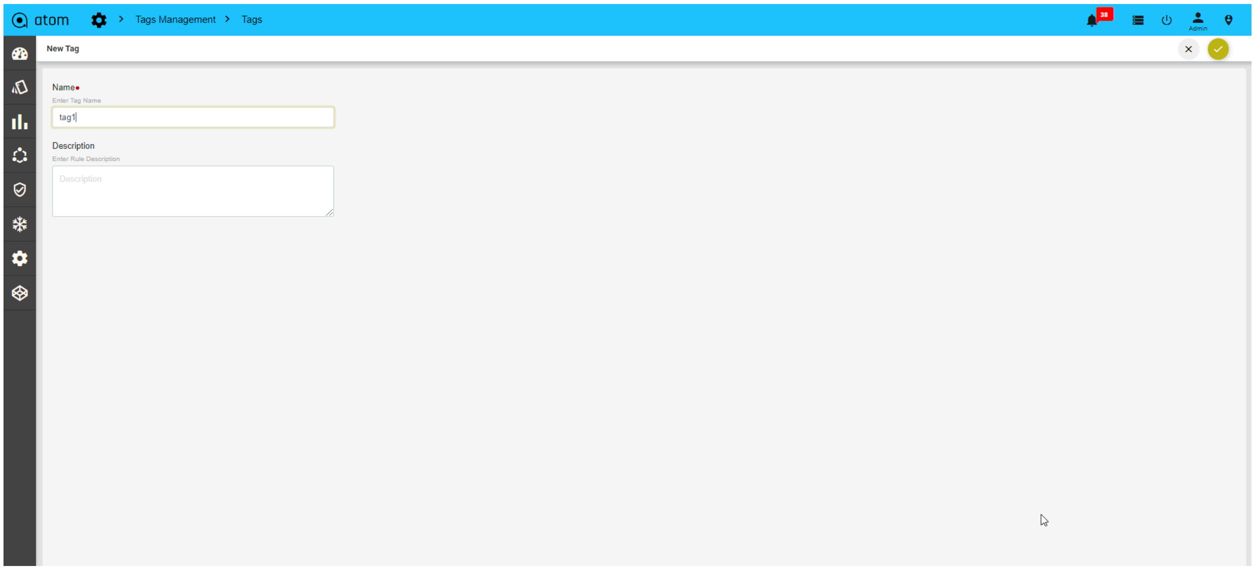
Tag Management

Navigate > Administration > Tag Management

By creating the tags in global, it should show in create alert rule definition



Name	Description
cnani	
create	
csaa	
cvrf111	
cvrf222	
delete	
dnani	
dsaa	
dviz	
dvrf111	
dvrf222	
nosnmp	
snmp	
t1	
testnew1	
testtag	testtagDesc



Name•
Enter Tag Name
tag1

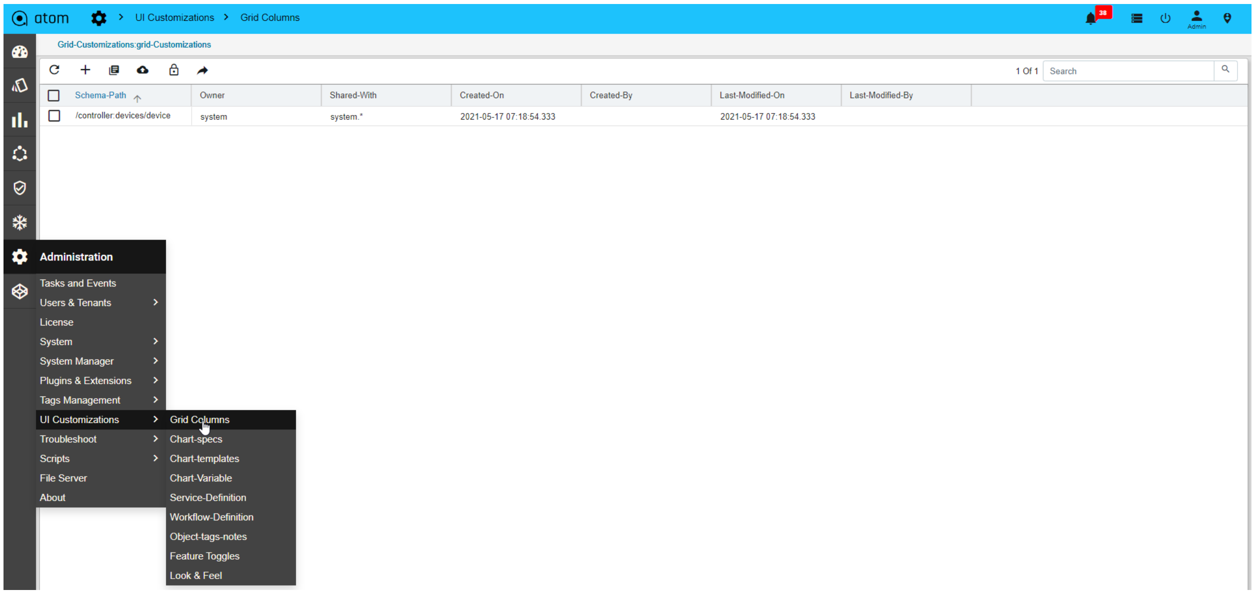
Description
Enter Rule Description
Description

UI Customizations

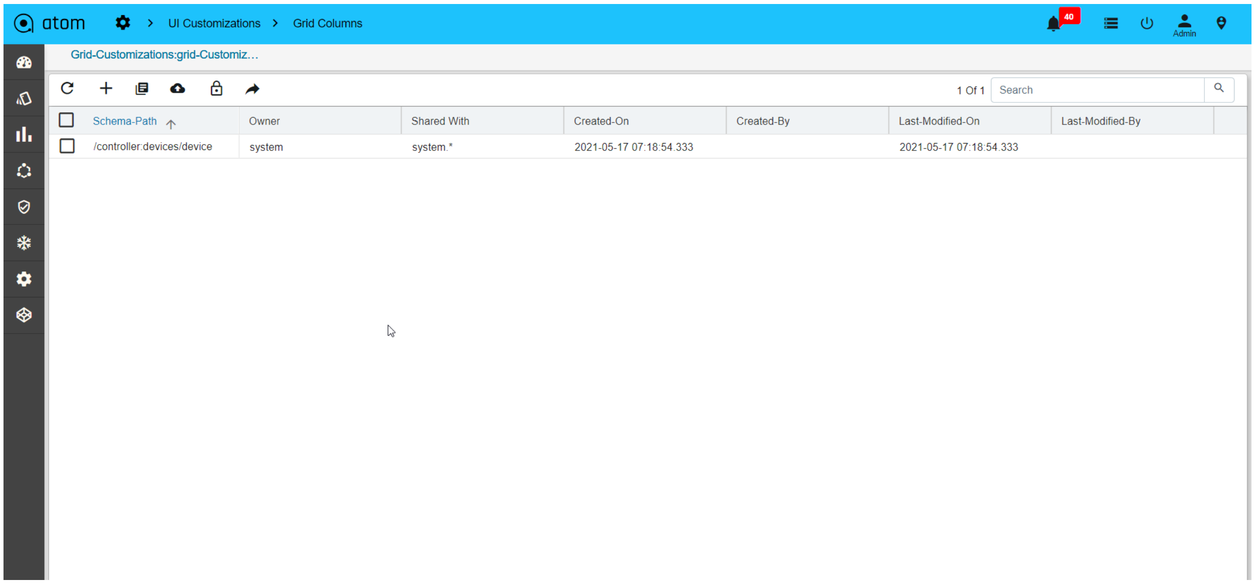
Customization give control to the user.Customization may involve moving items around an interface to reflect the users' priorities

1.**Grid column:** Grid columns allows us to select which grid columns can be shown for each entity.Current by default we have one for devices now in grid column.

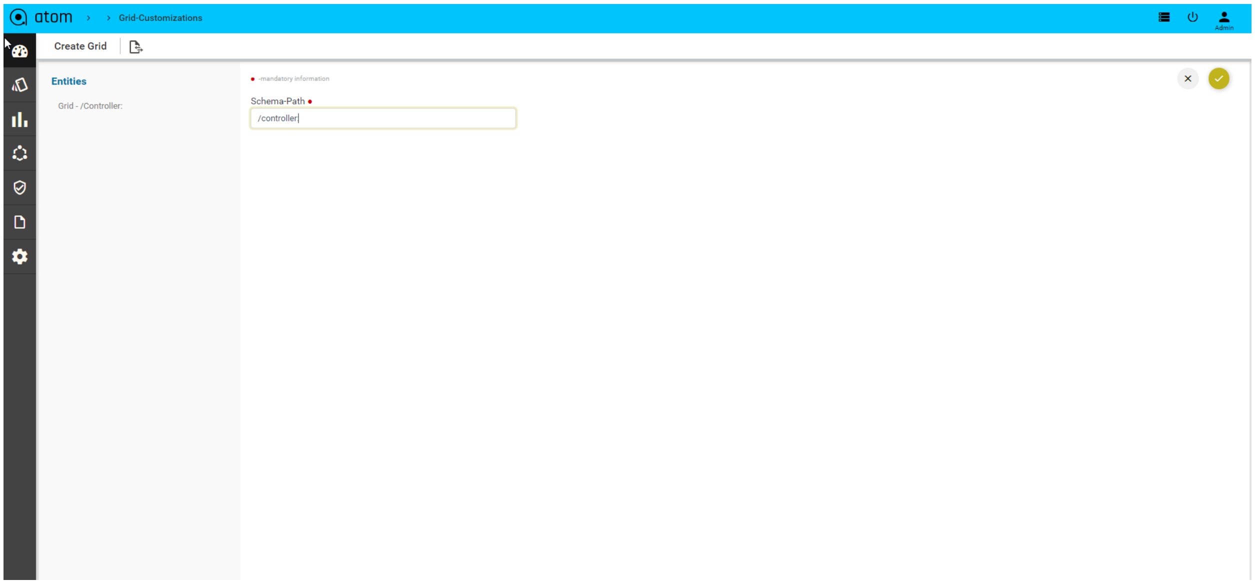
Navigate > Administration > UI customization > Grid column >Add



□	Schema-Path	Owner	Shared-With	Created-On	Created-By	Last-Modified-On	Last-Modified-By
□	/controller:devices/device	system	system.*	2021-05-17 07:18:54.333		2021-05-17 07:18:54.333	


atom
UI Customizations > Grid Columns
40
Admin
Grid-Customizations:grid-Customiz…
1 Of 1
Search

□	Schema-Path	Owner	Shared With	Created-On	Created-By	Last-Modified-On	Last-Modified-By
□	/controller:devices/device	system	system.*	2021-05-17 07:18:54.333		2021-05-17 07:18:54.333	



-mandatory information

Schema-Path ●

/controller

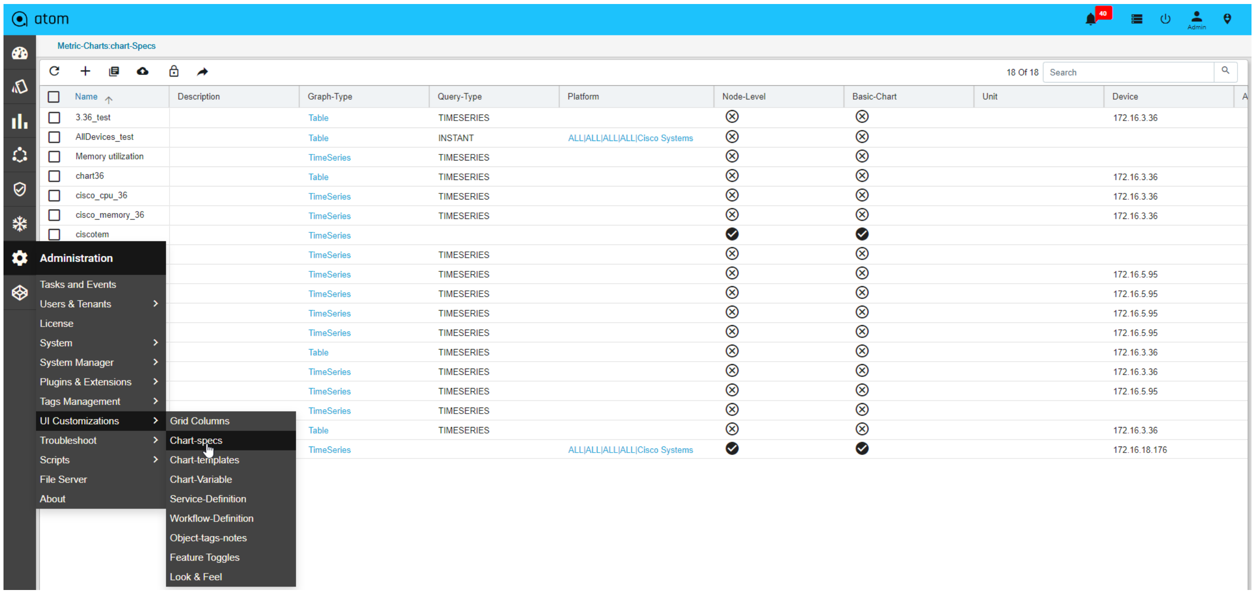
2.**Chart-specs:**

A Chart Spec defines the query to be used, variables used in the query and the intended graph type.For example, a chart spec can be written for a TopNUtilizedInterfaces report.The query would use variables for device and the N.

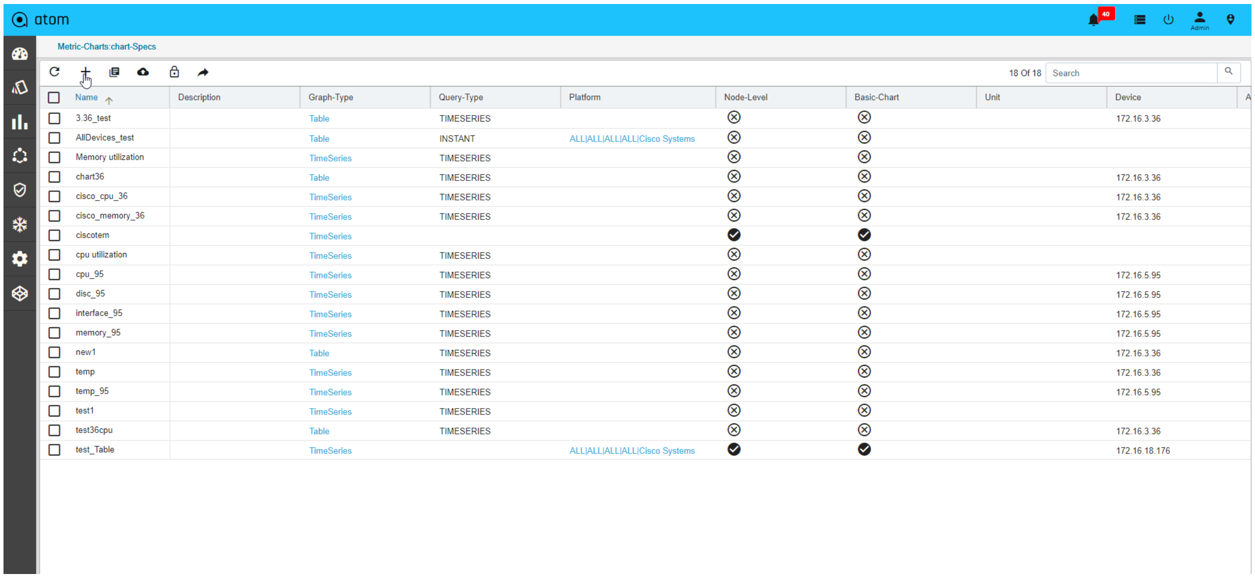
An admin may decide to create two invocations of this chart spec and make them available readily; one for top 5 and one for top 10.Admin can do so by creating 2 chart-invocation payloads and give 25 and 50 for the N value.An end user can run these two different charts out of the box.In addition, end user can tweak the parameter values and explore the graphs.

If a user decides to save the changed chart invocations it is a simple matter of changing the corresponding chart invocation objects.

Navigate > Administration > UI customization > chart -specs >Add



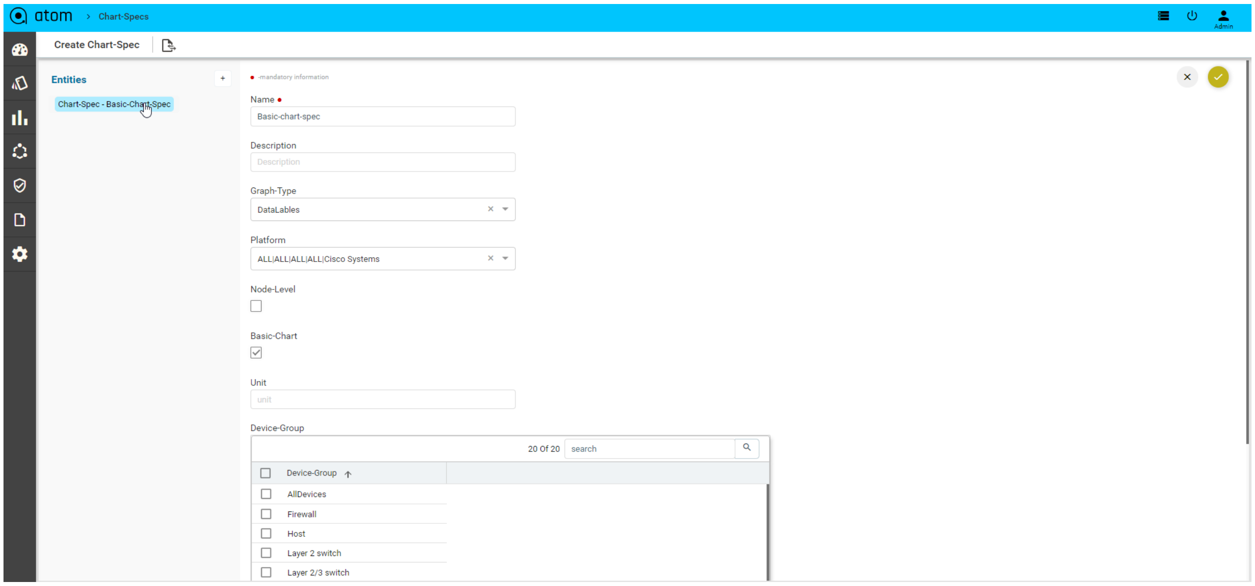
□	Name	Description	Graph-Type	Query-Type	Platform	Node-Level	Basic-Chart	Unit	Device	A
□	3.36_test		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	AllDevices_test		Table	INSTANT	ALL|ALL|ALL|ALL|Cisco Systems	⊗	⊗			
□	Memory utilization		TimeSeries	TIMESERIES		⊗	⊗			
□	chart36		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	cisco_cpu_36		TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
□	cisco_memory_36		TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
□	ciscotem		TimeSeries			✓	✓			
			TimeSeries	TIMESERIES		⊗	⊗			
			TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
			TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
			TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
			TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
			Table	TIMESERIES		⊗	⊗		172.16.3.36	
			TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
			TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
			TimeSeries	TIMESERIES		⊗	⊗			
			Table	TIMESERIES		⊗	⊗		172.16.3.36	
			TimeSeries		ALL|ALL|ALL|ALL|Cisco Systems	✓	✓		172.16.18.176	



Metric-Charts:chart-Specs

18 Of 18 Search

□	Name	Description	Graph-Type	Query-Type	Platform	Node-Level	Basic-Chart	Unit	Device	A
□	3.36_test		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	AllDevices_test		Table	INSTANT	ALL|ALL|ALL|ALL|Cisco Systems	⊗	⊗			
□	Memory utilization		TimeSeries	TIMESERIES		⊗	⊗			
□	chart36		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	cisco_cpu_36		TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
□	cisco_memory_36		TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
□	ciscotem		TimeSeries			✓	✓			
□	cpu utilization		TimeSeries	TIMESERIES		⊗	⊗			
□	cpu_95		TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
□	disc_95		TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
□	interface_95		TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
□	memory_95		TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
□	new1		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	temp		TimeSeries	TIMESERIES		⊗	⊗		172.16.3.36	
□	temp_95		TimeSeries	TIMESERIES		⊗	⊗		172.16.5.95	
□	test1		TimeSeries	TIMESERIES		⊗	⊗			
□	test36cpu		Table	TIMESERIES		⊗	⊗		172.16.3.36	
□	test_Table		TimeSeries		ALL|ALL|ALL|ALL|Cisco Systems	✓	✓		172.16.18.176	



atom › Chart-Specs

Create Chart-Spec

Entities +

Chart-Spec - Basic-Chart-Spec

● -mandatory information

Name ●
Basic-chart-spec

Description
Description

Graph-Type
DataLables

Platform
ALL|ALL|ALL|ALL|Cisco Systems

Node-Level
□

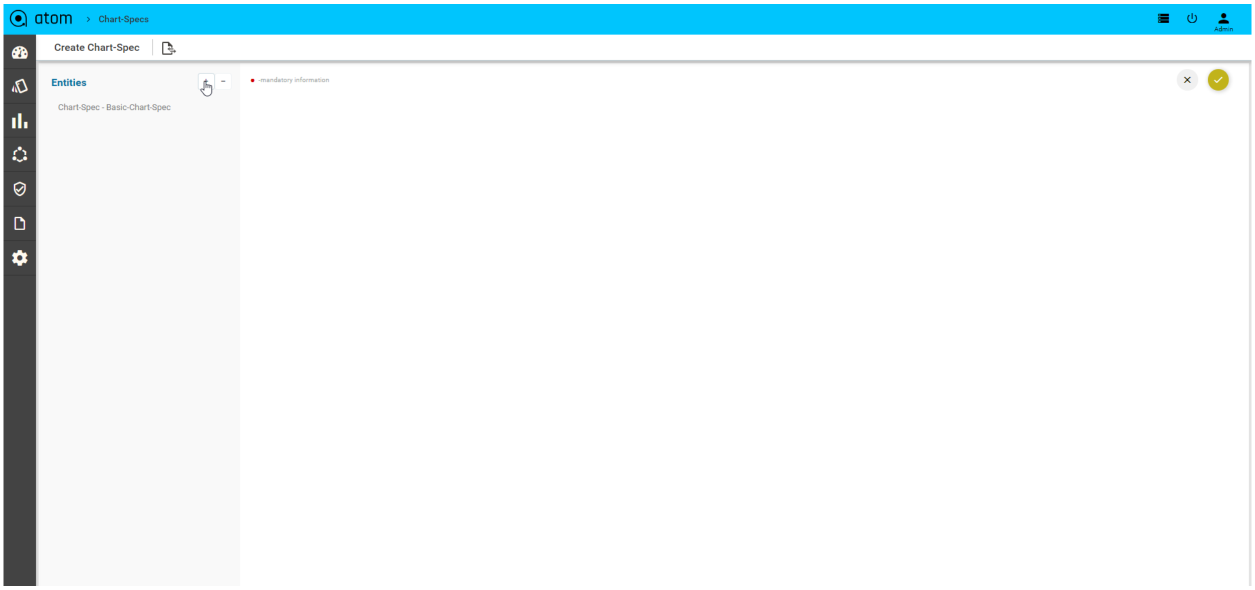
Basic-Chart
☑

Unit
unit

Device-Group

20 Of 20 search

□	Device-Group
□	AllDevices
□	Firewall
□	Host
□	Layer 2 switch
□	Layer 2/3 switch



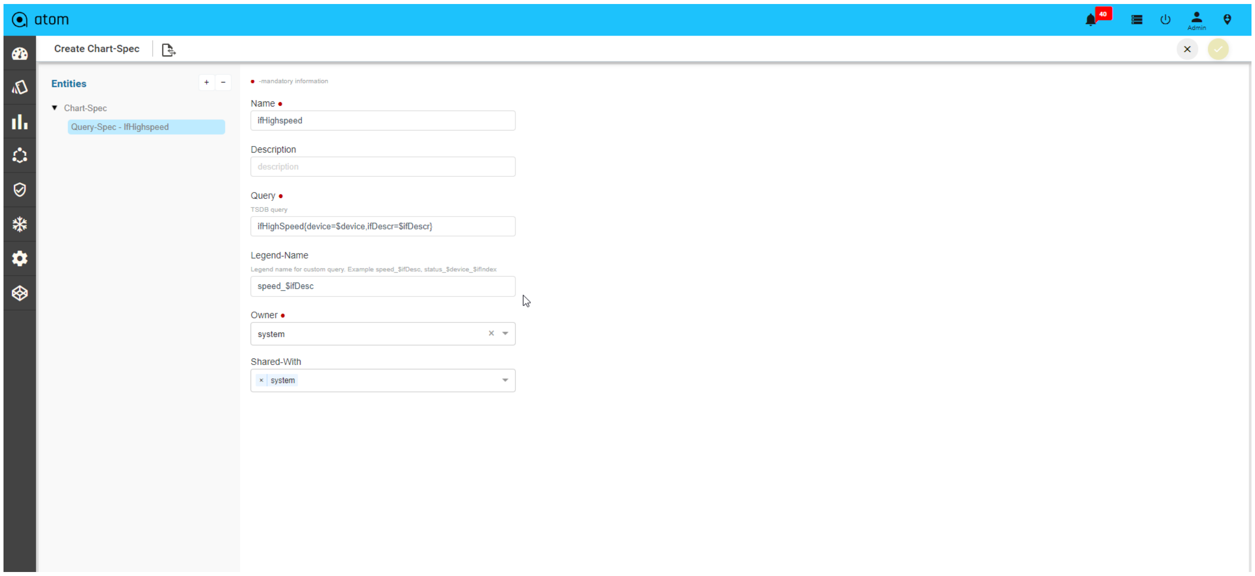
atom › Chart-Specs

Create Chart-Spec

Entities + -

Chart-Spec - Basic-Chart-Spec

● -mandatory information



● -mandatory information

Name ●
ifHighspeed

Description
description

Query ●
TSDB query
ifHighSpeed{device=$device,ifDescr=$ifDescr}

Legend-Name
Legend name for custom query. Example speed_$ifDesc, status_$device_$ifIndex
speed_$ifDesc

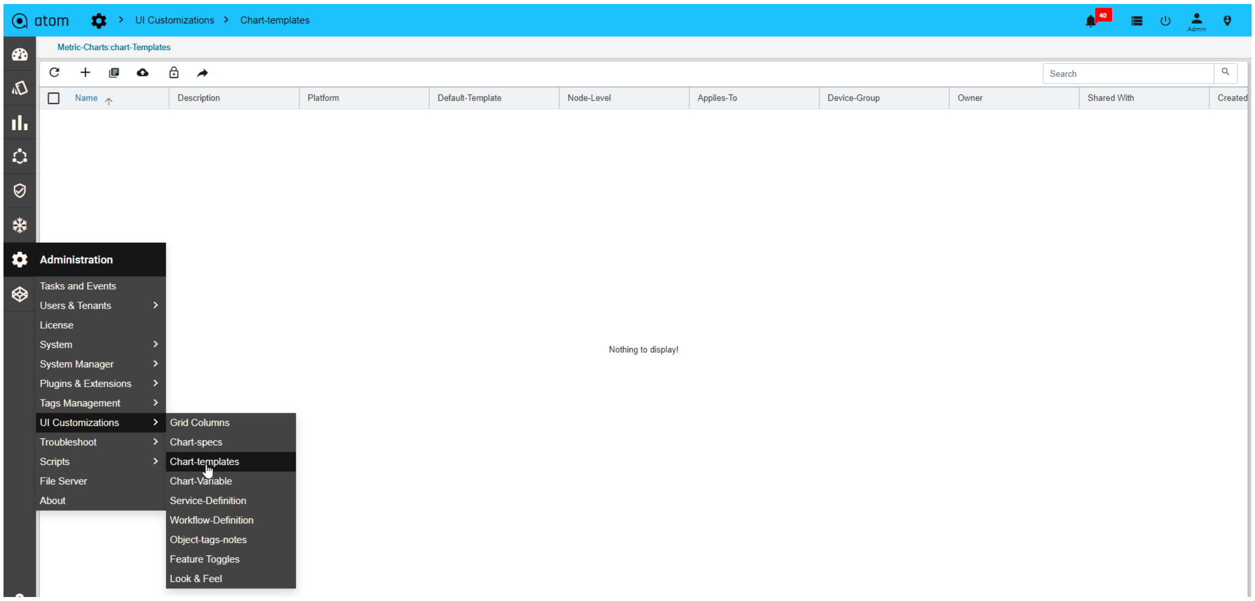
Owner ●
system

Shared-With
× system

3.**Chart-Template:**

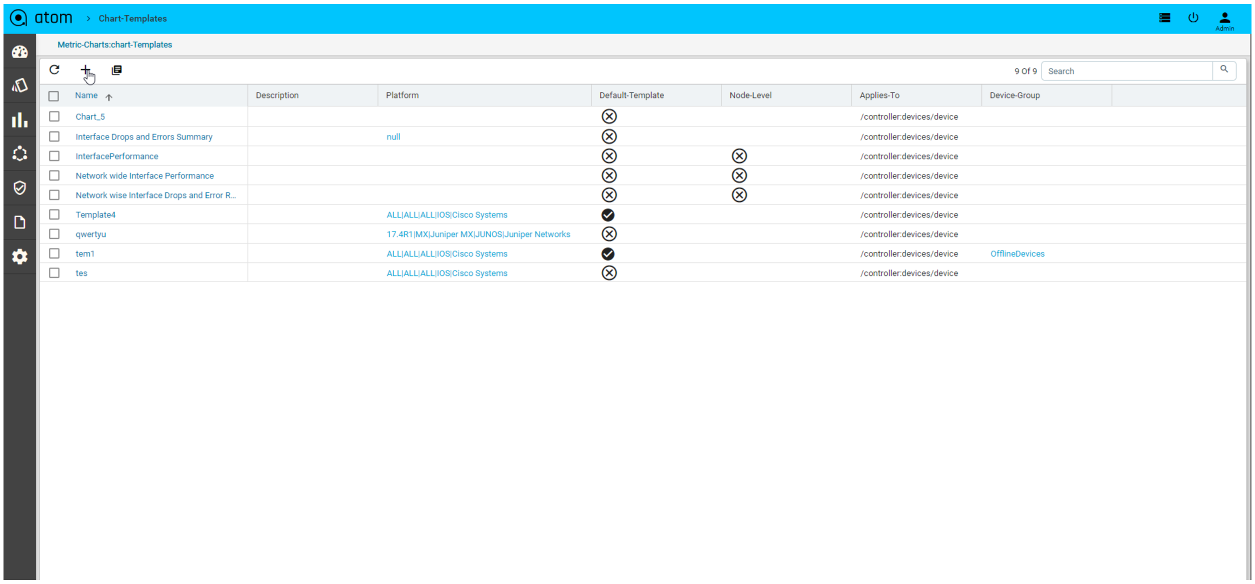
To define the template is a collection of custom charts.create the multiple basic and advanced custom charts can be grouped into one template.it should show the chart graph in monitoring

Navigate > Administration > UI customization > chart -template >Add



☐	Name	Description	Platform	Default-Template	Node-Level	Applies-To	Device-Group	Owner	Shared With	Created

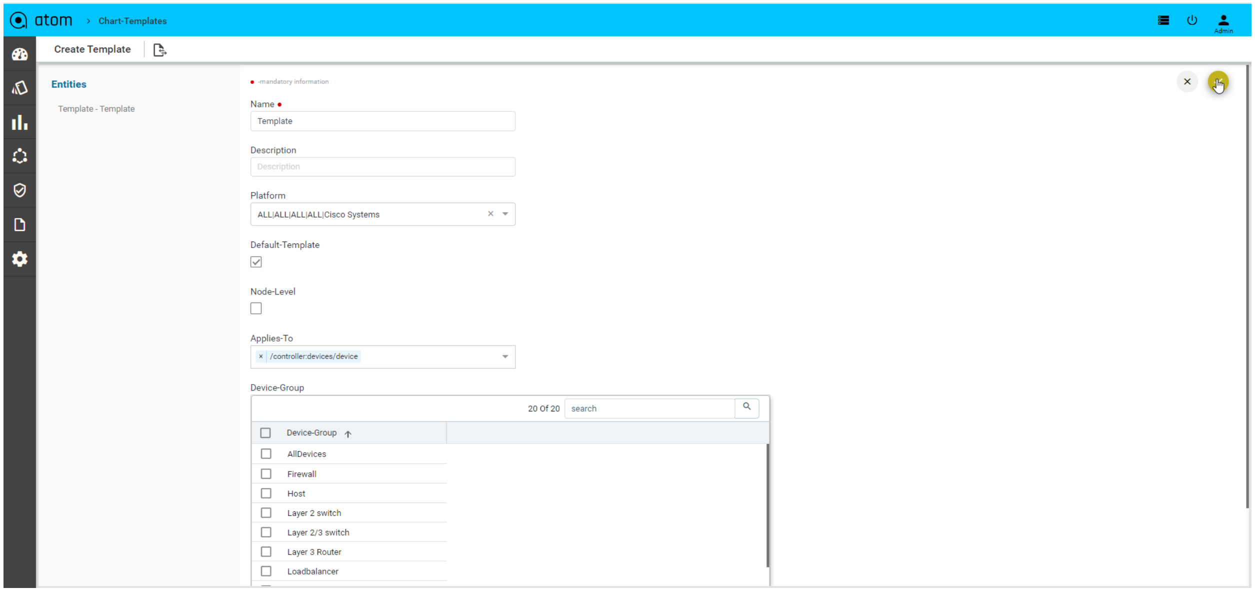
Nothing to display!



Metric-Charts:chart-Templates

9 Of 9 Search

□	Name	Description	Platform	Default-Template	Node-Level	Applies-To	Device-Group
□	Chart_5			☒		/controller:devices/device	
□	Interface Drops and Errors Summary		null	☒		/controller:devices/device	
□	InterfacePerformance			☒	☒	/controller:devices/device	
□	Network wide Interface Performance			☒	☒	/controller:devices/device	
□	Network wise Interface Drops and Error R...			☒	☒	/controller:devices/device	
□	Template4		ALL|ALL|ALL|IOS|Cisco Systems	✓		/controller:devices/device	
□	qwertyu		17.4R1|MX|Juniper MX|JUNOS|Juniper Networks	☒		/controller:devices/device	
□	tem1		ALL|ALL|ALL|IOS|Cisco Systems	✓		/controller:devices/device	OfflineDevices
□	tes		ALL|ALL|ALL|IOS|Cisco Systems	☒		/controller:devices/device	



Entities

Template - Template

● -mandatory information

Name ●
Template

Description
Description

Platform
ALL|ALL|ALL|ALL|Cisco Systems

Default-Template
☑

Node-Level
□

Applies-To
× /controller:devices/device

Device-Group

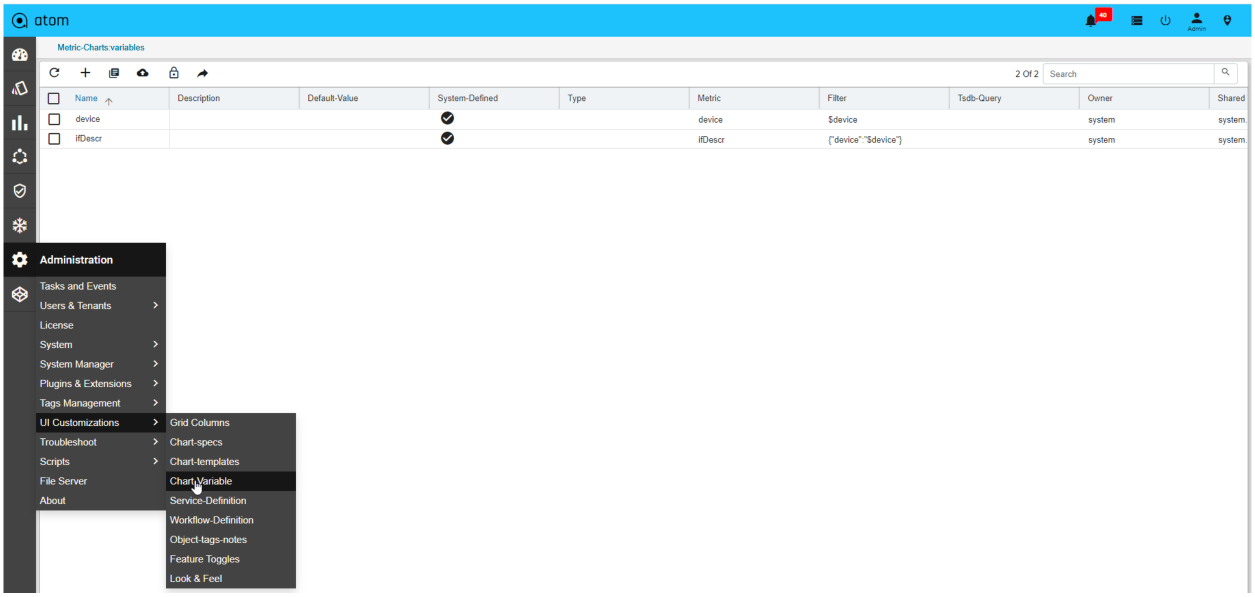
20 Of 20 search

□	Device-Group
□	AllDevices
□	Firewall
□	Host
□	Layer 2 switch
□	Layer 2/3 switch
□	Layer 3 Router
□	Loadbalancer

4.Chart-variables: To define a Variables are useful when the user is writing the queries to build a custom chart.Global variable which can be reusable across multiple charts

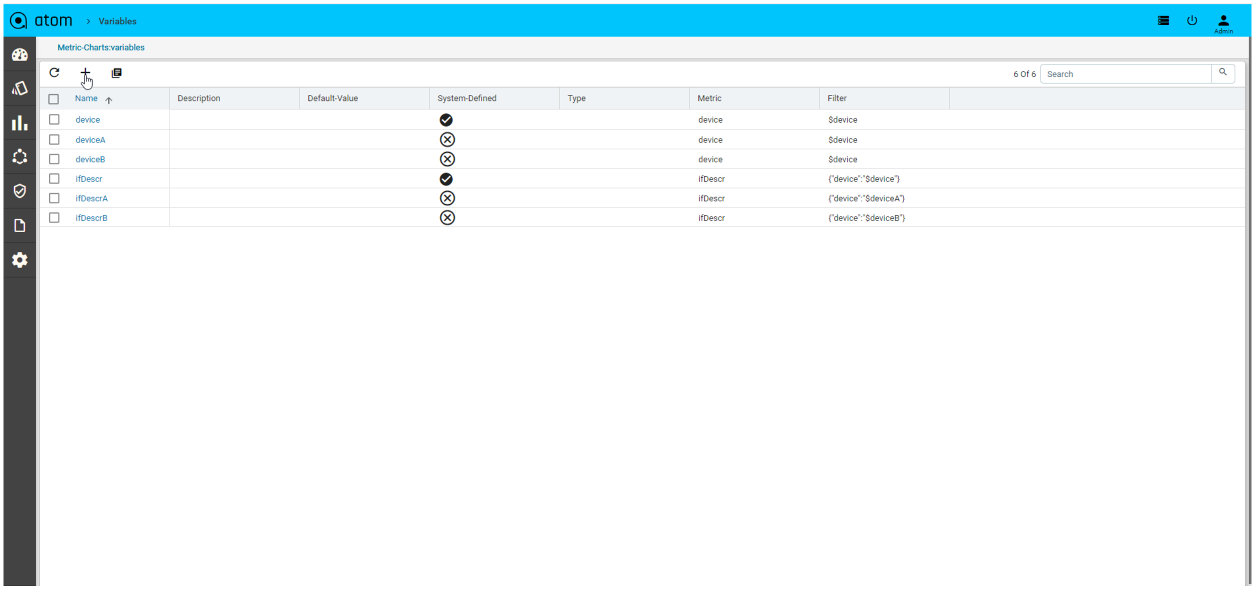
Here Two types of variables are Constant and Query,Query type is useful to fetch a list of entities like devices, interfaces etc.and constant is for any static values like bucket interval etc.

Navigate > Administration > UI customization > chart -variables >Add



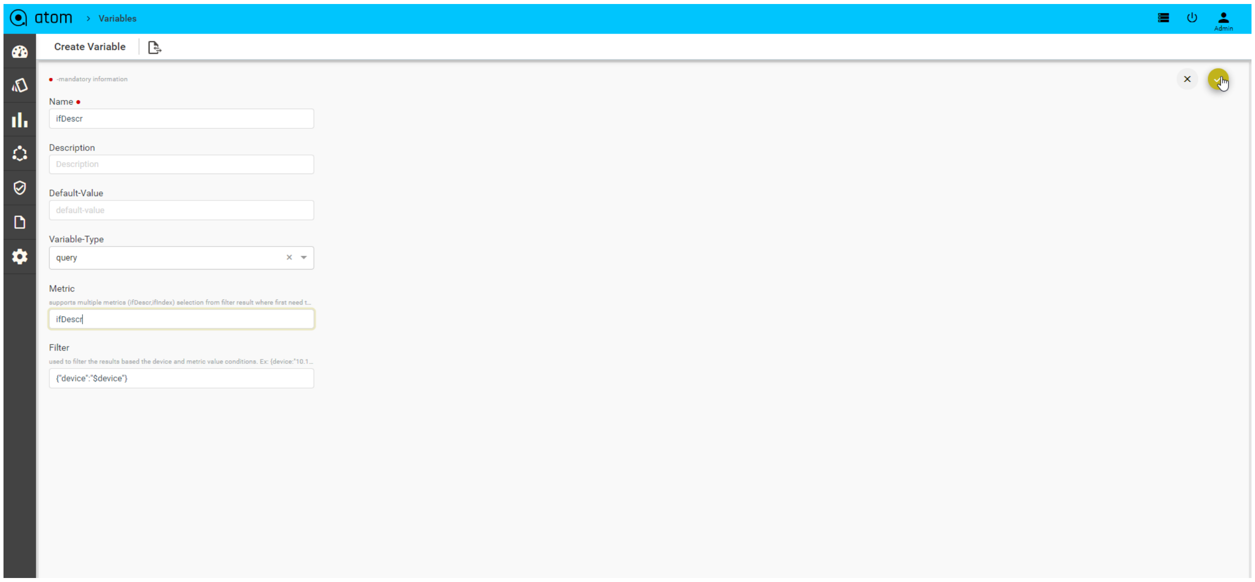
Metric-Charts:variables

□	Name	Description	Default-Value	System-Defined	Type	Metric	Filter	Tsdb-Query	Owner	Shared
□	device			✓		device	$device		system	system.
□	ifDescr			✓		ifDescr	{"device":"$device"}		system	system.



Metric-Charts:variables

□	Name	Description	Default-Value	System-Defined	Type	Metric	Filter
□	device			✓		device	$device
□	deviceA			⊗		device	$device
□	deviceB			⊗		device	$device
□	ifDescr			✓		ifDescr	{"device":"$device"}
□	ifDescrA			⊗		ifDescr	{"device":"$deviceA"}
□	ifDescrB			⊗		ifDescr	{"device":"$deviceB"}



● -mandatory information

Name ●
ifDescr

Description
Description

Default-Value
default-value

Variable-Type
query

Metric
supports multiple metrics (ifDescr,ifIndex) selection from filter result where first need t...
ifDescr

Filter
used to filter the results based the device and metric value conditions. Ex: {device:"10.1...
{"device":"$device"}

Troubleshoot

From the Troubleshoot tab, the system administrator can perform the following tasks:

- "Services & Metrics"
- "Queue Statistics"
- “Device Comm and Inv”

Services & Metrics :

The administrator can view a summary of the health of the server and the associated agents. All the services running on the ATOM server are also displayed here.

1. Go to **Administration** > **Troubleshoot** > **Services and Metrics**
2. In the left pane, click **Servers** > **Components** to view the different categories of the servers running in ATOM.
3. Click **Servers** > **System Health** in the right pane to view the health of the components of the server.

   The health of the associated services is also displayed in the lower pane.
4. Click the **Servers** icon to view the Services in the right pane.
5. Select a service that is running and view the Statistics and Events associated with the service in the bottom panel.

Queue Statistics :

ATOM uses a bus to communicate various events between the different ATOM modules or components, thereby providing a view of the activity of the Naas Bus.

- Broker Statistics
- Naas Bus Monitor Statistics

Each row represents a particular event that ATOM components publish or subscribe to, thereby help in monitoring the Bus.

Device Comm and Inv

Ping

As an administrator, you can check the reachability of a device from ATOM using Ping Test.

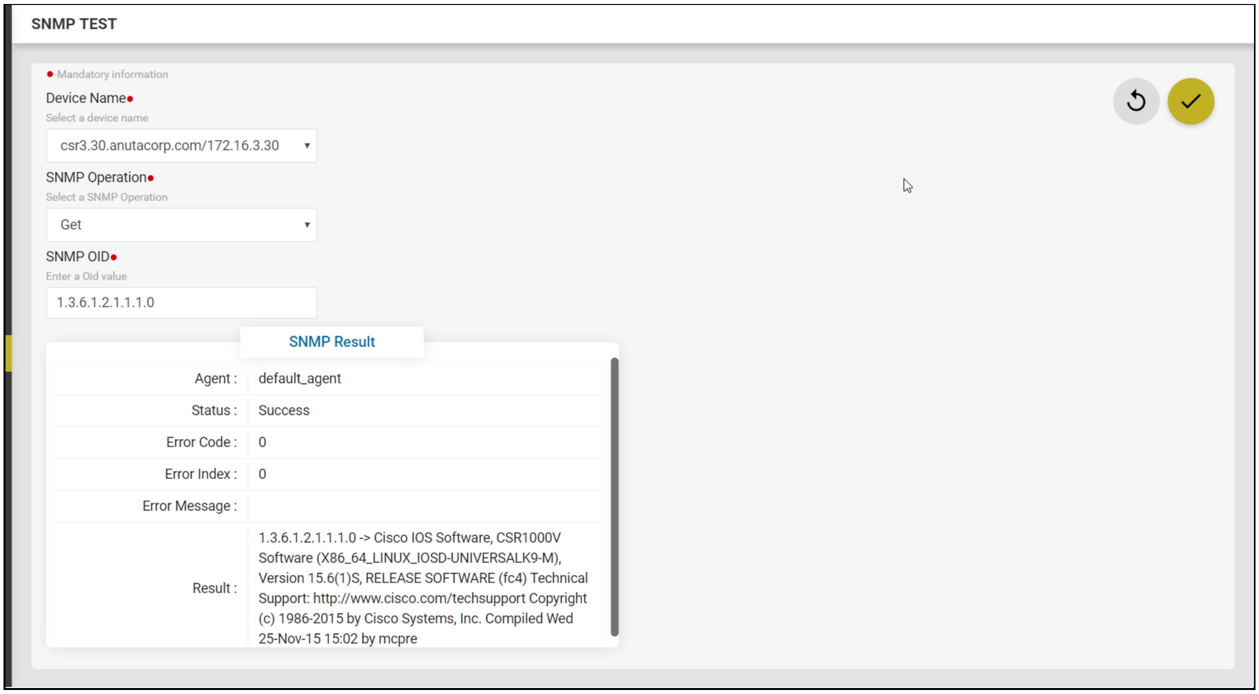
1. Navigate to **Administration** > **Troubleshoot** > **Device Comm & In > Ping Test**
2. To create a **Ping Test**, fill the fields described below:
    - **IP Address**: Enter the IP address of a device that needs to be verified for its reachability.
    - **Packet Count**: Enter the number of ICMP Echo request messages to be sent.
    - **Time Out** (sec): Specify a value for the time for which the ping command should wait for each reply.

SNMP

SNMP Tests You can test if SNMP devices are responding correctly to SNMP queries. By default, SNMP v2c is supported.

1. Navigate to **Administration** > **Troubleshoot** > **Device Comm & In > SNMP**
2. To create an SNMP test, fill the following fields:

- **Device Name**: Enter the name of the device
- **SNMP Operation**: Choose an appropriate SNMP operation from the drop- down menu:
    - GET
    - GET NEXT
    - GET BULK
    - WALK
- **SNMP OID**: Enter the OID of the SNMP device



SNMP TEST

●-Mandatory information

Device Name●
Select a device name
csr3.30.anutacorp.com/172.16.3.30

SNMP Operation●
Select a SNMP Operation
Get

SNMP OID●
Enter a Oid value
1.3.6.1.2.1.1.1.0

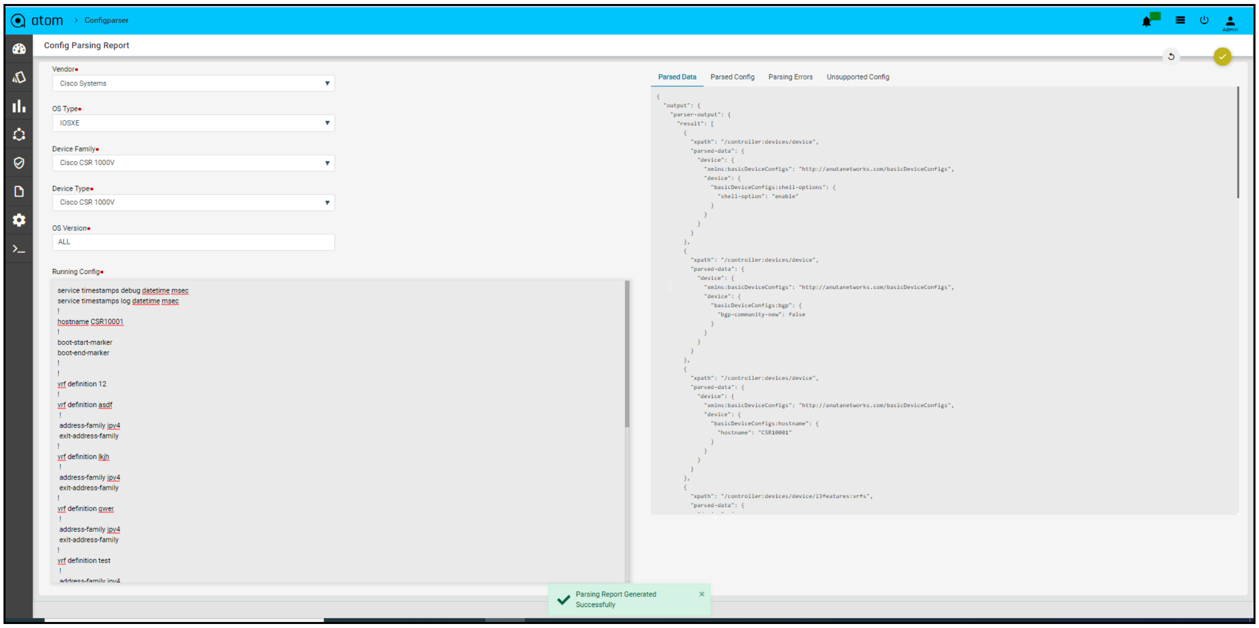
SNMP Result

Agent :	default_agent
Status :	Success
Error Code :	0
Error Index :	0
Error Message :	
Result :	1.3.6.1.2.1.1.1.0 -> Cisco IOS Software, CSR1000V Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 15.6(1)S, RELEASE SOFTWARE (fc4) Technical Support: http://www.cisco.com/techsupport Copyright (c) 1986-2015 by Cisco Systems, Inc. Compiled Wed 25-Nov-15 15:02 by mcpre

Config Parser

This utility helps you check the parsed output of any running configuration of any device. By doing so, you can verify the extent to which ATOM supports the config parsing for a given running configuration. All the parsed configuration can also be visualized in the supported data models in ATOM.

1. Navigate to **Administration** > **Troubleshoot** > **Device Comm & Inv** > **Config Parse**



Config Parsing Report

Vendor●
Cisco Systems

OS Type●
IOSXE

Device Family●
Cisco CSR 1000V

Device Type●
Cisco CSR 1000V

OS Version●
ALL

Running Config●

```
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname CSR10001
!
boot-start-marker
boot-end-marker
!
!
vrf definition 12
!
vrf definition asdf
 !
 address-family ipv4
 exit-address-family
!
vrf definition lkjh
 !
 address-family ipv4
 exit-address-family
!
vrf definition qwer
 !
 address-family ipv4
 exit-address-family
!
vrf definition test
 !
 address-family ipv4
```

```
{
  "output": {
    "parser-output": {
      "result": [
        {
          "xpath": "/controller:devices/device",
          "parsed-data": {
            "device": {
              "xmlns:basicDeviceConfigs": "http://anutanetworks.com/basicDeviceConfigs",
              "device": {
                "basicDeviceConfigs:shell-options": {
                  "shell-option": "enable"
                }
              }
            }
          }
        },
        {
          "xpath": "/controller:devices/device",
          "parsed-data": {
            "device": {
              "xmlns:basicDeviceConfigs": "http://anutanetworks.com/basicDeviceConfigs",
              "device": {
                "basicDeviceConfigs:bgp": {
                  "bgp-community-new": false
                }
              }
            }
          }
        },
        {
          "xpath": "/controller:devices/device",
          "parsed-data": {
            "device": {
              "xmlns:basicDeviceConfigs": "http://anutanetworks.com/basicDeviceConfigs",
              "device": {
                "basicDeviceConfigs:hostname": {
                  "hostname": "CSR10001"
                }
              }
            }
          }
        },
        {
          "xpath": "/controller:devices/device/l3features:vrfs",
          "parsed-data": {
```

Parsing Report Generated Successfully

2. Select the device family details for which the config parsing support needs to be verified in ATOM:

i. **Vendor**: Select the vendor from the supported vendor list in ATOM
ii. **OS Type**: Select the OS type for the device vendor for which the config parsing needs to be checked
iii. **Device Family**: Select the device family that the device belongs to
iv. **Device Type**: Select the type of the device belonging to the selected device family
v. **OS Version:** Select the version of the OS
vi. In the Running Config pane, paste the running configuration of the device for which config parsing needs to be verified
vii. Click **Submit** to generate the Config Parsing Report

The results of the Report can be viewed in the right pane as

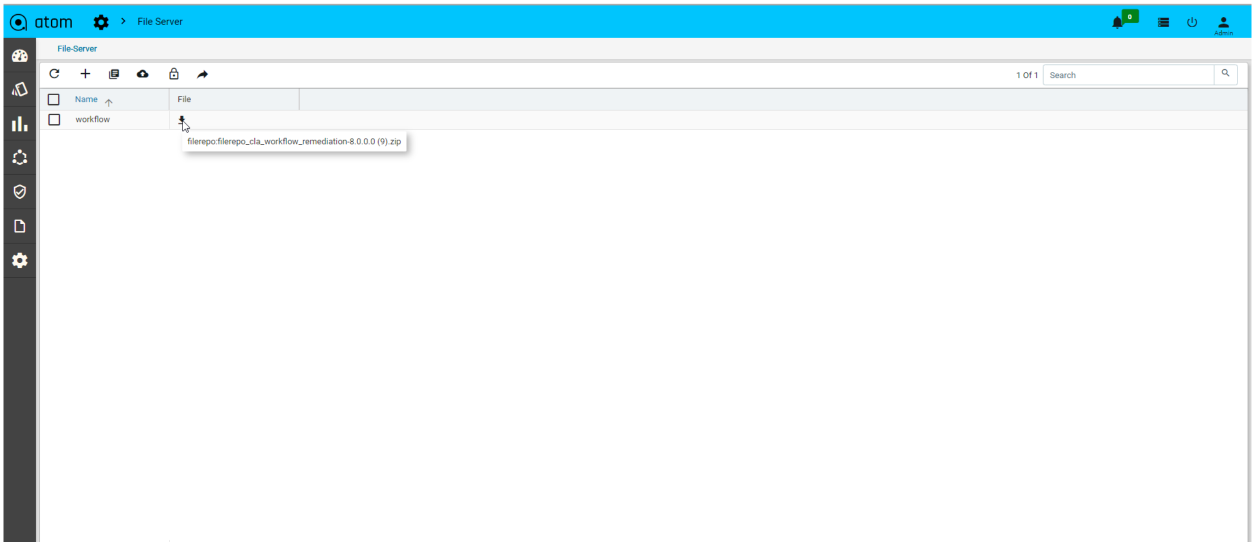
- **Parsed Data**: The configuration, which is parsed in ATOM, for which the data model is available can be viewed in this tab.
- **Parsed Configurations**: The running configuration that is parsed into blocks by ATOM can be viewed in this tab.
- **Parsing Errors**: The parsed configuration derived in ATOM but with errors can be viewed in this tab.
- **UnSupported Configurations**: The running configuration for which there is no parsing support available in ATOM can be viewed in this tab

File Server

File server helps users to upload and can also down the packages related to the services or any workflow if any user wants to save a package in the repository.

Navigate to **Administration** > **File Server** and click on the add button.

Name: Enter a name of the package
Choose File: Upload a package or a file which needs to be saved.

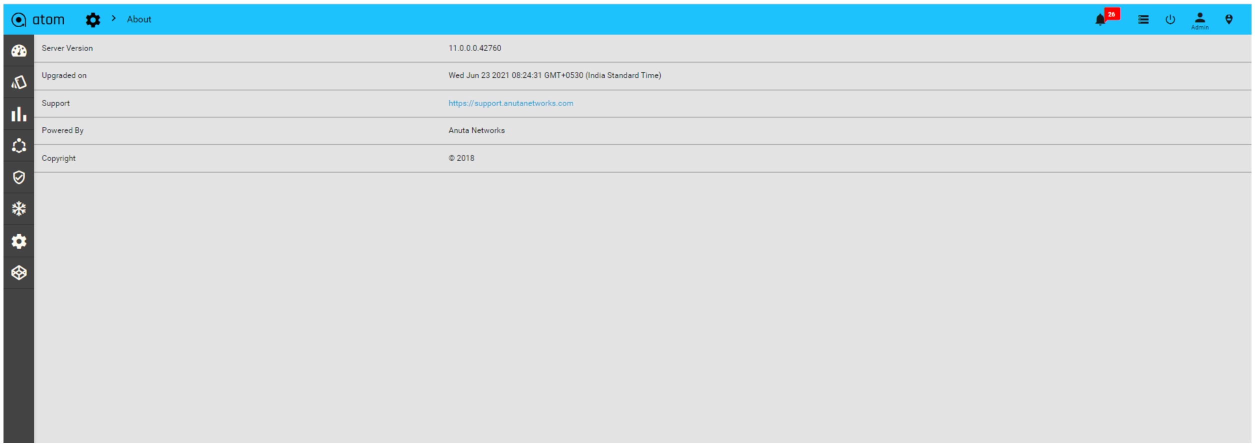


□	Name	File
□	workflow	

filerepo:filerepo_cla_workflow_remediation-8.0.0.0 (9).zip

About

Navigate > Administration > About



Server Version	11.0.0.0.42760
Upgraded on	Wed Jun 23 2021 08:24:31 GMT+0530 (India Standard Time)
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