



# User Guide

FortiAI Ops 3.0.0



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FortiAIOps 3.0.0 User Guide

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## Change log

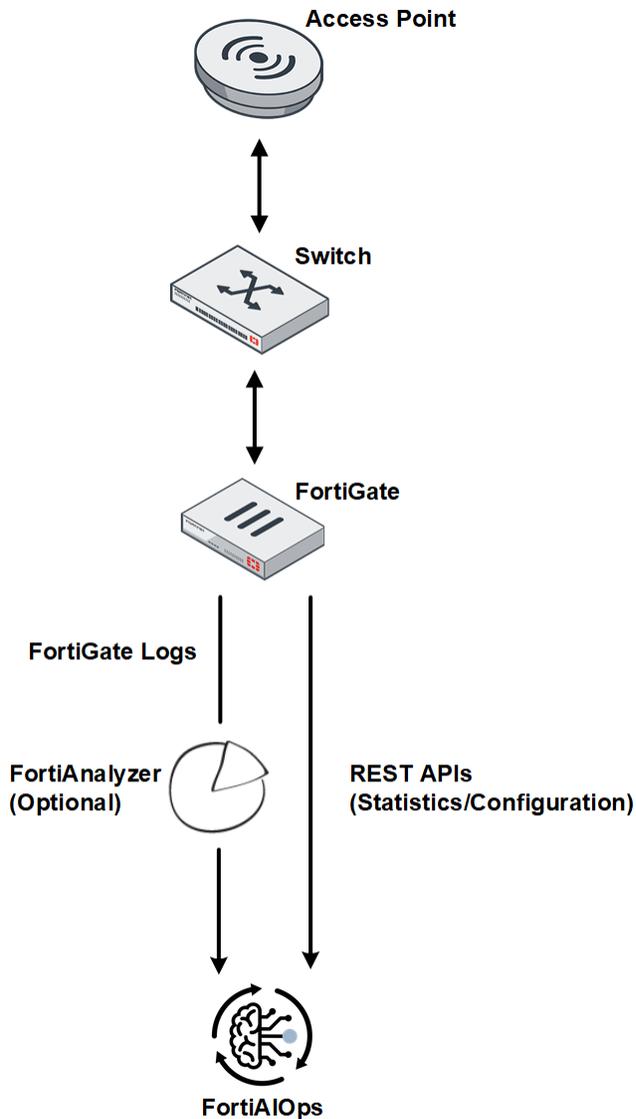
Date	Change description
2025-07-01	FortiAIOps 3.0.0 release document.
2025-07-22	Updated <a href="#">Enable Log Forwarding</a> .
2025-09-05	Updated <a href="#">Licensing</a> .
2025-09-25	Added <a href="#">Increasing VM Disk Space</a> section.
2025-11-12	Editorial fix.
2026-01-19	Updated <a href="#">Backup and Restore</a> .

## Overview

FortiAI Ops enables you to proactively monitor the health of your entire wireless, wired, and SD-WAN network, and provides insights into key health statistics, based on the Artificial Intelligence (AI) and Machine Learning (ML) architecture that it is built upon. FortiAI Ops ingests data for analysis and automated event correlation to precisely detect anomalies that impact the clients' network experience. It learns from numerous sources such as FortiGates, FortiAPs, FortiSwitches, and FortiExtenders to report statistics on a series of comprehensive and simple dashboards, providing visibility and deep insight into your network. This predictable network infrastructure enables you to swiftly identify the root cause with the highest probability of association to actual issues, and its resolution.

FortiAI Ops is based upon a deployment-specific and adaptive learning AI/ML model, that automatically adjusts whenever there are changes in the Radio Frequency (RF) environment. This is an enhancement from the static AI/ML model of the previous releases. The system runs a weekly (on each Saturday) analysis, to detect any RF changes based on the past week's collected data, and assess if accuracy improvements are possible. If improvements are identified, the AI/ML model is updated to better align with your RF environment. All AI/ML model changes are notified via a local log event message.

FortiAI Ops monitors integrated wireless, wired, and SD-WAN networks by supporting the monitoring of FortiGate controllers. You can monitor and manage FortiGate controllers concurrently associated with FortiAPs and stations in a large deployments. The centralized real-time data and event logs offered by FortiAI Ops, aim at diagnosing and troubleshooting network issues by analyzing potential problems and suggesting remedial steps.



The FortiAI Ops application provides the following advantages.

- Maximizes the uptime of your organization's network infrastructure.
- Reduces the time taken to diagnose network issues, thereby the mean response time.
- Increases the productivity of network users and that of your organization.

FortiAI Ops calculates the SLA thresholds/baselines *dynamically* using the AI-ML architecture, to enable you to diagnose network issues based on accurate and latest data trends. The algorithms identify the values for each environment by clustering clients based on the connection quality using specific parameters. The thresholds are then derived based on the calculated average of the client connection data, to report variations in your network. These AI driven algorithms are designed to learn new data regularly for changes in client activity, calculate thresholds, and report statistics. You can also provide *static* threshold values for some SLAs, to report network issues. You can view the impacted SLA data in the dashboards.

- [Wireless](#)
- [Switching](#)
- [WAN](#)

## Wireless

The following SLAs are monitored for wireless clients.

- [Throughput](#)
- [Coverage](#)
- [Roaming](#)
- [Time to Connect](#)
- [Connection Failure](#)
- [AP Health and Uptime](#)
- [WIDS](#)

### Throughput

This SLA monitors your wireless network at the system and client level, to identify potential low throughput conditions and categorize them based on the underlying issue type, into different classifiers and sub-classifiers. Low throughput is determined based on specific network health parameters, such as, noise, retries, discards, channel utilization etc. and client health parameters, such as, MCS index, data rate.

### Coverage

Network coverage issues are monitored by detecting the coverage holes and overlapping FortiAPs (crowded FortiAPs). These conditions in a network are determined by evaluating client's RSSI (low signal strength) and presence of multiple neighbouring FortiAPs.

### Roaming

Wireless clients roam from one AP to another in a multi-AP deployment area swiftly and frequently. Associating with different AP requires a process of re-authentication that can take some time to complete, impeding data connectivity especially for time sensitive applications. The *Roaming* SLA identifies such slow roaming connections, determines the causes for it and suggests suitable remedy for facilitating faster client roaming.

### Time to Connect

This SLA computes the time taken by clients to connect to the network. FortiAIOPS reports those clients that take longer than certain thresholds to connect to the network. These thresholds are statically configured or FortiAIOPS computes them dynamically using machine learning algorithms. The algorithms compute specific thresholds for the AP-client environment and for different connectivity phases such as association, authentication (4-way handshake) and DHCP.

### Connection Failure

This SLA determines the failed/unsuccessful client connections based on different stages of connection to a network. For example, association failures due to low RSSI, authentication failures due to unreachable RADIUS server, DHCP failure due to a DHCP server process crash, or DNS failure due to an invalid DNS domain.

### AP Health and Uptime

This SLA determines the health of the FortiAPs based on the configured CPU, memory, temperature thresholds, and events such as FortiAP reboot, FortiSwitch port down, FortiGate, and so on. FortiAIOPS

displays relevant SLAs under different sections on the monitor dashboard.

## WIDS

The WIDS SLA monitors and reports on potential Wireless Intrusion Detection System (WIDS) attempts on your network. It detects security threats and recommends corrective actions to maintain network integrity, boosting security with real-time alerts and actionable insights for faster threat resolution.

## Switching

The switching SLAs monitor the switch health and connection status.

- [Throughput](#)
- [Network](#)
- [Switch Health and Uptime](#)
- [Switch Connection Failure](#)

### Throughput

The **Throughput** SLA monitors your wired network at the system and client level, to identify potential low throughput conditions and categorizes them based on the underlying issue type, into different classifiers and sub-classifiers. Low throughput is reported based on traffic congestion due to high inbound/outbound traffic, storm conditions, low wired bandwidth conditions leading to network slowdowns, packet drops, and increased latency.

### Network

The **Network** SLA monitors the deployed FortiSwitches to predict any potential network disruptions that may lead to poor connectivity. FortiAIOps detects such issues based on monitoring broadcast and multicast storms, possible IP address exhaustion in the DHCP server, or MLAG issues such as hardware mismatch or peer communication glitches.

### Switch Health and Uptime

The **Switch Health and Uptime** SLA determines the health of the switches based on the configured thresholds (CPU, memory, temperature) and events such as uplink and power budget issues, port flapping, *port down*, *switch down*, and so on. FortiAIOps displays relevant SLAs under different sections on the **AI Insight** dashboard and the **Impacted SLA** and **Impacted Devices** pages.

### Switch Connection Failure

The **Switch Connection Failure** SLA determines the failed/unsuccessful client connections based on authentication events such as MAC authentication and 802.1x authentication, MAC learning limit, and blocked DHCP clients.

## WAN

WAN is a software-defined approach for managing Wide-Area Networks (WAN). It allows you to offload internet bound traffic, that is, private WAN services remain available for real-time and mission critical applications. This

added flexibility improves traffic flow and reduces pressure on the network. WAN has member interfaces and ports that are used to run traffic.

- [Performance](#)
- [FortiExtender Health](#)
- [Interface Health](#)

### **Performance**

FortiAIOps continuously monitors network performance using Performance SLA, tracking key metrics like latency, jitter, and packet loss. This helps assess link quality, detect configuration issues, and identify SD-WAN failures, reporting SLA breaches when forecast thresholds are exceeded. By leveraging real-time and historical data from FortiGate health checks, FortiAIOps forecasts future network performance for proactive optimization. It also monitors tunnel status to pinpoint overlay network misconfiguration that could impact performance and connectivity.

### **FortiExtender Health**

FortiExtender integrates with FortiGate and SD-WAN to extend the network reach and resilience within the Fortinet Security Fabric. It provides continuous connectivity by acting as SD-WAN extension for FortiGate, ensuring failover if the primary link fails. FortiExtender also enables network access for remote sites beyond fixed broadband and facilitates load balancing with the primary SD-WAN link.

The FortiExtender Health SLA monitors and reports the FortiExtender's health metrics, including CPU, Memory, Temperature, and Carrier Failure.

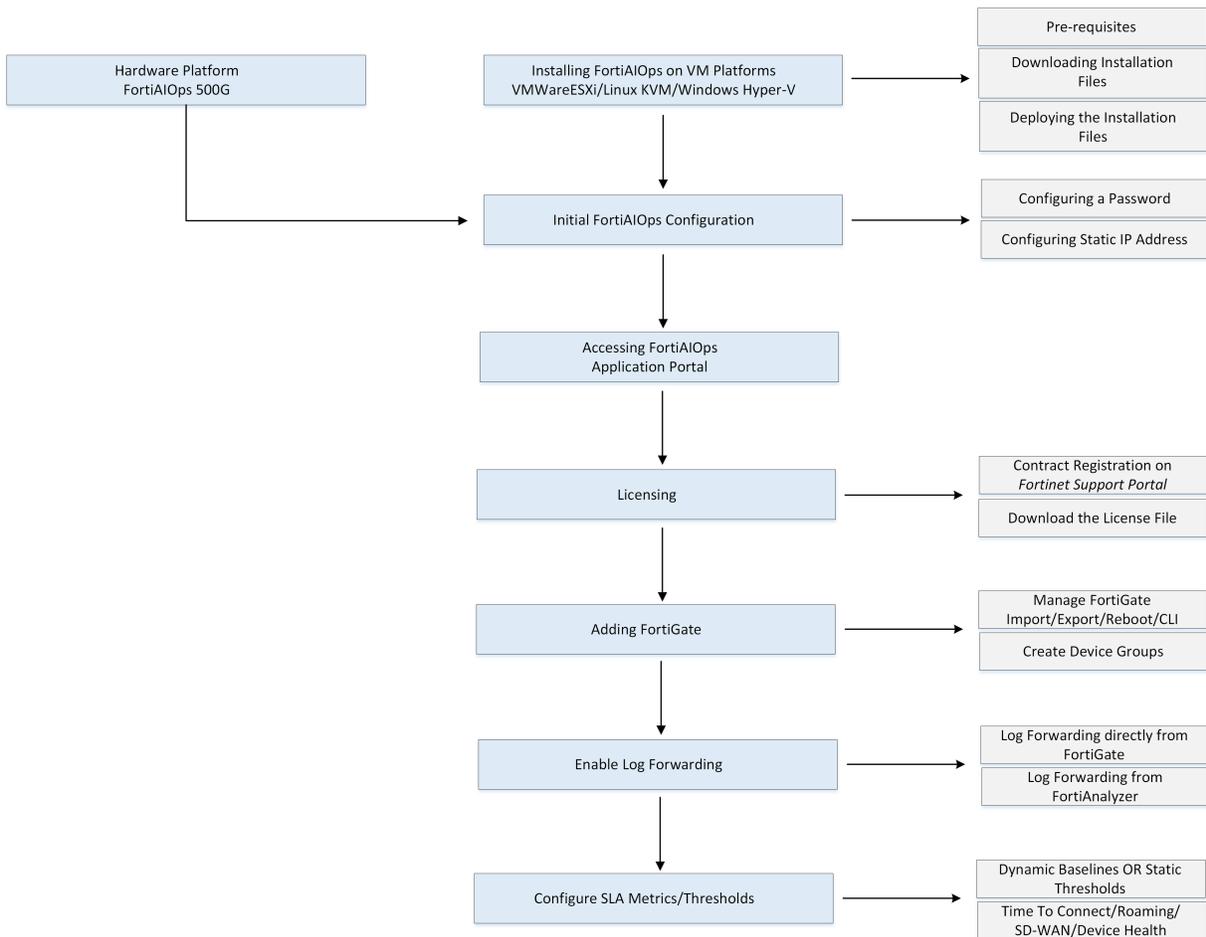
**Note:** FortiAIOps monitors only the FortiExtender devices managed by FortiGate.

### **Interface Health**

Interface Health SLA in FortiAIOps monitors the stability of both underlay and overlay network links, detecting status changes and interface flaps to ensure consistent performance. It also evaluates SD-WAN interface selection strategies to identify the most efficient traffic paths, ensuring seamless connectivity and optimizing SD-WAN configurations for maximum performance and reliability.

# Getting Started

This section is a tutorial to get you started with installing, setting up, and using the FortiAI Ops application to monitor your networks.



The steps depicted in this graphic are described in the following sections.

- [Installing FortiAI Ops](#)
- [Initial FortiAI Ops Configuration](#)
- [Accessing FortiAI Ops](#)
- [Licensing](#)
- [Adding FortiGate](#)
- [Enable Log Forwarding](#)
- [SLA Config](#)
- [Monitoring](#)
- [API Reference](#)
- [System Diagnostics](#)

## Installing FortiAIOps

You can deploy FortiAIOps on supported VM, public cloud, and hardware platforms. Refer to the following sections for detailed instructions on deployment procedures.

- **VM Platforms** - [Deploying FortiAIOps on VM Platforms](#)
- **Public Cloud Platforms** - [Deploying FortiAIOps on Public Cloud Platforms](#)
- **Hardware Platforms** - [Deploying FortiAIOps on Hardware Platforms](#)

**Note:** The FortiAIOps CLI and GUI users are different.

## Initial FortiAIOps Configuration

After FortiAIOps is successfully installed, login as an administrator with the default username (**admin**). A password is not required. For more information on the commands, see [Command Line Interface \(CLI\) Reference](#).

- [Configuring a Password](#)
- [Configuring the IP Address](#)
- [NTP/Timezone and DNS Configurations](#)
- [Viewing the Configuration](#)

### Configuring a Password

Login into the CLI with the username `admin`, a password is not required. However, after you login, you are prompted to change the password.

```
Poky (Yocto Project Reference Distro) 4.0.12 FAOESX -
FAOESX login: admin
Password:
You are forced to change your password, please input a new password.
New Password: _
```

### Configuring the IP Address

The DHCP IP address is assigned by default. Run the `get system interface` command to view the IP address. Run the `config system interface` command to configure a static IP address.

```
fortiaios # config system interface
fortiaios (interface) # edit port1
fortiaios (port1) # set mode static
fortiaios (port1) # set ip 10.34.159.xxx/xx
fortiaios (port1) # end
```

You are required to configure the gateway IP address when using a static IP address. Run the `config router static` command.

```
fortiaios # config router static
fortiaios (static) # edit 1
fortiaios (1) # set gateway 10.34.159.xx
fortiaios (1) # set device port1
fortiaios (1) # end
```

### NTP/Timezone and DNS Configurations

Fortinet recommends that you configure the NTP settings and DNS server. Run the following commands.

- `config system ntp`
- `config system global [set timezone]`
- `config system dns`

You can also configure the IP address, DNS, NTP, and the timezone via the GUI. See [Settings](#).

### Viewing the Configuration

Run the `show full-configuration` command to view all changes.

For detailed information on these configurations, see [Post-installation Tasks](#)

## Licensing

FortiAIops offers Monitoring, AI Insights, and SD-WAN subscriptions, with licensing based on the type of devices you use. For more information, see [FortiAIops Data Sheet](#).

Perform the following steps to obtain the license for FortiAIops on VM platforms or public cloud platforms.

1. **Copy System ID information:** Navigate to **Dashboard > Summary** and copy the System ID.
2. **Contract Registration:** Login to <https://support.fortinet.com> using your account credentials to register the contract received over email for the product SKU purchased. Paste the copied system id during the registration process to generate the license file.
3. **Download License file:** Once the registration is complete, validate the entitlement details and download the license file if generated successfully. Upload this file in **System > FortiGuard > Upload License File**.



For FortiAIops 500G, manual license upload is not required. FortiAIops automatically synchronizes the license from *Fortinet Support*.

To initiate an immediate license and definition update, navigate to **System > FortiGuard** and click the **Update License and Definitions Now**.

---

#### Note:

- Fortinet recommends that all network elements are fully licensed.
- To enable monitoring and management of SD-WAN network, an SD-WAN license must be applied separately.

If the network elements are partially licensed, related statistics are not reported in FortiAIops. For example, a FortiAP is licensed and the connected FortiSwitch is not licensed; a FortiAP down event is triggered due to FortiSwitch port down/FortiSwitch reboot. In this case, the FortiAP down event is reported in FortiAIops but the

FortiSwitch port issues or reboot is not reported in FortiAIOps (as the FortiSwitch is not licensed). For more information, see [Licensing](#).

Ensure that the FortiAIOps NTP settings and your time zone are synchronized.

## Adding FortiGate

In the FortiAIOps application portal, manually add the FortiGate controller. Navigate to **Inventory > Managed FortiGates > Add** and provide the required configuration details. Standalone and HA FortiGate controllers can be added. Optionally, you can add FortiGates in bulk using the import operation. For detailed information on adding and managing FortiGate controllers, see [Adding and Managing FortiGates](#).

You can group FortiGate controllers into **Device Groups** for ease of management. Each controller can belong to only one group; if a controller is added to a second group, it is automatically removed from the previous group. For detailed information on creating device groups, see [Device Groups](#).

## Enable Log Forwarding

FortiGate logs must be forwarded to FortiAIOps for seamless identification of issues and populating proper data.

FortiAIOps supports direct FortiGate log forwarding and FortiAnalyzer log forwarding. You can enable log forwarding from FortiGate or FortiAnalyser based on the log storage used.

- [Forwarding Logs from FortiGate](#)
- [Forwarding Logs from FortiAnalyzer](#)

### Forwarding Logs from FortiGate

To configure direct FortiGate log forwarding to FortiAIOps on the FortiGate GUI:

1. Navigate **Log & Report > Log Settings** and select the **Global Settings**.

The screenshot shows the 'Global Settings' tab of the 'Log Settings' configuration page. The page is divided into two main sections: 'Log Settings' and 'GUI Preferences'.

**Log Settings:**

- Event logging:** A dropdown menu is set to 'All', with a 'Customize' button next to it.
- Local traffic logging:** A dropdown menu is set to 'All', with a 'Customize' button next to it.
- Log allowed traffic:** A toggle switch is currently turned off.
- Log denied unicast traffic:** A toggle switch is currently turned off.
- Log denied broadcast traffic:** A toggle switch is currently turned off.
- Log local out traffic:** A toggle switch is currently turned on.
- Syslog logging:** A dropdown menu is set to 'Enable', with a 'Disable' button next to it.
- IP address/FQDN:** A text input field contains the IP address '10.34.207.25'.

**GUI Preferences:**

- Resolve hostnames:** A toggle switch is currently turned on.
- Resolve unknown applications:** A toggle switch is currently turned on.

2. Enter the IP address/FQDN with the FortiAIOps IP address.
3. Click **Apply**.

To configure direct FortiGate log forwarding to FortiAIOps from FortiGate CLI, use the following commands:

```
config log syslogd setting
set status enable
set server 10.34.xxx.xxx
end
```

For more information, see [FortiGate Administration Guide](#).

## Forwarding Logs from FortiAnalyzer

For FortiGates using FortiAnalyzer as the log storage, log forwarding to FortiAIOps can be enabled directly from the FortiAnalyzer.

To configure FortiAnalyzer to forward FortiGate logs to FortiAIOps, you must first configure FortiGate remote logging to FortiAnalyzer and then forward logs from FortiAnalyzer to FortiAIOps.

1. On the FortiGate GUI, navigate to **Fabric Connectors > Logging & Analytics > Logging Settings > FortiAnalyzer** and specify the FortiAnalyzer IP address.

Logging Settings

FortiAnalyzer Cloud Logging

Status  Enabled  Disabled

Server

Connection status  Connected

Upload option  Real Time  Every Minute  Every 5 Minutes

Allow access to FortiGate REST API

Verify FortiAnalyzer certificate  FAZ-XXXXXXXXXX31

2. On the FortiAnalyzer GUI, navigate to **System Settings > Advanced > Log Forwarding > Settings**.
3. Click **Create New** to create new log forwarding.
4. Specify the FortiAIOps IP address and select the FortiGate controller in **Device Filters**.

Create New Log Forwarding

Name \*

Status

Remote Server Type

Server FQDN/IP \*

Server Port

Reliable Connection

Device Filters ⓘ

Operator	ADOM	Device	Action
<input type="text" value="Include"/>	<input type="text" value="root"/>	<input type="text" value="FGXXXXXXXXXX06..."/>	<input type="button" value="x"/> <input type="button" value="+"/>

Log Filters

Enable Exclusions

Enable Masking

**Note:**

- The syslog port is the default UDP port 514.
- Enable **Log Filters** to choose either **Traffic** or **Event**; the remaining options are not used.

## Monitoring

After the FortiAIOps setup and configurations are complete, you can view different aspects of your network in the following panels of the FortiAIOps application portal.

GUI Panels	Description
<b>Dashboard</b>	The dashboard provides a graphical overview of network elements, resource usage, and AI insights.
<b>AI Insights</b>	You can configure SLA metrics and the required thresholds, and monitor the AI enabled data insights of your network and the impacted SLAs and devices.
<b>Inventory</b>	You can add FortiGate controllers and configure management operations.
<b>Wireless</b>	The wireless section provides comprehensive data and statistics to monitor wireless networks.
<b>Switch</b>	The switch section provides comprehensive data and statistics to monitor FortiSwitches and FortiSwitch clients.
<b>SD-WAN</b>	The SD-WAN section provides comprehensive insights and forecasts on monitored SD-WAN interfaces and their associated health checks.
<b>Security Fabric</b>	The security fabric page represents the topology, that illustrates the logical placement of the wireless service and the physical placement of hardware devices.
<b>Logs and Reports</b>	The Logs section offers both detailed event logs and local logs. Logs for specific event types like WiFi Events, FortiSwitch Events, and SD-WAN Events are available. You can also generate comprehensive FortiAI Ops reports here.
<b>System</b>	The system section includes several pages that offer valuable insights into various aspects of system management, such as users, user groups, backup and restore, settings, licensing, location services, and certificates.
<b>SAM</b>	The service assurance section provides an overview of the diagnostic and trouble-prevention capability of FortiAI Ops.

## System Diagnostics

Access the FortiAI Ops GUI and in top-right, click  to download the diagnostics to aid in troubleshooting, comprising of system, application, and FortiAI Ops related logs. You can create the diagnostics file and download it as required.

Diagnostics ✕

Choose content for diagnostics

- System Diagnostics
- Application Diagnostics
- FortiAIOps Logs

[Create File](#) [Download Latest File](#)

## API Reference

FortiAIOps is Swagger compliant providing well documented APIs and improving their accessibility. You can access API documentation using the URL, <https://<FortiAIOps IP address>/swagger>.

# Deploying FortiAI Ops on VM Platforms

Deploying FortiAI Ops is a simple process that involves downloading the installation files, performing the installation, and completing post-installation steps. Here is an overview of the deployment process:

1. Ensure that the [prerequisites](#) are met before performing the installation.
2. Download installation files from the [Fortinet Support](#) portal.
3. Perform the installation.
  - [Installing FortiAI Ops on VMware ESXi](#)
  - [Installing FortiAI Ops on Hyper-V](#)
  - [Installing FortiAI Ops on KVM](#)
  - [Installing FortiAI Ops on Nutanix](#)
  - [Installing FortiAI Ops on Proxmox on page 36](#)
4. Complete the [post-installation](#) tasks.

## Pre-installation Requirements

Ensure that the following requirements are met before proceeding with the installation.

### Supported Environments

Supported environments include:

- *VMware ESXi* - 7.0.3 and above
- *Microsoft Hyper-V*
- *KVM* - Ubuntu 20.04 and above, CentOS 9.0 and above

### Hardware Requirements

The following table lists the minimum hardware requirements for deploying FortiAI Ops.

CPU	Memory	Storage	
		Disk 1	Disk 2
8	32 GB	8 GB	500 GB

**Note:** Disk 1 is used for OS and Disk 2 is used for data. You can extend or modify Disk 2 size based on your requirements.

## Installing FortiAI Ops on VMware ESXi

Perform the following steps to deploy FortiAI Ops.

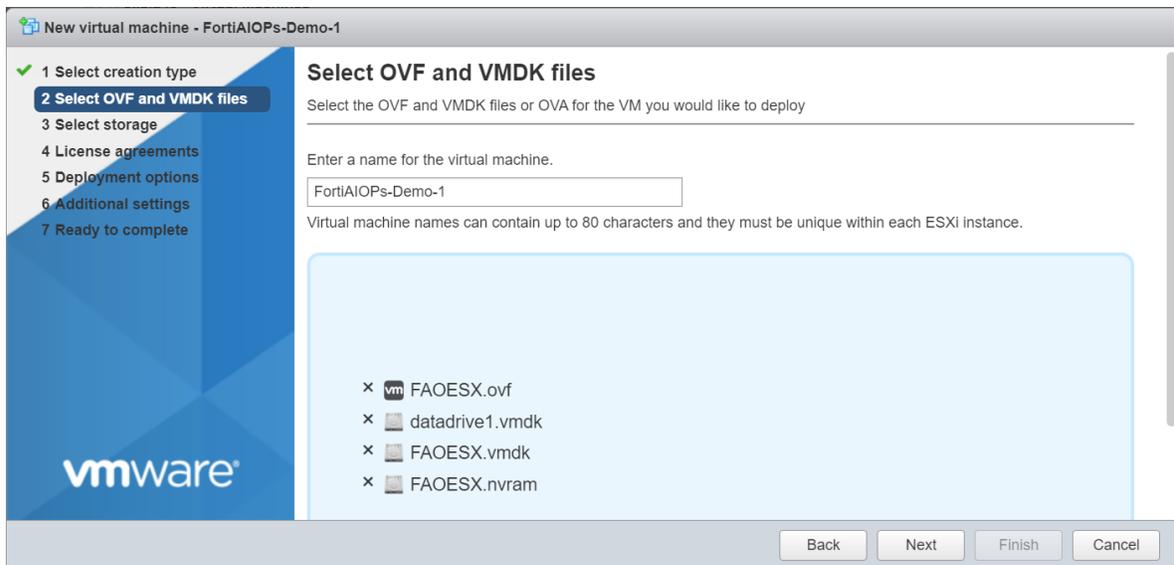
1. Download the installation file from [Fortinet Support](#) portal and unzip the file (*FAO\_VM64-vx.x.x-devbuildxxxx-FORTINET.out.ovf.zip*). This folder contains 4 installation files.

 datadrive1.vmdk	13-10-2023 06:42	VMDK File	131 KB
 FAOESX.ovf	13-10-2023 06:42	OVF File	25 KB
 FAOESX.vmdk	13-10-2023 06:42	VMDK File	13,19,844 KB
 FAOESX.nvram	13-10-2023 06:41	NVRAM File	265 KB

2. Connect and log in to the VMware ESXi host client with administrative rights.
3. Select **Create/Register VM** in the **Host** tab.

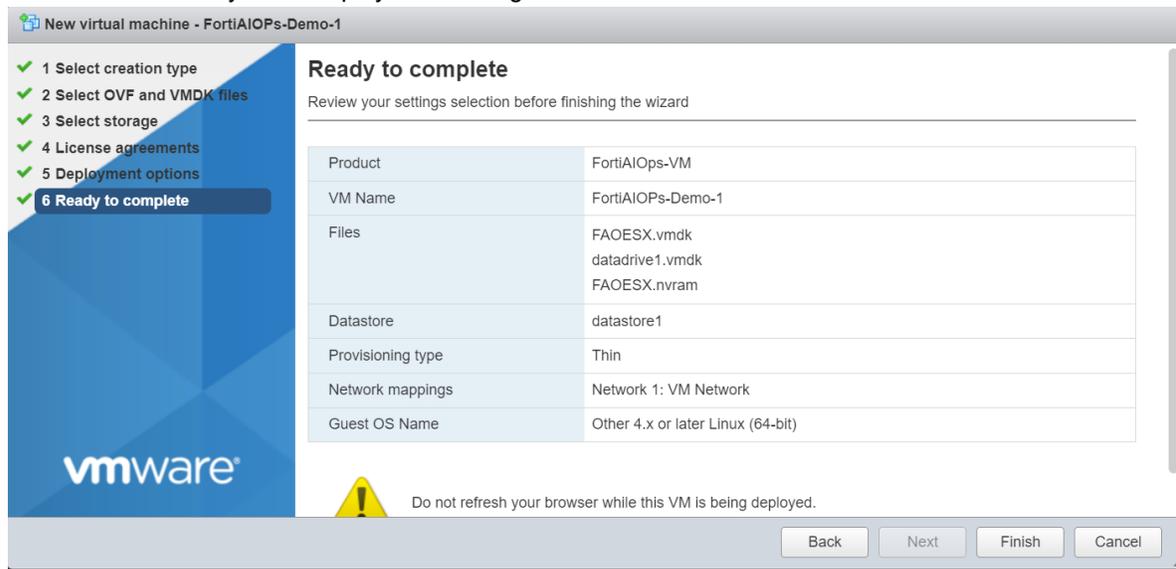


4. Select **Deploy a virtual machine from an OVF or OVA file** as the creation type.
5. Browse and select the downloaded installation files and enter a suitable hostname.



6. Select your preferred datastore to store the virtual machine files in the **Select storage** page.
7. Accept the end user license agreement.
8. In the **Deployment options** page:
  - a. Select you preferred VM network
  - b. Select your preferred disk provisioning method. Thin disk provisioning method is recommended.
  - c. Ensure **Power on automatically** option is selected  
**Note:** To modify configurations, it is necessary to edit the VM configuration while the VM is in a powered off state, and then start the VM.

9. Review the summary of the deployment settings and click **Finish**.



10. You can monitor the progress of the deployment in the **Recent Tasks** pane. When the installation is complete, the virtual machine will be listed in the **Inventory** pane.

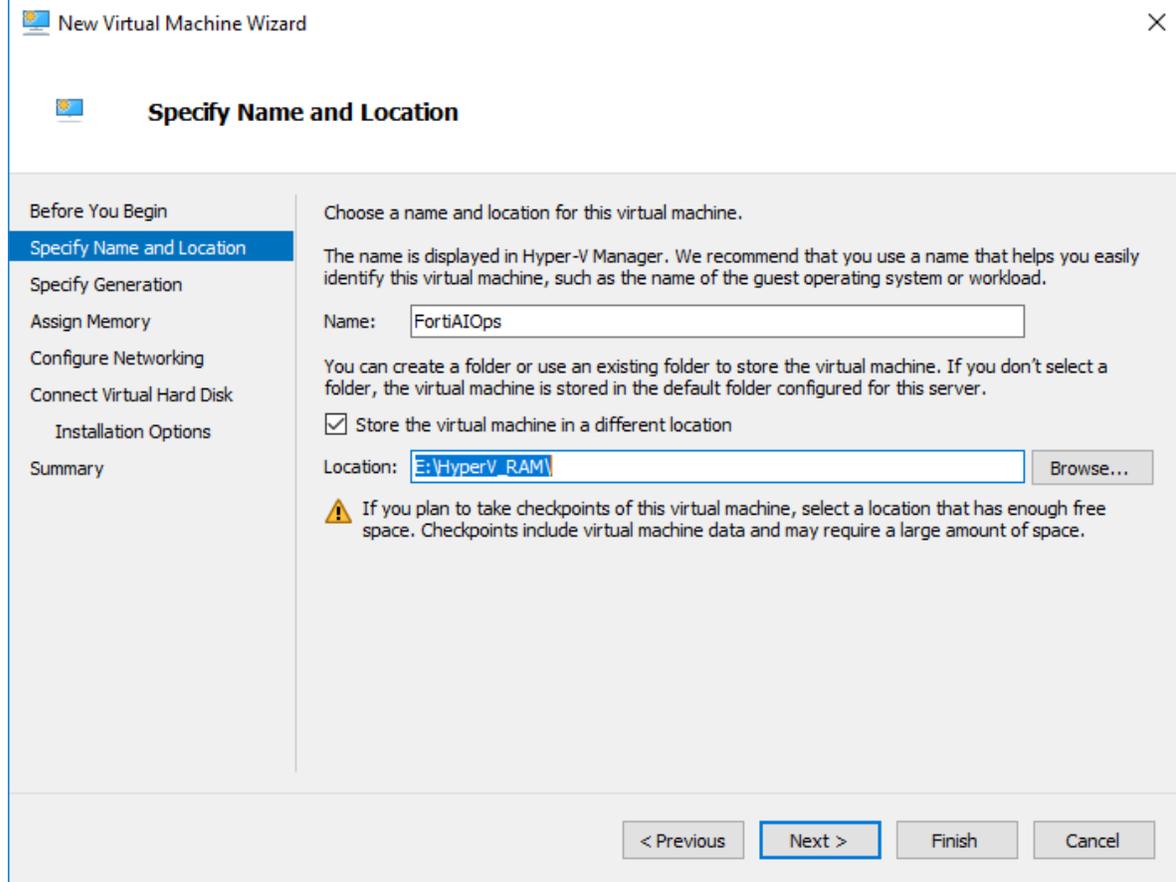
11. Perform [post-installation](#) tasks.

## Installing FortiAI Ops on Hyper-V

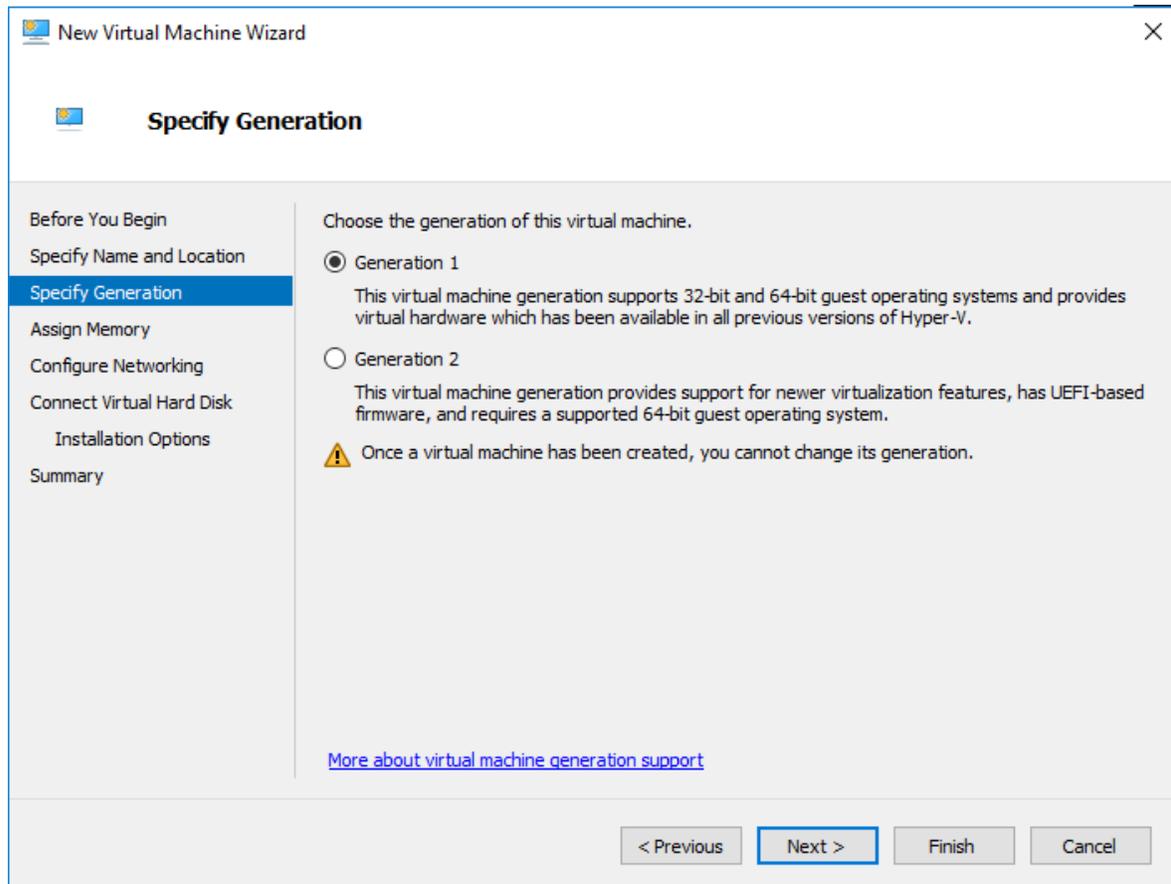
Perform the following steps to deploy FortiAI Ops.

1. Download the installation file from [Fortinet Support](#) portal and unzip the file *FAO\_VM64\_HV-vx.x.xdevbuildxxx-FORTINET.out.hyperv.zip*. This folder contains 2 installation files.
2. Open the Start menu, search for **Hyper-V Manager**, and click on the application to launch it.
3. Click **New** in the Actions pane and select **Virtual Machine** to start the New Virtual Machine Wizard. Click **Next**.

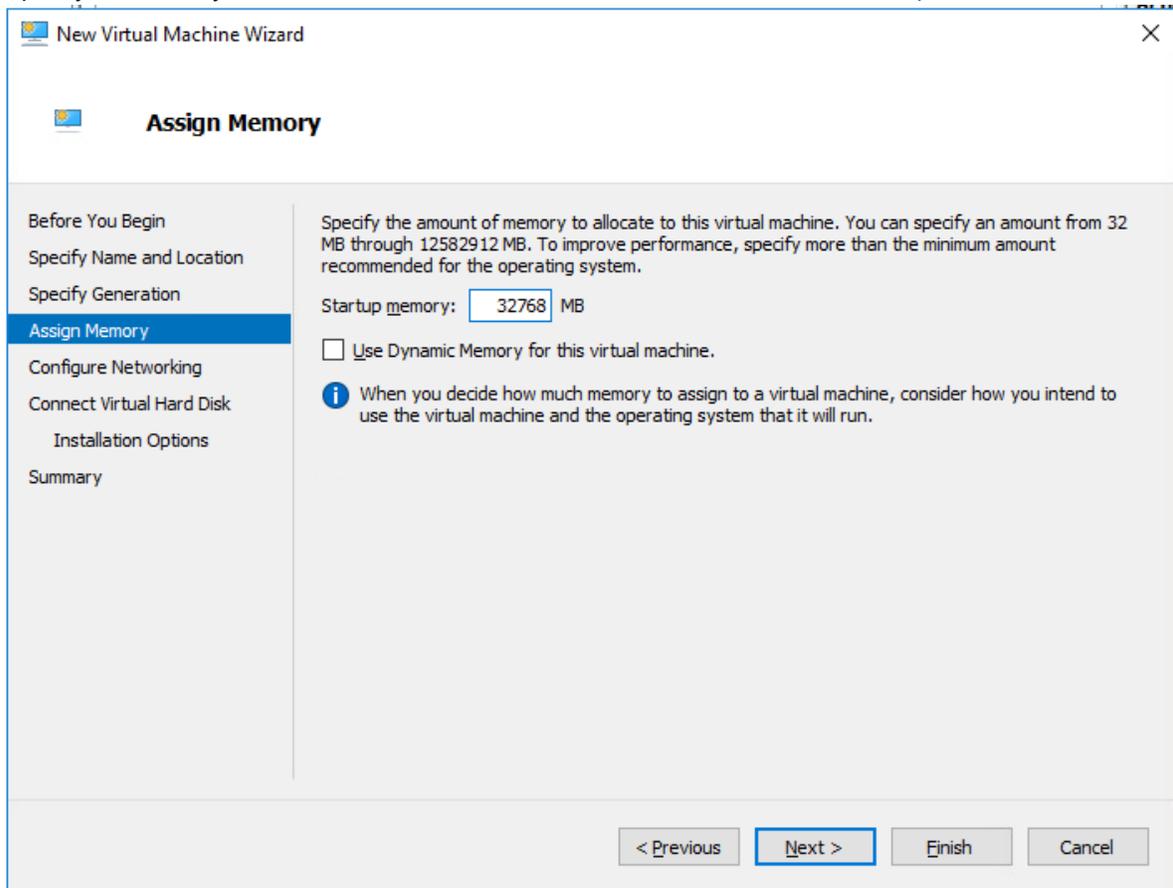
4. Enter a name and select location for FortiAI Ops. Click **Next**.



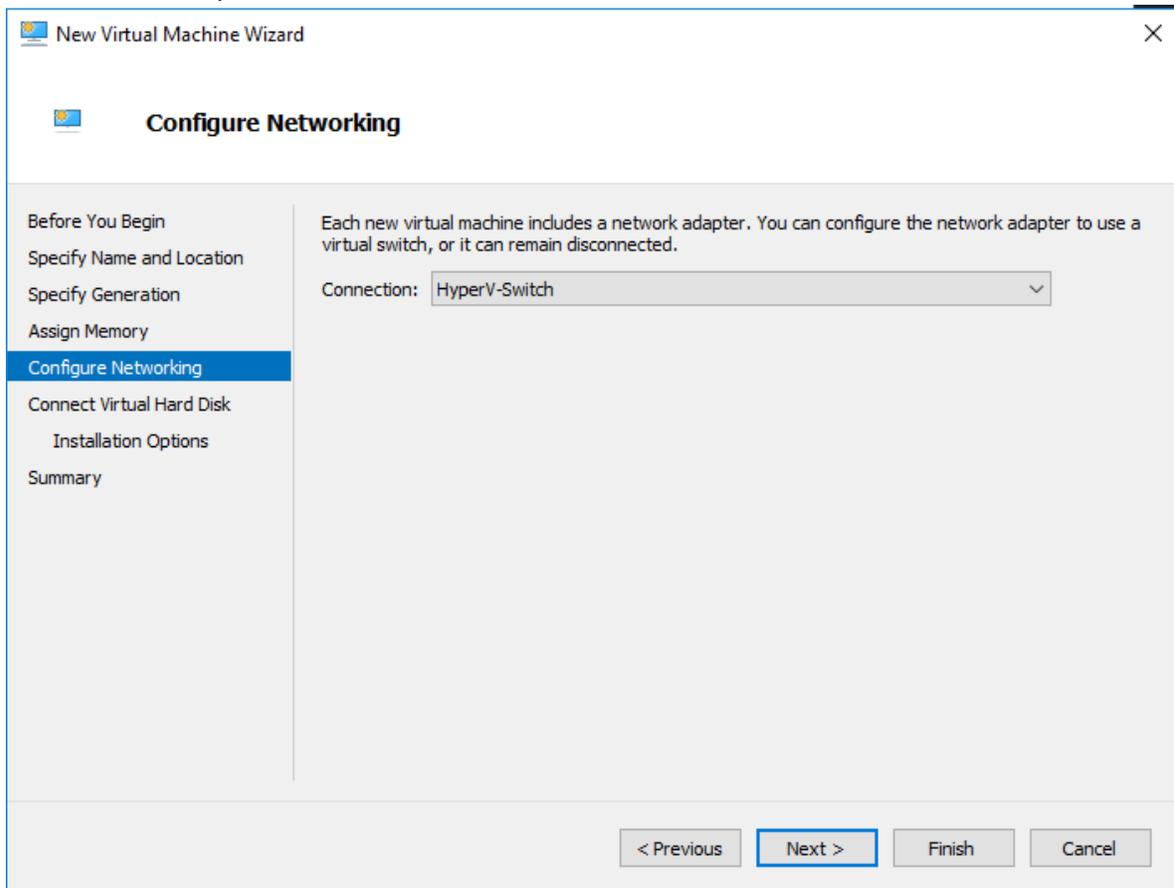
5. Select **Generation 1** and click **Next**.



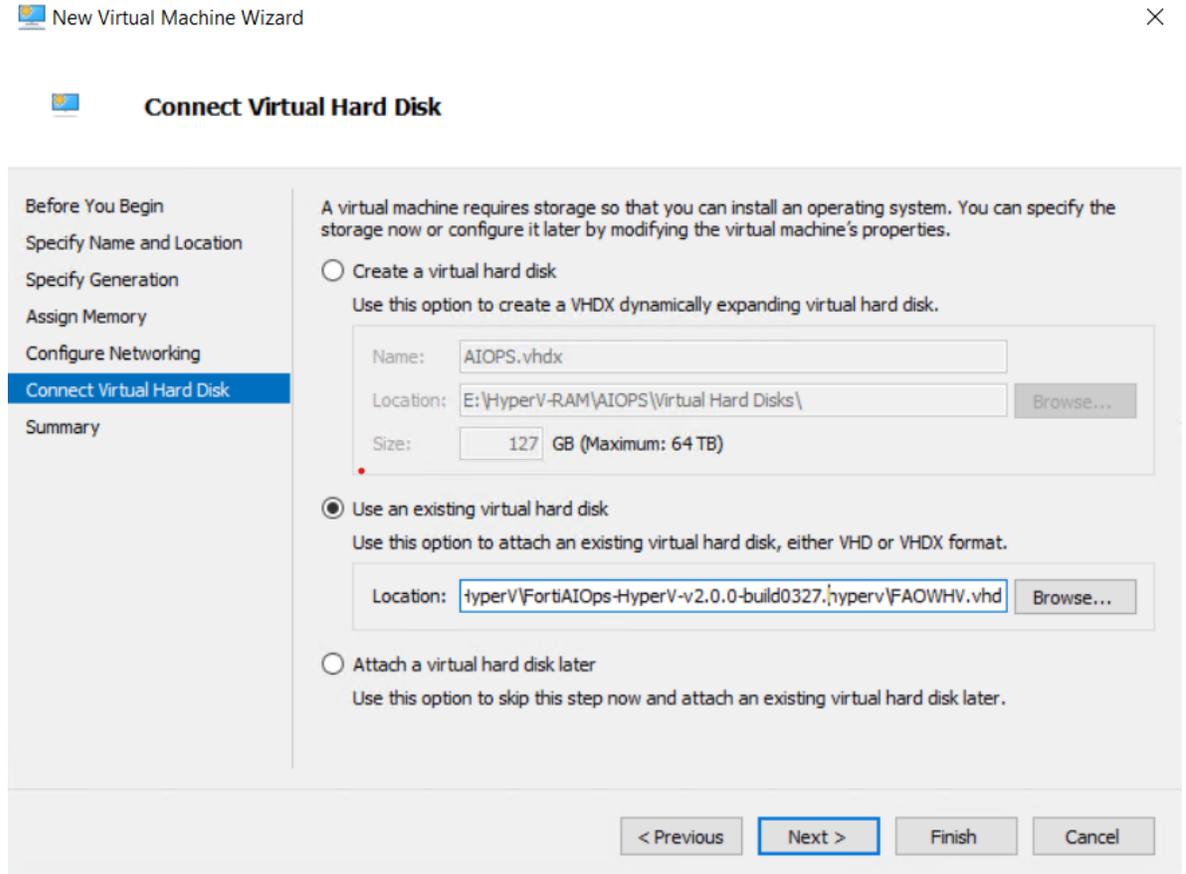
6. Specify the memory that needs to be allocated. Click **Next**. See [Pre-installation Requirements](#).



7. Select network adapter and click **Next**.

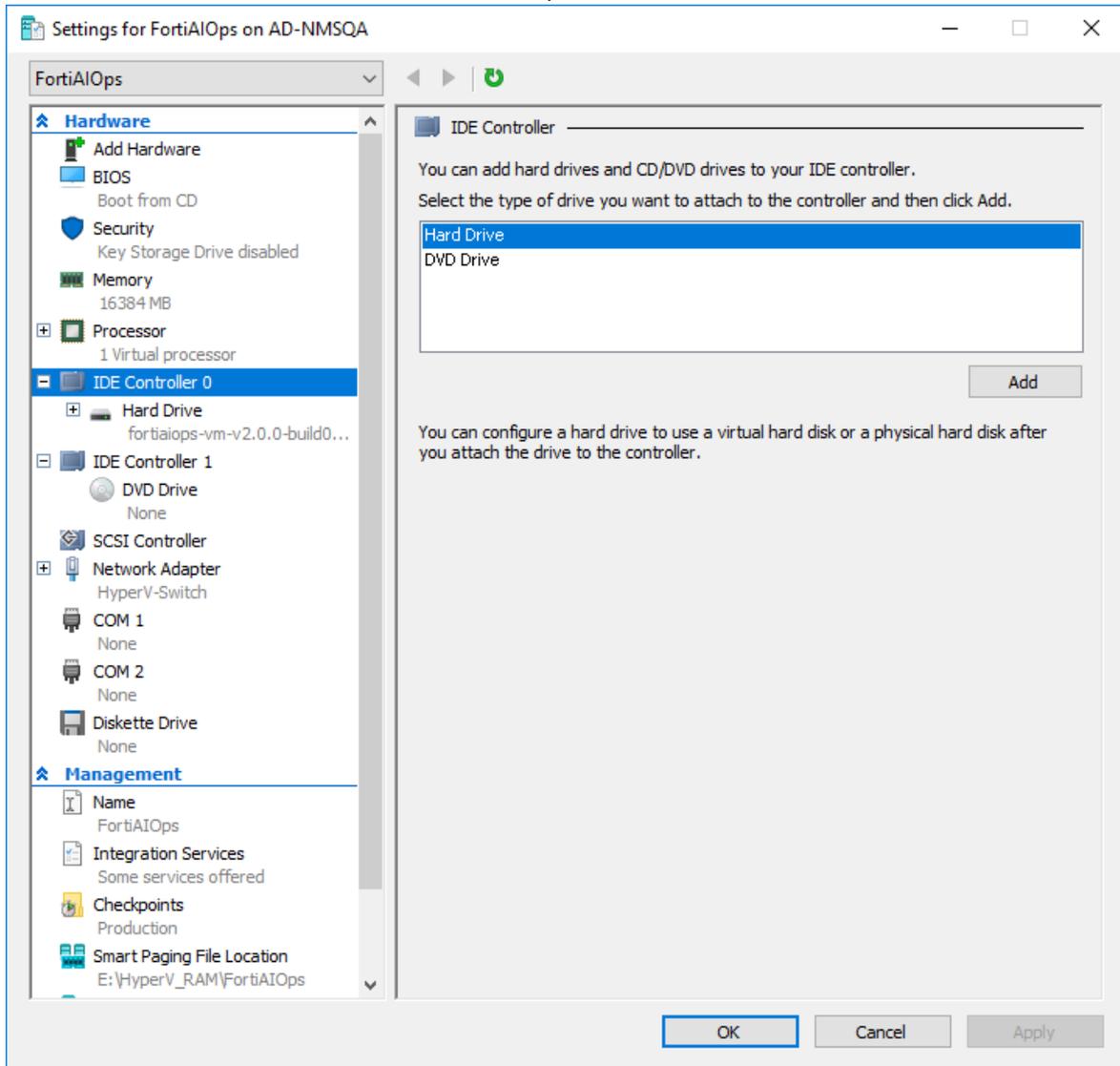


8. Select **Use an existing virtual hard disk**. Browse and select **FAOWHV.vhd** image locally stored. Click **Next**.

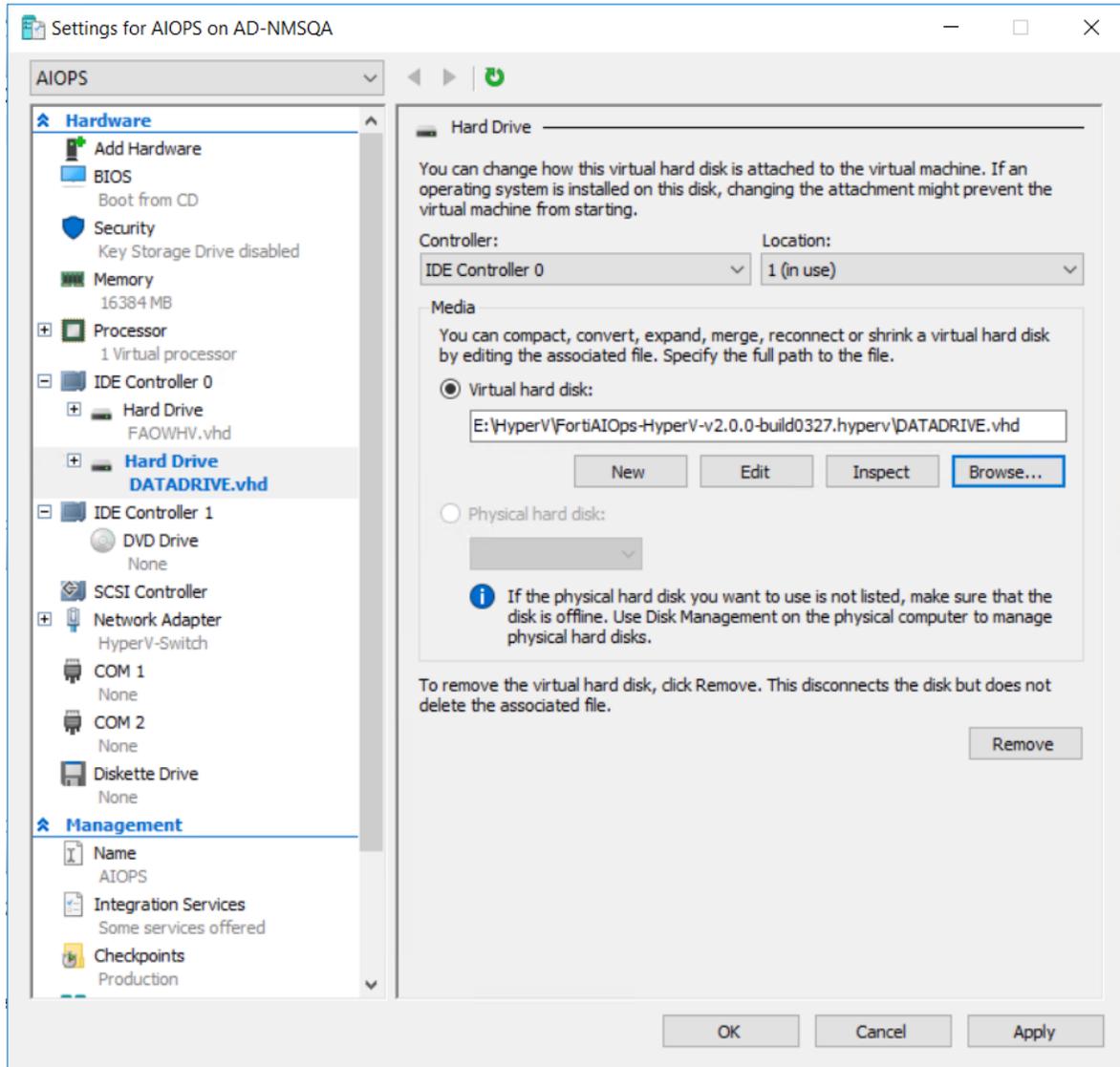


9. Review the settings and click **Finish**.
10. Right click on the new virtual machine created and select **Settings**.

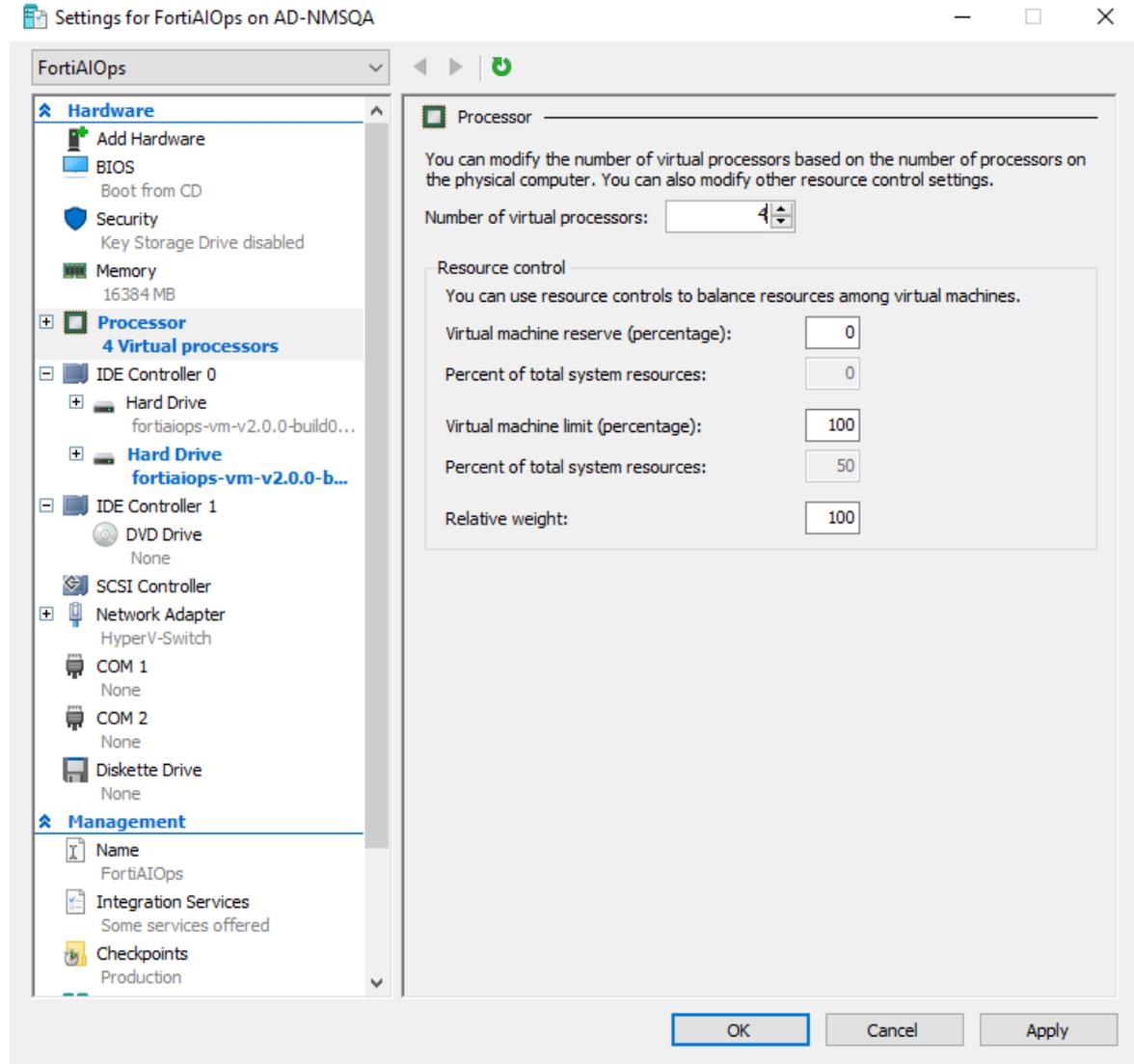
11. Select **IDE Controller 0** under **Hardware** in the left pane. Select **Hard Drive** and click **Add**.



12. Select the newly created hard drive. Select **Virtual hard disk** option. Browse and select the **DATADRIVE.vhd** image. Click **Ok**.



13. Select **Processor** under **Hardware** in the left pane. Enter the number of virtual processors based on your FortiAI Ops configuration. Click **Apply**. Click **Ok**.



14. Right click on the virtual machine and click **Start**. Once the virtual machine is up and running, launch the console.
15. Perform [post-installation](#) tasks.

## Installing FortiAI Ops on KVM

Perform the following steps to deploy FortiAI Ops on KVM using virt-manager.

1. Download the installation file from [Fortinet Support](#) portal and unzip the file *FAO\_VM64\_KVM-vx.x.xdevbuildxxx-FORTINET.out.kvm.zip*.
2. Open terminal and navigate to the path of the downloaded and unzipped installation files.

- Run the `./deploy_kvm {name of machine} {interface to run the machine}` command to deploy FortiAI Ops in the virt-manager automatically.

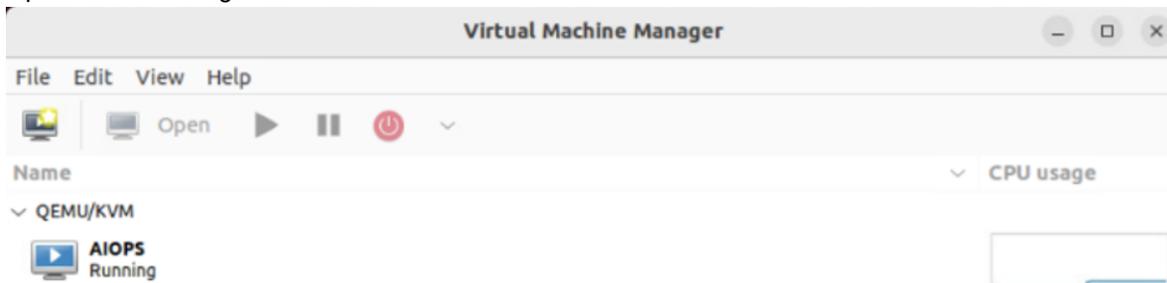
```

kvmserver@kvmserver-virtual-machine: ~/Downloads/FAO_...
kvmserver@kvmserver-virtual-machine:~$ cd Downloads/
kvmserver@kvmserver-virtual-machine:~/Downloads$ cd FAO_VM64_KVM-v2.0.0-devbuild
0336-FORTINET.out.kvm/
kvmserver@kvmserver-virtual-machine:~/Downloads/FAO_VM64_KVM-v2.0.0-devbuild0336
-FORTINET.out.kvm$ ls
datadrive.qcow2  FAOKVM.qcow2  KVM.xml.tpl
deploy_kvm       Fimg_VARS.fd  OVMF_CODE_4M.secboot.fd
kvmserver@kvmserver-virtual-machine:~/Downloads/FAO_VM64_KVM-v2.0.0-devbuild0336
-FORTINET.out.kvm$ ./deploy_kvm AIOPS
Usage: deploy_kvm <domain_name> <bridge_interface_name>
kvmserver@kvmserver-virtual-machine:~/Downloads/FAO_VM64_KVM-v2.0.0-devbuild0336
-FORTINET.out.kvm$ ./deploy_kvm AIOPS br0
Ubuntu
pc-q35-4.2
/usr/bin/kvm-spice
virsh define AIOPS.xml
Domain 'AIOPS' defined from AIOPS.xml

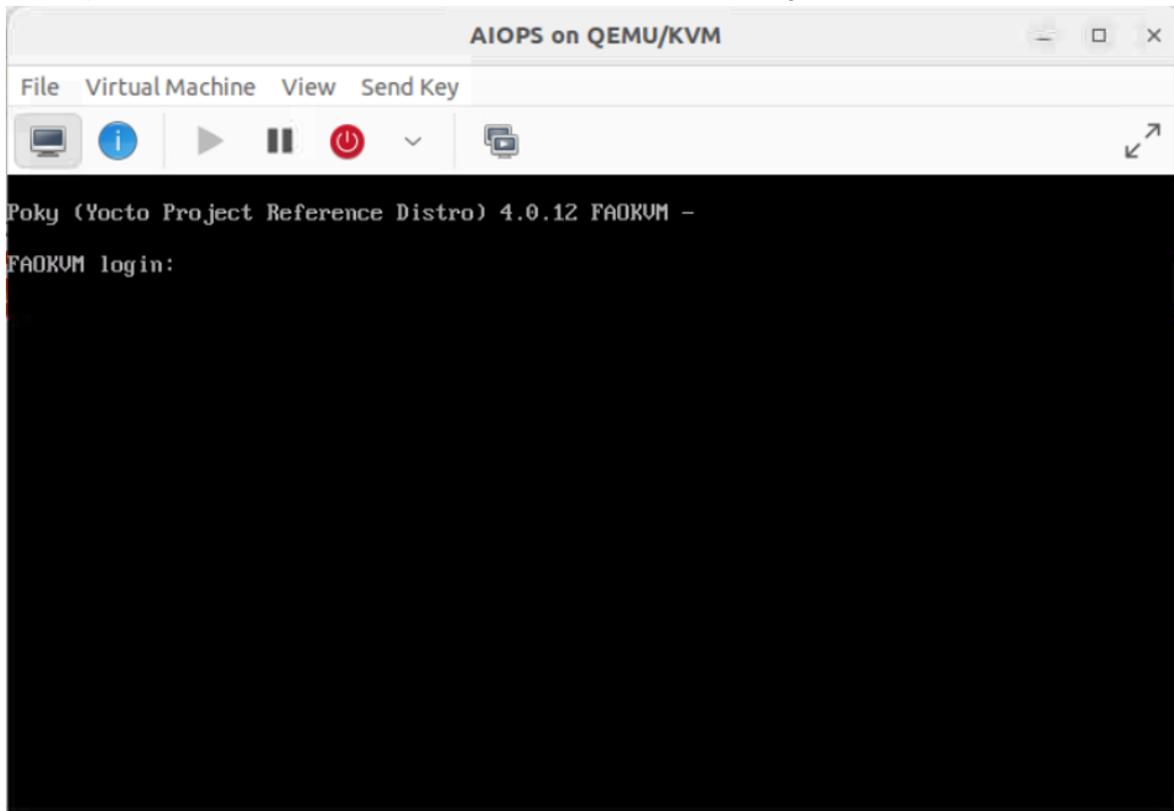
[sudo] password for kvmserver:
Domain 'AIOPS' started

kvmserver@kvmserver-virtual-machine:~/Downloads/FAO_VM64_KVM-v2.0.0-devbuild0336
-FORTINET.out.kvm$
    
```

- Open the virt-manager window.



5. Click **Open** to launch the console after the virtual machine is in a running state.

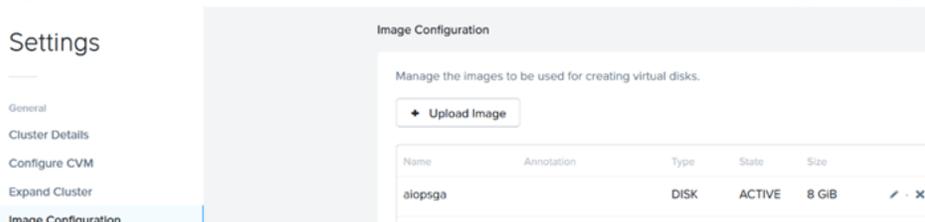


6. Perform [post-installation](#) tasks.

## Installing FortiAI Ops on Nutanix

Perform the following steps to deploy FortiAI Ops on Nutanix.

1. Obtain *FAO\_VM64\_HV-v2.0.1-[build0xxx]-FORTINET.out.hyperv.zip* from Fortinet and extract it to obtain the files *FAOWHV.vhd* and *DATADRIVE.vhd*.
2. Log in into the Nutanix Prism user interface and click the  icon. Select **Image Configuration**.



3. Upload both the *FAOWHV.vhd* and *DATADRIVE.vhd* files in the order as mentioned here. To upload *FAOWHV.vhd*, click **Upload Image** and update the following fields.

The screenshot shows a 'Create Image' dialog box with the following fields and options:

- Name:** FortiAI Ops
- Annotation:** (empty)
- Image Type:** DISK
- Storage Container:** default-container-89159414444738
- Image Source:**  Upload a file (with a 'Browse...' button) FAOWHV.vhd

At the bottom, there are three buttons: '< Back', 'Cancel', and 'Save'.

- Enter a **Name** for the FortiAI Ops image file.
- Select **Disk** in as the **Image Type**.
- Select the **Storage Container**.
- In the **Image Source** section, click **Upload a file** and browse to the FortiAI Ops image file *FAOWHV.vhd*.

4. Click **Save**.
5. Repeat steps 3 and 4 to upload *DATADRIVE.vhd*.

The screenshot shows a 'Create Image' dialog box with the following fields and options:

- Name:** FortiAI Ops
- Annotation:** (empty)
- Image Type:** DISK
- Storage Container:** default-container-89159414444738
- Image Source:**  Upload a file (with a 'Browse...' button) DATADRIVE.vhd

At the bottom, there are three buttons: '< Back', 'Cancel', and 'Save'.

6. Refresh the browser after a few seconds and the newly created images are listed in the **Image Configuration** page.
7. To create a VM, navigate to the VM dashboard and click **Create VM** and enter the following configuration.



- Enter a **Name** for the FortiAI Ops VM.
- Select your **Timezone**.
- In the **Compute Details** section, enter **4 vCPU(s)** and **8 GB of Memory**.

Create VM ? ×

**General Configuration**

Name

Description

Timezone

Use UTC timezone for Linux VMs and local timezone for Windows VMs.

Use this VM as an agent VM

**Compute Details**

vCPU(s)

Number Of Cores Per vCPU

Memory ?  
 GiB

**Note:** By default, a CD-ROM is listed under **Disks**, delete this CD-ROM.

**Disks** + Add New Disk

Type	Address	Parameters	✎ · ✕
CD-ROM	ide.0	EMPTY=true; BUS=ide	

8. To create a new Boot disk, click **Add New Disk** and enter the following configuration.
  - Select **Clone from Image Service** as the **Operation** and the disk is cloned from the FortiAI Ops image files uploaded earlier in this procedure.
  - Select **SCSI** as the **Bus Type**.

- Select the uploaded FortiAI Ops disk **Image - FAOWHV.vhd**.

Add Disk ? ✕

Type

DISK
▼

Operation

Clone from Image Service
▼

Bus Type

SCSI
▼

Image ?

FortiAI Ops
▼

Size (GiB) ?

500
▼

Please note that changing the size of an image is not allowed.

Index

Next Available
▼

Cancel

Add

9. Click **Add**.

10. Add another disk for *DATADRIVE.vhd* following the previous step.

**Note:** Ensure to create a new disk for *FAOWHV.vhd* first and then for *DATADRIVE.vhd*.

11. Add 4 Network Adapters, click **Add New NIC**.

Create NIC ? ✕

Subnet Name

fortinet\_switch
▼

Network Connection State

Connected
▼

**Private IP Assignment**

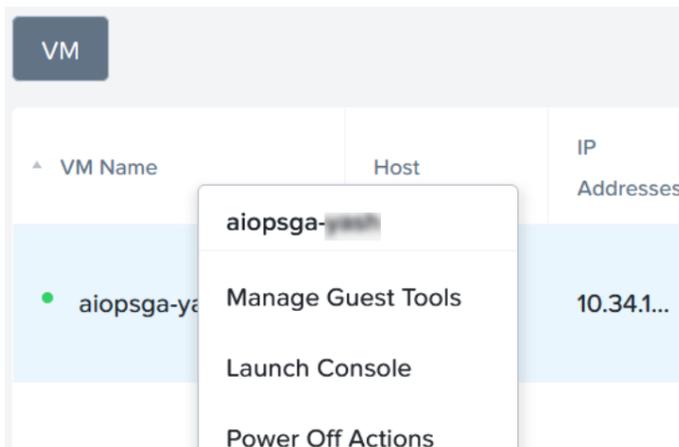
Network address / prefix

NONE

Cancel

Add

- Power on the VM and launch the console.



- Configure the FortiAI Ops static IP address on starting the VM. See [Post-installation Tasks](#).

## Installing FortiAI Ops on Proxmox

Perform the following steps to deploy FortiAI Ops on the Proxmox KVM platform.

- Obtain `FAO_VM64_KVM-v2.0.1-[build0xxx]-FORTINET.out.kvm.zip` from Fortinet.
- Use SCP to transfer this file to a Proxmox machine and extract it.

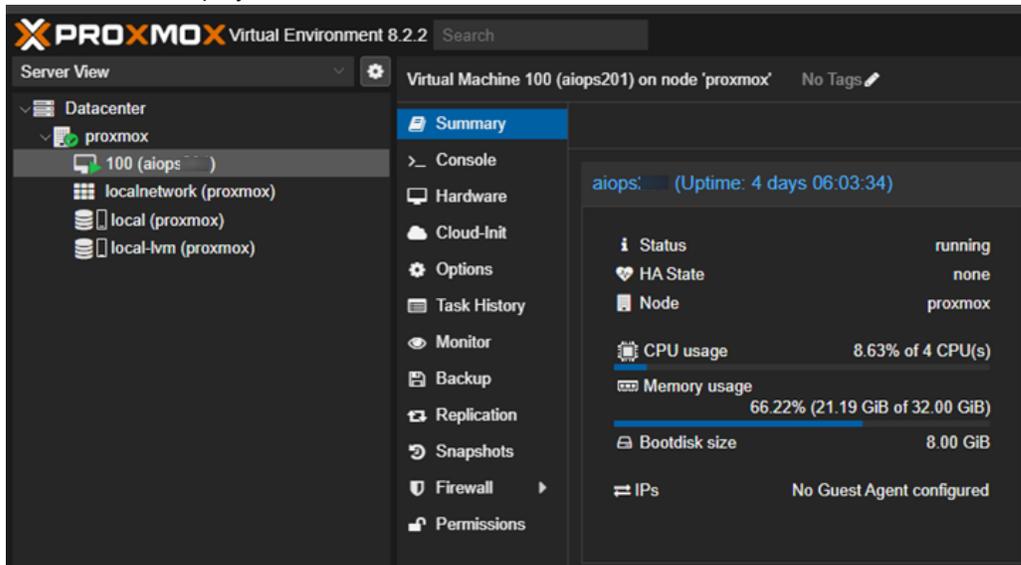
```
unzip FAO_VM64_KVM-v2.0.1-[build0xxx]-FORTINET.out.kvm.zip
-rwxrwxr-x 1 root root 3653632 May 9 12:06 OVMF_CODE_4M.secboot.fd
-rwxrwxr-x 1 root root 540672 May 9 12:06 Fimg_VARS.fd
-rw-r--r-- 1 root root 1394802688 May 9 12:20 FAOKVM.qcow2
-rwxr-xr-x 1 root root 1964 May 9 12:20 deploy_pmx
-rwxr-xr-x 1 root root 4112 May 9 12:20 deploy_kvm
-rw-r--r-- 1 root root 204608 May 9 12:20 datadrive.qcow2
-rw-r--r-- 1 root root 4521984 May 9 12:20 OVMF.qcow2
-rwxr-xr-x 1 root root 2749 May 9 12:20 KVM.xml.tpl
-rw-r--r-- 1 root root 1358948555 May 9 16:48 FAO_VM64_KVM-v2.0.1-
[build0xxx]-FORTINET.out.kvm.zip
```

- Import the FortiAI Ops disk image manually in the Proxmox shell to create the VM.
 

```
./deploy_pmx -n <name> -v <volume> -b <bridge> [-i <vmid>] [-c <cores>] [-m <memory>]
```

 where
  - <name> is the name of the VM, for example, fortiaios.
  - <volume> is the target storage ID, for example, local-lvm.
  - <bridge> is the network bridge to use, for example, vmbr0.
  - <vmid> is the ID assigned to the new VM; the default is to use the next available free ID.
  - <cores> is the number of CPU cores to allocate; the default is 8.
  - <memory> is the amount of RAM to allocate (in MB); the default is 32768 MB.

- The VM is now deployed.



- Configure the FortiAI Ops static IP address on starting the VM.

## Post-installation Tasks

Perform the following steps to access FortiAI Ops after successful installation.

- Turn on the newly created VM, if it is not already ON. In the virtual machine console, log in as an admin user with the username **admin**. A password is not required
- Login as FortiAI Ops administrator with username **admin**. Configure the password after the first login.
 

**Note:**

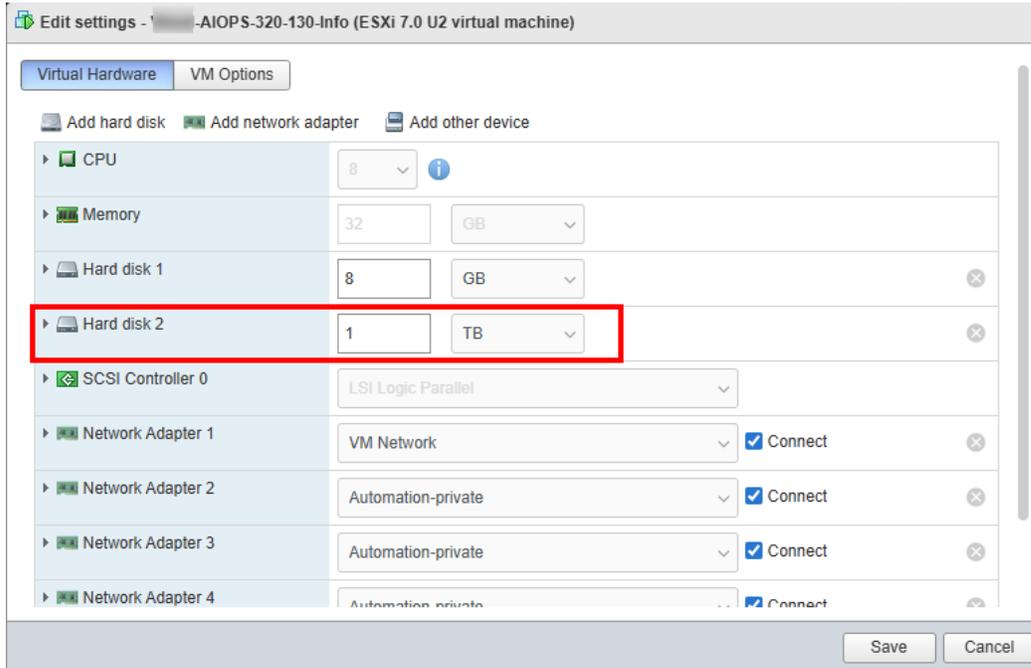
  - By default, there is no password for logging into the CLI mode for the first time. However, you are prompted to change the password after logging in.
  - By default, the username for logging into GUI is admin and there is no password.
  - Configuring the CLI password will sync with GUI password
- Ensure that the IP address is configured properly. Run the `get system interface` command to view the dynamically assigned IP address. Run `config router static` command to assign a static IP address.

## Increasing VM Disk Space

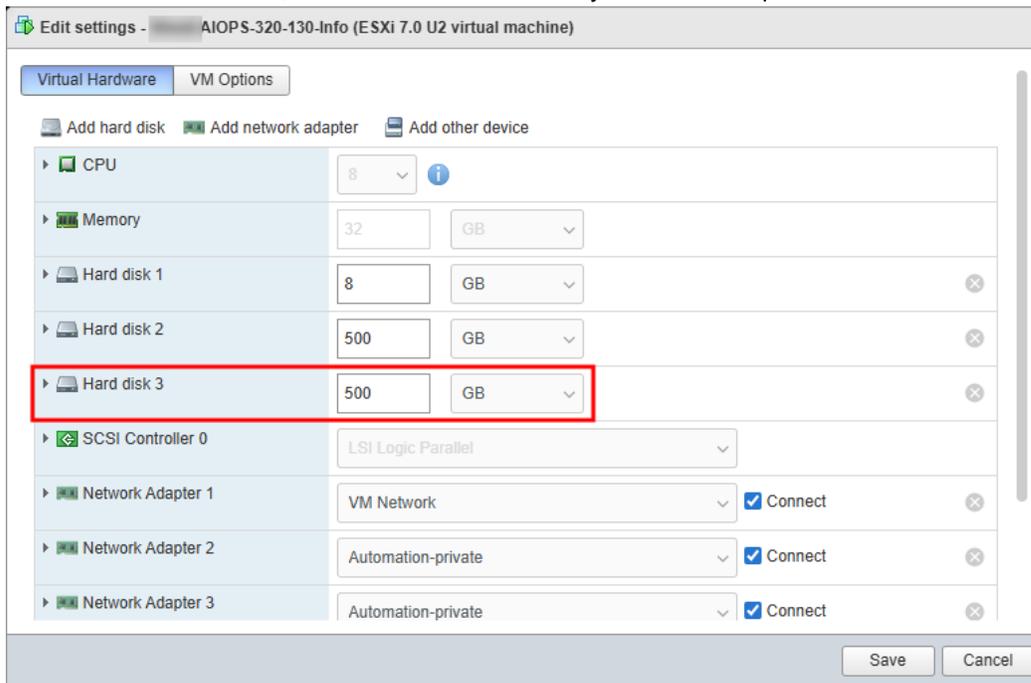
Use the following procedure to increase the disk space on your virtual machine. This procedure uses VMware ESXi as an example, but the steps are similar for other virtual machine platforms.

- Log in to your virtual machine management GUI (For example, VMware ESXi).
- Navigate to the list of virtual machines and select the instance you want to modify.
- Before making any hardware changes, you must **Shut down** the virtual machine instance to prevent data corruption.

4. Once the VM is off, select the option to **Edit** its settings.
5. In the settings window, find **Hard disk 2** and modify its size to the desired capacity.



6. To add another hard disk, click **Add hard disk**. Modify the size as required.



7. Click **Save** to apply the changes.
8. **Power on** the virtual machine instance.
9. After the VM reboots, log in to the virtual machine using the console.
10. Run the following command to view the updated disk and partition information:  
`diagnose hardware deviceinfo disk`

```

FADESX #
FADESX #
FADESX # diagnose hardware deviceinfo disk
TYPE NAME          TRAN LABEL      SIZE FS@VAIL FSUSE% PATH
disk sda            spi             8G          /dev/sda
part sda1           FORTIBLODR     32M        /dev/sda1
part sda2           fosboot        3G 1.4G 49% /dev/sda2
part sda3           datapartition  3G 1.9G 0% /dev/sda3
part sda4           datapartition  2G 1.9G 0% /dev/sda4
disk sdb            spi             1T          /dev/sdb
lvm appDataVG-appDataLU 1024G 955.7G 1% /dev/mapper/AppDataVG-AppDataLU
FADESX #
    
```

The output shows that the disk sdb is increased to 1 TB in size.

If you have added another hard disk, you will see an output similar to the following:

```

FADESX # diagnose hardware deviceinfo disk
TYPE NAME          TRAN LABEL      SIZE FS@VAIL FSUSE% PATH
disk sda            spi             8G          /dev/sda
part sda1           FORTIBLODR     32M        /dev/sda1
part sda2           fosboot        3G 1.4G 52% /dev/sda2
part sda3           datapartition  3G 1.9G 0% /dev/sda3
part sda4           datapartition  2G 1.9G 0% /dev/sda4
disk sdb            spi             500G       /dev/sdb
disk sdc            spi             500G       /dev/sdc
lvm appDataVG-appDataLU 1000G 937.1G 0% /dev/mapper/AppDataVG-AppDataLU
    
```

## Accessing FortiAI Ops

After successfully generating a new password and configuring a static IP address for the FortiAI Ops server, you can access the FortiAI Ops application portal for management operations and to monitor your network. Open a compatible web browser and enter the `https://<fortiaops_server_IP>` URL, where `<fortiaops_server_IP>` is the configured static IP address. The default username is admin and there is no password. You are prompted to change the password after the first login.

## Upgrading FortiAI Ops

You can upgrade FortiAI Ops via the GUI and the CLI.

- **Upgrade via GUI** - Navigate to **System > Upgrade** to upgrade FortiAI Ops. See [Upgrade](#).
- **Upgrade via CLI** - Run the following command to upgrade FortiAI Ops.

```
execute restore image ftp <path to upgrade file><upgrade file name> <IP address> <username> <password>
```

# Deploying FortiAI Ops on Public Cloud Platforms

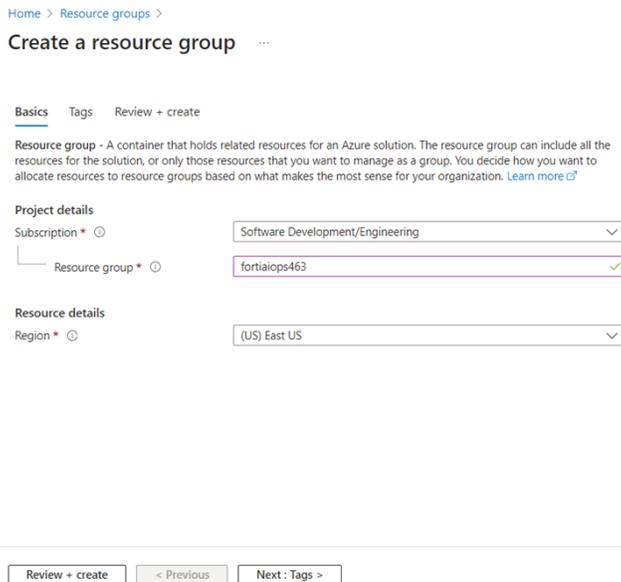
FortiAI Ops can now be deployed on the following public Cloud platforms.

- [Microsoft Azure](#)
- [Google Cloud Platform](#)
- [Amazon Web Services \(AWS\)](#)
- [Oracle Cloud Infrastructure \(OCI\)](#)

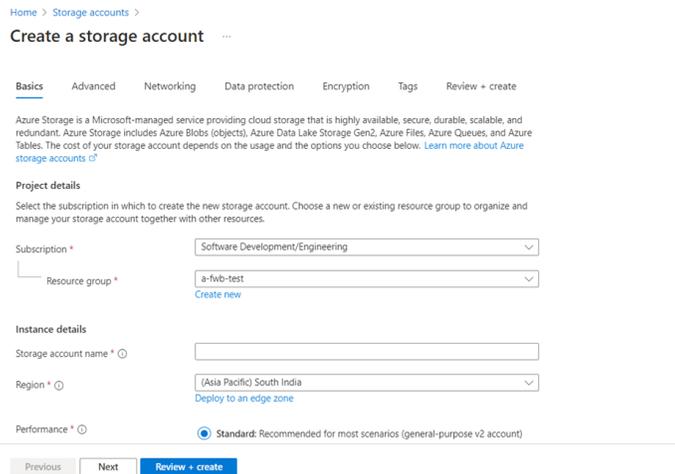
## Microsoft Azure

Perform the following steps to deploy FortiAI Ops on Microsoft Azure. For more information on the Azure portal configurations, see the [Azure documentation](#).

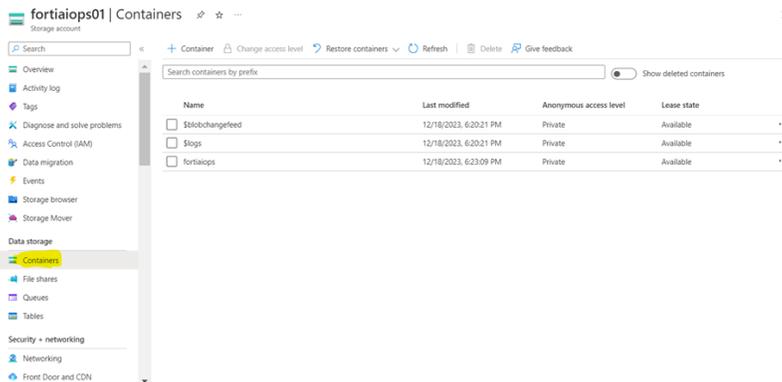
1. Download the file *FAO\_VM64\_AZURE-v2.0.1-[build0xxx]-FORTINET.out.azure.zip* from Fortinet and extract it to obtain the file *FAO\_VM64\_AZURE-v2.0.1-[build0xxx]-FORTINETout.vhd*.
2. Upload the extracted VHD file on to the Azure portal using the following procedure.
  - Create a new **Resource Group** or use an existing one from the portal. See [Manage Azure Resource Group](#).



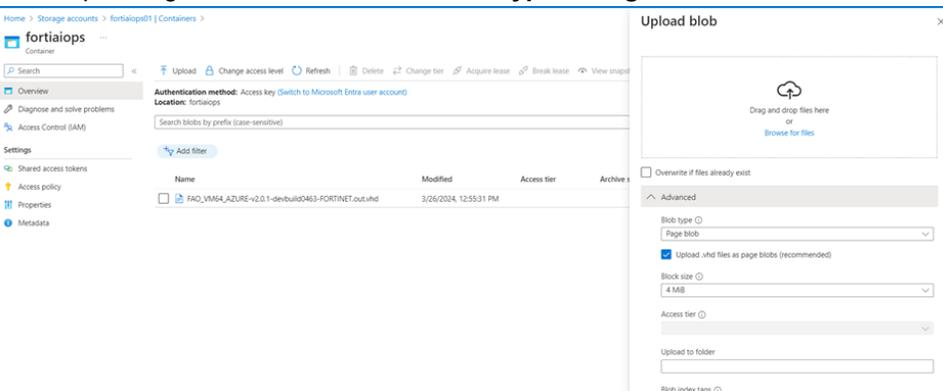
- Create a new **Storage account** or use an existing one from the portal. See [Create a storage account](#).



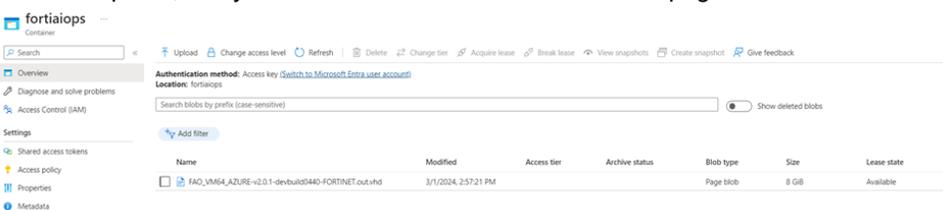
- In the Storage account, select a **Container** or create a new one to upload the VHD file. See [Create a container](#).



- When uploading the VHD file, select the **Blob type** as **Page blob**.



- After the upload, verify that the file is listed in the **Containers** page.



3. Create a managed image from the uploaded VHD file. Navigate to **Images > Create** an image in the Azure portal and configure the following settings.

- Select a **Resource group**.
- Enter a **Name** for the image.
- Select the applicable **Region** from the list.
- Set the **OS type** to **Linux**.
- Set the **VM generation** to **Gen 1**.

[Home](#) > [Images](#) > [Create an image](#) >

### Create an image ...

Create a managed image that can be used to deploy virtual machines and virtual machine scale sets. The image contains a list of managed blobs and metadata necessary for creating virtual machines. [Learn more](#)

#### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* 

Resource group \*   [Create new](#)

#### Instance details

Name \*  

Region \* 

Zone resiliency 

OS disk

OS type \*   Windows  
 Linux

VM generation \*   Gen 1  
 Gen 2

Storage blob \*     
[Browse](#)

Account type \* 

Host caching \* 

#### Encryption

You can encrypt the OS and data disks with a platform-managed or customer-managed key. [Learn more](#)

Key management 

#### Data disk

[+ Add data disk](#)

[Review + create](#) [< Previous](#) [Next : Tags >](#)

4. Browse and select the uploaded VHD file in the **Storage blob**.

**Note:** It is not required to add data disk in this step, the data disk addition is required when the virtual machine is created.

5. Click **Review + create** to create an image.

6. Create a virtual machine from the managed image that you just created. Select **Virtual machines > Create Azure virtual machine** on portal.

[Home](#) > [Virtual machines](#) >

## Create a virtual machine

Try out the Azure Copilot for additional recommendations while creating a virtual machine →

[Basics](#) [Disks](#) [Networking](#) [Management](#) [Monitoring](#) [Advanced](#) [Tags](#) [Review + create](#)

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

### Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*

Resource group \*  [Create new](#)

### Instance details

Virtual machine name \*

Region

Availability options

Security type

Image \*  [See all images](#) | [Configure VM generation](#)

- Select a **Resource group**.
- Enter a **Name** for the virtual machine.
- Select the applicable **Region** from the list.

VM architecture  Arm64  x64  
 Arm64 is not supported with the selected image.

Run with Azure Spot discount

Size \*  [See all sizes](#)

Enable Hibernation (preview)   
 To enable Hibernation, you must register your subscription. [Learn more](#)

Administrator account  
 Authentication type  SSH public key  Password  
 Azure now automatically generates an SSH key pair for you and allows you to store it for future use. It is a fast, simple, and secure way to connect to your virtual machine.

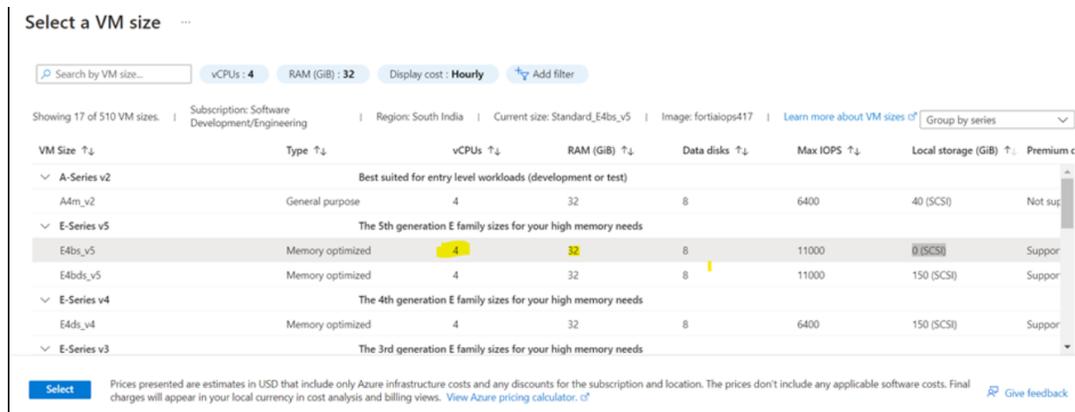
Username \*

SSH public key source

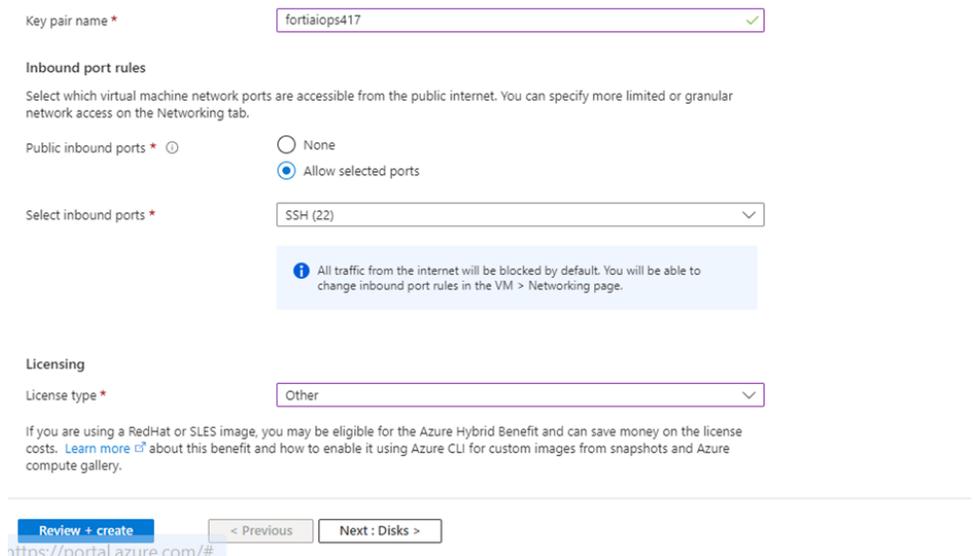
7. Click **See all images** to browse and select the image that was generated in the previous step.

8. Click **See all sizes** to select a virtual machine size.

**Note:** It is recommended to select VM size as 4 vCPU and 32 GB RAM, and the **Local storage** as 0.



9. Configure network inbound port rules to allow SSH access in the field **Select inbound ports**.



10. Click **Next: Disks** and configure disk data as is depicted in the following image.  
**Note:** The recommended minimum data disk size is 128GB.

Home > Virtual machines >

## Create a virtual machine ...

Basics **Disks** Networking Management Monitoring Advanced Tags Review + create

Azure VMs have one operating system disk and a temporary disk for short-term storage. You can attach additional data disks. The size of the VM determines the type of storage you can use and the number of data disks allowed. [Learn more](#)

### VM disk encryption

Azure disk storage encryption automatically encrypts your data stored on Azure managed disks (OS and data disks) at rest by default when persisting it to the cloud.

Encryption at host

**i** Encryption at host is not registered for the selected subscription. [Learn more about enabling this feature](#)

### OS disk

OS disk size

OS disk type \*

Delete with VM

Key management

Enable Ultra Disk compatibility   
Ultra disk is not supported in South India.

#### Data disks for fortiaio417

You can add and configure additional data disks for your virtual machine or attach existing disks. This VM also comes with a temporary disk.

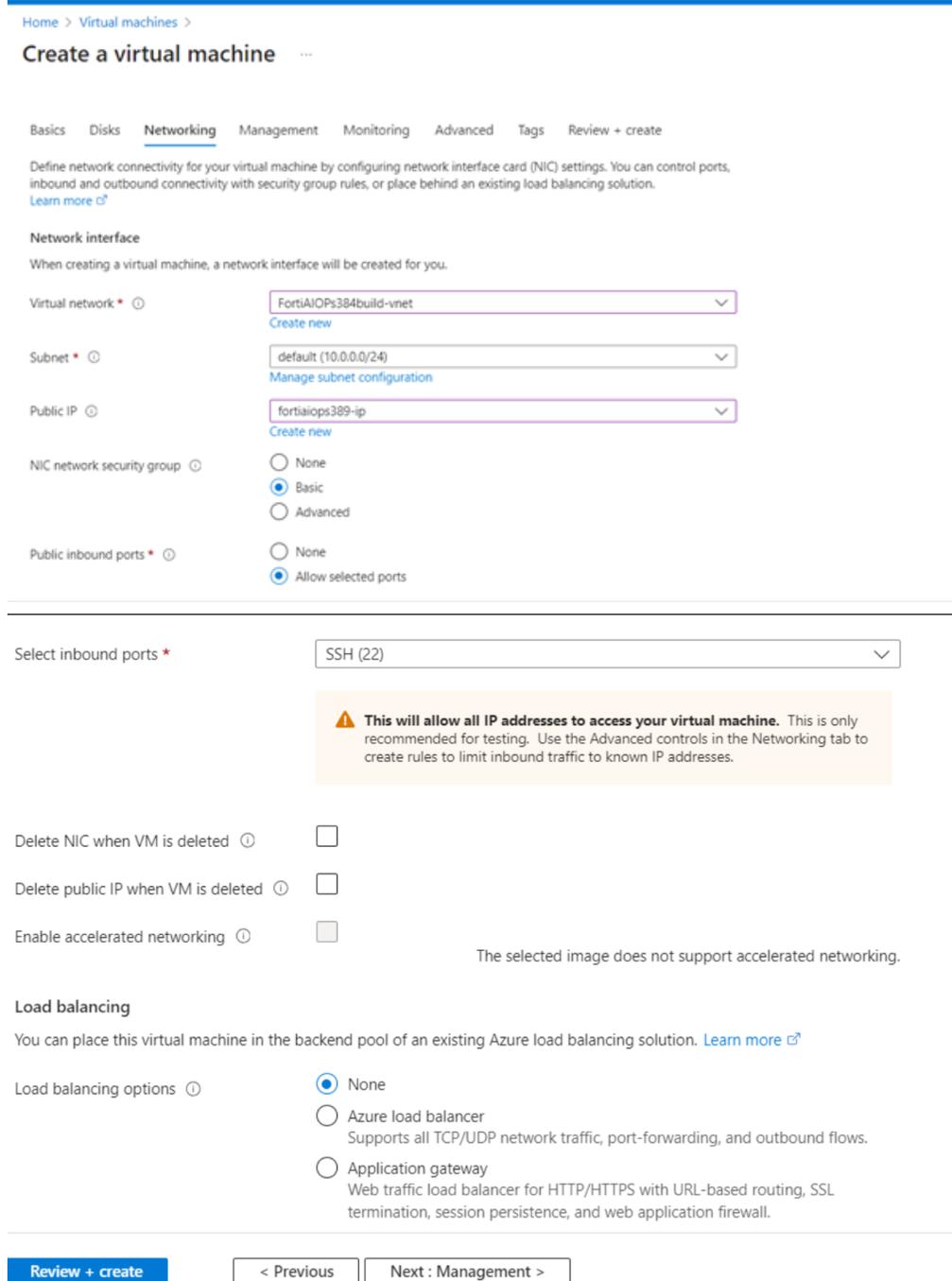
LUN	Name	Size (GiB)	Disk type	Host caching	Delete with VM
0	fortiaio417_DataDis...	512	Premium SSD LRS	Read-only	<input type="checkbox"/>

[Create and attach a new disk](#) [Attach an existing disk](#)

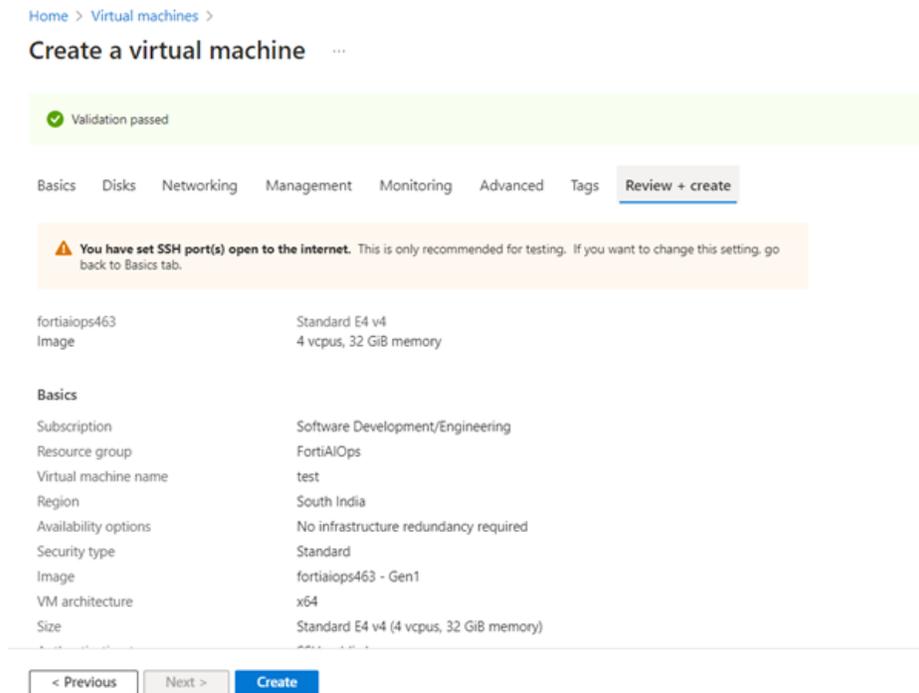
Advanced

[Review + create](#) [< Previous](#) [Next: Networking >](#)

11. Click **Next: Networking** to configure the network settings.

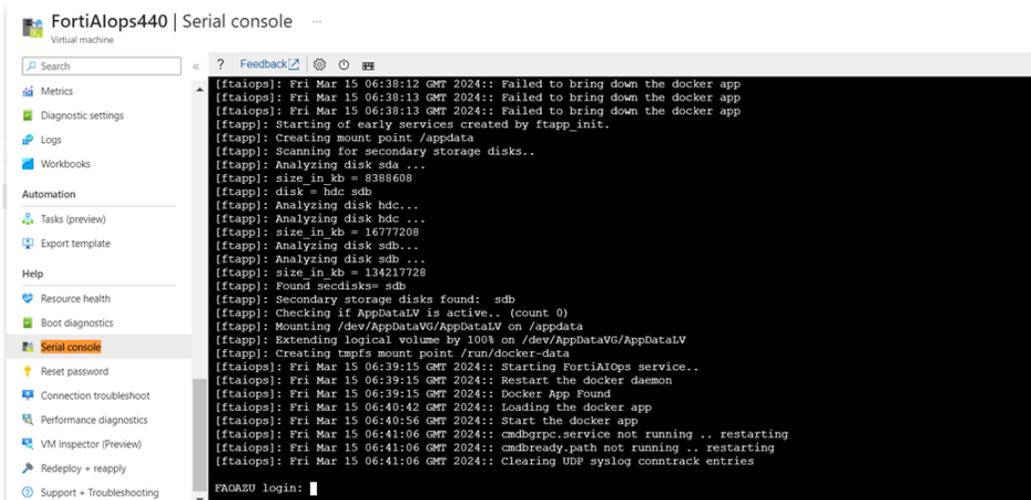


12. Select the available **Virtual network** and the **Public IP** of the deploying machine.
13. Review the configurations under the tabs, **Management**, **Monitoring**, and **Advanced**.
14. Click **Next: Tags** and add the required tags.
15. Click **Next: Review + create** and click **Create** only if the virtual machine validation is passed, as depicted in the following image.



16. Connect the virtual machine in one for the following methods.

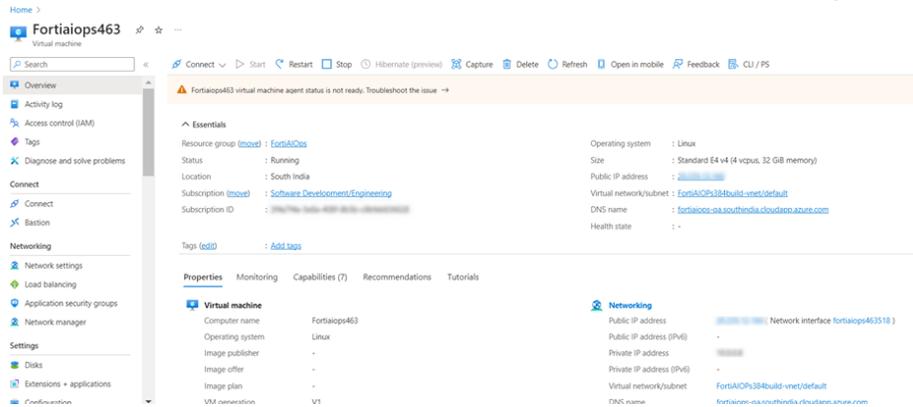
- **Connect via Serial Console** - Select the running virtual machine and then select Serial console in the menu.



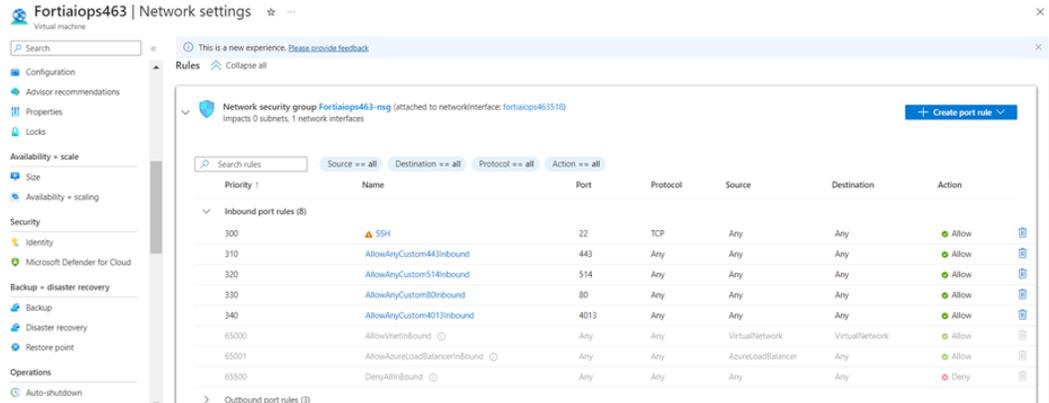
- **Connect via SSH** - Obtain the public IP address of the virtual machine and use SSH to connect to the virtual machine.  
`ssh admin@<public_IP>`

## Post-installation Tasks

- The public IP address of the virtual machine is available in the **Overview** page of the virtual machine.



- Create the inbound port rules as depicted in the following image, in the **Network settings** of the virtual machine, to enable all FortiAIOPS functionality.



**Note:** Do not change the corresponding IP mode setting from the FortiAIOPS GUI or CLI; modify all network from the Azure portal only.

## Google Cloud Platform

Perform the following steps to deploy FortiAIOPS on Google Cloud.

- Download the file *FAO\_VM64\_GCP-v2.0.1-[build0xxx]-FORTINET.out.gcp.zip* from Fortinet and extract it to obtain *FAO\_VM64\_GCP-v2.0.1-[build0xxx]-FORTINET.out.gcp.tar.gz*.
- Install and setup **gsutil** to access Cloud storage from the CLI using HTTPS. To install **gsutil**, see [Install gsutil](#).
- Alternatively, run the following command to download the Linux 64-bit archive file.  
`curl -O https://dl.google.com/dl/cloudsdk/channels/rapid/downloads/google-cloud-cli-389.0.0-linux-x86_64.tar.gz`
- Extract the contents of the file to any location on your file system (preferably your Home directory). To replace an existing installation, remove the existing *google-cloud-sdk* directory and then extract the archive to the same location - `tar -xf google-cloud-cli-389.0.0-linux-x86.tar.gz`.

5. Run the `./google-cloud-sdk/install.sh` script (from the root of the folder you extracted the file to).
6. Run `./google-cloud-sdk/bin/gcloud init` to initialize GCP CLI.
7. Upload the file `FAO_VM64_GCP-v2.0.1-[build0xxx]-FORTINET.out.gcp.tar.gz` to the Cloud storage bucket in the GCP CLI.

```
./google-cloud-sdk/bin/gsutil FAO_VM64_GCP-v2.0.1-[build0xxx]-
FORTINET.out.gcp.tar.gz gs://my-some-bucket
```

8. Run the following script to create a secure boot image.

```
# bash -x import2gcpimg.sh AIOPSBuild FAO_VM64_GCP-v2.0.1-devbuild0448-
FORTINET.out.gcp.tar.gz aiops-gcp.
```

where, `IMAGE_NAME` = [FortiAI Ops build], `SOURCE_FILE` = [FortiAI Ops image file name, and `BUCKET_NAME` = aiops-gcp.

**Note:** Make sure to create a storage bucket in the GCP GUI where the FortiAI Ops image files are uploaded.

```

initiating: db.der
[sshwin@sshwin1-virtual-machine:~/GCPcloud/build467$ bash -x import2gcpimg.sh image467 FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz aiopsin
ages
+ IMAGE_NAME=image467
+ SOURCE_FILE=FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz
+ BUCKET_NAME=aiopsimages
+ PK_DER=PK.der
+ KEK_DER=KEK.der
+ DB_DER=db.der
+ '[' -z image467 -o -z FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz -o -z aiopsimages ']'
+ '[' '' -z '' ']'
+ import_image
+ gsutil cp FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz gs://aiopsimages/FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz
Copying file://FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz [Content-Type=application/x-tar]...
==> NOTE: You are uploading one or more large file(s), which would run
significantly faster if you enable parallel composite uploads. This
feature can be enabled by editing the
"parallel_composite_upload_threshold" value in your .boto
configuration file. However, note that if you do this large files will
be uploaded as 'composite objects
<https://cloud.google.com/storage/docs/composite-objects>', which
means that any user who downloads such objects will need to have a
compiled crcmod installed (see "gsutil help crcmod"). This is because
without a compiled crcmod, computing checksums on composite objects is
so slow that gsutil disables downloads of composite objects.

- [1 files][ 1.3 GiB/ 1.3 GiB] 2.2 MiB/s
Operation completed over 1 objects/1.3 GiB.
+ '[' 0 -ne 0 ']'
+ gcloud compute images create image467 --source-uri gs://aiopsimages/FAO_VM64_GCP-v2.0.1-devbuild0467-FORTINET.out.gcp.tar.gz --platform-key-file=PK.der --k
ey-exchange-key-file=KEK.der --signature-database-file=db.der --guest-os-features=UEFI_COMPATIBLE
Created [https://www.googleapis.com/compute/v1/projects/forti-ai-ops-gcp/global/images/image467].
NAME      PROJECT          FAMILY  DEPRECATED  STATUS
image467  fort-ai-ops-gcp  FAMILY  DEPRECATED  READY
+ '[' 0 -ne 0 ']'
+ echo ----
+ echo 'ENABLE Secure Boot through GUI or this CLI before instance start'
ENABLE Secure Boot through GUI or this CLI before instance start
+ echo 'gcloud compute instances update IMAGE_NAME --shielded-secure-boot'
gcloud compute instances update IMAGE_NAME --shielded-secure-boot

```

9. In the GCP portal, navigate to **Compute Engine > Images** and select the uploaded FortiAI Ops image file.
10. Click **Create instance** and update the following configurations. For more information, see [Create a VM](#).
  - Enter a **Name** for the instance.
  - Select the applicable **Region** from the list.

- In the Machine configuration, configure the E2 Standard with 4 VCPUs and 16 GB memory.

The screenshot shows the 'Create an instance' page in the AWS Management Console. On the left, there are four options: 'New VM instance from scratch', 'New VM instance from template', 'New VM instance from machine image', and 'Marketplace'. The 'Machine configuration' section is active, showing tabs for 'General purpose', 'Compute optimized', 'Memory optimized', 'Storage optimized', and 'NEW GPUs'. A table lists various machine types with columns for Series, Description, vCPUs, Memory, and Platform. The 'E2' series is selected, which is described as 'Low cost, day-to-day computing' with 0.25-32 vCPUs and 1-128 GB of memory. At the bottom, there are 'CREATE', 'CANCEL', and 'EQUIVALENT CODE' buttons.

**Note:** It is recommended to use a minimum of 4 CPUs and a memory of 16 GB with the Intel Broadwell CPU platform.

This screenshot shows the 'Advanced configurations' section of the AWS console. It features a 'PRESET' tab and a 'CUSTOM' tab. The selected preset is 'e2-standard-4 (4 vCPU, 2 core, 16 GB memory)'. Below this, there are several configuration options: 'CPU platform' set to 'Automatic', 'vCPUs to core ratio' set to '2 vCPUs per core', and 'Visible core count' set to '2 cores'. An 'ADVANCED CONFIGURATIONS' section is expanded to show 'Availability policies' with 'VM provisioning model' set to 'Standard'. A note at the bottom suggests using 'Spot' for discounted VMs.

11. Enable **Allow HTTPS traffic** for web access in Firewall.

The screenshot shows the 'Firewall' configuration page. It includes a title 'Firewall' with a help icon, a subtitle 'Add tags and firewall rules to allow specific network traffic from the I', and three checkboxes: 'Allow HTTP traffic' (checked), 'Allow HTTPS traffic' (checked), and 'Allow Load Balancer Health Checks' (unchecked).

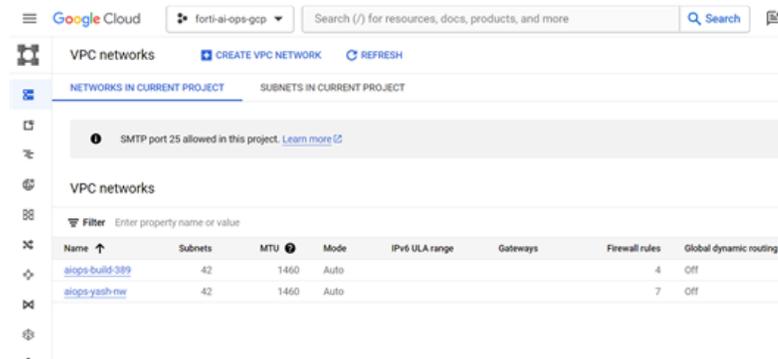
12. Click **Advanced options** to configure networking, disk and security parameters for the instance.

- Set the **Network interface card** to **VirtIO** .

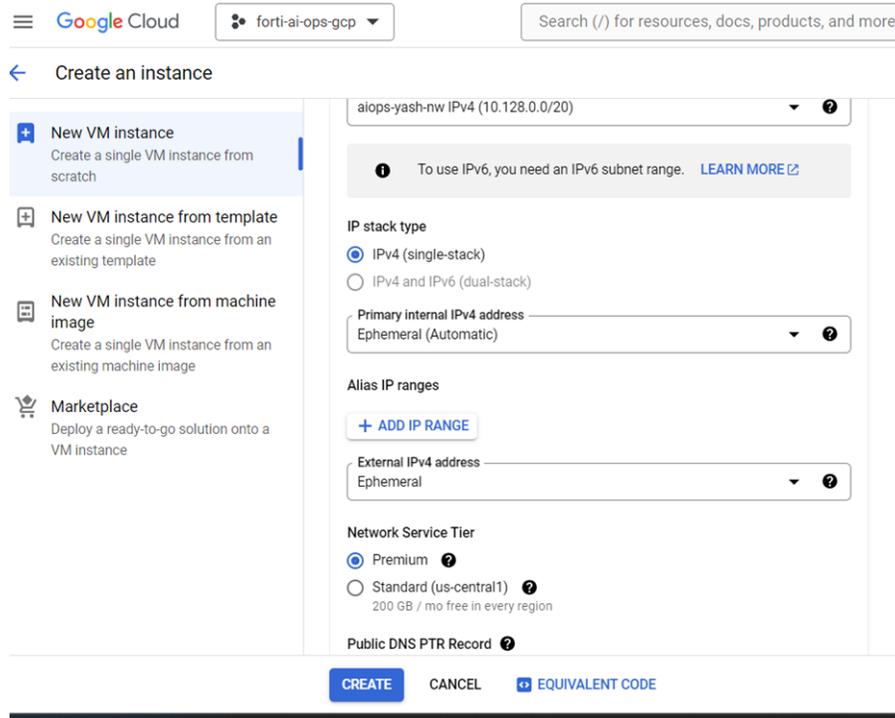
- Select the Virtual Private Cloud (VPC) in the **Network interfaces**.

**Note:** Ensure that you create VPC networks to use as network interfaces for your instance, and provide

the IP address from specified subnets. To create and use a VPC network, see [Create and manage VPC networks](#).

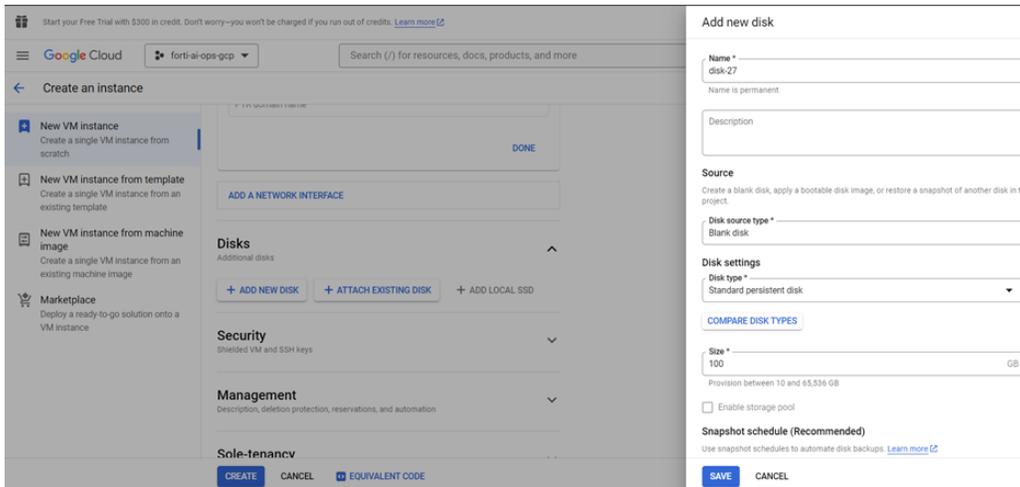


- Select other network parameters such as IP stack, primary Internal IPv4 address, and external IPv4 address as depicted in this image.
- Note:** You can select the external IPv4 address as Ephemeral (automatic /dynamic or static IP address. ). To create external IPv4 addresses for GCP, see [Reserve a static external IP address](#).



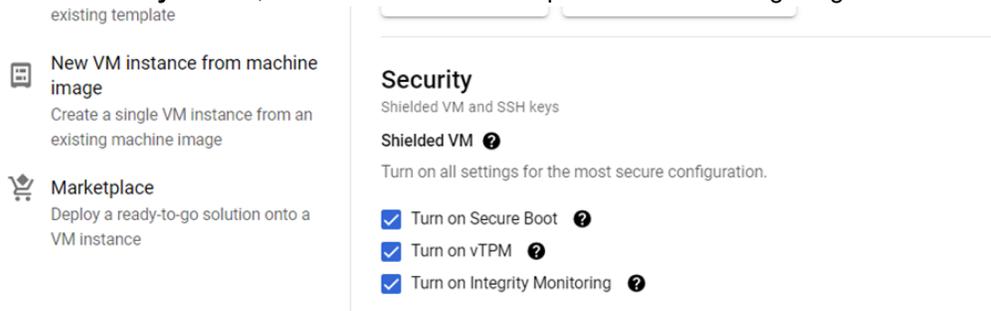
13. Add another hard disk. In the **Create an instance** page, select **Add New Disk** and configure the following.
  - Enter a disk **Name**.
  - Set the **Disk source type** to **Blank disk**.
  - Set the **Disk type** to **Standard persistent disk**.
  - Set the disk **Size** to 100 GB

**Note:** The minimum recommended disk size is 100 GB.



14. Click **Save**.

15. In the **Security** section, enable secure boot as depicted in the following image.



16. Click **Create** to complete installation. The newly created instance is listed in the **VM instances** page. Select the instance and verify that the instance is running with the recommended CPU and machine configurations.

17. After successful installation, enable the serial console.

- Select the instance in the **VM instances** page.

The screenshot shows the Google Cloud console interface for a VM instance named 'imageaiops448'. At the top, there are navigation options: 'EDIT' (highlighted in yellow), 'RESET', and 'CREATE MACHINE IMAGE'. Below this, there are tabs for 'DETAILS', 'OBSERVABILITY', 'OS INFO', and 'SCREENSHOT'. Under the 'DETAILS' tab, there are buttons for 'SSH' and 'CONNECT TO SERIAL CONSOLE'. A message states 'Connecting to serial ports is disabled'. Below this is a 'Logs' section with links for 'Logging' and 'Serial port 1 (console)', and a 'SHOW MORE' link. At the bottom is a 'Basic information' table:

Name	imageaiops448
Instance Id	1620690093879126281
Description	None
Type	Instance

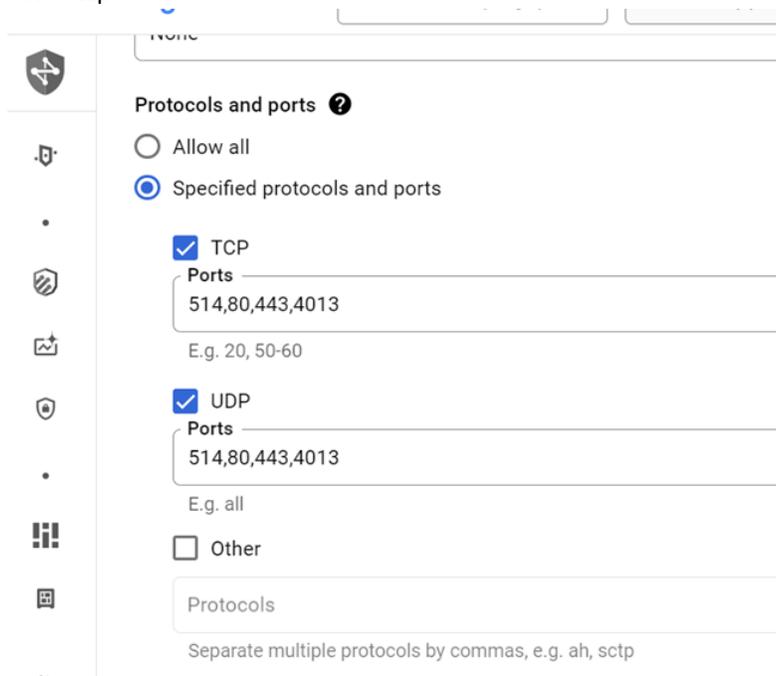
- Click **Edit** to enable the following TCP and UDP ports.

The screenshot shows the 'Edit imageaiops448 instance' page. It displays various configuration options:

- Zone:** us-central1-a
- Reservation:** Automatically choo
- Confidential VM service:** Disabled
- Rename:** A text input field containing 'imageaiops448'. Below it is a tip: 'Tip: Reference the VM by its URI in API calls and gcloud CLI commands. project isn't affected by any name changes. [Learn more](#)'
- Remote access:** A checkbox labeled 'Enable connecting to serial ports' is checked.
- Labels:** A 'MANAGE LABELS' button is visible.
- Tags:** A 'Tags' section with a help icon is partially visible at the bottom.

- 514:514/udp
- 514:514/tcp
- 4013:4013/udp
- 4013:4013/tcp
- 443:443/tcp

- 80:80/tcp



**Note:** Ensure that all required TCP and UDP ports are enabled.

**18.** Connect the VM instance and login.

- To connect via the Compute Engine console, click **VM Instances** and select the VM instance that you want to connect to. Click **Connect to Serial Console**. See [Connect to the Serial Console](#). In the console interface, login with the user name admin. A password is not required.

```

FAOGCP login: admin
Password:
You are forced to change your password, please input a new password.
New Password:
Confirm Password:
Welcome!

FAOGCP #
FAOGCP # get system status
Platform:          FAO_VM64_GCP (Debug)
Version:           FAO_VM64_GCP v2.0.1,build0448,240310 (Debug)
Architecture:     64-bit
Serial-Number:    FAOGCP
Hostname:         FAOGCP
Branch point:     0448
Uptime:           0 days, 0 hours, 20 minutes
Last reboot:      Thu Mar 28 11:44:05 GMT 2024
System time:      Thu Mar 28 12:04:24 GMT 2024
SystemID:         fb370651-3cc5-c390-a185-1b1b1b1b1b1b

FAOGCP # █
    
```

- To connect via the SSH, obtain the public IP address from the VM Instances interface and connect via SSH. The `get system interface` command displays the internal IP address assigned to the

instance.

```

login as: admin
Keyboard-interactive authentication prompts from server:
| Password:
End of keyboard-interactive prompts from server
Welcome!

FAOGCP #
FAOGCP #
FAOGCP # get system interface
== [ port1 ] (2024-03-28 11:44:14)
type: physical   mode: dhcp   ip: 10.128.0.8/32   allowaccess: https ping ssh http

Number of items: 1

FAOGCP # █

```

You can use the external IP address to access the FortiAI Ops GUI, *https: <external\_IP\_address>*.

## Amazon Web Services (AWS)

Perform the following steps to deploy FortiAI Ops on AWS.

1. Download the file *FAO\_VM64\_AWS-v2.0.1-[build01xx]-FORTINET.out.aws.zip* from Fortinet
2. Install or gain access to the AWS CLI. See [Get started with the AWS CLI](#).
3. Configure the AWS CLI as per your access requirements. These are some sample values that you must replace with the relevant ones.

```

$ aws configure
AWS Access Key ID [None]: AKIAIOSFODNN7EXAMPLE
AWS Secret Access Key [None]: YEXAMPLEKEY
Default region name [None]: us-west-2
Default output format [None]: json

```

4. Create *vmimport* role and attach the policy to the IAM user. This operation requires IAM permissions.

```

cat <<EOF > trust-policy.json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": { "Service": "vmie.amazonaws.com" },
      "Action": "sts:AssumeRole",
      "Condition": {
        "StringEquals": {
          "sts:Externalid": "vmimport"
        }
      }
    }
  ]
}
EOF

```

```
aws iam create-role --role-name vmimport --assume-role-policy-document
```

```
file://trust-policy.json
```

- a. Create a policy for the Amazon S3 bucket and attach it to the AWS IAM user.

```
cat <<EOF > role-policy.json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "s3:GetBucketLocation",
        "s3:GetObject",
        "s3:ListBucket"
      ],
      "Resource": [
        "arn:aws:s3:::$s3BucketName",
        "arn:aws:s3:::$s3BucketName/*"
      ]
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:ModifySnapshotAttribute",
        "ec2:CopySnapshot",
        "ec2:RegisterImage",
        "ec2:Describe*"
      ],
      "Resource": "*"
    }
  ]
}
EOF
```

```
aws iam put-role-policy --role-name vmimport --policy-name vmimport --
policy-document file://role-policy.json
```

For more information, see [Importing a VM as an Image](#).

5. Enable *Amazon EC2 Full Access* and *Amazon S3 Full Access* permissions.

- a. Add permission for *create inline policy* in **Permission policies**. Enable write access (*CreateRole*) and user permission management (*PutRolePolicy*). Select **Any** as the policy name in resource selection.

The screenshot shows the AWS IAM console interface for managing permissions policies. At the top, there are buttons for 'Remove' and 'Add permissions'. Below this is a search bar and a 'Filter by Type' dropdown set to 'All types'. A table lists three policies: 'AmazonEC2FullAccess' (AWS managed, Directly attached), 'AmazonS3FullAccess' (AWS managed, Directly attached), and 'IAMtoCreatePolicy' (Customer inline, Inline attached). The 'IAMtoCreatePolicy' policy is expanded to show its JSON configuration:

```
1- [{"Version": "2012-10-17",
2-   "Statement": [
3-     {
4-       "Sid": "VisualEditor0",
5-       "Effect": "Allow",
6-       "Action": [
7-         "iam:CreateRole",
8-         "iam:PutRolePolicy"
9-       ],
10-      "Resource": "arn:aws:iam::250424965647:role/*"
11-    }
12-  ]
13- }]
```

- b. For user security credentials, create an access key (CLI) and download the CSV.

The screenshot shows the AWS IAM console interface. At the top, there are tabs for 'Permissions', 'Groups', 'Tags', 'Security credentials', and 'Access Advisor'. The 'Security credentials' tab is selected. Below this, there are sections for 'Console sign-in', 'Multi-factor authentication (MFA)', and 'Access keys'. The 'Access keys' section shows a table with one key listed, which is active. The key's description is '-', its status is 'Active', it was created 111 days ago, and it was last used in the us-east-2 region.

- c. If you run the `import2awsimg.sh` manually, then un-comment the line 209 in `Creare_vmimport_role_and_policy`.

```
check_S3 $s3BucketName

# create vmimport role and attach policy. This requires IAM permissions.
# Need to be executed in the script, please remove the following "#"
create_vmimport_role_and_policy

import_image
```

6. Extract the file `FAO_VM64_AWS-v2.0.1-[build01xx]-FORTINET.out.aws.zip`. Post extraction, you have the VHD file and the import script.
  - a. VHD - `FAO_VM64_AWS-v2.0.1-[build01xx]-FORTINET.out.vhd`
  - b. Import script - `import2awsimg.sh`
7. Run the `import2awsimg.sh` script to import the VM.

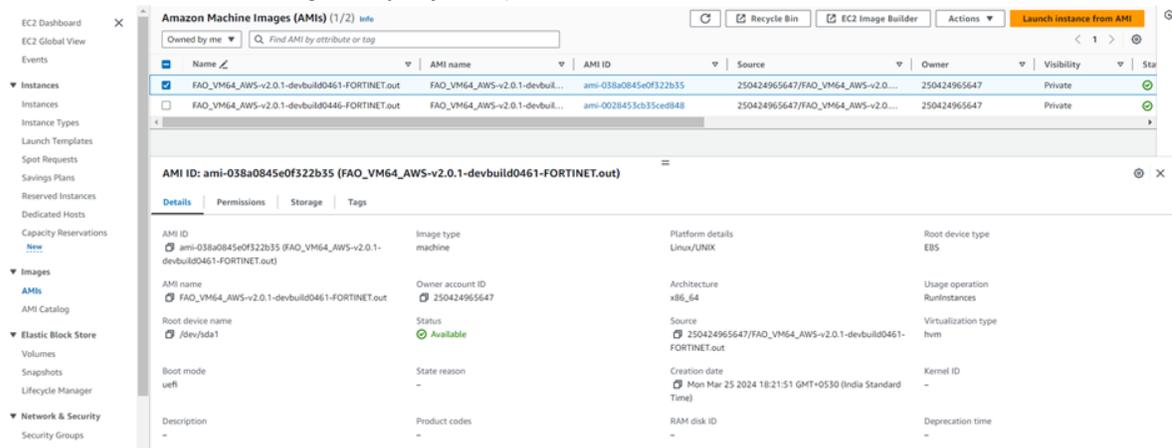
```
bash -x import2awsimg.sh <imported_image_file> <s3_bucket_name>
- virtual-machine:~/Downloads/test$ bash -x import2awsimg.sh FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd aiopsqa
+ '[' 2 -gt 1 ']'
+ imageFile=FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd
+ s3BucketName=aiopsqa
+ '[' '!' -f FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd ']'
+ check_S3 aiopsqa
+ type aws
+ aws s3 ls s3://aiopsqa
+ '[' 0 -ne 0 ']'
+ import_image
++ basename FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd
+ imageName=FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd
+ amName=FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out
+ echo 'Upload image file to S3..'
Upload image file to S3..
+ aws s3 cp FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd s3://aiopsqa/FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd
upload: ./FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd to s3://aiopsqa/FAO_VM64_AWS-v2.0.1-devbuil0461-FORTINET.out.vhd
+ cat
+ echo 'Start import image file as snapshot..'
Start import image file as snapshot..
++ aws ec2 import-snapshot --description 'Fimg aws' --disk-container file://container.json
++ awk -F "" '{if($2=="ImportTaskId")print $4}'
+ import_task_id=import-snap-05a78f80bdd0517b1
+ '[' -z import-snap-05a78f80bdd0517b1 ']'
+ echo import-snap-05a78f80bdd0517b1
import-snap-05a78f80bdd0517b1
+ true
++ aws ec2 describe-import-snapshot-tasks --import-task-ids import-snap-05a78f80bdd0517b1
```

```
+ amiId=ami-038a0845e0f322b35
+ '[' -z ami-038a0845e0f322b35 ']'
+ aws ec2 create-tags --resources ami-038a0845e0f322b35 --tags Key=Name,Value=FA0_VM64_AWS-v2.0.1-devbuild0461-FORTINET.out
+ echo 'Register AMI done..'
Register AMI done..
+ echo 'AMI ID: ami-038a0845e0f322b35'
AMI ID: ami-038a0845e0f322b35
+ echo 'AMI NAME: FA0_VM64_AWS-v2.0.1-devbuild0461-FORTINET.out'
AMI NAME: FA0_VM64_AWS-v2.0.1-devbuild0461-FORTINET.out
+ rm -f block_device_mappings.json container.json
```

**Note:**

- To import the VM, you must have read & write permissions to the Amazon bucket, EC2 Snapshot, and image creation, and import permissions.
- Some AWS regions use /dev/xvda as the root device name instead of /dev/sda1. If you are importing an image into a region that uses /dev/xvda, update the script by replacing all instances of /dev/sda1 with /dev/xvda. For example, modify the block\_device\_mappings.json section of the import2awsimg.sh by replacing /dev/sda1 with /dev/xvda.

8. Launch an instance from the Amazon Machine Images (AMI). Select **Images > AMI** in the EC2 service interface and select the image that you just imported. Click **Launch instance** from AMI.



9. Add **Name and tags** for the instance, select the **Instance type**, set the **Key pair**, and configure the **Network settings** based on your requirement. Select the required hard disk size in **Configure storage**. The default size of disk storage 2 is 10 GB, modify the size as per your requirement. Click **Launch instance**.

**Launch an instance** Info  
 Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

**Name and tags** Info  
 Name:  [Add additional tags](#)

**Application and OS Images (Amazon Machine Image)** Info  
 An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.  
  
 Recents | **My AMIs** | Quick Start  
 Owned by me  Shared with me [Browse more AMIs](#)  
Including AMIs from AWS, Marketplace and the Community

**Amazon Machine Image (AMI)**  
 FAO\_VM64\_AWS-v2.1.0-build0313-FORTINET.out  
ami-04725358b614aad1d 2024-03-08T19:22:29.281000Z Virtualization: hvm EFA enabled: true Root device type: ebs Root mode: ufi

**Description**  
 -

**Architecture** x86\_64 **AMI ID** ami-04725358b614aad1d

**Instance type** Info | Get advice  
 Instance type:   All generations [Compare instance types](#)  
Family: t3 8 vCPU 32 GiB Memory Current generation: true On-Demand RHEL base pricing: 0.448 USD per Hour On-Demand Linux base pricing: 0.5328 USD per Hour On-Demand Ubuntu Pro base pricing: 0.5468 USD per Hour On-Demand SUSE base pricing: 0.4578 USD per Hour On-Demand Windows base pricing: 0.48 USD per Hour  
 Additional costs apply for AMIs with pre-installed software

**Key pair (login)** Info  
 You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.  
 Key pair name - required:  [Create new key pair](#)

**Network settings** Info [Edit](#)

**Configure storage** Info [Advanced](#)  
 1x  GiB  Root volume, Not encrypted  
 1x  GiB  EBS volume, Not encrypted  
  
[Add new volume](#)

**Summary**  
 Number of instances:  Info  
 Software Image (AMI): FAO\_VM64\_AWS-v2.1.0-build0313-...[read more](#)  
ami-04725358b614aad1d  
 Virtual server type (instance type): t3.2xlarge  
 Firewall (security group): -  
 Storage (volumes): 2 volume(s) - 517 GiB  
 **Free tier:** In your first year of opening an AWS account, you get 750 hours per month of t2.micro instance usage for t3.micro where t2.micro isn't available) when used with free tier AMIs, 750 hours per month of public IPv4 address usage, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the Internet. [X](#)  
[Cancel](#) [Launch Instance](#) [Preview code](#)

- Obtain the public IP address of the instance from the EC2 service interface and connect via a private key using SSH.

```

FA0AWS #
config          Configure object.
get            Get dynamic and system information.
show          Show configuration.
diagnose       Diagnose facility.
execute       Execute static commands.
exit          Exit the CLI.
full-configuration Show full configuration.

FA0AWS-AWS-Vinod # show
config system global
    set hostname FA0AWS-AWS-Vinod
end
config system interface
    edit port1
        set type physical
        set mode dhcp
        set allowaccess https ping ssh http
        config ipv6
        end
    next
end
config router static
end
config router static6
end
config system dns
end
config system ntp
end
config system admin
    edit admin

```

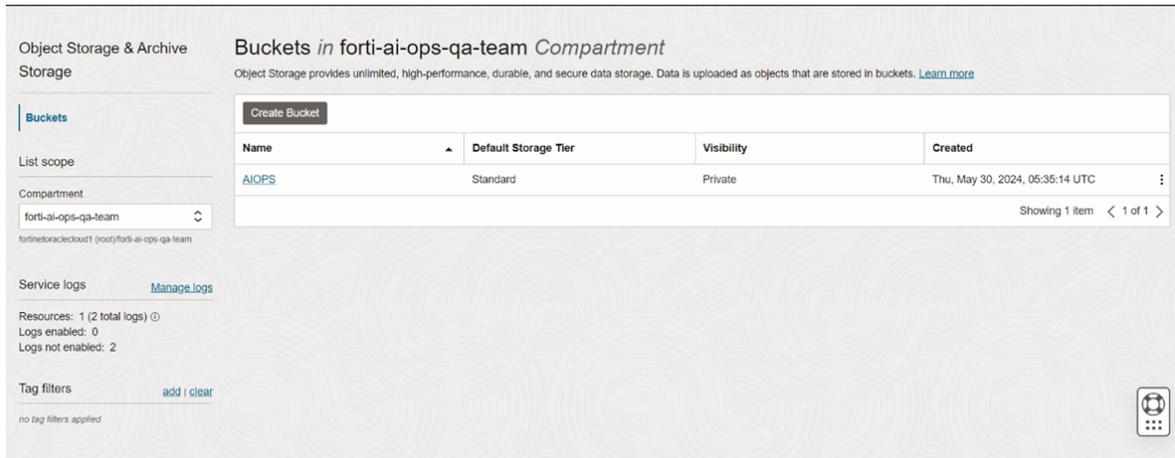
11. From release 3.0.0, by default AWS AIOps `instance-id` will be the password for the AIOps CLI/GUI. After login through CLI/GUI you will prompt to change the password.

## Oracle Cloud Infrastructure (OCI)

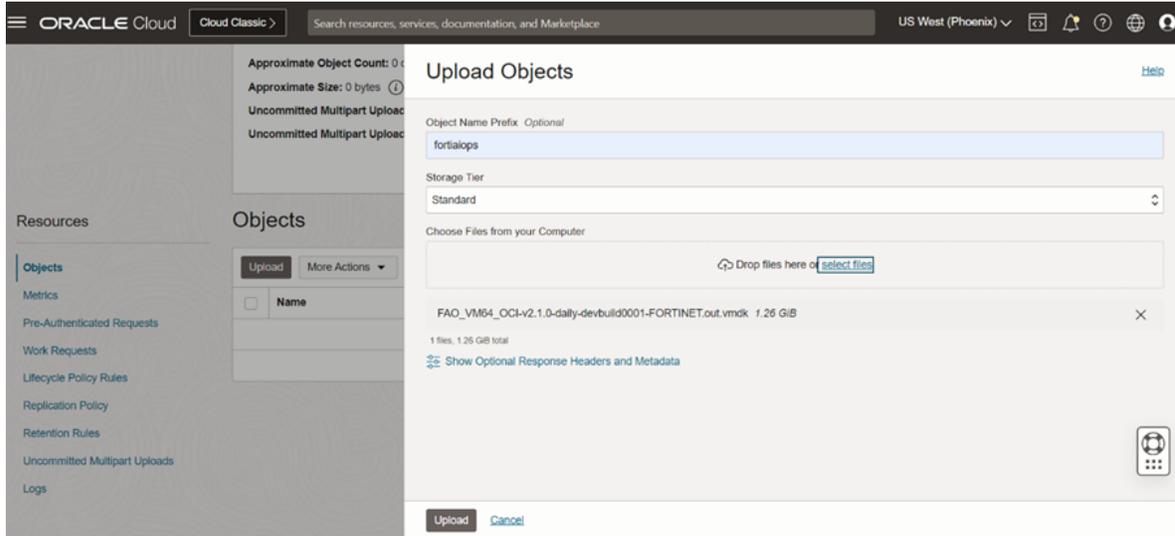
Perform the following steps to deploy FortiAIOps on OCI, for more information, see OCI Documentation.

1. Obtain the file `FAO_VM64_OCI-v2.1.0-[build0xxx].out.oci.zip` from Fortinet.
2. To create a Bucket in OCI, log in to your OCI account and navigate to the **Object Storage & Archive Storage > Buckets > Create Bucket** in the OCI portal.
3. Enter a unique name for your *Bucket* and select the relevant *Compartment*.

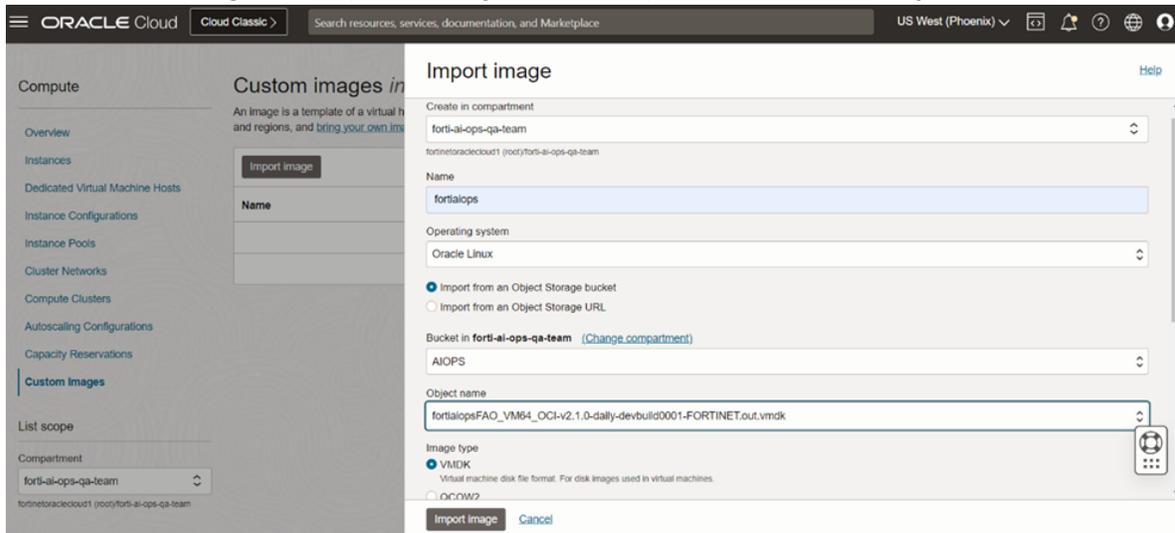
4. Click **Create** or **Confirm**.



5. Extract the file *FAO\_VM64\_OCI-v2.1.0-[build0xxx].out.oci.zip* to obtain *FAO\_VM64\_OCI-v2.1.0-[build0xxx].vmdk*. Upload the *.vmdk* file in the bucket.

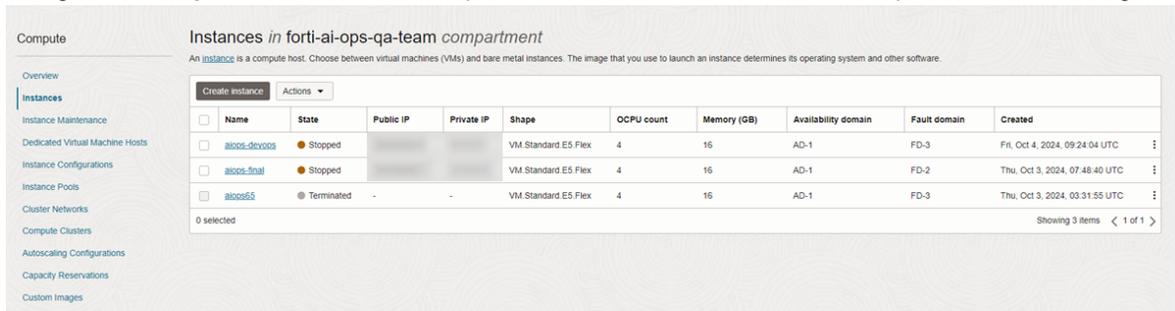


6. Select **Custom Images** and import the image; select the uploaded VMDK file in **Object Name**.



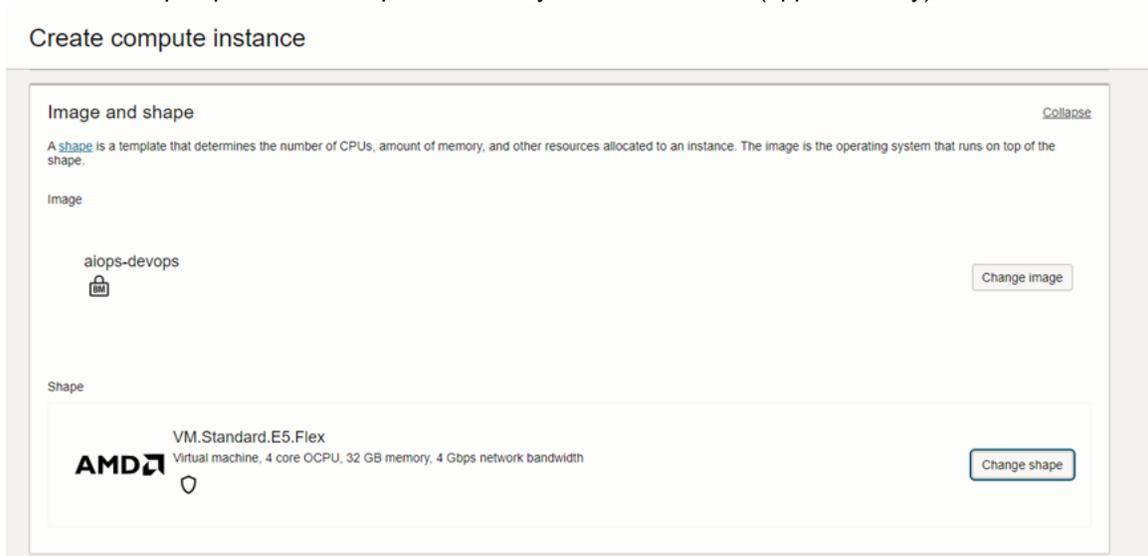
7. Search for the **Block Volume Service** and create block volume with 500 GB using the **Custom** option.

8. Navigate to **Compute Service** in the OCI portal and create an instance with the uploaded custom image.

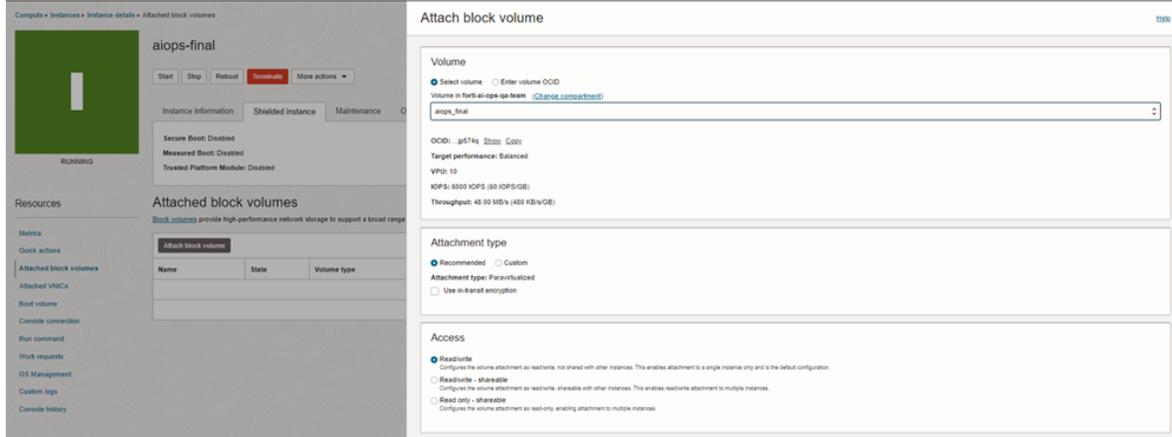


9. Click **Create instance** and select the required **Image** and **Shape Series**. Set the number of CPUs to 4 and RAM to 32 GB, as per your requirements. Wait for the import process to complete. This may take 6-10 minutes (approximately).

Wait for the import process to complete. This may take 6-10 minutes (approximately).



10. Save any private keys or SSH keys that you may need to access the instance.
11. After creating an instance, navigate to **Attached block volumes** and select the block volume created earlier. The recommended attachment type is **Paravirtualized**.



12. Reboot the instance after attaching the volume.

# Deploying FortiAI Ops on Hardware Platforms

FortiAI Ops can be deployed on the following hardware platform:

- [FortiAI Ops 500G \(FAO-500G\)](#)

## Deploying FortiAI Ops 500G (FAO-500G)

The FAO-500G hardware platform comes with FortiAI Ops pre-installed. Perform the following steps to deploy and configure the device.

- [Initial Configuration](#)
- [Accessing the GUI](#)

### Initial Configuration

After setting up and mounting the appliance on the rack, connect to the FortiAI Ops 500G CLI using the console port and perform the following steps. See, *FortiAI Ops 500G Quick Start Guide*.

1. On the console Log in as an admin user with the username admin. A password is not required. You will be prompted to configure a new password after the initial login.



This CLI password is same as the GUI password. The default username for logging into GUI is admin and there is no password.

---

2. Verify the dynamically assigned IP address using the command: `get system interface`
3. Configure a static IP address (recommended) using the command: `config system interface`

For a complete list of supported CLI commands, see [Command Line Interface \(CLI\) Reference](#).

### Accessing the GUI

After completing the initial CLI configuration, you can access the FortiAI Ops GUI.

1. Open a web browser and enter the following URL.  
`https://<fortiaaiops_server_IP>`  
Replace `<fortiaaiops_server_IP>` with the static IP address you configured.
2. Log in using the default GUI credentials. Enter the username as admin. There is no password for the initial login.

# Command Line Interface (CLI) Reference

The following commands are supported for FortiAIOps.

- [Configuration Commands](#)
- [Show Commands](#)
- [Diagnostic Commands](#)
- [Management Commands](#)
- [System Information](#)
- [Diagnostic Tool Commands](#)

## Configuration Commands

The following commands are available to configure FortiAIOps.

Command	Parameters	Description
<b>config system interface</b>	edit <interface port>	Edit the interface port and enter the port setting mode in the CLI.
	?	Displays the various parameters available for this command.
	abort	Aborts the port setting mode and exits.
	next	Returns to the interface configuration mode.
	set mode <static DHCP>	Configure the port IP address mode; static or DHCP.
	set ip <IP/netmask>	Configure the port IP address (static).
	set allowaccess <ssh https http ping>	Configure the admin access type; SSH, THHP, HTTPS, Ping, or SNMP.
	get	Obtain the system information.
	show	Displays the current interface configuration details.

Command	Parameters	Description
	end	Exit the port configuration mode; the configuration changes then take effect.
<b>config system</b>	admin	Configures admin users. edit admin - Edit admin user details. set password - Set the admin user password.
	dns	Configures DNS and enters the DNS configuration mode. set primary - Configures the primary DNS server.
	global	Configures global settings and enters the global configuration mode.
	interface	Configures the system interface.
	ntp	Configures system NTP information. <ul style="list-style-type: none"> <li>set ntpsync - Enable/disable the system time by synchronizing with the NTP server.</li> <li>set ntpserver - Configure the IP address or hostname of the NTP servers (up to 10).</li> </ul>

Command	Parameters	Description
	lldp-transmission	<p>LLDP is enabled by default on all interfaces, global and per interface settings. Run the following commands to manage LLDP.</p> <pre> config system global     set lldp- transmission     enable &lt;enable LLDP&gt;     disable &lt;disable LLDP&gt; </pre>

### Show Commands

The following commands can be used for viewing configuration information.

Command	Parameters	Description
<b>show</b>		Displays bootstrap configuration.
<b>show full-configuration</b>		Displays all configuration (includes defaults).

### Diagnostic Commands

The following commands are used to diagnose and troubleshoot issues.

Command	Parameters	Description
<b>diagnose</b>	?	Displays the various parameters available for this command.
	hardware ?	Displays the various parameters available for this command.
	hardware deviceinfo disk	Displays information of all disks.
	hardware deviceinfo nic	Display the available list of NICs.

Command	Parameters	Description
	<code>hardware deviceinfo &lt;nic name&gt;</code>	Displays information of a specific NIC.
	<code>hardware deviceinfo tpm</code>	Displays Trusted Platform Module (TPM) module information.
	<code>hardware lspci</code>	Displays the PCI parameters.
	<code>hardware lspci tree</code>	Displays PCI bus tree.
	<code>hardware lspci verbose</code>	Displays detailed information about all devices.
	<code>hardware sysinfo ?</code>	Displays the various parameters available for this command.
	<code>hardware sysinfo cpu</code>	Displays detailed information for all installed CPU(s).
	<code>hardware sysinfo interrupts</code>	Displays details of system interruptions.
	<code>hardware sysinfo iomem</code>	Displays the memory map of I/O ports.
	<code>hardware sysinfo ioports</code>	Display the address list of I/O ports.
	<code>hardware sysinfo memory</code>	Displays the system memory details.
	<code>hardware sysinfo mtrr</code>	Displays the memory type range register.
	<code>hardware sysinfo slab</code>	Displays the memory allocation information.
<b>diagnose system</b>	<code>top all</code>	Displays the top threads information.
	<code>top cpu</code>	Displays processes with the highest CPU usage at the top of the list.
	<code>load</code>	Displays system uptime and load information.
	<code>process &lt;cpu   mem&gt; &lt;num&gt;</code>	Displays the processes sorted by specified criteria (default 10 processes).

Command	Parameters	Description
	<code>fsck harddisk</code>	Check and repair the file system, then reboot the system.
	<code>raid hwinfo</code>	Displays raid controller information.
	<code>raid hwinfodetail</code>	Displays detailed raid controller information.
	<code>raid migrate</code>	Migrate to a new disk.
	<code>raid rebuild</code>	Rebuild the existing disk.
	<code>disk attributes</code>	Displays vendor specific Self-Monitoring, Analysis, and Reporting Technology (SMART) attributes.
	<code>disk errors</code>	Displays SMART error logs.
	<code>disk health</code>	Displays SMART health status.
	<code>disk info</code>	Displays SMART information.

### Management Commands

The following enable some management and other operations in FortiAIOps.

Command	Parameters	Description
<b>execute</b>	?	Displays the various parameters available for this command.
	<code>date &lt;YYYY-MM-DD&gt;</code>	Set the date in the <i>YYYY-MM-DD</i> format.
	<code>time &lt;HH:MM:SS&gt;</code>	Set the time in the <i>HH:MM:SS</i> format.
	<code>factoryreset reboot</code>	Reset to the factory default settings and reboot the system.
	<code>factoryreset shutdown</code>	Reset to the factory default settings and shutdown the system.
	<code>formatlogdisk</code>	Format the log disk.
	<code>ping &lt;destination&gt;</code>	Ping the host name or IPv4 address.

Command	Parameters	Description
	<code>traceroute &lt;destination&gt;</code>	Traceroute of the host name or IPV4 address.
	<code>reboot</code>	Reboot the system.
	<code>shutdown</code>	Shut down the device.
	<code>backup config ftp &lt;path&gt; &lt;server fqdn ipaddr&gt;[:port] [ftp_user] [ftp_passwd]</code>	Creates a remote backup of the configuration file from an FTP server.
	<code>backup config tftp &lt;filename&gt; &lt;server fqdn ipaddr&gt;</code>	Creates a remote backup of the configuration file from a TFTP server.
	<code>restore image ftp &lt;filename string&gt; &lt;ftp server&gt;[:port] [ftp_user] [ftp_passwd]</code>	Restores the firmware image from an FTP server using specific details.
	<code>restore image tftp &lt;filename string&gt; &lt;tftp server&gt;</code>	Restores the firmware image from a TFTP server.
	<code>dns-no-domain</code>	<p>The <i>DNS No Domain</i> events are disabled in FortiAIOps, by default. Run the following commands to enable these events.</p> <pre>execute dns-no-domain   disable &lt;disable the events&gt;   enable &lt;enable the events&gt;   status &lt;show the current setting&gt;</pre>
	<code>sensor list</code>	Displays sensor list and status from IPMI.
	<code>format disk 0</code>	Create RAID 0 and format disk.
	<code>format disk 1</code>	Create RAID 1 and format disk.
	<code>format disk 5</code>	Create RAID 5 and format disk.
	<code>format disk 10</code>	Create RAID 10 and format disk.

## System Information

The following commands information related to the system configurations.

Command	Parameters	Description
<b>get system</b>	?	Displays the various parameters available for this command.
	status	Displays system status, such as, version, serial number, BIOS details, time stamp, hostname, and so on.
	admin	Displays the configuration details of the admin users.
	admin <username>	Displays the configuration details of a specific admin user.
	dns	Displays the DNS configuration.
	global	Displays the configuration details of global attributes.
	interface	Displays the interface details, status, and IP address.
	interface <port>	Displays the port details, status, and IP address.
	ntp	Displays the configuration details and status of NTP server.

### Diagnostic Tool Commands

Use the following command to run diagnostics using the CLI:

Command	Parameters	Description
<b>execute diagnostics</b>	all System	Executes all application and logs diagnostics.
	download <ftp_server>[:port] [ftp_user] [ftp_passwd] [ftp_path]	Download diagnostics file from the local system to a remote destination.

# Dashboard

The FortiAIOps dashboard provides a graphical overview of network elements, resource usage, AI insights, and Service Assurance.

The interactive graphs and charts allow you to navigate into detailed views of network statistics for analytical and monitoring purpose.

The data on this dashboard is automatically refreshed every 60 seconds; the following options are available to manage the auto-refresh feature for this page.

- Click  to manually refresh data.
- Click  to pause the auto-refresh.
- Click  to resume the auto-refresh.
- Select the time range from the drop-down. Choose from 10 minutes, 1 hour, 4 hours, 6 hours, 1 day, 1 week.

## Adding a Widget to the Dashboard

You can add widgets based on your requirements to the dashboards.

To add a widget to the dashboard:

1. Select the dashboard you want to modify.
2. Click **Add Widget** to add required widgets from the widget library.
3. In the the **Manage Dashboard Widgets** pane, hover on the widget name to select the required widget and click +.  
For more information on widget library, see [Managing Dashboard Widgets](#)
4. Click **Close** to close the pane once the widgets are selected.
5. Click **Reset dashboard layout** to clear all the widgets added to the dashboard.

## Summary

This dashboard provides visual summary of key system information, network elements, and resource usage.

The following charts are available:

- [System Information](#)
- [System Resource Summary](#)
- [Summary](#)
- [Overall Network Health](#)
- [Top 5 Problematic Devices](#)
- [Impacted Clients Trend](#)
- [FortiGates](#)
- [FortiGate Events](#)

- [FortiGates CPU Usage and FortiGates Memory Usage](#)
- [High Latency FortiGates](#)

### System Information

This widget provides generic information about the FortiAIOps such as the host name, firmware version, system ID, current system time, uptime, and the IP address.

System Information

Host Name	FAOESX
Firmware	v3.0.0- <span style="background-color: #eee; padding: 0 5px;">[REDACTED]</span>
System ID	97d24 <span style="background-color: #eee; padding: 0 5px;">[REDACTED]</span>
System Time	<a href="#">2025/06/09 20:14:20</a>
Uptime	<a href="#">2d:21h:36m:43s</a>
IP Address	10.32.8.25

### System Resource Summary

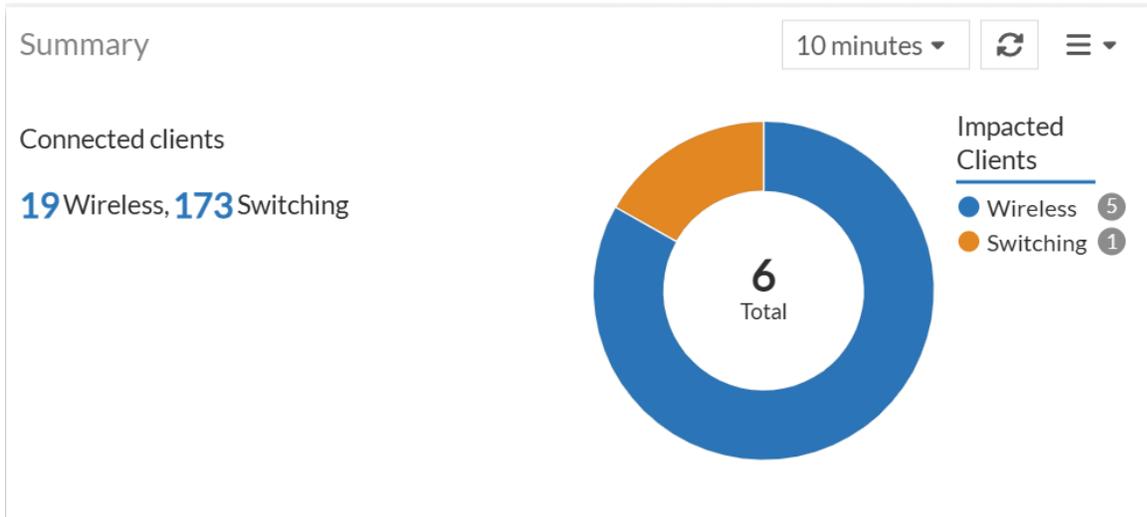
This widget provides an overview of the current system resource usage for FortiAIOps. The statistics include the total available and used disk space (HDD and SSD), the number of CPU cores used and the average usage, and total available and used memory. Click on the trends icon to view the resource usage summary; filter data based on the selected duration or customized time slot. You can select a time window or define a **Custom range**. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**. The minimum, maximum, and average values are displayed when a time interval of more than 6 hours is selected.

System Resource Summary

Disk Usage	200.07 GiB	Used 200.07 GiB of total 491 GiB
CPU Usage	35.92%	8 CPU cores with average usage of 35.92%
Memory Usage	7.97 GiB	Used 7.97 GiB of total 31 GiB

### Summary

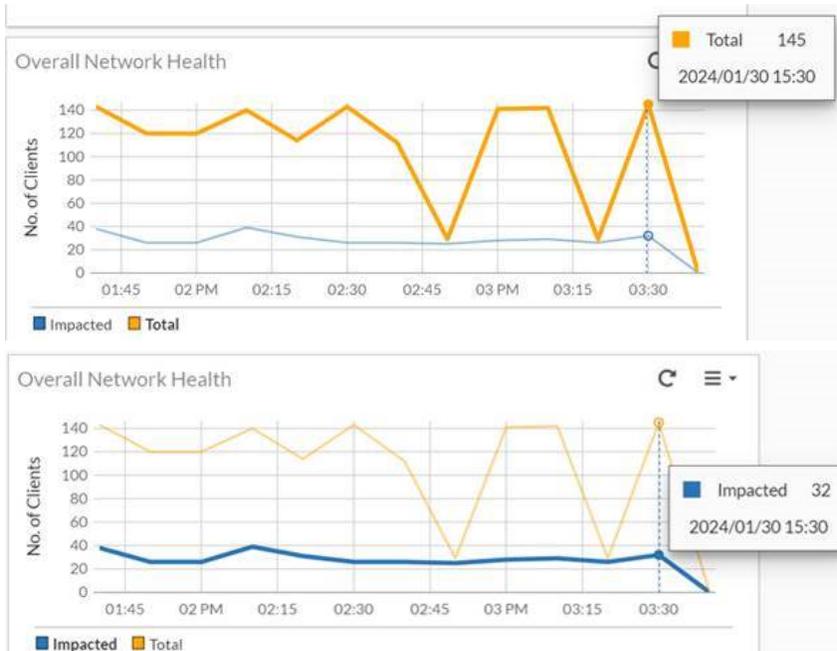
This chart displays details of the various devices in your network that are associated with impacted clients, that include the wireless, switching, and WAN clients. For more information, see [Impacted Devices](#).



### Overall Network Health

This panel displays the overall client count trends and health status of all wireless, switching, and WAN clients connected to your network, at specific intervals of 10 minutes. You can view the total number of clients in your network and the number of impacted clients at a given point in time.

Hover over the line to view the total number of clients and the line to view the number of impacted clients. In this example, at 03.30 hours, a total of 145 clients were present in the network of which 32 clients are impacted.



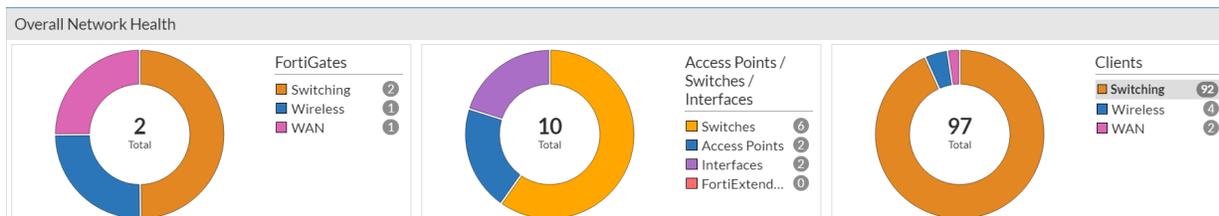
Click on any given time interval for total clients to view the **Connected Clients** panel. The data displayed in tabular format in all the monitor dashboard pages is filterable based on columns, you can group data by a specific column or filter data for specific values.

MAC Address	FortiGate	IP Address	AP Name	SSID	Device
			FP221	simulator2.4G	
			FP221	simulator2.4G	
			FP221	simulator2.4G	

Click the **AP Name** to view the FortiAP details and the operational status of the radios.

Serial Number		
IP Address		
Status	Online	
Firmware Version	FP231F-v7.4.2-build0634	
Radio 1	Band	2.4 GHz
	Channel	11
	Channel Utilization	97%
	Client Count	1
	Operating TX Power	10 dbm
Radio 2	Band	5 GHz
	Channel	36
	Channel Utilization	72%
	Client Count	2
	Operating TX Power	22 dbm
MAC Address		

Click on any given time interval for total clients to view the **Overall Network Health** panel. This page displays details of the various devices in your network that are associated with impacted clients. The number of devices are listed for each category, you can click on any of these or click on the respective section in the donut chart to view details. The data is displayed in the following three panels. Refer to [Impacted Devices](#) for more descriptions.



Switching Clients

Impacted SLAs	MAC Address	FortiGate Serial Number	FortiGate IP Address	FortiSwitch Name	FortiSwitch Serial Number	Con
2FLB2 (71)						
Switch Health and Uptime		FGT3K020917801177	10.33.4.130	SW4NCF3K13000076	SW4NCF3K13000076	14
Switch Health and Uptime		FGT3K020917801177	10.33.4.130	2FLB2	SW4NCF4K14000044	14

**FortiGates** - Displays the number of deployed FortiGate controllers with impacted wireless, switching, and WAN clients.

- **Access Points/ Switches/ Interfaces/FortiExtenders** - Displays the number of devices, that is, APs, interfaces, FortiExtenders, and switches with impacted clients.
- **Clients** - Displays the number of impacted clients for the wireless, switching, and WAN.

Click on the impacted SLA to view the device topology.

### Top 5 Problematic Devices

This panel displays the 5 devices with the highest number of impacted clients. The devices displayed here can be FortiAPs, FortiSwitches, FortiExtenders, and/or interfaces. The device name and the number of associated clients that are impacted are displayed in descending order.

Top 5 Problematic Devices	
🗑️ S248E1 (2001284)	Impacted Clients: 37
🗑️ 2FLB2	Impacted Clients: 35
🗑️ S248E1 (2001284)	Impacted Clients: 20
🗑️ S248E1 (2001284)	Impacted Clients: 16
🗑️ SuperDesk_233F	Impacted Clients: 12

Click on the device name to view details.

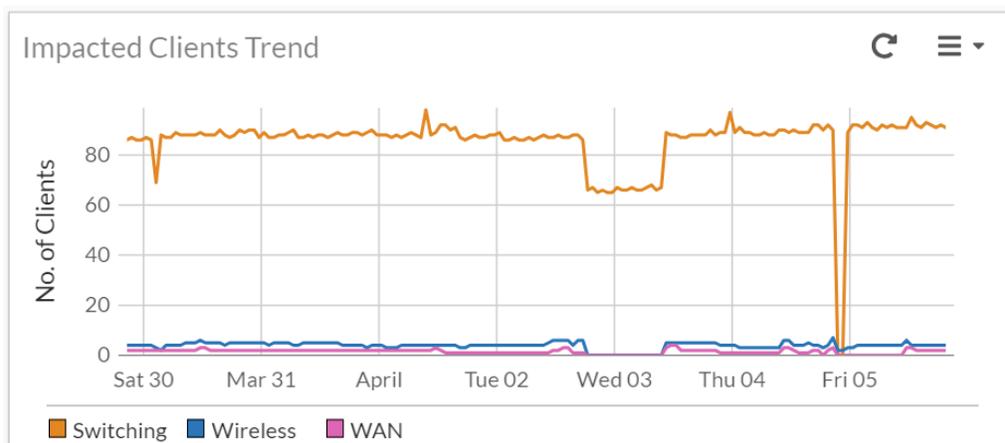
Problematic device

FortiSwitch Serial Number == S248E1 (2001284) × FortiGate Serial Number == FGT1K10917601177 × 🔍 Search filterable columns

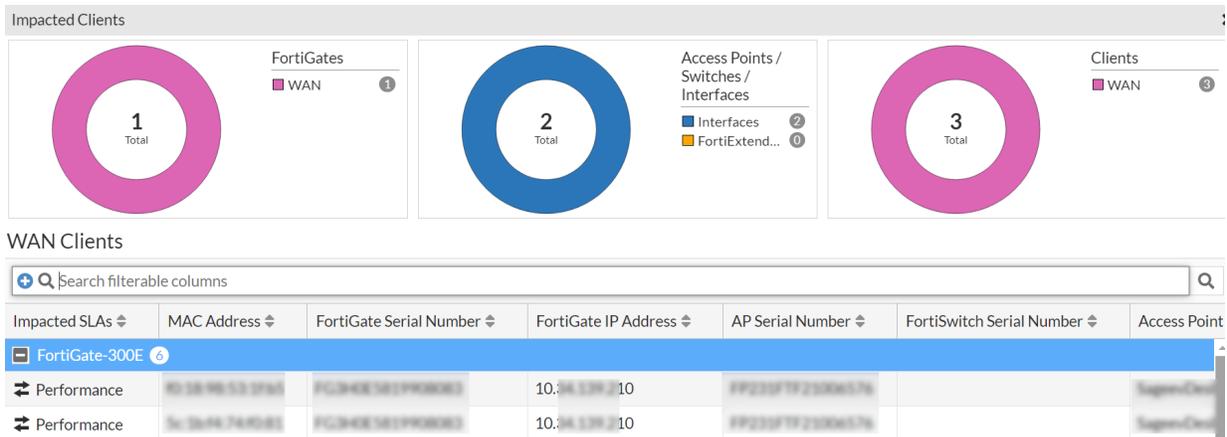
Impacted SLAs	MAC Address	FortiGate Serial Number	FortiGate IP Address	FortiSwitch Name	FortiSwitch Serial Number
2FLB2 (37/93)					
↕ Switch Health and Uptime	8656.294c.7a2a	FGT1K10917601177	10.33.4.130	S248E1 (2001284)	S248E1 (2001284)
↕ Switch Health and Uptime	8656.2937fa.58	FGT1K10917601177	10.33.4.130	S248E1 (2001284)	S248E1 (2001284)
↕ Switch Health and Uptime	52538a42440f	FGT1K10917601177	10.33.4.130	S248E1 (2001284)	S248E1 (2001284)

### Impacted Clients Trend

The **Impacted Clients Trend** panel displays data trends for the total number of impacted clients for switching, wireless, and WAN, over a period of time.



Click on any given time interval for the impacted clients to view the **Impacted Clients** page. This page displays details of the various devices in your network that are associated with impacted clients. The following image depicts an example of the impacted WAN clients.



The data is displayed in the following three panels. For more information on the data and fields displayed on this page, see [Impacted Devices](#).

- **FortiGates** - Displays the number of deployed FortiGate controllers with impacted wireless, switching, and WAN clients.
- **Access Points/ Switches/ Interfaces/FortiExtenders** - Displays the number of devices, that is, APs, interfaces, FortiExtenders, and switches with impacted clients.
- **Clients** - Displays the number of impacted clients for the wireless, switching, and WAN.

### FortiGates

Displays the total number of FortiGate controllers in your network and their status (*Online/Offline*). Click on the chart to view more details of the controllers. For more information, see [Managing FortiGates](#).

### FortiGate Events

Displays the FortiGate events at a given time and categorizes them based on the severity level as, *Information, Debug, Notice, Warning, Error, Critical, Emergency, and Alert*. You can select the period to view the data (10 or 30 minutes, 1 or 12 hours, or 1 day).

The Event Details window includes a search bar with "Level = notice" selected and a search icon. Below is a table of event columns:

Timestamp	Level	Action	Message	SSID	Station MAC Address	Log ID	Fortigate Serialnumber
-----------	-------	--------	---------	------	---------------------	--------	------------------------

### FortiGates CPU Usage and FortiGates Memory Usage

Displays the real-time FortiGate CPU and memory usage at a given time and categorizes it as *Low, Medium, High, and Critical*. You can select the period to view the resource usage (10 or 30 minutes, 1 or 12 hours, or 1 day). Click on the graph to view the details.

FortiGate CPU Usage							
CPU Usage = 0 -> 29							
Timestamp	FortiGate Name	Firmware Version	Model	Online APs	Offline APs	Clients	
2023/04/05 13:15:46		v7.2.3	FGVM64	1	14	0	
2023/04/05 13:15:49		v7.2.4	FG3H0E	7	10	3	8.

FortiGate Memory Usage							
Memory Usage = 30 -> 59							
Timestamp	FortiGate Name	Firmware Version	Model	Online APs	Offline APs	Clients	Throughput

### High Latency FortiGates

This widget displays the FortiGates with high latency determined based on the timed out API request. Hover over the graph to view the number of FortiGates with high latency at a given period of time and click on the graph to view the details of the FortiGates. You can select the period to view the FortiGates (10 or 30 minutes, 1 or 12 hours, or 1 day).

**Note:** This is not a default widget. To add it to your dashboard, click **Add Widget** and select it from the **Manage Dashboard Widgets** pane.

High Latency FortiGates				
Date/Time	Hostname	FortiGate IP Address	FortiGate Timeout	Failed API Count
2024/04/03 00:51:54	FortiGate-60E	10.17.24.11	3000	1
2024/04/03 02:22:21		10.17.44.9	3000	4
2024/04/03 02:31:54	HA-Primary	10.16.139.225	3000	7

Select a particular FortiGate and click **View stats** to view the details of the timed out APIs.

Failed API details	
Date/Time	API Endpoint
2024/04/03 01:11:54	/api/v2/monitor/forti-gate-60e/select?count=5000
2024/04/03 01:21:54	/api/v2/monitor/forti-gate-60e/select?count=5000
2024/04/03 01:51:54	/api/v2/monitor/forti-gate-60e/select?count=5000

## Wireless

The **Wireless** page gives you a complete picture of your wireless network. It displays key metrics such as the status, CPU usage, and memory usage of your Access Points, along with WIDS events for a selected time period. It also provides wireless client insights, a summary of rogue APs, and details of the top impacted applications and a full list of applications by usage.

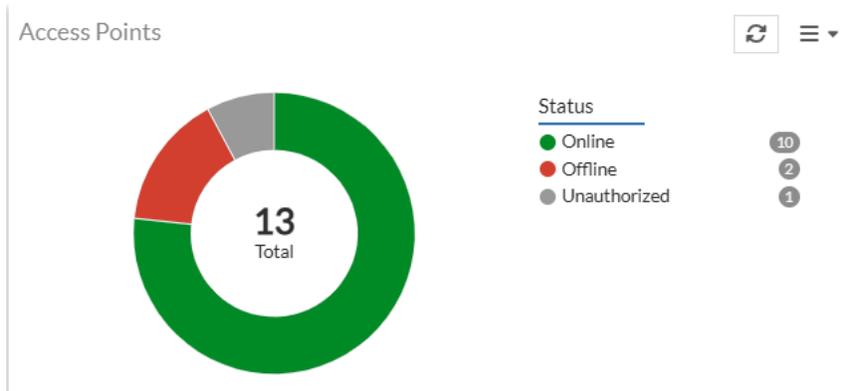
The following charts are available in the **Wireless** page:

- [Access Points](#)
- [WIDS Events](#)

- [Access Points CPU Usage](#)
- [Access Points Memory Usage](#)
- [Wireless](#)
- [Top 3 Impacted Apps](#)
- [Wireless Insights](#)
- [Rogue APs](#)
- [Applications by Usage](#)

### Access Points

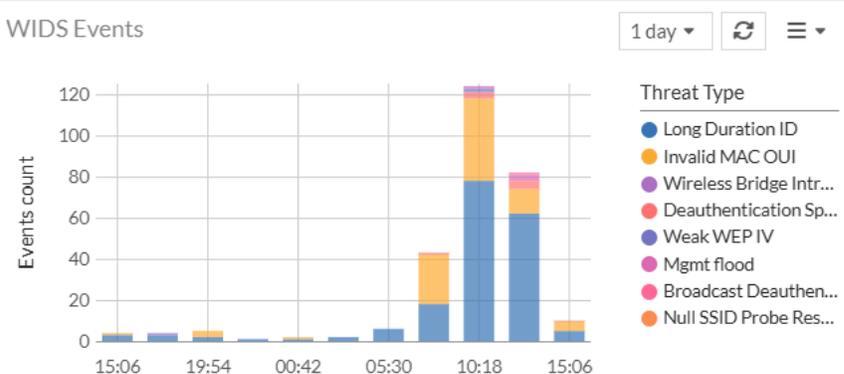
This chart displays the total number of access points in your network and their status (Online, Offline, Waiting for Authorization, or Unknown).



Click the chart for detailed information about the Access Points in use. For more information, see [Access Points](#).

### WIDS Events

This chart displays the threat type and the number of events for each type of threat.



Click on a Threat Type to open WIDS Events pane with details for the filtered threat type.

WIDS Events							
Threat Type == Long Duration ID							
Date/Time	Level	Action	Message	SSID	Station MAC Address	Log ID	FortiGate Serial
2025/06/09 12:40:37	■	wids-detect-first	WIDS long_dur: rts/NO from ea:57:af:30:85:56 chan 64...			0104043534	FG3
2025/06/09 12:38:31	■	wids-detect-first	WIDS long_dur: rts/NO from 96:5d:c6:52:fc:14 chan 36 d...			0104043534	FG3
2025/06/09 12:36:07	■	wids-detect-first	WIDS long_dur: rts/NO from 0a:0e:76:62:1d:64 chan 15...			0104043534	FG3

Double-click on an event to view more details

**General**

Absolute Date/Time: 2025/06/09 12:40:37

Time: 12:40:37

Virtual Domain: root

Log Description: Wireless long duration attack detected

**Source**

MAC Address: N/A

Interface: N/A

SSID: N/A

User: N/A

**Action**

Action: wids-detect-first

Reason: N/A

**Security**

Level: ■

Security Mode: N/A

Encryption: N/A

**Cellular**

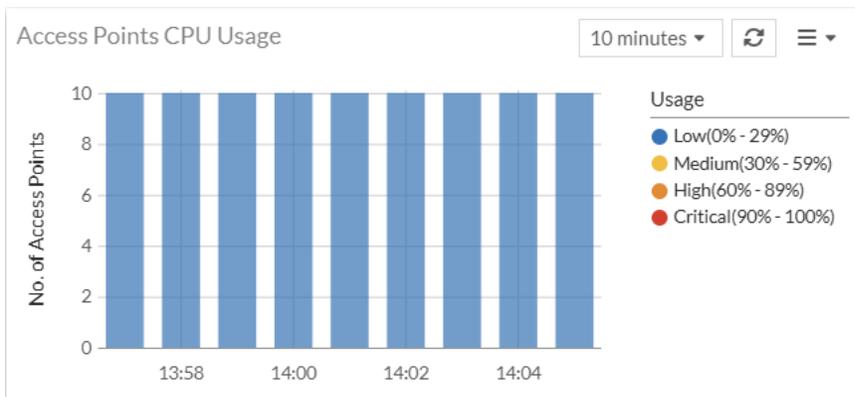
Serial Number: N/A

**Event**

Serial Number: N/A

### Access Points CPU Usage

This chart displays the real-time FortiAP CPU usage at a given time and categorizes it as Low, Medium, High, and Critical. You can select the period to view the resource usage (10 or 30 minutes, 1 or 12 hours, or 1 day).



Click on the CPU usage chart to view more details.

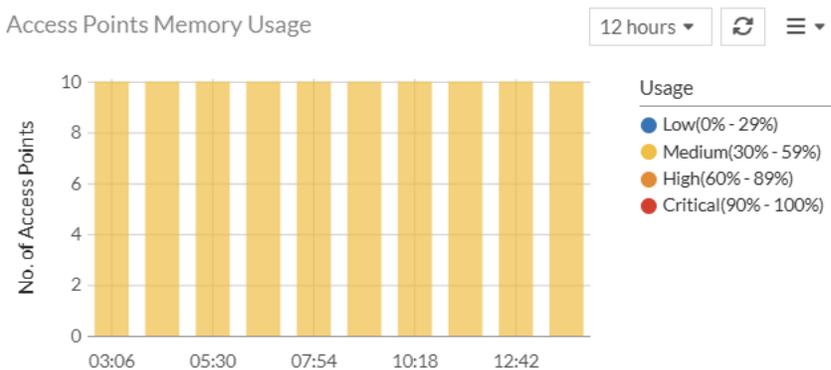
Access points Health

Filter: CPU Usage = 0 -> 29

	Date/Time	FortiGate Name	AP Name	Memory Usage	CPU Usage	Temperature 1	Temperature 2	Temperature 3	VDOM
<input type="checkbox"/>	2025/06/06 14:05:23	office	(FAP 4...	58%	6%	46	47	45	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(6.83x...	41%	11%	48	48	47	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(1.83x...	42%	11%	44	44	44	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(8.83x...	41%	10%	48	48	48	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(2.FAP...	40%	9%	49	50	49	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(7.83x...	41%	6%	51	50	49	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(9.83x...	41%	9%	45	46	45	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(4.83x...	41%	10%	48	48	48	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(83x_3l...	39%	9%	45	45	44	root
<input type="checkbox"/>	2025/06/06 14:05:23	office	(3.83x...	41%	11%	51	51	50	root

### Access Points Memory Usage

This chart shows real-time FortiAP memory usage, categorized into Low, Medium, High, and Critical levels. You can select the viewing period to see resource usage over 10 or 30 minutes, 1 or 12 hours, or 1 day.

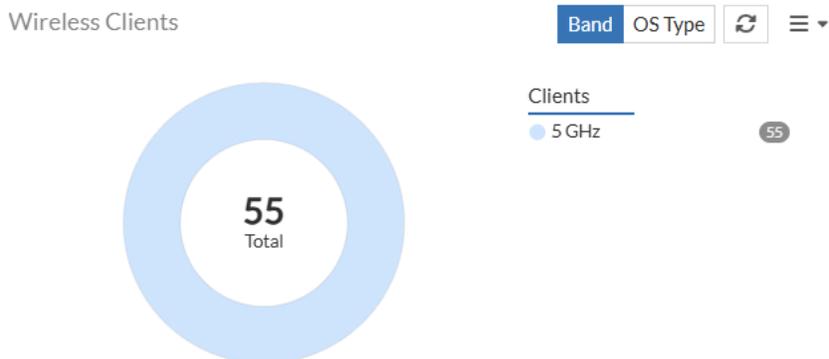


Click on the memory chart to view more details.

Access points Health										
Memory Usage = 30 -> 59										
Search filterable columns										
	Date/Time	FortiGate Name	AP Name	Memory Usage	CPU Usage	Temperature 1	Temperature 2	Temperature 3	VDOM	
<input type="checkbox"/>	2025/06/06 05:25:11	office	(*) 9.83: [AP Name]	40%	8%	52	52	51	root	
<input type="checkbox"/>	2025/06/06 05:24:10	office	(*) 3.83: [AP Name]	40%	11%	53	54	52	root	
<input type="checkbox"/>	2025/06/06 05:21:11	office	(*) 2.FA: [AP Name]	40%	10%	55	55	54	root	
<input type="checkbox"/>	2025/06/06 05:05:11	office	(*) 8.83: [AP Name]	40%	9%	52	53	52	root	
<input type="checkbox"/>	2025/06/06 05:00:11	office	(*) 4.83: [AP Name]	40%	12%	53	52	52	root	
<input type="checkbox"/>	2025/06/06 04:51:11	office	(*) 7.83: [AP Name]	40%	6%	54	54	53	root	
<input type="checkbox"/>	2025/06/06 04:49:11	office	(*) 1.83: [AP Name]	41%	11%	54	54	54	root	
<input type="checkbox"/>	2025/06/06 04:42:10	office	(*) FAP: [AP Name]	56%	6%	49	49	47	root	
<input type="checkbox"/>	2025/06/06 04:34:11	office	(*) 6.83: [AP Name]	40%	9%	53	53	51	root	
<input type="checkbox"/>	2025/06/06 04:21:11	office	(*) 83X: [AP Name]	39%	10%	58	58	57	root	

### Wireless Clients

This chart displays the total number of connected clients with their Band categorization of 2.4GHz, 5GHz, and 6GHz. This panel also provides representation for clients based on the OS Type.



Click on the chart to view more details. For more information, see [Wireless Clients](#).

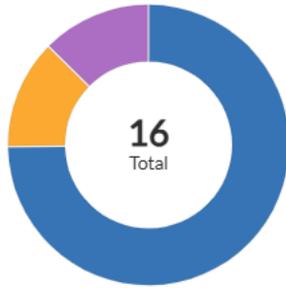
### Top 3 Impacted Apps

This panel displays the 3 conference applications running on client devices that are most impacted. These applications are Microsoft Teams calls, Google Meet, Zoom, WhatsApp audio and video call, and Apple FaceTime.

**Note:** This is not a default widget. To add it to your dashboard, click **Add Widget** and select it from the **Manage Dashboard Widgets** pane.

Top 3 Impacted Apps

1 week



- Apps
- MS Teams
  - WhatsApp
  - Zoom

To view details, click on the name of the application on the chart or the panel.

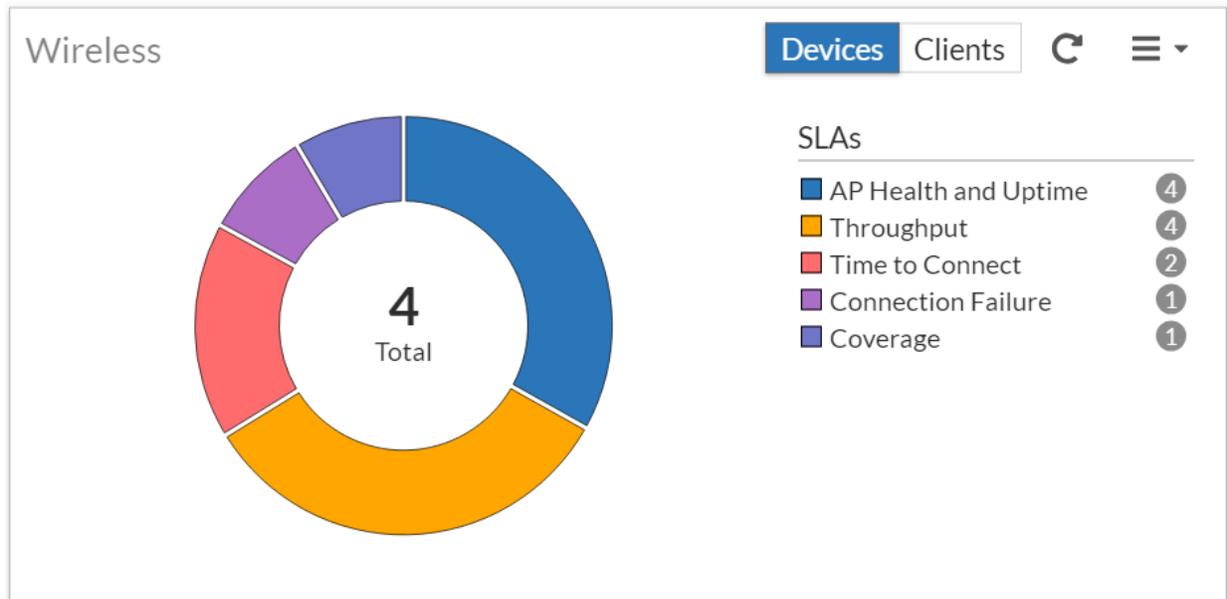
Hostname	MAC Address	Timestamp	Downtime	Username	AP Serial Number	Sessions	Bandwidth Tx	Bandwidth Rx
IND	04:cf	2025/06/03 11:36:21	1m		FP8C	1	1.73 kB/s	15.99 kB/s
IND	bc:0c	2025/06/03 11:36:21	1m		FP8C	1	6.1 kB/s	13.07 kB/s

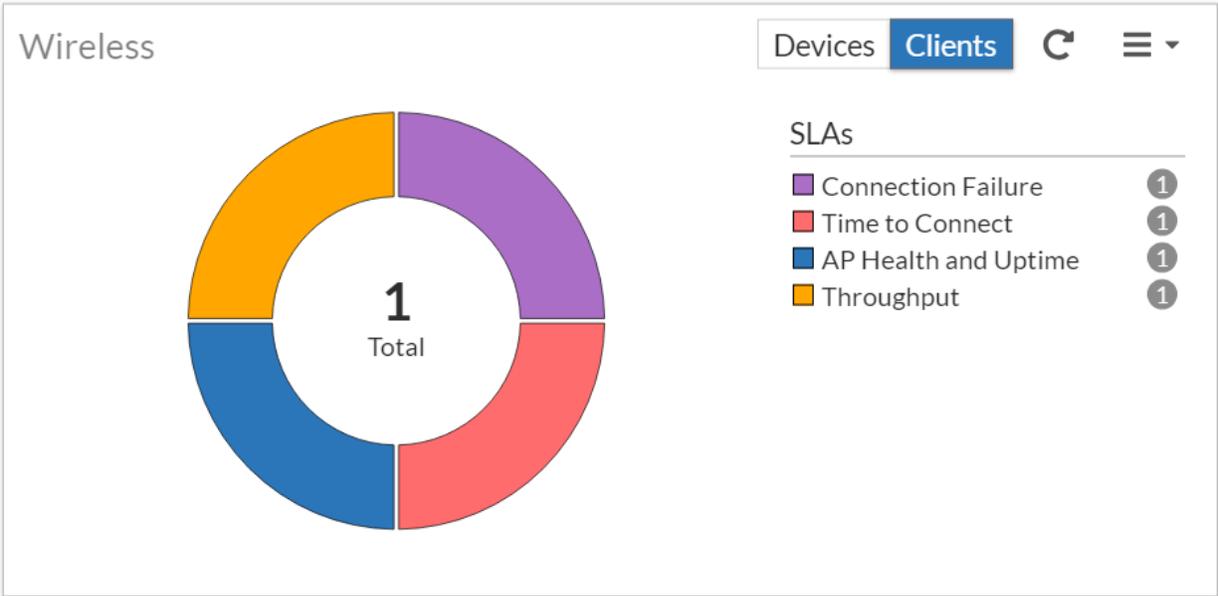
The applications are classified as impacted based on the downtime it experiences during various sessions in the selected time period. You can view the downtime for the latest session and the number of sessions. Furthermore, click on the number of sessions to view the downtime and other details for each session.

**Note:** For accurate applications related data in this panel, renew the FortiGuard license for general updates, including application control signatures for application detection.

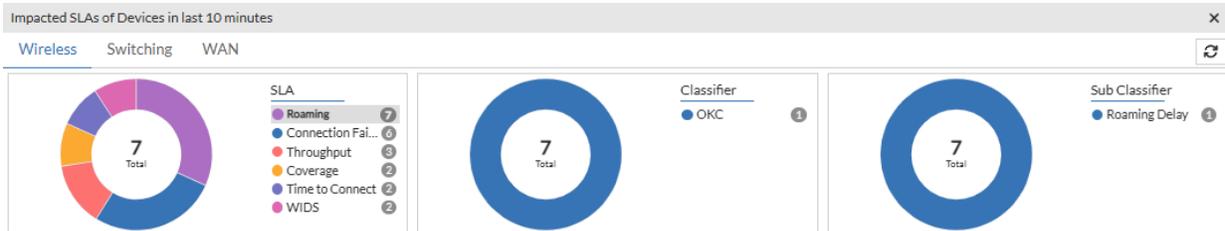
Wireless Insights

The **Wireless** panel displays the details of impacted SLAs with the associated device and client details. The **Clients** view displays the impacted client count and the **Devices** view displays the impacted AP count.





The impacted SLAs are detected and reported by FortiAI Ops with device and client details. The issues reported are categorized based on classifiers and sub-classifiers, with suggested remedial measures to curtail the SLA breaches and enhance network performance. The data displayed in this panel is for the time period set in the dashboard. If you select the **Devices** view in the Wireless panel and click on any SLA in the impacted SLAs list or click on the bar in the chart, the impacted devices details such as, AP name, AP serial number, AP IP address, AP status (online/offline) and state, FortiGate host name and serial number, and classifier and sub-classifier are displayed.

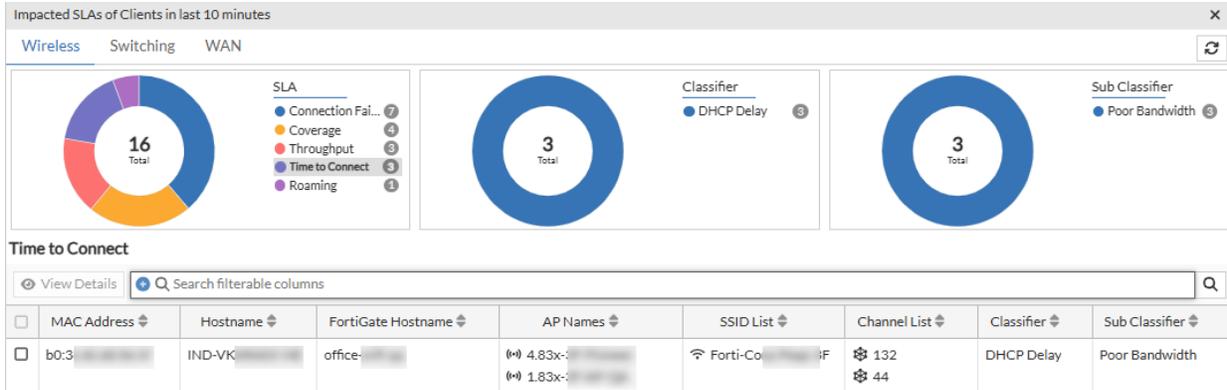


**Roaming**

View Details | Search filterable columns

	AP Names	FortiGate Hostname	AP IP address	AP Status	Classifier	Sub Classifier
<input type="checkbox"/>	6.83x-3F	office	10.3	Online	OKC	Roaming Delay

If you select the **Clients** view in the Wireless panel and click on any SLA in the impacted SLAs list or click on the bar in the chart, the impacted client details, such as, MAC address, hostname, associated SSID and channels, the AP name, IP address, and serial numbers, the associated FortiGate hostname and serial number, and the classifier and sub-classifiers are displayed.

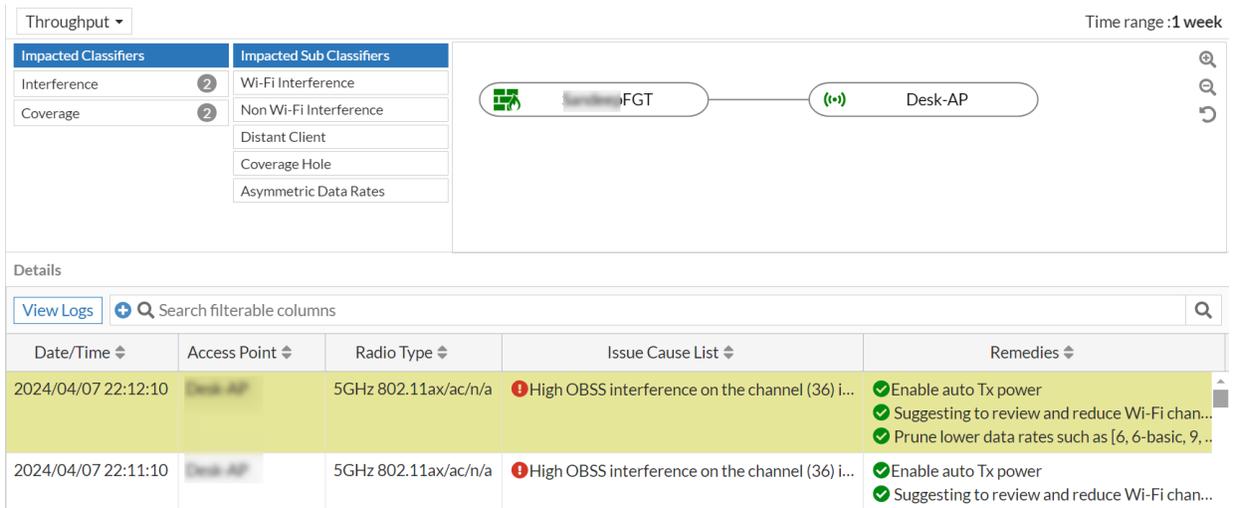


Select any row and click **View Details** to view a simplified topology with a visualization/illustration of the physical placement of devices, such as, FortiGates, FortiSwitches, and FortiAPs connected to each other in your network. This hierarchical pattern is representational; you cannot modify the placement of devices on this page. The topology displays the impacted devices, categorized based on their SLAs, classifiers, and sub-classifiers. The details of the topologies are described for each SLA in the following sections. You can toggle between different impacted SLAs on this page and filter data based on the impacted classifier and sub-classifier.

- [Throughput](#)
- [Connection Failure](#)
- [Time to Connect](#)
- [Coverage](#)
- [Roaming](#)
- [AP Health and Uptime](#)
- [WIDS](#)

### Throughput

This SLA monitors your network for low throughput conditions and reports clients/devices based on dynamically configured threshold breaches.



The **Details** table displays information such as the impacted radios for the reported classifiers and sub-classifiers, issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>Classifiers</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifiers</b>	The sub-classifier of the issue for the reported classifier.
<b>Impacted Client Count</b>	The number of impacted clients.
<b>Issue Cause List</b>	Detailed cause of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Radio</b>	The AP radio that the client associated with.
<b>Access Point</b>	The AP name that the client associated with.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>Bandwidth Rx</b>	The Rx data throughput of the impacted AP.
<b>Bandwidth Tx</b>	The Tx data throughput of the impacted AP.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial</b>	The serial number of the associated FortiGate.
<b>Radio Type</b>	The impacted radio and band information.
<b>Radio Impacted Minutes</b>	The duration (in minutes) that the radio was impacted for.

In the impacted details displayed, select a specific row of throughput failure and click **View Details**. You can view details of the impacted AP and issue diagnostics. You can view throughput logs related to **Diagnostics** with the issue description and the suggested remediation, **AP Stats** with the associated AP radio details, **AP Logs** with the time of the throughput failure event and the associated AP details, **Switch Info** with the switch port details connected to the AP, **WiFi Clients** with details of the impacted clients and a list of all WiFi clients, **Interfering APs** with the BSSID and the signal strength of the interfering APs.

Throughput Logs

- [Diagnostics](#)
[AP Stats](#)
[AP Logs](#)
[Switch Info](#)
[Neighbour APs](#)
[WIFI Clients](#)
[Interfering APs](#)

AP Info	
Name	PU431F5E19001086
Serial	PU431F5E19001086
Mac Address	00-0c-40-7c-d7-b0
IP Address	192.168.100.16
Status	connected
Version	PU431F-v6.2-build0296
FortiGate Hostname	unknown
Up Time	6 days, 2 hours, 43 minutes, 57 seconds



Issue Diagnostics	
Issue Cause	<ul style="list-style-type: none"> <li>Half Duplex mode is detected on the uplink, affecting AP's LAN capacity; half duplex is negotiated for switch port(s) configured to use auto mode - <b>85240F5C18000043</b> (port17)</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Suggesting to configure Auto negotiation for switch port(s) and also to review if switch port supports full duplex</li> </ul>

Close

**Logs** **Description**

**Diagnostics** This tab provides detailed cause of the SLA breach that impacted the client/AP/FortiGate. FortiAI Ops also suggests the remedy to resolve the issue.

Issue Diagnostics	
Issue Cause	<ul style="list-style-type: none"> <li>Asymmetric uplink and downlink rates for some clients; likely due to asymmetric power/high channel contention/retries</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Check client driver and update if necessary, also check the AP and client vicinities for any physical obstructions that can affect Wi-Fi data exchanges</li> <li>Review MBO and 802.11kvr settings for AP's SSIDs</li> </ul>

**AP Stats** This tab displays the details of the AP radio that the client associated with and the WAN status details of the AP.

Radio Info								
Q Search								
<input type="checkbox"/>	Date/Time	Radio Type	Bandwidth Tx	Bandwidth Rx	Channel Utilization(%)	Client Count	Oper Chan	Oper Tx Power
<input type="checkbox"/>	2025/06/23 12:37:23	802.11ax-5G	3.03 Mbps	1.43 Mbps	48	337	100	26 dBm

**AP Logs** This tab provides the AP event logs generated from FortiGate.

Logs		Description			
Date/Time	AP Name	Action	Message	Log Desc	
2023/11/09 12:35:48.871	43x_2F_CS_Bay	client-disconnected-by-wtp	Client 04:cf:4b:b3:3d:19 disconnected b...	Wireless client WTP disc	
2023/11/09 12:38:29.019	43x_2F_CS_Bay	auth-req	AP received authentication request fra...	Authentication request f	
2023/11/09 12:38:29.019	43x_2F_CS_Bay	auth-resp	AP sent authentication response frame t...	Authentication response	
2023/11/09 12:38:29.019	43x_2F_CS_Bay	reassoc-req	AP received reassociation request frame...	Reassociation request fr	
2023/11/09 12:38:29.019	43x_2F_CS_Bay	reassoc-resp	AP sent reassociation response frame to...	Reassociation response t	

**Switch Info**

This tab displays the configuration details of the switch port connected to the AP.

**Switch Config**

Switch Name	Interface	Duplex	Speed	Status	Collisions	Rx Bytes	Tx bytes
Switch-1	port15	full	1000	up	0	840629319	5317837210

**Neighbour APs**

This tab displays details of the detected neighbour APs by the client, for distant client & coverage hole issues.

AP Radio	Band	RSSI	RSSI Age
FP231F			
2	5 GHz	18	37
FP431F			
2	5 GHz	22	38
FP431F			
1	5 GHz	16	38

3

**WIFI Clients**

This tab provides details of the impacted clients and also lists all the clients associated with the AP.

Date/Time	Client Mac Address	SSID	Radio Type	Classifier	Subclassifier	Signal Strength
2022/05/24 13:23:42	08:00:27:00:00:00	Forti-Client	802.11ax-5G	Coverage	Asymmetric Data Rates	-54 dBm
2022/05/24 13:23:42	08:00:27:00:00:00	Forti-Client	802.11ac	Coverage	Asymmetric Data Rates	-58 dBm
2022/05/24 13:23:42	08:00:27:00:00:00	Forti-Client	802.11ac	Coverage	Asymmetric Data Rates	-58 dBm
2022/05/24 13:23:42	08:00:27:00:00:00	Forti-Client	802.11ac	Coverage	Asymmetric Data Rates	-54 dBm

0% 5

**All Clients**

Client Mac Address	Channel	Radio Type	SSID	Data Rate	Bandwidth Rx	Bandwidth Tx
08:00:27:00:00:00	60	802.11ax-5G	Forti-Client	456.00 Mbps	0	642.00 bps
08:00:27:00:00:00	60	802.11ax-5G	Forti-Client	12.00 Mbps	0	1.77 Kbps
08:00:27:00:00:00	60	802.11ax-5G	Forti-Client	797.20 Mbps	426.39 Kbps	45.10 Kbps

**Interfering APs**

This tab displays details of the interfering APs in your network.

Logs	Description															
	<table border="1"> <thead> <tr> <th>Date/Time</th> <th>BSSID</th> <th>Signal Strength</th> </tr> </thead> <tbody> <tr> <td>2023/11/07 16:23:26</td> <td>[REDACTED]</td> <td>-67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>[REDACTED]</td> <td>-67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>[REDACTED]</td> <td>-67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>[REDACTED]</td> <td>-82 dBm</td> </tr> </tbody> </table>	Date/Time	BSSID	Signal Strength	2023/11/07 16:23:26	[REDACTED]	-67 dBm	2023/11/07 16:23:26	[REDACTED]	-67 dBm	2023/11/07 16:23:26	[REDACTED]	-67 dBm	2023/11/07 16:23:26	[REDACTED]	-82 dBm
Date/Time	BSSID	Signal Strength														
2023/11/07 16:23:26	[REDACTED]	-67 dBm														
2023/11/07 16:23:26	[REDACTED]	-67 dBm														
2023/11/07 16:23:26	[REDACTED]	-67 dBm														
2023/11/07 16:23:26	[REDACTED]	-82 dBm														

### Connection Failure

Displays the failed/unsuccessful client connections based on different stages of connection to a network. For example, association failures due to low RSSI, authentication failures due to unreachable RADIUS server, DHCP failure due to a DHCP server process crash, or DNS failure due to an invalid DNS domain.

Connection Failure Time range :1 week

Impacted Classifiers	Impacted Sub Classifiers
Association <span>1</span>	DHCP NAK
Authentication <span>1</span>	Too Many Retries
DNS <span>1</span>	Poor Channel Condition
	No Domain
	Server Failure

#### Details

[View Logs](#)

Date/Time	MAC Address	Hostname	Issue Cause List	Remedies
2024/04/07 18:23:49	[REDACTED]	[REDACTED]	Wireless station DNS process failed due to n...	Check local domain name(s) configured for t...
2024/04/07 14:27:06	[REDACTED]	[REDACTED]	Wireless station DNS process failed due to n...	Check local domain name(s) configured for t...
2024/04/07 14:26:04	[REDACTED]	[REDACTED]	Wireless station DNS process failed due to n...	Check local domain name(s) configured for t...

The **Details** table displays details such as the client MAC address, the associated AP serial number and the SSID, the issue classifier/category and the sub-classifier, the issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Access Point</b>	The name of the AP that the impacted client associated with.
<b>SSID</b>	The SSID that the impacted client is associated with.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Issue Cause List</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.

Attribute	Description
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial</b>	The serial number of the associated FortiGate.
<b>User Name</b>	The impacted client user name.

Select a specific client and click **View Logs**. You can view **Client Details** such as the client device name, the name of the AP it is associated with and the time of association, associated SSID, and operational details such as the channel and the MIMO mode. The client **Status** such as the associated bandwidth (2.5GHZ/5GHZ), signal strength (RSSI), signal noise, rate of transmission discard and rate of transmission retry between the client and the AP. The **Client Logs** display the time stamp of each action and action classification as notice, warning, etc., and the action details and the associated channel.

Client Details
✕

<b>Association Time</b>	2023-11-08 10:53:57	<b>5GHz</b>	Band	<b>-72dBm</b>	Signal Strength
<b>Channel</b>	116	<b>20dB</b>	Signal Strength/Noise	<b>0%</b>	Transmission Discard
<b>FortiAP</b>		<b>2%</b>	Transmission Retry		
<b>MIMO</b>	2x2				
<b>SSID</b>	Forti-...				

**CLIENT LOGS**

Date/Time	Level	Action	Message	Channel
2023/11/08 10:53:55.125	Notice	client-denial		116
2023/11/08 10:53:54.383	Notice	client-disconnected-by-wtpp		116
2023/11/08 10:53:33.120	Notice	DHCP-ACK		-
2023/11/08 10:53:33.120	Notice	DHCP-REQUEST		-
2023/11/08 10:53:33.120	Notice	DHCP-OFFER		-
2023/11/08 10:53:12.116	Warning	DHCP-DECLINE		-
2023/11/08 10:52:57.113	Notice	DHCP-ACK		-
2023/11/08 10:52:57.113	Notice	DHCP-REQUEST		-
2023/11/08 10:52:57.113	Notice	client-authentication		116
2023/11/08 10:52:57.113	Warning	WPA-4/4-key-msg		116
2023/11/08 10:52:57.113	Warning	WPA-3/4-key-msg		116

0% 22

### Time to Connect

Displays the details of clients that breach the SLA threshold values for these stages of connection, **Association, Authentication, DHCP, and DNS**. The actual value of time taken and the configured **Time to Connect** threshold values (static/dynamic) are compared. For SLA configurations, see [Time To Connect](#)

Time to Connect ▾ Time range :1 week

Impacted Classifiers	Impacted Sub Classifiers
Authentication Delay <span>1</span>	Coverage or Load Issue
DHCP Delay <span>1</span>	Poor Bandwidth

Details

[View Logs](#) +  Q

Date/Time	MAC Address	Hostname	Issue Cause List	Remedies
2024/04/05 18:15:39	[Redacted]		<span>!</span> AP health - detected high channel utilization. ...	<span>✓</span> Rectify the channel utilization issue. Alternati...
2024/04/04 19:51:04	[Redacted]		<span>!</span> Wired Network - packet delays detected	<span>✓</span> Check switch side connections and configurat...
2024/04/04 16:32:03	[Redacted]		<span>!</span> Wired Network - packet delays detected	<span>✓</span> Check switch side connections and configurat...

The **Details** table displays details such as the client MAC address, the associated AP serial number and the SSID, the issue classifier/category and the sub-classifier, the issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>SSID</b>	The SSID that the impacted client is associated with.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Signal Strength</b>	The signal strength of the client at the time of impact.
<b>Issue Cause List</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Access Point</b>	The name of the access point that the client associated with.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial</b>	The serial number of the associated FortiGate.
<b>User Name</b>	The impacted client user name.
<b>Association Delay</b>	The association delay measured in milliseconds.
<b>Association Time</b>	The total time taken by the client for association.
<b>Authentication Delay</b>	The authentication delay measured in milliseconds.

Attribute	Description
<b>Authentication Time</b>	The total time taken by the client for authentication.
<b>DNS Delay</b>	The DNS delay measured in milliseconds.
<b>DNS Time</b>	The total time taken by the client to resolve the DNS request.
<b>DHCP Delay</b>	The DHCP delay measured in milliseconds.
<b>DHCP Time</b>	The total time taken by a client to receive a DHCP address.

Select a specific row and click **View Logs** to view the raw logs associated with the impacted client. You can view **Client Details** such as the client device name, the name of the AP it is associated with and the time of association, associated SSID, and operational details such as the channel and the MIMO mode. The client **Status** such as the associated bandwidth (2.5GHZ/5GHZ), signal strength (RSSI), signal noise, rate of transmission discard and rate of transmission retry between the client and the AP. The **Client Logs** display the time stamp of each action and action classification as notice, warning, etc., and the action details and the associated channel.

Client Details
✕

		<b>5GHz</b>	Band		
Association Time	2023-11-08 10:53:57	-72dBm	Signal Strength		
Channel	116	20dB	Signal Strength/Noise		
FortiAP		0%	Transmission Discard		
MIMO	2x2	2%	Transmission Retry		
SSID	Forti-XXXXXX				

**CLIENT LOGS**

Date/Time	Level	Action	Message	Channel
2023/11/08 10:53:55.125	Notice	client-denial		116
2023/11/08 10:53:54.383	Notice	client-disconnected-by-wtp		116
2023/11/08 10:53:33.120	Notice	DHCP-ACK		-
2023/11/08 10:53:33.120	Notice	DHCP-REQUEST		-
2023/11/08 10:53:33.120	Notice	DHCP-OFFER		-
2023/11/08 10:53:12.116	Warning	DHCP-DECLINE		-
2023/11/08 10:52:57.113	Notice	DHCP-ACK		-
2023/11/08 10:52:57.113	Notice	DHCP-REQUEST		-
2023/11/08 10:52:57.113	Notice	client-authentication		116
2023/11/08 10:52:57.113	Warning	WPA-4/4-key-msg		116
2023/11/08 10:52:57.113	Warning	WPA-3/4-key-msg		116

0% 22

### Coverage

This SLA monitors your network for coverage issues and reports clients/devices based on dynamically configured threshold breaches.

Coverage ▾ Time range : 1 week

Impacted Classifiers	Impacted Sub Classifiers
Coverage hole <span>2</span>	Poor Coverage
Overlapping APs <span>2</span>	No better neighbour AP f... Wi-Fi Interference

Details

[View Logs](#) + 🔍 Search filterable columns

Date/Time	Access Point	Radio ID	Radio Type	Issue Cause List	Remedies
2024/04/07 21:44:10	Desk-AP	2	5GHz 802.11ax/ac/n/a	High OBSS interference on the channel (36) i...	<ul style="list-style-type: none"> <li>Enable auto Tx power</li> <li>Suggesting to review and rec</li> <li>Prune lower data rates such</li> </ul>
2024/04/07 21:42:10	Desk-AP	2	5GHz 802.11ax/ac/n/a	High OBSS interference on the channel (36) i...	<ul style="list-style-type: none"> <li>Enable auto Tx power</li> <li>Suggesting to review and rec</li> </ul>

The **Details** table displays issue details such as the radio type, Tx power, neighbour AP count, the issue classifier/category and the sub-classifier, the issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>Access Point</b>	The name of the FortiAP.
<b>Classifiers</b>	The classifiers of the issue reported for the SLA.
<b>Sub Classifiers</b>	The sub-classifiers of the issue for the reported classifier.
<b>Issue Cause List</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Radio ID</b>	The AP radio that the client associated with.
<b>Radio Type</b>	The impacted radio and band information associated with the client.
<b>Radio Impacted Minutes</b>	The duration of time (in minutes) that the Radio was impacted.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>TX Power</b>	The Tx power of the AP at the time of impact.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial</b>	The serial number of the associated FortiGate.
<b>Radio Type</b>	The impacted radio and band associated with the client.
<b>Channel</b>	The channel at which the client connected.
<b>Impacted Client Count</b>	The number of impacted clients.
<b>Interfering AP</b>	The list of interfering APs in the network.

To view the logs, select a specific row of an AP event and click **View Logs**. You can view coverage logs related to **Diagnostics** with the issue description and the suggested remediation, **AP Stats** with the associated AP radio details, **AP Logs** with the time of the throughput failure event and the associated AP details, **Switch Info** with the switch port details connected to the AP, **WiFi Clients** with details of the impacted clients and a list of all WiFi clients, **Interfering APs** with the BSSID and the signal strength of the interfering APs.

Coverage Logs

**Diagnostics** AP Stats AP Logs Neighbour APs WIFI Clients Interfering APs

AP Info	
Name	43x_2F_...
Serial	...
Mac Address	...
IP Address	...
State	authorized
Status	connected
FortiGate Hostname	office-wifi-qa
Up Time	83 days, 14 hours, 13 minutes, 14 seconds

Issue Diagnostics	
Issue Cause	<ul style="list-style-type: none"> <li>Far off clients connected to the AP</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Review SSID specific configurations suggested below :</li> <li>SSID Forti-Corp-2F-PSK - Enable MBO + v, advanced option(s) - probe response suppression/ sticky client removal/ Rx-SOP ;Review these RSSI thresholds that are currently being used - probe response suppression (-80), sticky client removal (-79 for 2.4 GHz, -76 for 5 GHz), Rx-SOP (-79 for 2.4 GHz, -76 for 5 GHz)</li> <li>Prune lower data rates such as [6, 6-basic, 9, 9-basic] for the following SSID(s) - Forti-Corp-2F-PSK</li> </ul>

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**Logs**
**Description**

### AP Logs

This tab provides the AP event logs generated from FortiGate.

Date/Time	AP Name	Action	Message	
2023/11/09 13:17:34.885	BETWEEN CALL ROOM 8F	client-disconnected-by-wtp		Wireless client
2023/11/09 13:20:46.849	BETWEEN CALL ROOM 8F	DNS-no-domain		Wireless station
2023/11/09 13:19:58.783	BETWEEN CALL ROOM 8F	client-disconnected-by-wtp		Wireless client
2023/11/09 13:20:32.818	BETWEEN CALL ROOM 8F	DNS-no-domain		Wireless station

### WIFI Clients

This tab provides details of the impacted clients and also lists all the clients associated with the AP.

Date/Time	Client Mac Address	SSID	Radio Type	Classifier	Subclassifier	Signal Strength
2022/05/24 13:23:42		Forti-...	802.11ax-5G	Coverage	Asymmetric Data Rates	-54 dBm
2022/05/24 13:23:42		Forti-...	802.11ac	Coverage	Asymmetric Data Rates	-58 dBm
2022/05/24 13:23:42		Forti-...	802.11ac	Coverage	Asymmetric Data Rates	-58 dBm
2022/05/24 13:23:42		Forti-...	802.11ac	Coverage	Asymmetric Data Rates	-54 dBm

0% 5

**All Clients**

Client Mac Address	Channel	Radio Type	SSID	Data Rate	Bandwidth Rx	Bandwidth Tx
	60	802.11ax-5G	Forti-...	456.00 Mbps	0	642.00 bps
	60	802.11ax-5G	Forti-...	12.00 Mbps	0	1.77 Kbps
	60	802.11ax-5G	Forti-...	797.20 Mbps	426.39 Kbps	45.10 Kbps

### Interfering APs

This tab displays details of the interfering APs in your network.

Date/Time	BSSID	Signal Strength
2023/11/09 13:25:09		-73 dBm
2023/11/09 13:25:09		-46 dBm
2023/11/09 13:25:09		-47 dBm

## Roaming

Slow roaming clients are detected based on the variation of the classifier threshold values set by the users or calculated dynamically by FortiAIops. The parameters to identify slow roaming clients are **Fast BSS Transition Roams**, **PMK Cache**, and **Opportunistic Key Caching Roams**. Any breach in the threshold values are detected and reported. For SLA configurations, see [Roaming](#).

The **Details** table displays details such as the client MAC address, the associated AP serial number and the SSID, the issue classifier/category and the sub-classifier, the issue description and the suggested remediation measure, and so on. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>Device</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>SSID</b>	The SSID that the impacted client is associated with.
<b>Classifier</b>	The classifier of the issue reported for the SLA.

Attribute	Description
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Roaming Delay</b>	The delay (latency) in client roaming (milliseconds) in case of threshold breach.
<b>Roaming Time</b>	The duration of time the client was roaming the network.
<b>Radio ID</b>	The AP radio that the client associated with.
<b>Radio Type</b>	The impacted radio and band information.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>Channel</b>	The channel at which the AP/client were operating.
<b>Issue Cause List</b>	detailed cause of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Access Point</b>	The name of the access point.

To view the logs, select a specific row of an AP event and click **View Logs**. You can view client details such as **Diagnostics** with the issue description and the suggested remediation, **AP Stats** with the associated AP radio details, and **Client Logs** with details of the impacted clients.

Client Details ✕

**Diagnostics**   AP Stats   Client Logs

---

Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Roaming delay observed for 11r roaming over-the-ds</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Review threshold computed/configured for 11r Roaming delay alerts.</li> </ul>

Logs	Description														
<b>Diagnostics</b>	<p>This tab provides detailed cause of the SLA breach that impacted the client. FortiAIOps also suggests the remedy to resolve the issue.</p> <div style="border: 1px solid #ccc; padding: 5px; margin-top: 5px;"> <p>Issue Diagnostics</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 20%;">Issue Cause</td> <td> <ul style="list-style-type: none"> <li>Roaming delay observed for 11r roaming over-the-air</li> </ul> </td> </tr> <tr> <td>Remedy</td> <td> <ul style="list-style-type: none"> <li>Review threshold computed/configured for 11r Roaming delay alerts.</li> </ul> </td> </tr> </tbody> </table> </div>	Issue Cause	<ul style="list-style-type: none"> <li>Roaming delay observed for 11r roaming over-the-air</li> </ul>	Remedy	<ul style="list-style-type: none"> <li>Review threshold computed/configured for 11r Roaming delay alerts.</li> </ul>										
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802.11ax-5G	209.92 Kbps	158.65 Kbps	31	15	60	10 dBm									
<b>Client Logs</b>	This tab provides client event logs.														

Logs	Description				
Date/Time	Level	Action	Message	Channel	
2023/11/08 19:27:35.267	Notice	client-disconnected-by-wtp		157	
2023/11/08 19:25:55.112	Notice	client-ip-detected		157	
2023/11/08 19:25:55.112	Notice	client-ip-detected		157	
2023/11/08 19:25:54.996	Notice	DHCP-ACK		-	

In the various throughput logs displayed, you can right-click on the table header to select the details you want to view.

### AP Health and Uptime

Displays the AP health based on the configured AP health threshold values and the AP down status due to AP/FortiGate reboot, disabled switch port etc. For SLA configurations, see [Device Health](#)

AP Health and Uptime
Time range: 1 week

Impacted Classifiers	Impacted Sub Classifiers
AP Down <span style="font-size: 0.8em;">1</span>	FGT Shutdown
CPU <span style="font-size: 0.8em;">1</span>	FGT Reboot
Memory <span style="font-size: 0.8em;">1</span>	FSW Port Down
Switch Health <span style="font-size: 0.8em;">1</span>	Poor Uplink Connectivity
	FAP Reboot
	Configuration Issue or Ot...
	High Resource Utilization

Details

View Logs
Search filterable columns

Date/Time	FortiSwitch Name	Issue Cause List	Remedies	Classifier
2024/04/06 12:00:29		FortiAP Left - AP DTLS peer disconnected	Check the FortiAP configuration of FP431G...	AP Down
2024/04/06 11:59:53		Poor FortiSwitch Health - High CPU [41%] us...	Check if there's high traffic, high device coun...	Switch Health

The **Details** table displays issue details such as the issue classifier/category and the sub-classifier, the issue description and the suggested remediation measure, and so on. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiSwitch Name</b>	The name of the switch associated with the impacted AP/client.
<b>Issue Cause List</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>AP Serial Number</b>	The AP serial number that the client associated with.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate.
<b>FortiSwitch Serial Number</b>	The serial number of the switch associated with the impacted AP/client.

In the AP events displayed, select an event and click **View Logs**.

AP Details ✕

**Diagnostics** AP Stats Logs WiFi Clients Interfering APs

Issue Diagnostics	
Issue Cause	<ul style="list-style-type: none"> <li>Poor FortiAP Health - High CPU [28%] usage</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Rectify high interference and high client density issues, if any, and also check if any resource intensive features are enabled. Also, check if there's STP loop in the network.</li> </ul>

Logs	Description						
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<b>Logs</b>	<ul style="list-style-type: none"> <li>For the AP <i>down</i>/FortiSwitch health events, triggered due to FortiSwitch related failure, the FortiSwitch status and logs are displayed.</li> <li>For AP health related events like poor CPU and memory, the AP status and logs are displayed.</li> <li>For AP down events triggered due to FortiAP/FortiGate failure, the AP status and logs, and FortiGate logs are displayed.</li> </ul> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th colspan="2">SWITCH Status</th> </tr> </thead> <tbody> <tr> <td>CPU Usage</td> <td>50%</td> </tr> <tr> <td>Memory Usage</td> <td>12%</td> </tr> <tr> <td>Temperature</td> <td>41 °C</td> </tr> </tbody> </table> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th colspan="6">SWITCH Logs</th> </tr> <tr> <td colspan="6">+ Search</td> </tr> <tr> <th>Date/Time</th> <th>Level</th> <th>Message</th> <th>Log Description</th> <th>Switch SN</th> <th>user</th> </tr> </thead> <tbody> <tr> <td>2022/07/14 07:06:31</td> <td>Notice</td> <td>primary port port10 instance 0 chan...</td> <td>FortiSwitch spanning Tree</td> <td>S524DF4K16000024</td> <td>Fort</td> </tr> <tr> <td>2022/07/14 07:06:29</td> <td>Notice</td> <td>primary port port10 instance 0 chan...</td> <td>FortiSwitch spanning Tree</td> <td>S524DF4K16000024</td> <td>Fort</td> </tr> <tr> <td>2022/07/14 07:06:22</td> <td>Notice</td> <td>primary port port10 instance 0 chan...</td> <td>FortiSwitch spanning Tree</td> <td>S524DF4K16000024</td> <td>Fort</td> </tr> </tbody> </table>	SWITCH Status		CPU Usage	50%	Memory Usage	12%	Temperature	41 °C	SWITCH Logs						+ Search						Date/Time	Level	Message	Log Description	Switch SN	user	2022/07/14 07:06:31	Notice	primary port port10 instance 0 chan...	FortiSwitch spanning Tree	S524DF4K16000024	Fort	2022/07/14 07:06:29	Notice	primary port port10 instance 0 chan...	FortiSwitch spanning Tree	S524DF4K16000024	Fort	2022/07/14 07:06:22	Notice	primary port port10 instance 0 chan...	FortiSwitch spanning Tree	S524DF4K16000024	Fort
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**Logs** **Description**

**WIFI Clients**

This tab provides details of the impacted clients and also lists all the clients associated with the AP.

AP Details

Impacted Clients

+ Search

Date/Time	Client Mac Address	Device	AP Name	Classifier	Sub Classifier
2022/07/18 15:52:32	[REDACTED]	Corp [REDACTED] P	[REDACTED]	Memory	High Resource Utilization
2022/07/18 15:52:32	[REDACTED]	Corp [REDACTED] P	[REDACTED]	Memory	High Resource Utilization

2

All Clients

+ Search

Client Mac Address	Channel	Radio Type	SSID	Data Rate	Bandwidth Rx	Bandwidth Tx
[REDACTED]	6	802.11n	24ghz-25bridge	136.00 Mbps	0	0
[REDACTED]	6	802.11n	24ghz-25bridge	169.00 Mbps	0	0

OK Cancel

**Interfering APs**

This tab displays details of the interfering APs in your network.

Date/Time	BSSID	Signal Strength
2023/11/07 16:23:26	[REDACTED]	-67 dBm
2023/11/07 16:23:26	[REDACTED]	-67 dBm
2023/11/07 16:23:26	[REDACTED]	-67 dBm
2023/11/07 16:23:26	[REDACTED]	-82 dBm

Select any impacted client and click **Show AP details** to view the detailed AP logs.

AP Details

[Diagnostics](#) [AP Stats](#) [Logs](#) [Interfering APs](#)

Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Poor FortiAP Health - High Memory [81%] usage</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Rectify high interference and high client density issues, if any, and also check if any resource intensive features are enabled. Also, check if there's STP loop in the network.</li> </ul>

Select any of the tabs to view the data described in this table.

**Logs** **Description**

**Diagnostics**

This tab provides detailed cause of the SLA breach that impacted the client/AP/FortiGate. FortiAIOps also suggests the remedy to resolve the issue.

Logs	Description															
<div style="border: 1px solid #ccc; padding: 5px;"> <p>Issue Diagnostics</p> <table border="1"> <tr> <td style="width: 20%;">Issue Cause</td> <td> <ul style="list-style-type: none"> <li>Poor FortiAP Health - High CPU [28%] usage</li> </ul> </td> </tr> <tr> <td>Remedy</td> <td> <ul style="list-style-type: none"> <li>Rectify high interference and high client density issues, if any, and also check if any resource intensive features are enabled. Also, check if there's STP loop in the network.</li> </ul> </td> </tr> </table> </div>		Issue Cause	<ul style="list-style-type: none"> <li>Poor FortiAP Health - High CPU [28%] usage</li> </ul>	Remedy	<ul style="list-style-type: none"> <li>Rectify high interference and high client density issues, if any, and also check if any resource intensive features are enabled. Also, check if there's STP loop in the network.</li> </ul>											
Issue Cause	<ul style="list-style-type: none"> <li>Poor FortiAP Health - High CPU [28%] usage</li> </ul>															
Remedy	<ul style="list-style-type: none"> <li>Rectify high interference and high client density issues, if any, and also check if any resource intensive features are enabled. Also, check if there's STP loop in the network.</li> </ul>															
<b>AP Stats</b>	<p>This tab displays the details of the AP radio that the client associated with and the WAN status details of the AP.</p> <div style="border: 1px solid #ccc; padding: 5px;"> <p>Radio Info</p> <div style="border: 1px solid #ccc; padding: 2px; margin-bottom: 5px;"> <input type="text" value="Search"/> </div> <table border="1"> <thead> <tr> <th>Radio Type</th> <th>Bandwidth Tx</th> <th>Bandwidth Rx</th> <th>Channel Utilization(%)</th> <th>Client Count</th> <th>Oper Chan</th> <th>Oper Tx Po</th> </tr> </thead> <tbody> <tr> <td>802.11n,g-only</td> <td>0</td> <td>0</td> <td>76</td> <td>0</td> <td>11</td> <td>22 dBm</td> </tr> </tbody> </table> </div>	Radio Type	Bandwidth Tx	Bandwidth Rx	Channel Utilization(%)	Client Count	Oper Chan	Oper Tx Po	802.11n,g-only	0	0	76	0	11	22 dBm	
Radio Type	Bandwidth Tx	Bandwidth Rx	Channel Utilization(%)	Client Count	Oper Chan	Oper Tx Po										
802.11n,g-only	0	0	76	0	11	22 dBm										
<b>Interfering APs</b>	<p>This tab displays details of the interfering APs in your network.</p> <table border="1"> <thead> <tr> <th>Date/Time</th> <th>BSSID</th> <th>Signal Strength</th> </tr> </thead> <tbody> <tr> <td>2023/11/07 16:23:26</td> <td>XXXXXXXXXX</td> <td> -67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>XXXXXXXXXX</td> <td> -67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>XXXXXXXXXX</td> <td> -67 dBm</td> </tr> <tr> <td>2023/11/07 16:23:26</td> <td>XXXXXXXXXX</td> <td> -82 dBm</td> </tr> </tbody> </table>	Date/Time	BSSID	Signal Strength	2023/11/07 16:23:26	XXXXXXXXXX	-67 dBm	2023/11/07 16:23:26	XXXXXXXXXX	-67 dBm	2023/11/07 16:23:26	XXXXXXXXXX	-67 dBm	2023/11/07 16:23:26	XXXXXXXXXX	-82 dBm
Date/Time	BSSID	Signal Strength														
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2023/11/07 16:23:26	XXXXXXXXXX	-67 dBm														
2023/11/07 16:23:26	XXXXXXXXXX	-82 dBm														
<b>Logs</b>	<p>This tab provides the AP event logs generated from FortiGate.</p>															

## WIDS

The WIDS SLA monitors and reports on potential events detected within the network by the WIDS (Wireless Intrusion Detection System) system. It detects security threats and recommends corrective actions to maintain network integrity, enhancing security with real-time alerts and actionable insights for faster threat resolution.

The following types of intrusion detection is available:

Intrusion Type	Description
Broadcast Deauthentication	This is a type of Denial of Service attack. A flood of spoofed de-authentication frames forces wireless clients to de-authenticate, then re-authenticate with their AP.
Long Duration ID	To share radio bandwidth, WiFi devices reserve channels for brief periods of time. Excessively long reservation periods can be used as a denial of service attack. You can set a threshold between 1000 and 32 767 microseconds. The default is 8200.
Authentication Frame Flood	A Denial of Service attack using a large number of association requests. The default detection threshold is 30 requests in 10 seconds.
Association Frame Flood	A Denial of Service attack using a large number of association requests. The default detection threshold is 30 requests in 10 seconds.
Deauthentication Spoof	Spoofed de-authentication frames are a denial of service attack. They cause all clients to disconnect from the AP.
EAPOL Flood attacks	Extensible Authentication Protocol over LAN (EAPOL) packets are used in WPA and WPA2 authentication. Flooding the AP with these packets can be

Intrusion Type	Description
	a denial of service attack. Several types of EAPOL packets are detected: EAPOL-FAIL, EAPOL-LOGOFF, EAPOL-START, EAPOL-SUCC.
Wireless Bridge Intrusion	WiFi frames with both the fromDS and ToDS fields set indicate a wireless bridge. This will also detect a wireless bridge that you intentionally configured in your network.
Null SSID Probe Response	When a wireless client sends out a probe request, the attacker sends a response with a null SSID. This causes many wireless cards and devices to stop responding.
Invalid Mac OUI	Some attackers use randomly-generated MAC addresses. The first three bytes of the MAC address are the Organizationally Unique Identifier (OUI), administered by IEEE. Invalid OUIs are logged.
Weak WEP IV	A primary means of cracking WEP keys is by capturing 802.11 frames over an extended period of time and searching for patterns of WEP initialization vectors (IVs) that are known to be weak. WIDS detects known weak WEP IVs in on-air traffic.
ASLEAP Attack	ASLEAP is a tool used to perform attacks against LEAP authentication.

Select WIDS SLA from the chart and from the **WIDS** table select a row and click **View Details**.

The screenshot displays the FortiGate WIDS interface. On the left, a donut chart shows 5 total events. The main area features a 'Topology of N/A' diagram and a 'Details' table. The table lists various intrusion events with their corresponding timestamps, MAC addresses, and classifications.

Date/Time	Transmitter MAC	BSSID	Detected AP	Detected Radio ID	FortiGate Hostname	Classifier	Sub Classifier
2025/03/20 14:28:58		N/A		2	FortiGate-300E	Denial Of Service	Long Duration ID
2025/03/20 14:04:27				1	FortiGate-300E	Rogue Attack	Invalid MAC OUI
2025/03/20 13:59:28				1	FortiGate-300E	Rogue Attack	Invalid MAC OUI
2025/03/20 13:53:34		N/A		2	FortiGate-300E	Denial Of Service	Long Duration ID
2025/03/20 13:31:58				1	FortiGate-300E	Rogue Attack	Invalid MAC OUI
2025/03/20 13:30:28				1	FortiGate-300E	Rogue Attack	Invalid MAC OUI
2025/03/20 13:24:05		N/A		2	FortiGate-300E	Denial Of Service	Long Duration ID
2025/03/20 12:57:01		N/A		1	FortiGate-300E	Cipher Attack	Weak WEP IV
2025/03/20 12:31:03		N/A		2	FortiGate-300E	Denial Of Service	Long Duration ID
2025/03/20 12:22:38		N/A		2	FortiGate-300E	Denial Of Service	Long Duration ID
2025/03/20 11:58:28		N/A		2	FortiGate-300E	Rogue Attack	Invalid MAC OUI

WIDS SLAs are categorized based on the severity and potential impact of detected wireless intrusion events mentioned above. These events are classified into the following categories:

- Denial of Service
- Misconfigured Packet
- Rogue Attack

- Cipher Attack
- Tool Attack

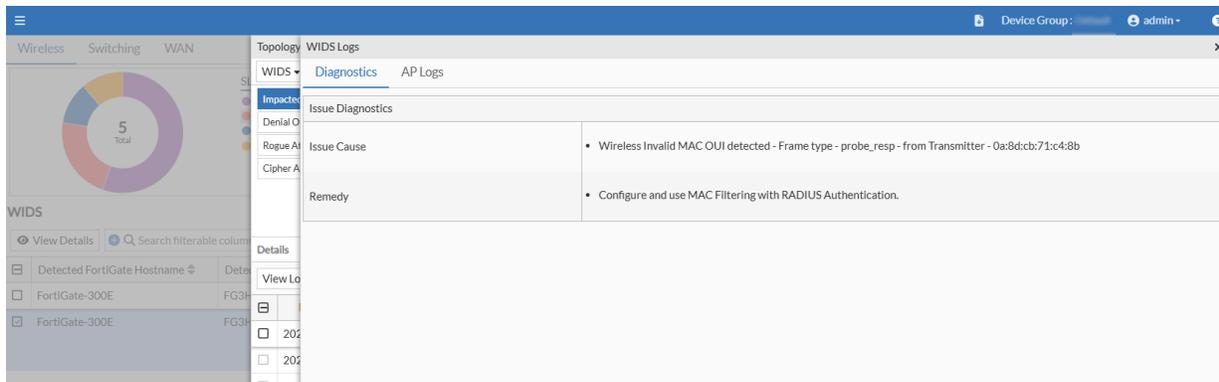
The **Details** table displays information such as the Detected FortiGate Hostname, Detected FortiGate, Affected AP Serial Number, Detected FortiGate IP Address, Classifier, Sub Classifier, Affected AP IP Address, Affected AP Name, Affected AP State, and Affected AP Status. Right-click on the header of the table to select the columns that you want to view.

The following table lists all the attributes listed in the **Details** table:

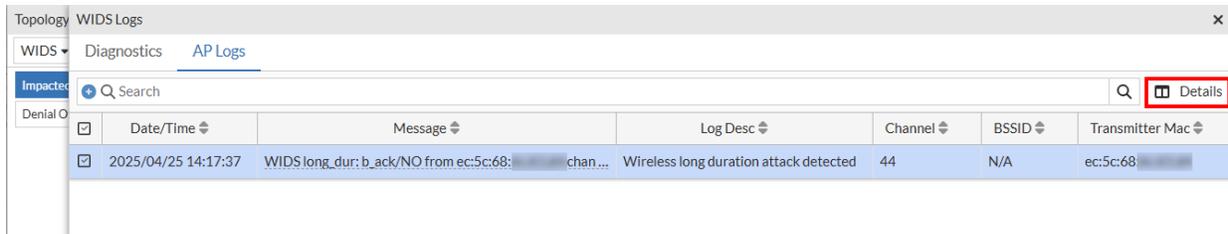
Attribute	Description
Detected FortiGate Hostname	The hostname of the FortiGate associated with AP detecting WIDS events.
Detected FortiGate	Name of the FortiGate in which AP detecting WIDS is connected.
Affected AP Serial Number	Serial number of Access Point detecting WIDS event.
Detected FortiGate IP Address	IP address of the FortiGate in which AP detecting WIDS is connected.
Classifier	The classifier of the issue reported for the SLA.
Sub Classifier	The sub-classifier of the issue for the reported classifier.
Affected AP IP Address	IP address of Access Point detecting WIDS event.
Affected AP Name	Name of Access Point detecting WIDS event.
Affected AP State	State of Access Point detecting WIDS event.
Affected AP Status	Status of Access Point detecting WIDS event.

Select a specific row and click **View Logs**. The **WIDS Logs** window displays detailed logs in two tabs namely – **Diagnostics** and **AP Logs**.

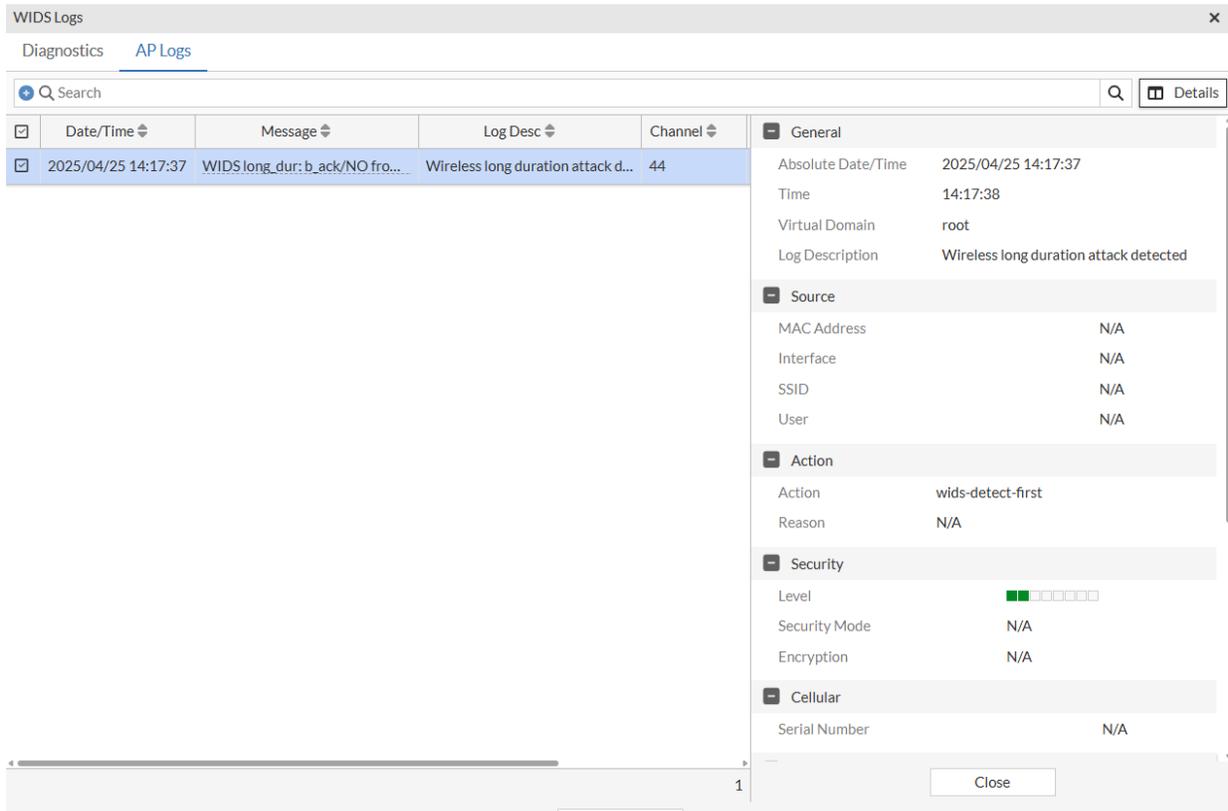
The **Diagnostics** tab displays diagnostics details such as Issue Cause and Remedy suggested to resolve the issue.



The **AP Logs** tab displays details of the event such as time of the event, error message and log of the event, and details of channel, BSSID, and Transmitter MAC address.



Select the log and click **Details** to view a more detailed log.

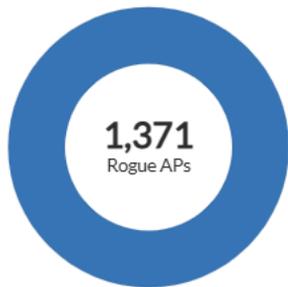


**Note:** WIDS must be enabled on FortiGate to detect wireless attacks and receive logs for the WIDS SLA. By default, intrusion detection in WIDS profile is disabled. For more information, see [FortiWiFi and FortiAP Configuration Guide](#).

### Rogue APs

This chart provides details of the rogue APs detected on the network.

Rogue APs



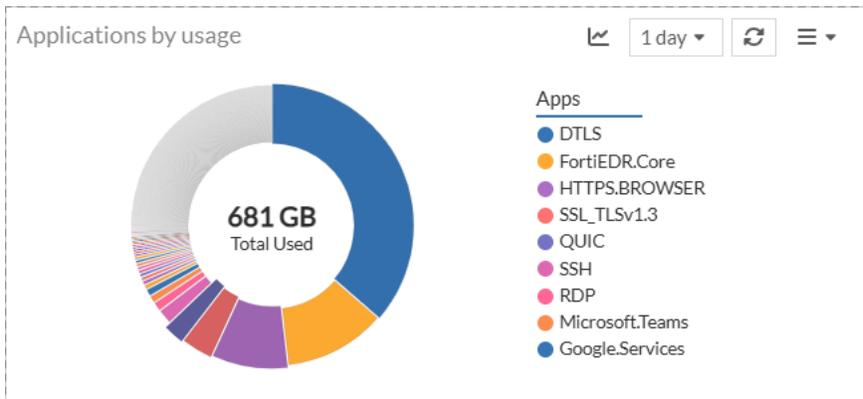
Interfering FortiAPs



Click on the chart to view more details. For more information, see [Rogue APs](#).

### Applications by Usage

This chart provides details of the applications being used in the network along with the data being used by each application.



Click on an application name to view more details. For more information, see [Applications](#).

## Switch

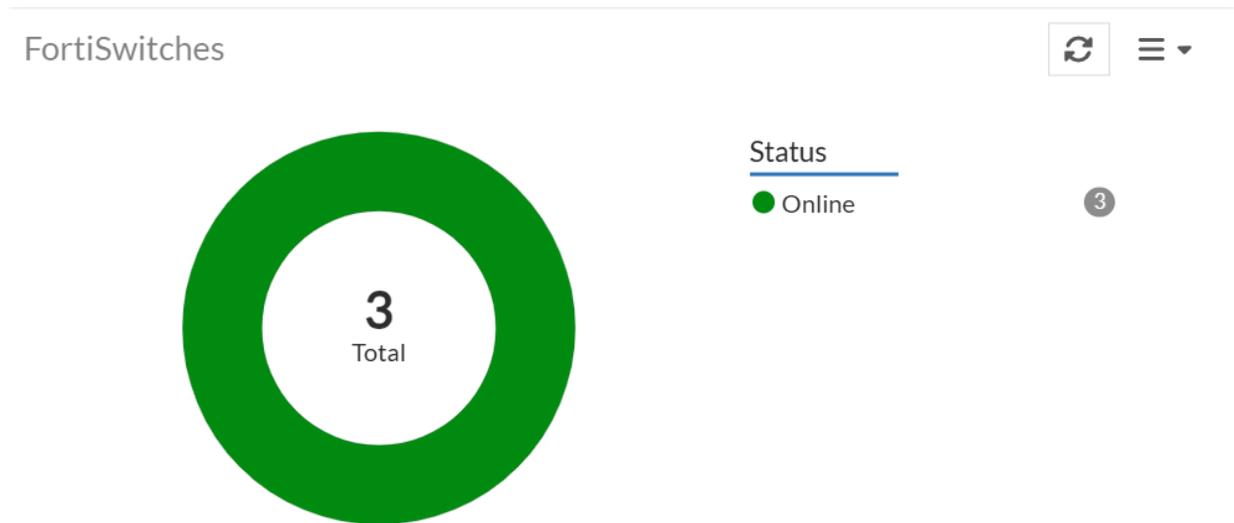
The Switch page displays all the important details about the switches within your network. Details of all the FortiSwitches and their status, the types of even in a specific time period, details of the wired clients, and different SLAs displayed.

The following charts are available:

- [FortiSwitches](#)
- [FortiSwitches Events](#)
- [Wired Clients](#)
- [Switching Insights](#)

## FortiSwitches

This chart displays the total number of FortiSwitches in your network and their status (Online, Offline, Waiting for Authorization, or Unknown).



Click the chart for detailed information about the FortiSwitches.

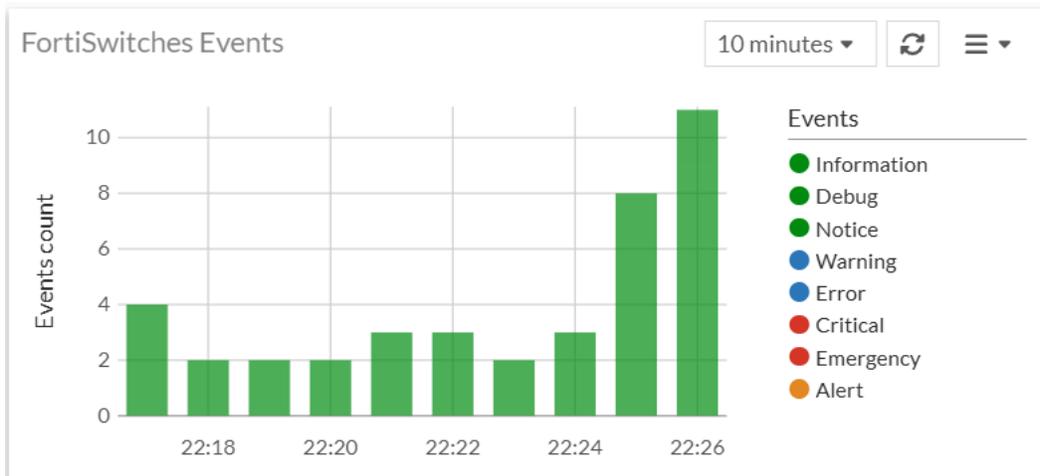
The detailed view shows a table with 8 columns: Name, FortiSwitch Serial Number, FortiGate, Status, Model, Firmware Version, Connecting From, and Join Time. There are 3 rows of data, all with a status of 'Online'.

Name	FortiSwitch Serial Number	FortiGate	Status	Model	Firmware Version	Connecting From	Join Time
3FH-...	S224...	office-...	Online	S224DF	S224DF-v7.6.1-build1047,241217 (GA)	10....	2025/06/05 17:53:48
GFH-...	S248...	office-...	Online	S248DF	S248DF-v3.6.12-build436,230614 (GA)	10....	2025/06/05 17:51:58
2FS-...	S548...	office-...	Online	S548DF	S548DF-v7.4.0-build767,230602 (GA)	10....	2025/06/05 17:51:53

For more information, see [FortiSwitch](#).

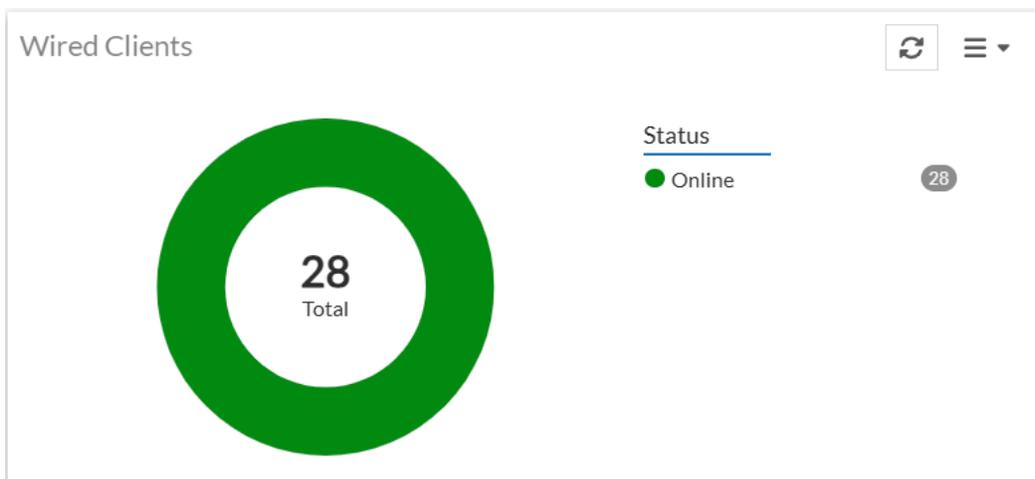
## FortiSwitches Events

This chart displays the FortiSwitch events at a given time and categorizes them based on the type of event as Information, Debug, Notice, Warning, Error, Critical, Emergency, and Alert. You can select the period to view the data (10 or 30 minutes, 1 or 12 hours, or 1 day).



### Wired Clients

This chart helps you to monitor the wired clients on your network.



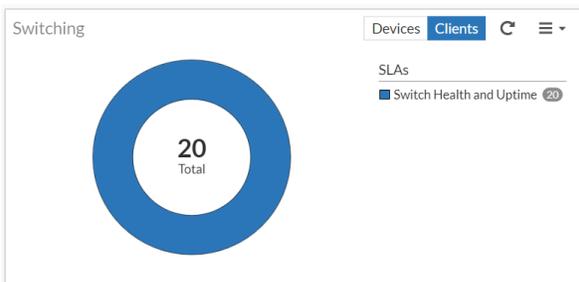
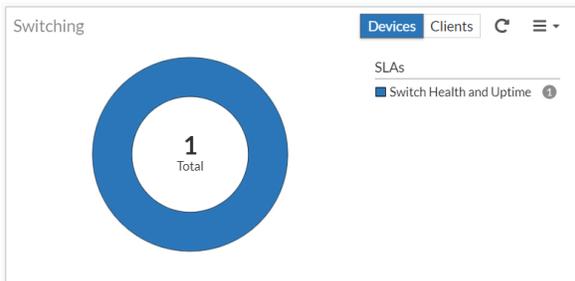
Click on the chart to view more details. For more information, see [Wired Clients](#).

### Switching Insights

The **Switching Insights** panel displays the total number of impacted clients and SLA data. Select **Devices** to view the impacted switch count or click **Clients** to view the impacted client count.

**Notes:**

- Ensure that all L2 security features, such as, BPDU guard, loop guard, DHCP snooping, root guard are enabled on the switch port to detect STP and DHCP failures.
- DHCP failures are reported only for DHCP configurations in the FortiSwitch, such as, DHCP client blocked, DHCP lease full.



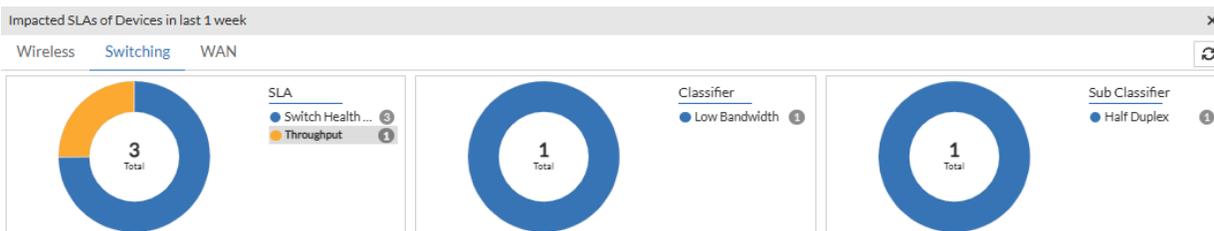
### SLAs, Topology and Logs

The following SLAs are detected and reported by FortiAI Ops for switching. The issues reported are categorized based on classifiers and sub-classifiers, with suggested remedial measures to curtail the SLA breaches and enhance network performance.

- [Throughput](#)
- [Network](#)
- [Switch Health and Uptime](#)
- [Switch](#)

### Throughput

Displays potential low throughput conditions. The system uses intelligent machine learning to analyze recent switch port statistics by dynamically learning from recent data. Unusual patterns and potential breaches are identified with significantly improved accuracy.



### Throughput

FortiGate Hostname	FortiSwitch Name	OS Version	Classifier	Sub Classifier
office-...	3FHR-...	S224DF-...	Low Bandwidth	Half Duplex

The **Throughput** table displays information such as the client MAC address, the associated FortiSwitch details, and port details for the reported classifiers and sub classifiers, issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the FortiSwitch/impacted client.
<b>FortiSwitch Name</b>	The name of the FortiSwitch that the impacted client associated with.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Connecting From</b>	The IP address of the FortiSwitch.
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the FortiSwitch/impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the FortiSwitch associated with the FortiSwitch/impacted client.
<b>OS Version</b>	The OS version of the FortiSwitch.
<b>Port Name</b>	The FortiSwitch port details.
<b>Status</b>	The status of the FortiSwitch (online/offline).
<b>State</b>	The state of the FortiSwitch (authorized/unauthorized).

Select a row and click **View Details**. The **Details** table displays the following information.

Topology of 50:3e:aa:b1:70:34 x

Throughput Time range: 1 week

Impacted Classifiers	Impacted Sub Classifiers
Congestion <span style="float: right;">1</span>	Tx Congestion
Low Bandwidth <span style="float: right;">1</span>	



Details

View Logs + Search filterable columns Q

<input type="checkbox"/>	Date/Time	FortiSwitch Name	Client MAC Address	Hostname	Issue Cause List	Remedies
<input checked="" type="checkbox"/>	2024/09/16 13:41:54	S424EFT	50:3e:aa:b1:70:34	AP-QA-PC1	<ul style="list-style-type: none"> <li><span style="color: red;">●</span> Congestion detected on port19</li> <li><span style="color: red;">●</span> Tx Utilisation:141.32%</li> <li><span style="color: red;">●</span> Port Utilisation: 7 Mbps out of 10 Mbps Half Duplex...</li> <li><span style="color: red;">●</span> Rx Drop:56.41%</li> <li><span style="color: red;">●</span> Huge packets from the devices connected to the swi...</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">●</span> Check for any devices connect</li> <li><span style="color: green;">●</span> Implement QoS Policy to prio</li> <li><span style="color: green;">●</span> Configure Traffic Shaping to c</li> <li><span style="color: green;">●</span> Upgrade the bandwidth to 10</li> <li><span style="color: green;">●</span> Add links using LAG (Link Agg</li> </ul>
<input type="checkbox"/>	2024/09/16 13:40:57	S424EFT	50:3e:aa:b1:70:34	AP-QA-PC1	<ul style="list-style-type: none"> <li><span style="color: red;">●</span> Congestion detected on port19</li> <li><span style="color: red;">●</span> Tx Utilisation:162.98%</li> <li><span style="color: red;">●</span> Port Utilisation: 8 Mbps out of 10 Mbps Half Duplex...</li> <li><span style="color: red;">●</span> Rx Drop:33.53%</li> <li><span style="color: red;">●</span> Huge packets from the devices connected to the swi...</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: green;">●</span> Check for any devices connect</li> <li><span style="color: green;">●</span> Implement QoS Policy to prio</li> <li><span style="color: green;">●</span> Configure Traffic Shaping to c</li> <li><span style="color: green;">●</span> Upgrade the bandwidth to 10</li> <li><span style="color: green;">●</span> Add links using LAG (Link Agg</li> </ul>

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiSwitch Name</b>	The name of the impacted switch.

Attribute	Description
<b>Client MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Issue Cause List</b>	Detailed cause of the SLA breach that impacted the client/switch.
<b>Remedies</b>	The suggested remedy to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the impacted client.
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the impacted switch.
<b>Port Name</b>	The FortiSwitch port details.

To view the Switch logs, select a specific row of a **Throughput** event and click **View Logs**. You can view Switch details and diagnostics with the issue description and the suggested remediation, along with the FortiSwitch port statistics.

Switch Logs ✕

Diagnostics   Switch Statistics

---

Switch Info

FortiGate Hostname	FortiGate-300E
FortiGate Serial No	FG3HOE5
IP Address	10.34.
Switch Name	S424EFTF
Switch Serial	S424EFTF
Status	Connected
State	Authorized
Version	S424EF-v7.6.0-build1015,240812 (GA)
Connecting From	169.2

Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Congestion detected on port17</li> <li>Rx Utilisation:98.88%</li> <li>Port Utilisation: 989 Mbps out of 1000 Mbps Full Duplex link speed</li> <li>Rx Drop:36.53%</li> <li>Huge packets from the devices connected to the switch could be flooding the port</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Check for any devices connected to the switch that could be flooding the switch.</li> <li>Implement QoS Policy to prioritize critical traffic.</li> <li>Configure Traffic Shaping to control the transmission rate.</li> <li>Upgrade the bandwidth to 10G or consider upgrading to a FortiSwitch that supports higher transmission rates.</li> <li>Add links using LAG (Link Aggregation Group) to handle higher bandwidth requirements.</li> </ul>

Close

Switch Logs

Diagnostics [Switch Statistics](#)

---

Port Status

Interface	port27
Supported Port Speeds	10half,10full,100half,100full,auto,1000auto
VLAN	_default
Duplex	full
Speed	100
Fortilink Port	false
Status	up

---

Port Statistics

+ Q Search filterable columns Q

<input type="checkbox"/>	Timestamp	Rx Packets	Tx Broadcast	Rx Drops	Rx Multicast	Tx Drops	Tx Multicast
<input type="checkbox"/>	2024/09/26 22:13:32	9992245	21162481	33	1581412	5	13404478
<input type="checkbox"/>	2024/09/26 22:12:32	9992217	21162389	33	1581409	5	13404418

### Network

Displays potential network disruptions that may lead to poor connectivity. Intelligent machine learning is used to analyze recent switch port statistics and learn from recent data, thus identifying unusual patterns and potentials threats.

Impacted SLAs of Devices in last 1 week

Wireless [Switching](#) WAN

SLA

- Switch Health ... 8
- Throughput 7
- Network 2

Classifier

- MLAG 2

Sub Classifier

- Peer Link Down 2
- Peer MAC Out of Sync 1

**Network**

View Details + Q Search filterable columns Q

<input type="checkbox"/>	FortiGate Hostname	FortiSwitch Name	OS Version	Classifier	Sub Classifier
<input type="checkbox"/>	inbr...	cubical...	S424EN-	MCLAG	Peer Link Down Peer MAC Out of Sync
<input type="checkbox"/>	inbr...	cubical...	S424EN-	MCLAG	Peer Link Down

The **Network** table displays information such as the client MAC address and the associated FortiSwitch details for the reported classifiers and sub classifiers, issue description and the suggested remediation measure, and so on are displayed. Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the FortiSwitch/impacted client.
<b>FortiSwitch Name</b>	The name of the FortiSwitch that the impacted client associated with.

Attribute	Description
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Connecting From</b>	The IP address of the FortiSwitch.
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the FortiSwitch/impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the FortiSwitch associated with the FortiSwitch/impacted client.
<b>OS Version</b>	The OS version of the FortiSwitch.
<b>Port Name</b>	The FortiSwitch port details.
<b>Status</b>	The status of the FortiSwitch (online/offline).
<b>State</b>	The state of the FortiSwitch (authorized/unauthorized).

Select a row and click **View Details**. The **Details** table displays the following information.

The screenshot shows the FortiAIOps interface. At the top, there's a 'Network' dropdown and a 'Time range: 2 hours' filter. Below this, there are two panels: 'Impacted Classifiers' and 'Impacted Sub Classifiers'. The 'Impacted Sub Classifiers' panel shows 'Storm' with a count of 1, and its sub-classifiers: 'Broadcast Storm' and 'Multicast Storm'. To the right is a network diagram showing a connection between 'FortiGate-300E-sa...' and 'S524DF4K...'. Below the network view is a 'Details' section with a search bar and a table of logs.

Date/Time	FortiSwitch Name	Client MAC Address	Issue Cause List	Remedies
2024/09/26 22:41:33	S524DF4K	00:be:4	<ul style="list-style-type: none"> <li>Broadcast and Multicast Storm detected on port4...</li> <li>Broadcast pps: 1527.</li> <li>Multicast pps: 595.</li> <li>Drop pps: 0.</li> <li>Redundant links in the network or some devices co...</li> </ul>	<p><b>Broadcast Remedy:</b></p> <ul style="list-style-type: none"> <li>Disconnect the device connected to port sen</li> <li>Segment the network into VLANs to limit the</li> </ul> <p><b>Multicast Remedy:</b></p> <ul style="list-style-type: none"> <li></li> </ul>

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiSwitch Name</b>	The name of the impacted switch.
<b>Client MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Issue Cause List</b>	Detailed cause of the SLA breach that impacted the client/switch.
<b>Remedies</b>	The suggested remedy to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.

Attribute	Description
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the impacted client.
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the impacted switch.
<b>Port Name</b>	The FortiSwitch port details.

To view the Switch logs, select a specific row of **Network** SLA event and click **View Logs**. You can view Switch details and diagnostics with the issue description and the suggested remediation, along with the FortiSwitch port statistics.

Switch Logs x

Diagnostics   Switch Statistics

Switch Info

FortiGate Hostname	FortiGate-300E-...
FortiGate Serial No	FG3H0E5...
IP Address	10.34. ...
Switch Name	S524DF4K ...
Switch Serial	S524DF4K ...
Status	Connected
State	Authorized
Version	S524DF-v7.4.3-build830,240422 (GA)
Connecting From	169. ...

Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Multicast Storm detected on port4. Received Multicast traffic exceeds storm rate 500.00 [pps].</li> <li>Multicast pps: 600.</li> <li>Drop pps: 0.</li> <li>Redundant links in the network or some devices could be flooding switch with broadcast/multicast traffic</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Segment the network into VLANs to limit the scope of multicast traffic</li> <li>Configure QoS policies to prioritize multicast traffic over less critical traffic</li> <li>Enable IGMP snooping on switch ports to prevent flooding of traffic</li> <li>Configure PIM for efficient multicast routing</li> </ul>

Close

Switch Logs							
Diagnostics	<u>Switch Statistics</u>						
Port Status							
Interface	port27						
Supported Port Speeds	10half,10full,100half,100full,auto,1000auto						
VLAN	_default						
Duplex	full						
Speed	100						
Fortilink Port	false						
Status	up						
Port Statistics							
<input type="text" value="Search filterable columns"/>							
<input type="checkbox"/>	Timestamp	Rx Packets	Tx Broadcast	Rx Drops	Rx Multicast	Tx Drops	Tx Multicast
<input type="checkbox"/>	2024/09/26 22:13:32	9992245	21162481	33	1581412	5	13404478
<input type="checkbox"/>	2024/09/26 22:12:32	9992217	21162389	33	1581409	5	13404418

### Switch Health and Uptime

Displays the switch health based on the configured switch health threshold values and the status of the switch (Up/Down). The associated impacted FortiGate controller, switch, and client count are displayed in a collapsible topology. If you select the **Devices** view in the Switching panel and click on the SLA in the impacted SLAs list or click on the bar in the chart, the impacted switches' details such as, OS version, the associated FortiGate host name and serial number, FortiSwitch name and serial number, FortiSwitch state and status, and classifier and sub-classifier are displayed.

Impacted SLAs of Devices in last 1 week

Wireless Switching WAN

SLA

- Switch Health an... 3
- Throughput 1

Classifier

- Switch Down 3
- Config Downlo... 3
- Port Down 2
- Port Flap 1

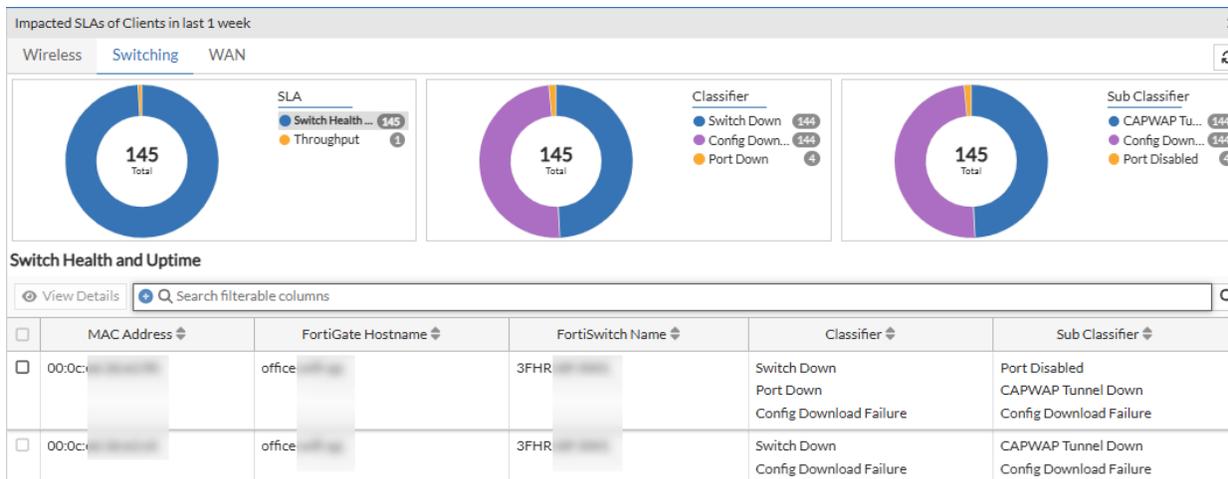
Sub Classifier

- CAPWAP Tunn... 3
- Config Downlo... 3
- Port Disabled 2
- Port Flap 1

**Switch Health and Uptime**

<input type="checkbox"/>	FortiGate Hostname	FortiSwitch Name	OS Version	Classifier	Sub Classifier
<input type="checkbox"/>	office-...	3FHR-...	S224DF-...	Switch Down Port Down Config Download Failure	Port Disabled CAPWAP Tunnel Down Config Download Failure
<input type="checkbox"/>	office-...	GFHR-...	S248DF-...	Switch Down Config Download Failure	CAPWAP Tunnel Down Config Download Failure
<input type="checkbox"/>	office-...	2FSR-...	S548DF-...	Switch Down Port Down Port Flap Config Download Failure	Port Disabled CAPWAP Tunnel Down Port Flap Config Download Failure

If you select the **Clients** view in the Switching panel and click on the SLA in the impacted SLAs list or click on the bar in the chart, the impacted client details, such as, MAC address, OS version, the associated FortiGate host name and serial number, FortiSwitch name and serial number, FortiSwitch state and status, and classifier and sub-classifier are displayed.



Select a row and click **View Details**. The **Details** table displays the following information.



Details

View Logs | Search filterable columns

Date/Time	FortiSwitch Name	Client MAC Address	Hostname	Issue Cause List	Remedies
2024/04/08 01:53:00	S424DF3X15000076	08:35:71:ec:5d:92	08:35:71:ec:5d:92	High CPU usage [13%] on switch S424DF3X...	Check if there's
2024/04/08 01:53:00	S424DF3X15000076	08:35:71:ec:5d:92	08:35:71:ec:5d:92	High memory usage [21%] on switch S524D...	Check if there's
2024/04/08 01:53:00	S424DF3X15000076	08:35:71:ec:5d:92	08:35:71:ec:5d:92	High CPU usage [6%] on switch S524DF4K1...	Check if there's

Right-click on the header of the table to select the following columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiSwitch Name</b>	The name of the impacted switch.
<b>Client MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Issue Cause List</b>	Detailed cause of the SLA breach that impacted the client/switch.
<b>Remedies</b>	The suggested remedy to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the impacted client.

Attribute	Description
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the impacted switch.

Select a particular switch and click **View Logs**, the issue diagnostics and the suggested remedy are displayed.

Switch Logs ✕

Diagnostics
Logs

---

Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>High CPU usage [40%] on switch [REDACTED]</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Check if there's high traffic, high device count or other causes for high resource utilization</li> </ul>

The **Logs** tab displays the time stamp of each action, the type of action such as notice, warning, etc., and the impact details are displayed. Different data tabs are displayed based on the selected issue/failure.

Switch Logs

Diagnostics
Logs

---

Date/Time	Level	Message
2022/07/06 12:48:52	Notice	cpu value is 40

**Note:** The default value for the CPU and memory parameters is 80% and the default value for the temperature is 65 degree Celsius.

### Switch Connection Failure

Displays the failed/unsuccessful client connections based on authentication events such as MAC authentication and 801x authentication and MAC learning limit.

Select a row and click **View Details**. The **Details** table displays the following information.

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiSwitch Name</b>	The name of the impacted switch.
<b>Client MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Issue Cause List</b>	Detailed cause of the SLA breach that impacted the client/switch.
<b>Remedies</b>	The suggested remedy to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.

Attribute	Description
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the impacted client.
<b>FortiGate Serial Number</b>	The serial number of the FortiGate associated with the impacted client.
<b>FortiSwitch Serial Number</b>	The serial number of the impacted switch.

Select a particular switch and click **View Logs**, the issue diagnostics and the suggested remedy are displayed.

Switch Logs

[Diagnostics](#) [Logs](#)

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Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Interface MAC learning limit exceeded on port7 Packet VID 100</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Review the MAC learning limit configured for the port7</li> </ul>

The **Logs** tab displays the time stamp of each action, the type of action such as notice, warning, etc., and the impact details are displayed. Different data tabs are displayed based on the selected issue/failure.

Switch Logs x

[Diagnostics](#) [Logs](#)

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Date/Time	Level	Message
2022/07/13 16:57:05	Notice	primary port port14 instance 0 changed state from disc...
2022/07/13 16:57:02	Notice	primary port port14 instance 0 changed role from disabl...
2022/07/13 16:57:02	Notice	primary switch port port14 has come up
2022/07/13 16:57:00	Error	send dhcp packet failed errno = 6
2022/07/13 16:57:00	Error	send arp packet failed errno = 6
2022/07/13 16:55:58	Notice	primary port port14 instance 0 changed state from forw...
2022/07/13 16:55:58	Notice	primary port port14 instance 0 changed role from desig...
2022/07/13 16:55:58	Notice	primary switch port port14 has gone down
2022/07/13 16:55:46	Information	Config download successful

**Note:** In the **Switch Logs > Diagnostics** tab, if the remedy contains the phrase `cable test`, a **Run Cable Test** button is displayed, to initiate a cable test on the affected port. For more information, see Cable Testing section in [FortiSwitch](#).

## SD-WAN

The **SD-WAN** page provides metric information for the FortiGate devices based on the SD-WAN Interfaces in the system. It provides a visual overview of network performance, application usage, and traffic distribution.



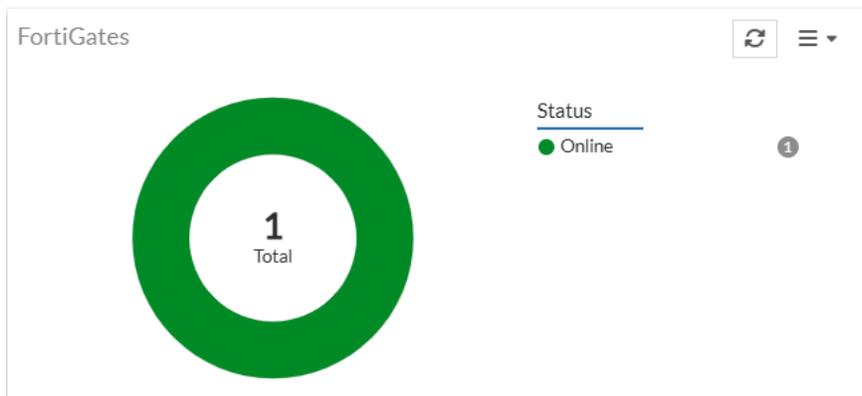
To ensure the charts display accurate values, configure the necessary prerequisites and consider the recommendations provided. If the prerequisites are not configured, both the SD-WAN dashboard and Forecast will appear empty. For more information, see [SD-WAN](#).

The following charts are available on the **SD-WAN** page:

- [FortiGates](#)
- [SD-WAN Health Overview](#)
- [SD-WAN Events](#)
- [SD-WAN](#)
- [Top SLA Issues](#)
- [Top Talkers](#)
- [Top Applications](#)

### FortiGates

This chart displays the total number of FortiGate controllers in your network and their status (Online/Offline).



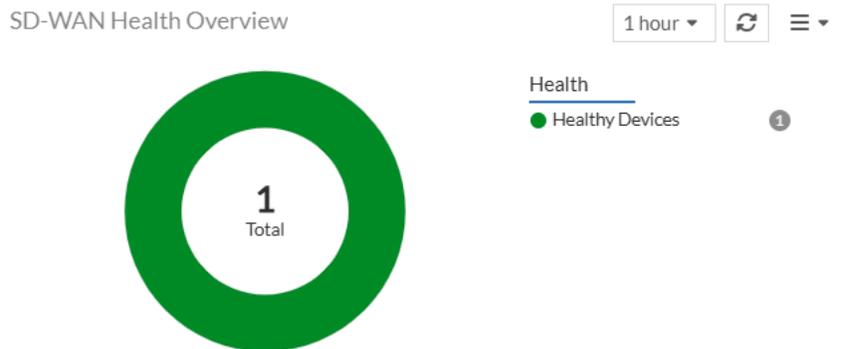
Click the widget to view more details of the FortiGate controllers.

The detailed view includes three summary widgets: 'Status' (1 Online), 'FortiGate Model' (1 FortiGate-300E), and 'OS Version' (1 v7.6.1). Below these is a table with the following data:

FortiGate Name	FortiGate IP Address	Status	Discovery State	Uptime	Cluster Name	HA Mode	License	DNS Hostname
office-...	10.0....	Online	Successfully Discovered	0d:18h:47m:47s		Standalone	Monitoring Analytics SD-WAN	Licensed Licensed Licensed

For more information, see [Managing FortiGates](#).

## SD-WAN Health Overview



This chart summarizes the health status of FortiGates based on the health results of health checks configured for each interface. Depending on the health check uptime, FortiGates are classified as Critical, Major, or Healthy:

- **Healthy Devices** – Indicates the number of devices where there is no health check failure observed over the selected duration (Overall Health Check status is 95% to 100% for the given FortiGate device).
- **Major Alerts Devices** - Indicates the number of devices where there were health check failure observed over the selected duration (Overall Health Check status is 50% to 95% for the given FortiGate device).
- **Critical Alert Devices** - Indicates the number of devices where there were health check failure observed over the selected duration (Overall Health Check status is 0% to 50% for the given FortiGate device).

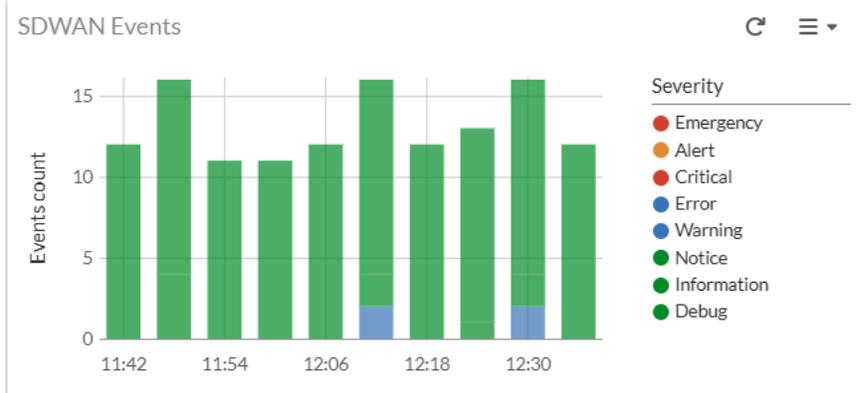
Clicking on each value displays a detailed table with information such as the hostname, up time, average latency, average jitter, and average packet loss.

Health Overview					
Search filterable columns					
<input type="checkbox"/>	Hostname	Up Time	Average Latency	Average Jitter	Average Packet Loss
<input type="checkbox"/>	offi...	● 97.7%	8.48ms	0.16ms	0.08%

Clicking on a FortiGate name redirects to the **Insights** page, which displays various SD-WAN Insights for the associated interfaces. These insights are derived from the performance of configured health checks and include metrics such as bandwidth usage, SD-WAN rule utilization, application usage, and performance indicators like latency, jitter, and packet loss.

### SD-WAN Events

This chart displays the number of SD-WAN events across various severity levels within a specified time frame.



Click an event on the chart to view a detailed SD-WAN Events table, including time, severity, log description, message, log ID, FortiGate serial number, hostname, interface, health check, and VDOM.

Date/Time	Level	Log Description	Message	Log ID	FortiGate Serial Number	Hostname	Int
2025/03/28 12:32:16	Warning	SDWAN SLA information warning	SD-WAN health-check member changed state.	01	4	re1	por
2025/03/28 12:32:14	Warning	SDWAN SLA information warning	SD-WAN health-check member changed state.	01	4	re1	por
2025/03/28 12:12:44	Warning	SDWAN SLA information warning	SD-WAN health-check member changed state.	01	4	re1	por
2025/03/28 12:12:41	Warning	SDWAN SLA information warning	SD-WAN health-check member changed state.	01	4	re1	por

Double-click a row in the detailed table to view further details.

Date/Time	Level	Log Description	Message	Log ID
2025/03/28 12:32:16	Warning	SDWAN SLA information warning	SD-WAN health-check member ch...	0113
2025/03/28 12:32:14	Warning	SDWAN SLA information warning	SD-WAN health-check member ch...	0113
2025/03/28 12:12:44	Warning	SDWAN SLA information warning	SD-WAN health-check member ch...	0113
2025/03/28 12:12:41	Warning	SDWAN SLA information warning	SD-WAN health-check member ch...	0113

**General**

Absolute Date/Time: 2025/03/28 12:32:16

Time: 12:32:17

Virtual Domain: root

Log Description: SDWAN SLA information warning

**Source**

Interface: [blurred]

Health Check: [blurred]

**Message**

Message: SD-WAN health-check member changed state.

**Security**

Level: [Warning icon]

**Other**

Log event original timestamp: 17 [blurred]

Timezone: +0530

Log ID: 011 [blurred]

Type: event

Sub Type: sdwan

Jitter: N/A

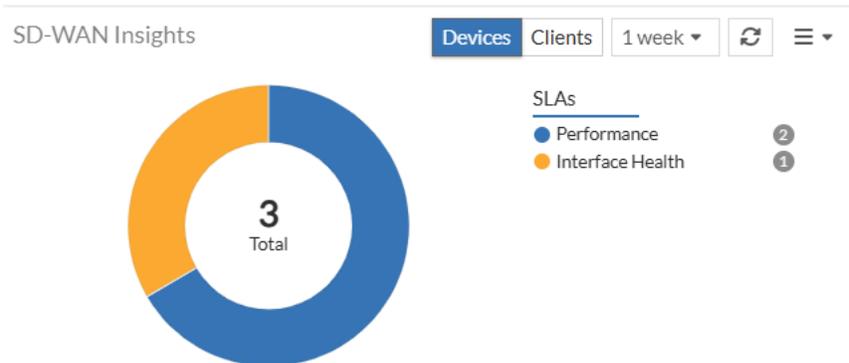
Latency: N/A

Packet Loss: N/A

4 | Updated: 13:00:27 ↻ Close

## SD-WAN Insights

The SD-WAN panel presents Performance SLA and Interface Health failures for monitored SD-WAN members, including detected issues related to FortiExtender health. It also highlights the affected clients on impacted SD-WAN interfaces. Within each SLA panel, you can select **Clients** to view the number of impacted clients or choose **Devices** to see the count of affected interfaces.



**Note:** **Devices** option is selected by default.

### Topology and Logs

You can click on the impacted SLA listed in the panel to view the **Performance**, **Interface Health** or **FortiExtender Health** impacted interface and client details. The issues reported are categorized based on classifiers and sub-classifiers, with suggested remedial measures. The data displayed in this panel is for the time period set in the dashboard.

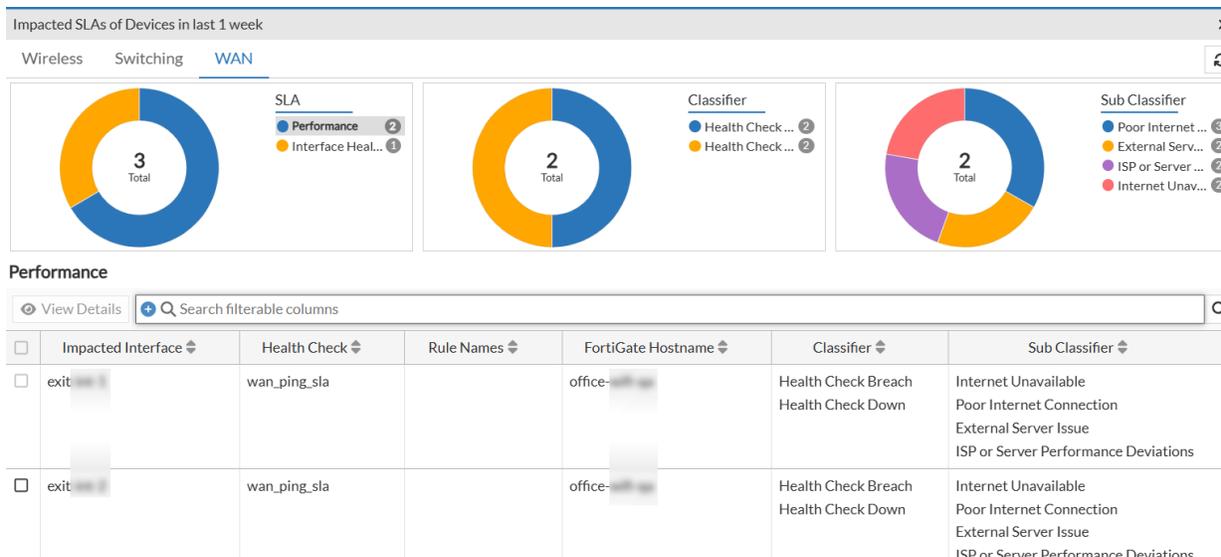
### Performance SLA

FortiAIOps continuously monitors network performance using Performance SLA to measure key metrics such as latency, jitter, and packet loss. This helps assess the quality of network links, detect Performance SLA configuration issues, and track SD-WAN rule-based failures, reporting SLA breaches when forecasted thresholds are exceeded. By monitoring all health checks on FortiGate devices, FortiAIOps leverages real-time and historical trends to forecast future network performance, enabling proactive optimization.

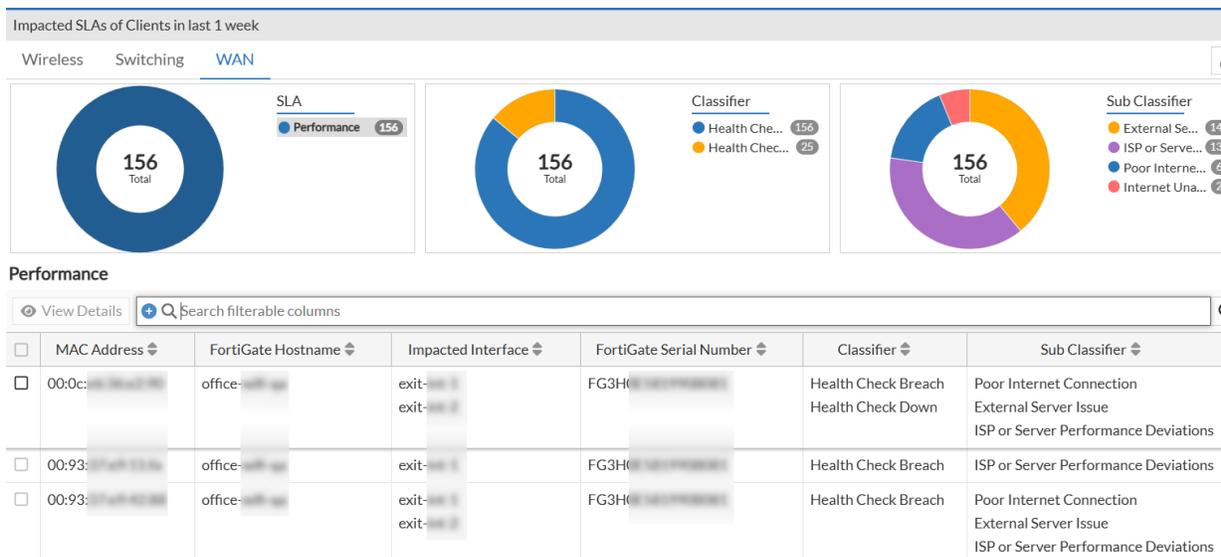


It is recommended to retain the default configurations for Link Status configuration in FortiGate monitored Performance SLAs. Aggressively configured values may lead to the generation of excessive failure alerts.

If you select the **Devices** view in the SD-WAN panel and click on the Performance SLA in the impacted SLAs list or click on the bar in the chart, the impacted interfaces' details such as, destination interface, the associated FortiGate host name, IP address, and serial number, FortiSwitch serial number, and classifier and sub-classifier are displayed.



If you select the **Clients** view in the SD-WAN panel and click on the Performance SLA in the impacted SLAs list or click on the bar in the chart, the impacted client details, such as, MAC address, the AP name and serial numbers, the associated FortiGate hostname and serial number, FortiSwitch name and serial number, destination interface, and the classifier and sub-classifiers are displayed.



Select a row and click **View Details**. The **Details** table displays the following information.

Topology of exit-int-1

Performance Time range: 1 week

Impacted Classifiers	Impacted Sub Classifiers
Health Check Breach 1	External Server Issue
Health Check Down 1	ISP or Server Performanc...
	Internet Unavailable
	Poor Internet Connection

Details

View Logs Search filterable columns

<input type="checkbox"/>	Date/Time	Issue Cause	Remedies	Health Check	Interface
<input type="checkbox"/>	2025/06/09 03:08:26	<ul style="list-style-type: none"> <li>All the health checks monitored through interfa...</li> <li>Internet link is down and the issue is more likely ...</li> </ul>	<ul style="list-style-type: none"> <li>Ensure interface exit-int-1 is connected to expe...</li> <li>Confirm FortiGate has routes for the SD-WAN i...</li> <li>Ensure firewall policies are not blocking the inte...</li> <li>Verify valid DNS is configured for member interf...</li> </ul>	wan_ping_sla	exit-int-1
<input type="checkbox"/>	2025/06/08 15:58:25	<ul style="list-style-type: none"> <li>Health check wan_ping_sla is failing for interfac...</li> <li>Metric(s) such as [latency] varied significantly, c...</li> <li>Issue could be with the server or health of the IS...</li> </ul>	<ul style="list-style-type: none"> <li>Review the routes and policies on the FortiGate ...</li> <li>Contact the server administrator or technical su...</li> <li>If the issue persists, contact the ISP</li> </ul>	wan_ping_sla	exit-int-1

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>Issue Cause List</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Health Check</b>	The performance SLA check configured in FortiGate.
<b>Interface</b>	The interface name for the reported issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Jitter</b>	The amount of jitter (milliseconds) reported for the client.
<b>Packet Loss</b>	The percentage of packet loss reported for the client.
<b>Latency</b>	The amount of latency (milliseconds) reported for the client.
<b>End Timestamp</b>	End time of the impact based on your timezone.
<b>FortiGate Hostname</b>	The hostname of the FortiGate associated with the AP/impacted client.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate.
<b>Jitter Dynamic Threshold</b>	Dynamically calculated jitter value based on historical values.
<b>Jitter Max Threshold</b>	Dynamically calculated maximum variation observed in Jitter for the Health check.
<b>Jitter Static Threshold</b>	Jitter SLA target configured in Performance SLA or FortiAIOps Default target.

Attribute	Description
<b>Latency Dynamic Threshold</b>	Dynamically calculated Latency value based on historical values.
<b>Latency Max Threshold</b>	Dynamically calculated maximum variation observed in Latency for the Health check.
<b>Latency Static Threshold</b>	Latency SLA target configured in Performance SLA or FortiAIOps Default target.
<b>Packet Dynamic Threshold</b>	Dynamically calculated Packet loss value based on historical values.
<b>Packet Max Threshold</b>	Dynamically calculated maximum variation observed in Packet loss for the Health check.
<b>Packet Static Threshold</b>	Packet loss SLA target configured in Performance SLA or FortiAIOps Default target.
<b>Rule Name</b>	The name of the rule to track the interface failure.
<b>Status</b>	Status of the interface.

Select a row from the table and click **View Logs** to view further details.

Device Details ×

Diagnostics   SD-WAN Logs   System Logs   VPN Logs

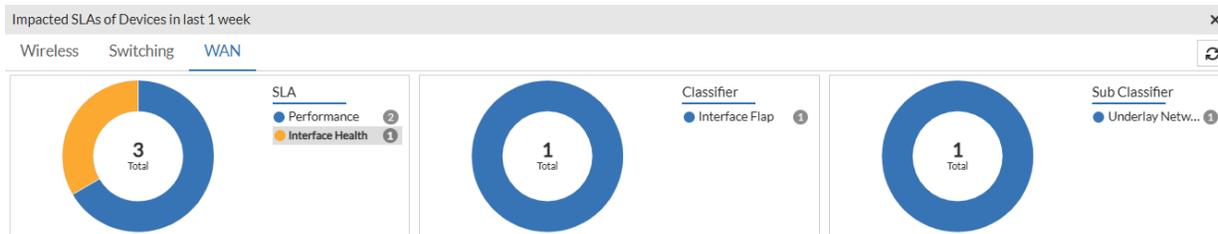
Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Health check wan_ping_sla is failing for interface exit-int-1 with 100% packet loss</li> <li>Note that the health check had passed sometime in the past for the same server "8.8.8.8"</li> <li>The server unreachability issues could be specific to the server, application or protocol being used in the health check, or due to any of the issues such as - network congestion on the path, link latency, firewall or security feature blocking the connection or server side problems, etc.</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Validate reachability of the server from the affected SD-WAN interface using the desired protocol</li> <li>Contact the server administrator or technical support to check if the server is overloaded, under maintenance, or upgrades and evaluate if alternate servers can be used in the meantime</li> <li>If the issue persists or if the server is reachable from any other interfaces, contact the ISP</li> </ul>

The **Diagnostics** tab details identified issues and provides steps for rectification. For more in-depth logs, navigate to the **SD-WAN Logs**, **System Logs**, or **VPN Logs** tabs.

## Interface Health SLA

Interface Health SLA in FortiAIOps focuses on monitoring the stability and reliability of both underlay and overlay network links. It detects link status changes and interface flaps to ensure consistent network performance. Additionally, FortiAIOps evaluates the interface selection strategies defined in SD-WAN rules, helping to identify the most efficient path for traffic. This ensures seamless connectivity and aids in optimizing SD-WAN configurations for maximum performance and reliability.



**Interface Health**

View Details Search filterable columns

Impacted Interface	Rule Names	FortiGate Hostname	Classifier	Sub Classifier
flm-wifi		office-...	Interface Flap	Underlay Network Down

The Interface Health table displays information such as Impacted Interface, Rule Names, FortiGate Hostname, Classifier, Sub Classifier, AP List, FortiExtender Name, FortiExtender Serial, FortiGate IP Address, FortiGate Serial Number, FortiSwitch Serial Number, and Health Check.

To get detailed information, select the impacted interface and click **View Details**.



**Details**

View Logs Search filterable columns

Date/Time	Issue Cause	Remedies	Classifier	Sub Classifier
2025/06/11 09:57:48	Physical interface flm-wifi toggled between alive an... Such events will disrupt the ongoing traffic sessions...	Enable interface flm-wifi and ensure the link is up. Al...	Interface Flap	Underlay Network Down
2025/06/05 17:51:17	Physical interface flm-wifi toggled between alive an... Such events will disrupt the ongoing traffic sessions...	Enable interface flm-wifi and ensure the link is up. Al...	Interface Flap	Underlay Network Down

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>Issue Cause</b>	The detailed causes of the SLA breach that impacted the client/AP/FortiGate.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>End Timestamp</b>	End time of the impact based on your timezone.
<b>In Bandwidth</b>	Bandwidth of the incoming data.
<b>Interface</b>	The interface name for the reported issue.
<b>Out Bandwidth</b>	Bandwidth of the outgoing data.

Attribute	Description
<b>Rule Name</b>	The name of the rule to track the interface failure.
<b>Tunnel Interface</b>	Name of the tunnel interface.

Select a row and click **View Logs** to view detailed logs for the issue.

Device Details x

[Diagnostics](#) [SD-WAN Logs](#) [System Logs](#) [VPN Logs](#)

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Issue Diagnostics

Issue Cause	<ul style="list-style-type: none"> <li>Physical interface flm-wifi toggled between alive and dead status atleast 1 times within 60 seconds, primarily due to interface config changes</li> <li>Such events will disrupt the ongoing traffic sessions and degrade the system performance and user experience</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Enable interface flm-wifi and ensure the link is up. Also, avoid such frequent changes to interface's config</li> </ul>

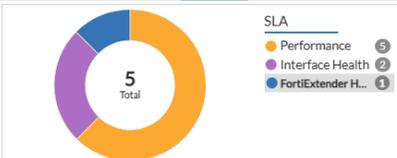
The **Diagnostics** tab details identified issues and provides steps for rectification. For more in-depth logs, navigate to the **SD-WAN Logs**, **System Logs**, or **VPN Logs** tabs.

### FortiExtender Health SLA

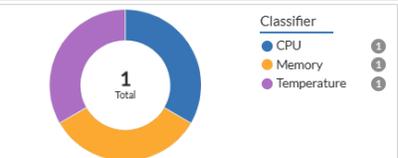
If you select the **Devices** view in the SD-WAN panel and click on the FortiExtender Health SLA in the impacted SLAs list or click on the bar in the chart, the impacted interfaces' details such as, destination interface, AP serial number, the associated FortiGate host name, IP address, and serial number, FortiSwitch serial number, FortiExtender name and serial number, and classifier and sub-classifier are displayed.

Impacted SLAs of Devices in last 1 week x

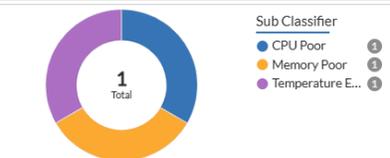
Wireless [Switching](#) [WAN](#) refresh



**5**  
Total



**1**  
Total



**1**  
Total

**FortiExtender Health**

[View Details](#)  Q

<input type="checkbox"/>	Impacted Interface	FortiGate Hostname	FortiGate Serial Number	FortiGate IP Address	Classifier	Sub Classifier
<input type="checkbox"/>		FortiGate-300E	FG3H...	10....	CPU Memory Temperature	CPU Poor Memory Poor Temperature Exceed
<input type="checkbox"/>		FortiGate-300E	FG3H...	10....	CPU Memory Temperature	CPU Poor Memory Poor Temperature Exceed

If you select the **Clients** view in the SD-WAN panel and click on the FortiExtender Health SLA in the impacted SLAs list or click on the bar in the chart, the impacted client details, such as, MAC address, the AP name and serial number, the associated FortiGate hostname and serial number, FortiSwitch name and serial number, FortiExtender name and serial number, destination interface, and the classifier and sub-classifiers are displayed.

Select a row and click **View Details**. The **Details** table displays the following information.

FortiExtender Health ▾
Time range :1 week

Impacted Classifiers	Impacted Sub Classifiers
CPU <span style="float: right;">1</span>	CPU Poor
Memory <span style="float: right;">1</span>	Memory Poor
Temperature <span style="float: right;">1</span>	Temperature Exceed

Details

View Logs
Search filterable columns

Date/Time	MAC Address	Hostname	Issue Cause List	Remedies
2024/04/07 20:41:05	80:24:24:4a:7e:84	DESKTOP-V386338	High CPU usage [3%] detected on FortiExten...	Check if there is high traffic on FortiExtende...
2024/04/07 20:41:05	80:24:24:4a:7e:84	DESKTOP-V386338	High memory usage [19%] detected on Forti...	Check if there is high traffic on FortiExtende...
2024/04/07 20:41:05	80:24:24:4a:7e:84	DESKTOP-V386338	Device temperature high [65.20°C] on FortiE...	Please ensure FortiExtender is placed in a sp...

Right-click on the header of the table to select the following columns that you wish to view.

Attribute	Description
<b>Date/Time</b>	The date and time of the impact as per your timezone.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate.
<b>AP Serial</b>	The serial number of the associated AP.
<b>Access Point</b>	The name of the associated AP.
<b>MAC Address</b>	The MAC address of the impacted client device.
<b>Hostname</b>	The name of the device as configured by the user. If the name is not configured or available, then MAC address is displayed.
<b>Issue Cause List</b>	The detailed cause of the SLA breach that impacted the client/AP/FortiGate/FortiExtender.
<b>Remedies</b>	The suggested remedies to resolve the issue.
<b>Classifier</b>	The classifier of the issue reported for the SLA.
<b>Sub Classifier</b>	The sub-classifier of the issue for the reported classifier.
<b>Source and Destination Interface</b>	The SD-WAN interface name.
<b>FortiSwitch Serial Number</b>	The serial number of the impacted switch.
<b>FortiSwitch Name</b>	The name of the impacted switch.
<b>FortiExtender Serial Number</b>	The serial number of the impacted FortiExtender.
<b>FortiExtender Name</b>	The name of the impacted FortiExtender.
<b>FortiGate Hostname</b>	The hostname of the FortiGate with which the impacted FortiExtender is associated.
<b>Client Type</b>	The client type that is impacted, wireless or wired.

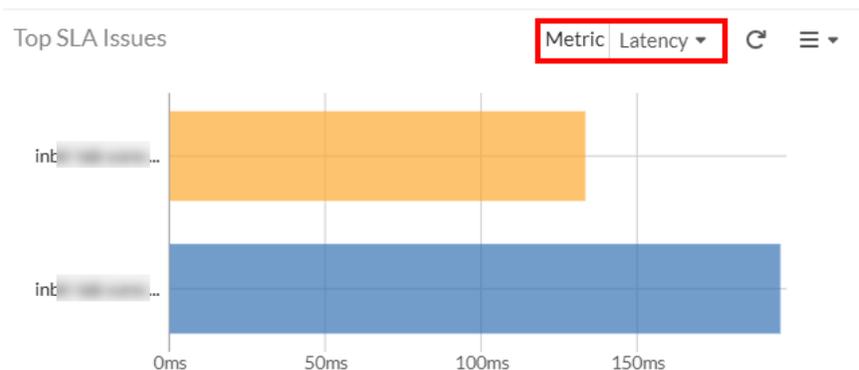
Select a particular client and click **View Logs**, to view the impacted client logs.

Client Details <span style="float: right;">✕</span>							
CLIENT LOGS							
<input type="text" value="Search"/>							
Date/Time	Health Check	Interface	Status	Latency	Jitter	Packet Loss(%)	
2022/07/06 16:56:29	google_dns	wan1	up	188.792ms	0.035ms	0.000	<a href="#">Health Check</a>
2022/07/06 16:56:29	google_dns	wan1	up	188.792ms	0.035ms	0.000	Health Check
2022/07/06 16:56:29	google_dns	wan1	up	188.792ms	0.035ms	0.000	Health Check

### Top SLA Issues

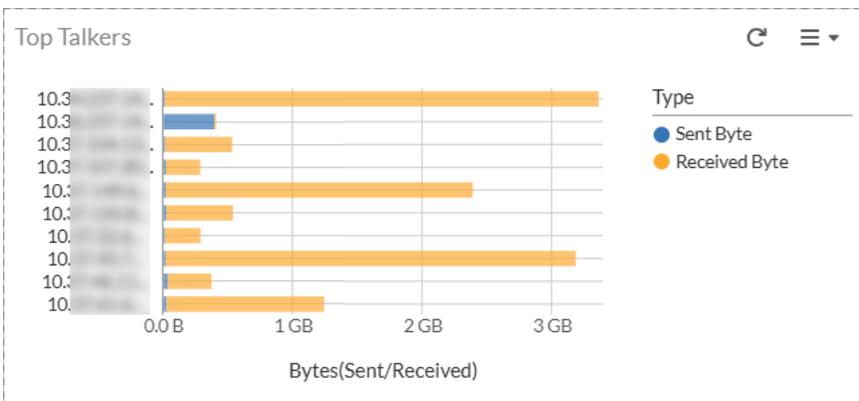
This chart displays the top 10 worst SD-WAN performance values for each metrics for Interfaces—Latency, Jitter, and Packet Loss for the selected time period.

You can select the SLA Performance Metrics from the **Metric** drop-down list.



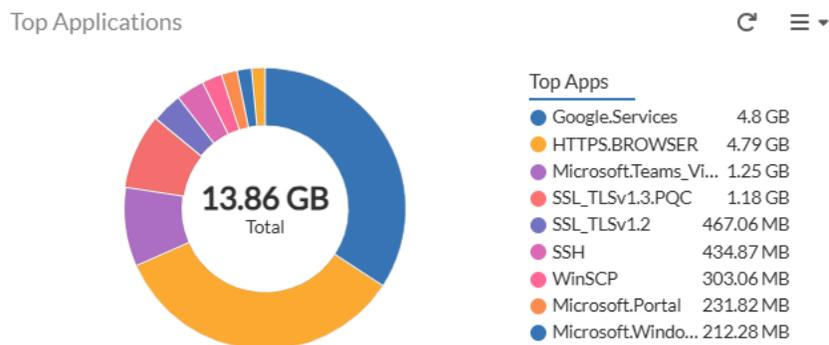
### Top Talkers

This chart displays the sources which have top 10 bandwidth usage (bytes sent and bytes received) on the SD-WAN interfaces across the FortiGates within a Device Group. Clicking on each value opens the Top Talkers detailed chart with information such as FortiGate name, interface, application, sent byte, and received byte.



### Top Applications

This chart displays the top 10 applications being used on the SD-WAN interfaces.



Hovering over each value displays the Application and Used Bandwidth.

Clicking on each value opens the Top Applications detailed chart for the application displaying the FortiGate name, used bandwidth, and the interface.

Top Applications			
Search filterable columns			
<input type="checkbox"/>	Hostname	Used Bandwidth	Interface
<input type="checkbox"/>	int-...	4.78 GB	port1
<input type="checkbox"/>	int-...	10.85 MB	port2

## Custom Dashboard

You can customize your dashboard experience—modify existing layouts by adding or deleting widgets, or create entirely new dashboards with your preferred widgets.

The following customizations are available:

- [Creating a New Dashboard](#)
- [Modifying an Existing Dashboard](#)
- [Deleting a Dashboard](#)
- [Rearranging the Dashboards](#)
- [Resetting the Dashboard Section](#)

**Note:** Customizations are saved across navigations, logouts, reboots, and upgrades, and are specific to each user.

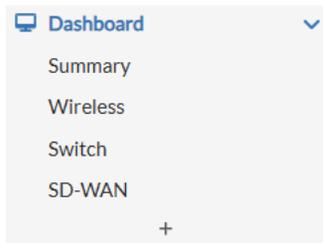
The widget library has also been improved for a more seamless user experience. For more information, see [Managing Dashboard Widgets](#).

### Creating a New Dashboard

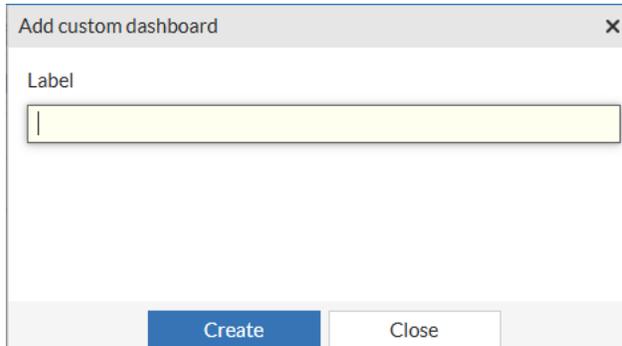
You can now create new custom dashboards and add widgets from the widget library.

To create a new dashboard:

1. On the left navigation pane, select **Dashboard** and click **+**.



2. In the **Add custom dashboard** pane, enter a name for the dashboard in the **Label** field.



3. Click **Create**.  
Add widgets to the newly created dashboard. See [Modifying an Existing Dashboard](#).

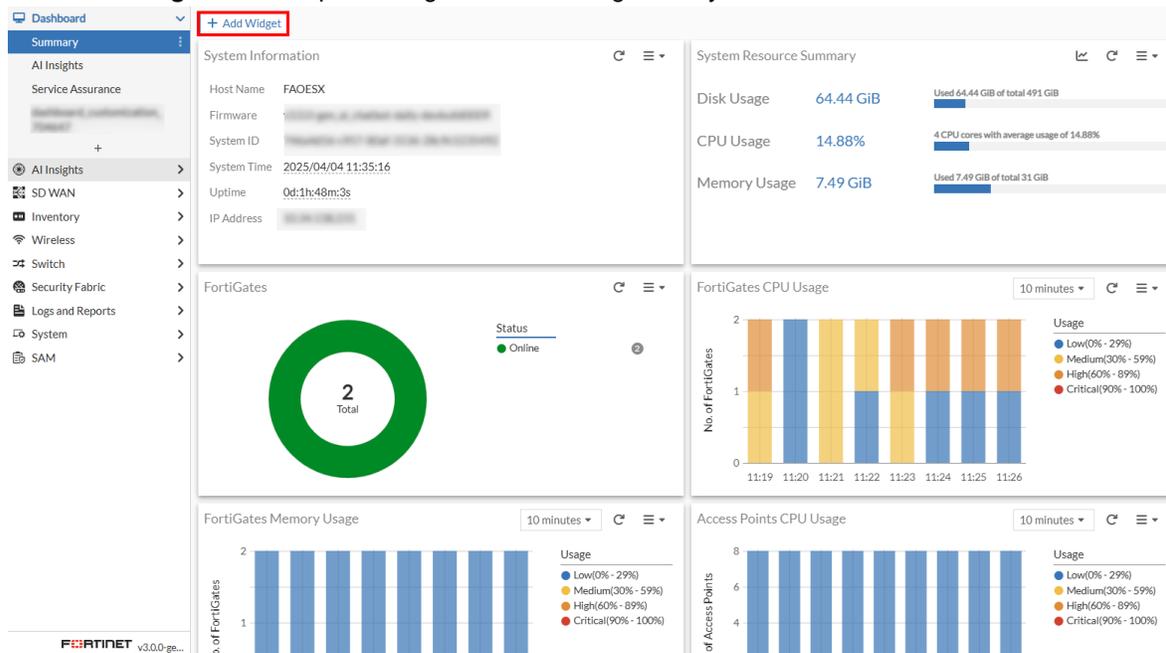
### Modifying an Existing Dashboard

You can customize both existing dashboards and default dashboards by adding/deleting widgets or renaming the dashboards.

**Note:** You can add a maximum of 20 widgets in a dashboard.

To add a widget to the dashboard:

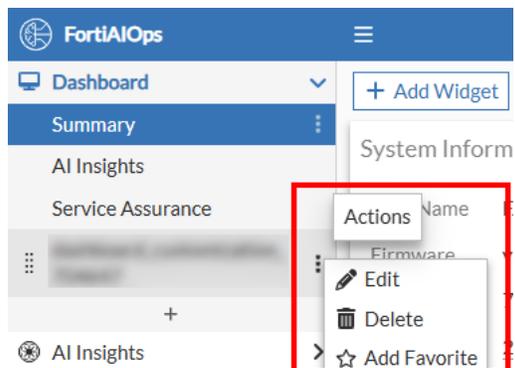
1. Select the dashboard you want to modify.
2. Click **Add Widget** to add required widgets from the widget library.



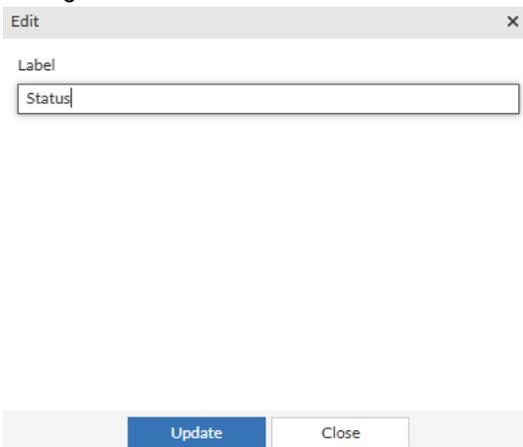
3. In the the **Manage Dashboard Widgets** pane, hover on the widget name to select the required widget and click +.  
For more information on widget library, see [Managing Dashboard Widgets](#)
4. Click **Close** to close the pane once the widgets are selected.
5. Click **Reset dashboard layout** to clear all the widgets added to the dashboard.

To change the name/label of the dashboard:

1. Select a dashboard and from the Actions menu click **Edit**.



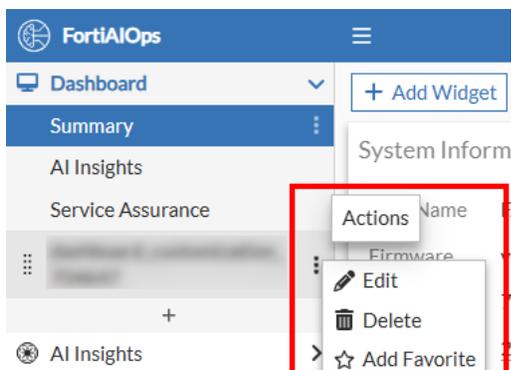
2. Change the name of the dashboard in the **Label** field and click **Update**.



### Deleting a Dashboard

Both default dashboards and user-added dashboards can be deleted.

Select the dashboard to be deleted and from the **Actions** menu click **Delete**.



**Note:** Dashboards once deleted cannot be recovered.

### Rearranging the Dashboards

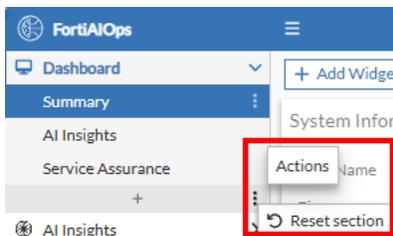
You can move a dashboard up or down to rearrange the dashboard list.

To rearrange your dashboards, click and drag a dashboard up or down in the list.

### Resetting the Dashboard Section

You can remove all your customized dashboards and revert to the default view.

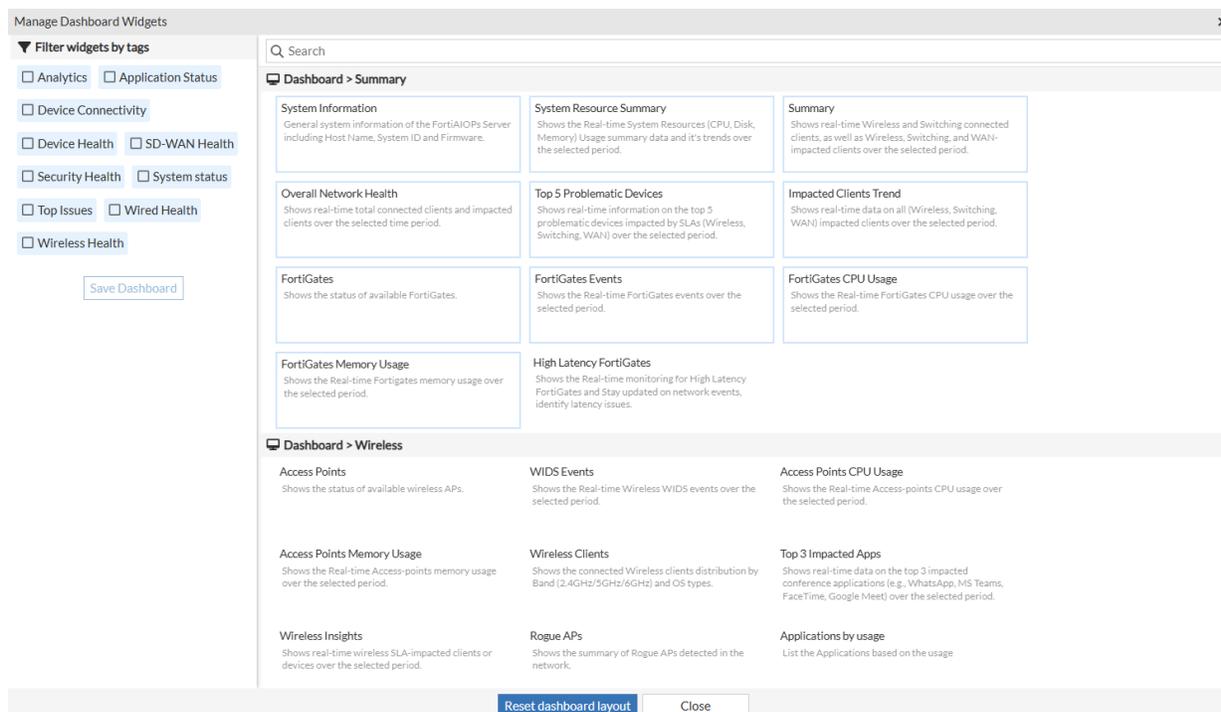
Hover over **+** and from the **Actions** menu, click **Reset section**.



## Managing Dashboard Widgets

The Manage Dashboard Widgets window lists all available widgets for your dashboard in one place. Widgets are organized into categories such as Monitoring, AI-Insights, Service Assurance, SD-WAN, and Licensing.

Use the filters on the left pane to quickly locate the widgets you are looking for.



To clear all the widgets added to the dashboard, click **Reset dashboard layout**.

The widgets are categorized into the following sections:

- [Summary](#)
- [Wireless](#)
- [Switch](#)
- [SD-WAN](#)
- [Applications](#)
- [Licensing](#)
- [Service Assurance](#)

## Service Assurance

The Service Assurance dashboard for FortiAI Ops is designed to provide comprehensive insights and monitoring of network performance. It consists of various widgets that offer visual representations and classifications of different metrics.



The data on this dashboard is based on scheduled test results and is automatically refreshed every 60 seconds; the following options are available to manage the auto-refresh feature for this page.

- Click to manually refresh data.
- Click to pause the auto-refresh.
- Click to resume the auto-refresh.
- Select the time range from the drop-down. Choose from 10 minutes, 1 hour, 4 hours, 6 hours, 1 day, 1 week.

The dashboard provides an option to select the duration of the data displayed. You can choose between 1 day, 1 week, 1 hour, and 10 minutes.

Use the **Add Widget** option to manage the widgets displayed on the dashboard; you can choose to add or remove the widgets.

Add Dashboard Widget ✕

▲ Trends

**Throughput** ✕

Shows the measured throughput results and classifies them as bar chart with Good, Fair and Bad markings.

**Connectivity** ✕

Shows the measured Connectivity results and classifies them as bar chart with Good, Fair and Bad markings.

**Channel Health** ✕

Shows the channel health based on the SAM Connectivity and Throughput test results.

**RF Health** ✕

Shows the RF health based on the SAM Connectivity and Throughput test results for each RF Band (2.4GHz/5GHz/6GHz)

**Top 5 APs by failure** ✕

Shows the sorted APs list based on the number of failed SAM test results.

**Top 5 SSIDs by Failure** ✕

Shows the SSIDs list sorted based on the number of failed SAM test results.

The following widgets provide network data on this dashboard.

- Throughput** - This widget displays the measured throughput results of your network. Throughput refers to the amount of data transferred through the network over a given time period. It presents the data in the form of a bar chart, indicating the performance levels as *Good*, *Fair*, or *Bad*. Click on the charts to view additional information.

Throughput ✕

🔍 Search

Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_thru	Throughput	FP4	1	6	2	5GHz	sam-thru-base

☰ Best Fit Columns

↺ Reset Table

Select Columns

Test name

Test Type

AP name

SSID

Radio ID

Band

Serial Number

Baseline Name

Channel

Status

Start Time

Packet Loss

Throughput

Apply
Cancel

Right-click on the header of the table to select the columns that you wish to view.

Attribute	Description
<b>Test Name</b>	The name of the associated test.
<b>Test Type</b>	The type of test, <i>throughput</i> or <i>connectivity</i> .
<b>AP Name</b>	The name of the access point used during the test.
<b>SSID</b>	The SSID associated with the network.
<b>Radio ID</b>	The associated radio ID .
<b>Band</b>	The frequency band utilized, <i>2.5 GHz</i> or <i>5 GHz</i> .
<b>Serial Number</b>	The serial number of the associated FortiGate.
<b>Baseline Name</b>	The name of associated baseline.
<b>Channel</b>	The channel number utilized.
<b>Status</b>	The status of the test, <i>Good</i> , <i>Fair</i> , or <i>Bad</i> .
<b>Start Time</b>	The timestamp indicating when the test was initiated.

Attribute	Description
<b>Packet Loss</b>	The amount of data lost during transmission, expressed as a percentage.
<b>Throughput</b>	The measured network throughput, indicating the amount of data transferred.

- Connectivity** - This widget displays the measured Connectivity results using a bar chart and classifies the results as *Good*, *Fair*, or *Bad*. Connectivity refers to the ability of devices to establish and maintain a connection to the network. Click on the charts to view additional information.

Connectivity							
+ Q Search							
Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_conn	Connectivity	FP4	1051	sam	36	2	5GHz

- RF Health** - This widget displays the radio frequency (RF) health based on the Service Assurance Manager (SAM) Connectivity and Throughput test results for each RF Band(2.4GHz/ 5GHz). Click on the charts to view additional information.

RF Health							
+ Q Search							
Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_conn	Connectivity	FP4	1051	sam	36	2	5GHz

- Top 5 APs by Failure** - This widget displays a sorted list of Access Points (APs) based on the highest number of bad results. Click on the charts to view additional information.

Top 5 APs By Failure							
+ Q Search							
Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_thru	Throughput	FP4	1051	sam	36	2	5GHz

- Top 5 SSIDs by Failure** - This widget displays a sorted list of SSIDs based on the highest number of bad results. Click on the charts to view additional information.

Top 5 SSIDs By Failure							
+ Q Search							
Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_conn	Connectivity	FP4	1051	sam	36	2	5GHz

- Channel Health** - This widget displays the overall health of the network channels based on the SAM Connectivity and Throughput test results. Click on the charts to view additional information.

Channel Health							
+ Q Search							
Test name	Test Type	AP name	SSID	Radio ID	Band	Serial Number	Baseline Name
sche_test_conn	Connectivity	FP4	1051	sam	36	2	5GHz

# AI Insights

This section describes the FortiAI Ops AI enabled data insights of your network and SLA configurations.

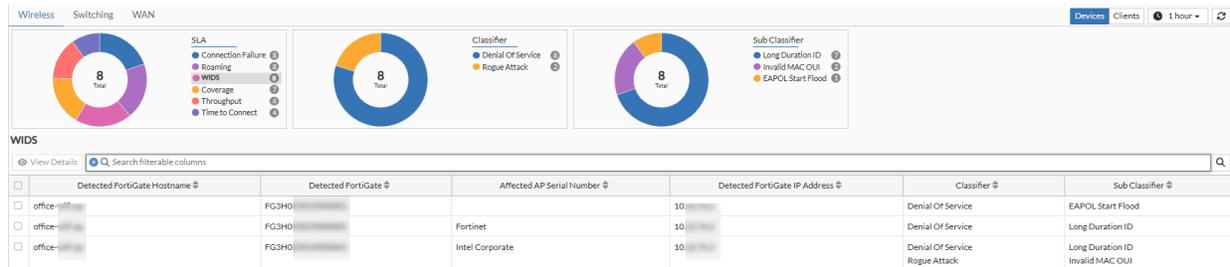
- Impacted SLA
- Impacted Devices
- SLA Config

## Impacted SLA

This page displays the impacted wireless, switching, and WAN clients, categorized based on their SLAs, classifiers, and sub-classifiers. Select any SLA and the associated classifier and sub-classifier charts are displayed. You can filter and view the SLAs as per any of these categories. In each impacted SLA panel for wireless, switching, and WAN, you can select **Clients** to view the impacted client count or click **Devices** to view the impacted device count. Navigate to **AI Insights > Impacted SLA**.

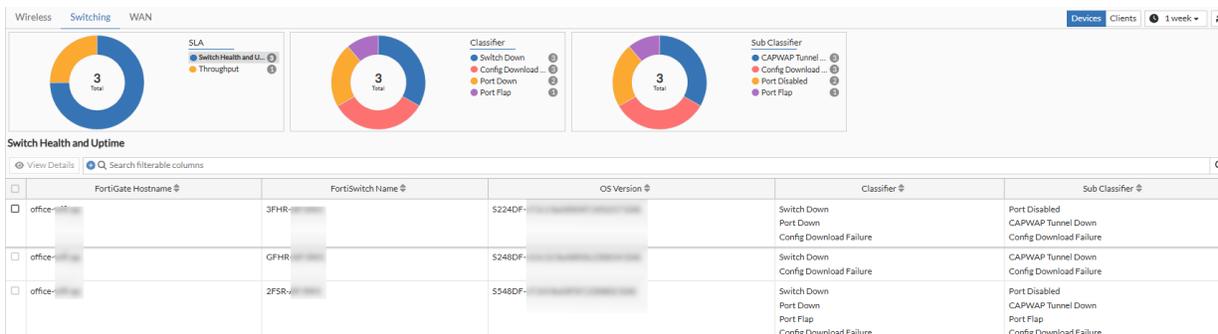
### Wireless

The wireless SLA data is reported based on the classifiers and sub-classifiers displayed in this panel. The SLA data tables lists the client MAC address and hostname, FortiGate hostname and serial number, AP name, IP address, and serial number, classifier and sub-classifier, the associated SSID, and the operating channel. Select any row and click on **View Details** to view the impacted SLA details.



### Switching

The switching SLA data is reported based on the classifiers and sub-classifiers listed displayed in this panel. The SLA data tables lists the client MAC address and hostname, FortiGate hostname and serial number, FortiSwitch name, serial number, and OS version, classifier and sub-classifier, FortiSwitch state and status (online/offline). Select any row and click on **View Details** to view the impacted SLA details.

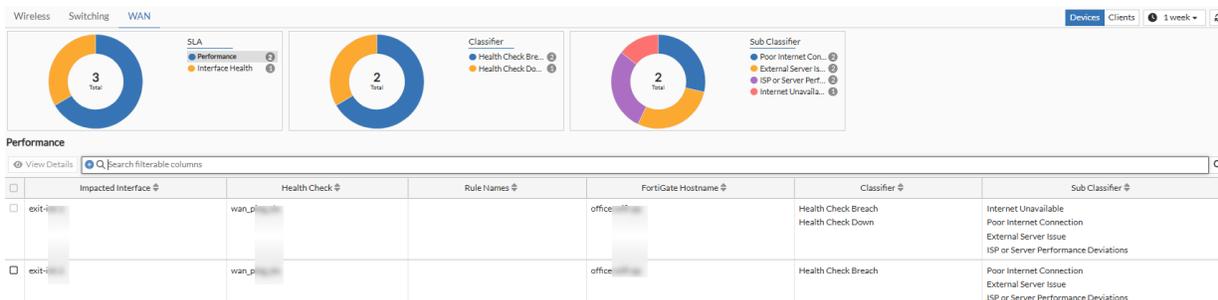


## WAN

The SD-WAN SLA monitoring makes use of sub-classifiers for deep insight into critical performance issues. Using real-time logs and statistical data from FortiGate devices, these sub-classifiers allow for more precise identification and resolution of potential challenges, enhancing network reliability and efficiency. The monitoring incorporates use-case specific classifications for performance SLAs, interface health SLAs and SD-WAN rule [Service] based SLAs in the SD-WAN network. This enables to identify a wider range of performance and interface related problems within the SD-WAN network

The WAN SLA data is reported based on the classifiers and sub-classifiers displayed in this panel. The SLA data tables lists the Impacted Interface, Health Check, Rule Name, FortiGate Hostname, Classifier, and Subclassifier.

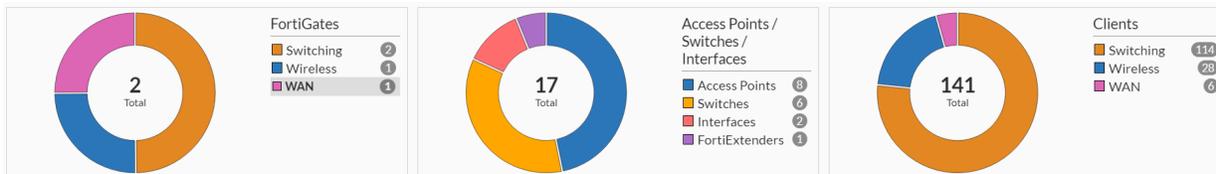
**Note:** To ensure the charts display accurate values, configure the necessary prerequisites and consider the recommendations provided. For more information, see [SD-WAN](#).



Select any device listed in the tables and click on **View Details** for topology and other details. For details on the SLAs, topology, and logs, see [SD-WAN](#).

## Impacted Devices

This page displays details of the various devices in your network that are associated with impacted clients, that include the wireless, switching, and WAN clients. You can view and analyze the SLA data based on the device type. The data is displayed in the following three panels. The number of devices are listed for each category, you can click on any of these or click on the respective section in the donut chart to view details. Navigate to **AI Insights > Impacted Devices**.



### FortiGates

Displays the number of deployed FortiGate controllers with impacted wireless, switching, and WAN clients.

The following example displays the *FortiGates-Wireless SLA* with information such as FortiGate host name, serial number, and IP address, and lists the impacted APs, clients, and SLAs. Select any row and click on the impacted SLA name to view the topology. Data is displayed for FortiGate wireless clients based on the selected SLA breaches only.

FortiGates Wireless SLA

Impacted SLAs	FortiGate Serial Number	IP Address	Impacted APs	Impacted Clients
FGVM04				
Connection Failure	FGVM04	10.34.139.200	7	14
Time to Connect	FGVM04	10.34.139.200	7	13
Throughput	FGVM04	10.34.139.200	7	12

The following example displays the *FortiGates-WAN SLA* with information such as FortiGate host name, serial number, and IP address, and lists the impacted APs, clients, SLAs, switches, and interfaces. Select any row and click on the impacted SLA name to view the topology.

FortiGates WAN SLA

Impacted SLAs	FortiGate Serial Number	IP Address	Impacted APs	Impacted Switch	Impacted Interfaces	Impacted Clients	Extenders
FortiGate-300E							
Performance	FG300E	10.34.139.200	7	1	2	6	0
FortiExtender Health	FG300E	10.34.139.200	6	1	1	4	1

The following example displays the *FortiGates-Switching SLA* with information such as FortiGate host name, serial number, and IP address, and lists the impacted clients, SLAs, and switches. Select any row and click on the impacted SLA name to view the topology.

FortiGates Switching SLA

Impacted SLAs	FortiGate Serial Number	IP Address	Impacted Switch	Impacted Clients
1				
Switch Health and Uptime	FG000E		1	5
FGT_BACKUP_182				
Switch Health and Uptime	FG000E	10.34.139.182	1	12
FGT_PRIMARY_181				

### Access Points/ Switches/ Interfaces/FortiExtenders

Displays the number of devices, that is, APs, SD-WAN interfaces, FortiExtenders, and switches with impacted clients.

The following example displays the *Access Points* with information such as AP name, serial number, and IP address, FortiGate host name and IP address, and lists the impacted clients and SLAs. Select any row and click on the impacted SLA name to view the topology.

Access Points

Search filterable columns

Impacted SLAs	Access Point	FortiGate Serial Number	FortiGate IP Address	AP Serial Number	AP IP Address	Impacted Clients
FGVM0 24						
Connection Failure	FG42PRT723000176	FGVM04THC3010404	30.34.139.207	FG42PRT723000176	30.37.26.15	10
Time to Connect	FG42PRT723000176	FGVM04THC3010404	30.34.139.207	FG42PRT723000176	30.37.26.15	8
Time to Connect	FP433GT723001340	FGVM04THC3010404	30.34.139.207	FP433GT723001340	30.37.42.15	7
Connection Failure						

The following example displays the *Interfaces* with information such as the interface, FortiGate host name, serial number, and IP address, and lists the impacted clients and SLAs. Select any row and click on the impacted SLA name to view the topology.

Interfaces

Search filterable columns

Impacted SLAs	FortiGate IP Address	FortiGate Serial Number	Interface	Impacted Clients
FortiGate-300E 2				
Performance	30.34.139.230	FG40E161P00001	FEXWAN1	6
Performance	30.34.139.230	FG40E161P00001	port15	6

The following example displays the *Switches* with information such as the switch host name, IP address, OS version, and serial number, FortiGate host name, serial number, and IP address, and lists the impacted clients and SLAs along with the status and state of the switch. Select any row and click on the impacted SLA name to view the topology.

Switches

Search filterable columns

Impacted SLAs	Name	OS Version	Connecting From	State	Status	FortiSwitch Serial Number	For
+ 1							
FGT_BACKUP_182 1							
Switch Health and Uptime	S248EF1920013730	S248EF-v7.4.0-build767.230602 (GA)	169.254.2.2	Authorized	Connected	S248EF1920013730	FGV
FGT_PRIMARY_181 1							
Switch Health and Uptime	S248EF1920013730	S248EF-v7.4.0-build767.230602 (GA)	169.254.2.2	Authorized	Connected	S248EF1920013730	FGV

The following example displays the *FortiExtenders* with information such as the interface, FortiGate host name, and FortiExtender name, and lists the impacted clients and SLAs. Select any row and click on the impacted SLA name to view the topology.

FortiExtenders

Search filterable columns

Impacted SLAs	FortiExtender Serial	FortiExtender Name	FortiGate IP Address	FortiGate Serial Number	Interface	Impacted Clients
FortiGate-300E 1						
FortiExtender Health	FP213E190000777	FP213E190000777	30.34.139.230	FG40E161P00001	FEXWAN1	4

## Clients

Displays the number of impacted clients for the wireless, switching, and WAN.

The following example displays the *Wireless Clients* with information such as the FortiGate host name, serial number, and IP address, AP name and IP address, client MAC address, and the impacted SLAs. Select any row and click on the impacted SLA name to view the topology.

Wireless Clients

+ Q Search filterable columns

Impacted SLAs	MAC Address	FortiGate Serial Number	FortiGate IP Address	AP Serial Number	Access Point	AP IP Address
FGVM04 43						
Connection Failure	A4:23:44:AF:6A:43	FG348E1811988883	10.34.139.207	FP423E7F23860176	FP423E7F23860176	10.37.26.13
Connection Failure	A4:23:44:AF:6A:43	FG348E1811988883	10.34.139.207	FP423E7F23860176	FP423E7F23860176	10.37.26.7
Time to Connect						
AP Health and Uptime						
Throughput						

The following example displays the *WAN Clients* with information such as the FortiGate host name, serial number, and IP address, AP name, IP address, and serial number, switch name, IP address, and serial number, client MAC address, interface details, and the impacted SLAs. Select any row and click on the impacted SLA name to view the topology.

WAN Clients

+ Q Search filterable columns

Impacted SLAs	MAC Address	FortiGate Serial Number	FortiGate IP Address	AP Serial Number	FortiSwitch Serial Number	Access Point
FortiGate-300E 47						
Performance	48:9F:9B:48:13:90	FG348E1811988883	10.34.139.230	FP23377F23860176		FP23377F23860176
Performance	7c:64:3a:f7:a5:32	FG348E1811988883	10.34.139.230	FP23377F23860176		SuperDesk_233
Performance	80:a7:a2:4a:7a:34	FG348E1811988883	10.34.139.230	FP423E7F23860176	S4C4E7F23860176	FP423E7F23860176
FortiExtender Health						

The following example displays the *Switching Clients* with information such as the FortiGate host name, serial number, and IP address, switch name, IP address, OS version, state, and status, client MAC address, and the impacted SLAs. Select any row and click on the impacted SLA name to view the topology.

Switching Clients

+ Q Search filterable columns

Impacted SLAs	MAC Address	FortiGate Serial Number	FortiGate IP Address	FortiSwitch Name	FortiSwitch Serial Number	Connecting F
5						
Switch Health and Uptime	80:23:8f:f7:a4:29	FG300E7K38934993		Super-104	S4C4E7F23860176	SW-254.L2
Switch Health and Uptime	80:23:8f:f7:a4:29	FG300E7K38934993		Super-104	S4C4E7F23860176	SW-254.L2
Switch Health and Uptime	80:23:8f:f7:a4:29	FG300E7K38934993		Super-104	S4C4E7F23860176	SW-254.L2

## SLA Config

This section explains how to configure SLA metrics to define values to match network deployment and required thresholds. Navigate to **AI Insights > SLA Config**.

- [Device Health](#)
- [Time To Connect](#)
- [Roaming](#)

## Device Health

Configure AP, switch, and FortiExtender health SLA threshold values. The AP health is displayed in the *AP Health and Uptime* SLA of the [Wireless](#) section, the switch health is displayed in the *Switch Health and Uptime* SLA of the [Switching](#) section, and the FortiExtender health is displayed in the *FortiExtender Health* SLA of the [WAN](#) section.

Navigate to **AI Insights > SLA config > Device Health** to configure the following parameters.

- **CPU** usage
- **Memory** usage

- **Temperature**

AP Health



Switch Health



FortiExtender Health



**Note:** The default value for the CPU and memory parameters is 80% and the default value for the temperature is 65 degree Celsius.

## Time To Connect

You can configure static thresholds or enable FortiAI Ops to compute them dynamically. Based on the configured thresholds, the variations in the time to connect are recorded for each phase, and the statistics are displayed in the [AI Insights](#) tab.

### Dynamic Baselines

You are required to provide the following information for threshold/baseline configuration.

Time to Connect
Roaming

Dynamic Baselines Configuration

Scope Device Group FortiGate AP

Time Selection Duration Date Range

15 Day(s) ▾

Schedule Baselines Computation  27-09-2024 📅 0

Repeat Cycle  7 Day(s)

Apply Changes

**DYNAMICALLY OBTAINED BASELINES VALUES**

Refresh
Recompute Baselines
+ 🔍 Search
🔍

<input type="checkbox"/>	Last Updated	FortiGate Hostname	Association	Authentication Time	DHCP Time	DNS Time
❌						

- **Scope** - Select the scope to calculate the thresholds which could either be per **Device Group**, per **FortiGate**, or per **AP**.
- **Time Selection** - Set the time range/duration for which FortiAI Ops analysis client data to derive the thresholds.
- **Schedule Baselines Computation** - Set the time when FortiAI Ops calculates the baselines and applies them to your network to obtain and report the relevant SLAs.
- **Repeat Cycle** - Configure the repetition of the above configurations, that is, the phase of analyzing client activity and the calculation/application of the algorithms.

The baseline values calculated by FortiAI Ops are displayed in the table. You can re-compute specific baseline values.

### Static Threshold

Configure the time (milliseconds) for the following stages of client connection to a network.

Time to Connect
Roaming

Dynamic Baselines Configuration

Association Time	<input type="text" value="176276"/>	ms	
			<input type="button" value="Low"/>
Authentication Time	<input type="text" value="51863"/>	ms	
			<input type="button" value="Low"/>
DHCP Time	<input type="text" value="2000"/>	ms	
			<input type="button" value="Low"/>
DNS Time	<input type="text" value="300"/>	ms	
			<input type="button" value="Low"/>

- **Association Time** - The time taken by a client to successfully associate.
- **Authentication Time** - The time taken by associated clients to authenticate.
- **DHCP Time** - The time taken by successfully associated and authenticated clients to receive a valid DHCP address.
- **DNS Time** - The time taken by successfully associated, authenticated, and received a DHCP address clients to resolve their first DNS request.

The default static threshold values for Time to Connect are as follows:

Attribute	Value
Association Time	1000 ms
Authentication Time	1000 ms
DHCP Time	300 ms
DNS Time	2000 ms

**Notes:**

- The default value for these parameters is 300 milliseconds and the valid range is 1 - 1000000 milliseconds.

## Roaming

You can configure static thresholds or enable FortiAI Ops to compute them dynamically. Based on the configured thresholds, the variations in the time to connect are recorded for each phase, and the statistics are displayed in the [AI Insights](#) tab.

## Dynamic Baselines

You are required to provide the following information for threshold/baseline configuration.

Time to Connect
Roaming

Dynamic Baselines Configuration

Scope Device Group | FortiGate | **AP** | SSID

Time Selection **Duration** | Date Range

15 Day(s) ▼

Schedule Baselines Computation  27-09-2024 📅 0

Repeat Cycle  7 Day(s)

Apply Changes

**DYNAMICALLY OBTAINED BASELINES VALUES**

Refresh
Recompute Baselines
+ 🔍 Search
🔍

<input type="checkbox"/>	Last Updated	AP Name	FortiGate Hostname	11r Time	OKC Time	PMK Time	Status

- **Scope** - Select the scope to calculate the thresholds which could either be per **Device Group**, per **FortiGate**, per **AP**, or per **SSID**.
- **Time Selection** - Set the time range/duration for which FortiAI Ops analysis client data to derive the thresholds.
- **Schedule Baselines Computation** - Set the time when FortiAI Ops calculates the baselines and applies them to your network to obtain and report the relevant SLAs.
- **Repeat Cycle** - Configure the repetition of the above configurations, that is, the phase of analyzing client activity and the calculation/application of the algorithms.

The baseline values calculated by FortiAI Ops are displayed in the table. You can re-compute specific baseline values.

## Static Threshold

For static threshold configuration to enable faster roaming, configure the following parameters.

Time to Connect
Roaming

Dynamic Baselines Configuration

Fast BSS Transition Roams(11r)	79732	ms	
	<input style="width: 100%;" type="range"/>		Low
Opportunistic Key Caching Roams(okc)	100	ms	
	<input style="width: 100%;" type="range"/>		Low
PMK Cache Roams	100	ms	
	<input style="width: 100%;" type="range"/>		Low

- **Fast BSS Transition Roams(11r)** - This is implemented as part of the 802.11r standard and enables fast roaming of wireless clients by pre-authenticating them with several APs in the network; this pre-authentication is done prior to when the client begins roaming. This feature allows immediate BSS transitions between APs and curtails the latency caused by deferred data connectivity, often experienced when a client has to transition from one BSS to another while roaming in a multi-AP deployment. The default roaming time value is 55 ms and the valid range is 1 - 600000 ms.

**Note:** To use this feature of FortiAIOps, ensure that the wireless client supports 802.11r standard enable 802.11r roaming on the SSID using the `set fast-bss-transition` CLI commands on FortiGate.

- **PMK Cache Roams** – The Pairwise Master Key (PMK) caching enables a wireless client to re-associate with an AP without re-authenticating. When a wireless client associates with an AP through the 802.1x authentication process, a master key negotiated with the AP is stored in a cache. When the client roams to different APs and then wants to re-associate with this AP again, then the already cached PMK is used for authentication. This significantly reduces the authentication time as the client-AP are not required to go through the entire 802.1x authentication process again, ensuring minimal latency in data connectivity during roaming. The default roaming time value is 100 ms and the valid range is 1 - 600000 ms.
- **Opportunistic Key Caching Roams (okc)** – This feature enables swift roaming of wireless clients to APs that it has never associated with earlier, without any requisite pre-authentication. When an AP successfully completes the 802.1x authentication and associates with a wireless client, it stores a unique PMK associated with that client. This per client PMK is advertised to and stored by all the APs in that particular network. When a client roams, it associates with a new AP based on this cached PMK, without any pre-authentication. This reduces the latency caused during roaming by eliminating the re-authentication process. The default roaming time value is 100 ms and the valid range is 1 - 600000 ms.

FortiAIOps dynamically determines the optimal roaming time for each type of roaming for a specific AP-Client environment using machine learning algorithms.

# FortiAI

FortiAI is a generative AI assistant integrated into the FortiAIOps platform. It simplifies network management by translating your natural language questions into actionable intelligence. From real-time diagnostics and performance monitoring to complex troubleshooting and step-by-step configuration help, FortiAI provides comprehensive support across your entire wireless, wired, and SD-WAN environments.

Following are some of the key capabilities of FortiAI:

- Utilize natural language to monitor network health, identify stability issues like port flaps, troubleshoot specific client or device problems, and receive step-by-step configuration guidance using simple queries. Responses are delivered in multiple formats, including tabular data and plain text, with information pulled directly from your FortiAIOps environment.
- Leverage a powerful AI and Machine Learning (ML) engine that ingests and analyzes data from FortiGates, FortiAPs, and FortiSwitches. FortiAI uses this information to diagnose network issues, identify potential root causes, and to suggest clear, remedial steps to accelerate resolution.
- Continuously recalculate performance baselines and SLA thresholds for the network, client connection quality, and the Radio Frequency (RF) environment. This allows for precise, context-aware anomaly detection that adapts to network changes over time.
- Identify network slowdowns, throughput bottlenecks, and potential configuration issues to maximize network uptime. The mean time to diagnose and resolve issues is greatly reduced, freeing up critical administrative resources.

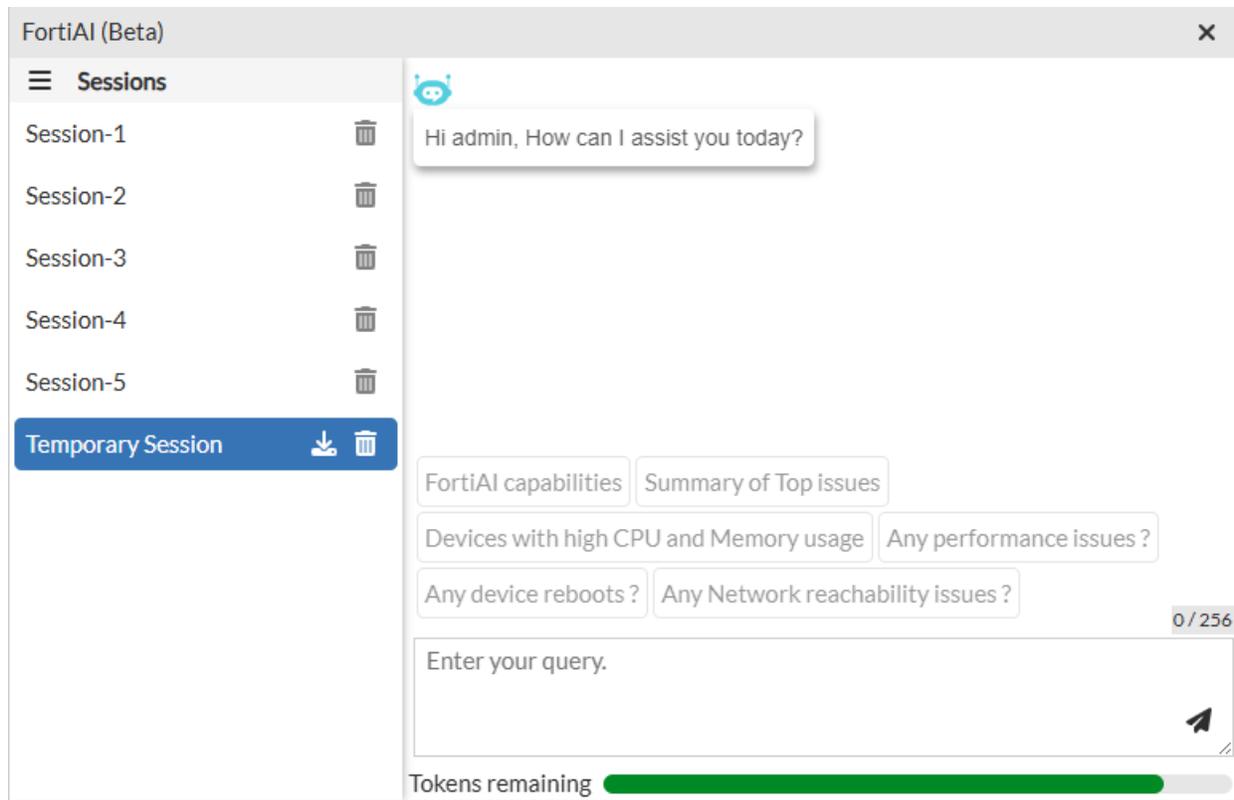


In this release, FortiAI is available to all customers as a **Beta** feature and includes a grant of 5 million tokens for use.

## Accessing FortiAI

**Note:** FortiAI requires an active internet connection and a valid DNS configuration to function correctly.

Click the **FortiAI** icon located in the FortiAIOps GUI banner to open the assistant pane.



A list of suggested queries is available in the main prompt area to help you get started.

## Using FortiAI

FortiAI provides real-time performance monitoring and targeted troubleshooting for specific client and device issues.

You can interact with the assistant using simple, natural language prompts to request information or actions. If you enter a prompt that is not understood by the FortiAI assistant, it will ask for more details to clarify your request. Responses from the FortiAI assistant may also include suggestions and requests for you to consider.

**Note:** If you log out, close, or reload your session, you will not be able to continue your current thread in the Temporary Session. History is retained in the other sessions.

### FortiAI Capabilities

The capabilities of FortiAI in FortiAI Ops can be categorized into the following areas:

Category	Description
Wireless Troubleshooting	Monitor access point health (power, CPU, performance), troubleshoot specific client connectivity issues, and analyze the RF environment for interference.

Category	Description
Wired Network Diagnostics	Diagnose physical layer issues such as port flaps, down ports, and cable faults, while also monitoring overall switch bandwidth and throughput performance.
SD-WAN Health	Track real-time SD-WAN health by identifying top issues, overlay failures, interface performance degradation, and recent SLA health check breaches.
Configuration and Task Support	Receive instructions for common administrative tasks, and platform configuration.

## FortiAI Prompts

For best results with FortiAI, ask clear, specific questions related to the network data it is designed to access. A good prompt is one that FortiAI can easily understand and translate into a precise data query, ensuring you get fast and accurate information.

### Example of valid prompts:

- Is channel overlap causing coverage or interference problems?
- Are there any throughput issues in the network?
- Are any SD-WAN interfaces facing performance issues?
- How do I back up the configuration?



The above examples use full sentences. However, in general, using more text means using more tokens. To more efficiently use tokens, keep your prompts concise. For more information about tokens, see [FortiAI Tokens](#).

## FortiAI Pane

The FortiAI pane includes the following:

Section	Description
Sessions	Continuous conversation that maintains context, allowing you to ask follow-up questions about previously discussed information until the session ends by logging out, closing the window, or reloading.
Thread	A chronological record of prompts and responses within a single session of the FortiAI assistant.
Prompt	An instruction or question you provide to the FortiAI assistant. It can be a query that you type yourself, or a pre-defined suggestion that you select to request common information or actions.
Token remaining	Displays your current token usage out of your total allotment. For more information, see <a href="#">FortiAI Tokens</a> .

## FortiAI Data Privacy

FortiAI Ops and FortiAI protects your data by masking private information such as IP addresses before it is sent to the FortiAI large language model (LLM) for processing.

Data such as MAC address, hostname, user name, IP address, VDOM names, and so on are considered as protected data and are masked before sending the information to FortiAI LLM.

### How private data is protected

1. The FortiAI assistant identifies information in a query that matches the list of protected data.
2. FortiAI Ops masks the private data, and the masked data is returned to the FortiAI assistant.
3. The FortiAI assistant creates a one-to-one mapping between the masked and unmasked data.
4. The FortiAI assistant sends the masked data to the LLM where the request is processed.
5. When the result is returned, FortiAI receives the masked data from the LLM, and a reverse mapping is performed.
6. The private data is returned to the user unmasked in the assistant's response.

## FortiAI Tokens

As a FortiAI Ops customer, you now have access to FortiAI as a **Beta** feature in this release. This includes an allocation of 5 million tokens for evaluation.

### How token usage is calculated

Tokens are used in large language models (LLMs) to process text and quantify usage. Tokens usage is calculated using the following guidelines:

- When you use the FortiAI assistant, the text in both the prompt (input) and the response (output) is processed as tokens.
- While there is no one-to-one relationship between words or characters and tokens, in general, more text in the query and response means using more tokens.
- Because the FortiAI assistant uses session history for its responses, queries that are a part of a long session will use more tokens than new conversations.

### Best practices

To ensure you are using your allocation of tokens effectively, consider implementing the following best practices:

- Make your prompts concise and specific. Vague questions require more processing and can yield broad, less useful answers, consuming more tokens.
- Use filters in your prompts to receive concise and specific responses. Add details like time-frames, device names, or specific metrics to narrow the focus. For example, instead of "How is my network doing?", try asking "Show me the top 5 non-performing access points in the last hour."

- Use terms that directly relate to functions and metrics you see in the FortiAI Ops dashboards. This helps the assistant translate your request into a precise query much more efficiently. For example, instead of "Are any connections bad?", try "Are there any throughput SLA issues in the network?"
- Reference details in the existing thread when possible. FortiAI remembers the context of your current conversation thread. Referencing previous responses is more efficient than starting a new query.

For example, imagine the following exchange:

You ask: "Is the <AP name> experiencing poor channel condition?"

FortiAI responds with the information.

Now, you can ask a related follow-up question: "Check for last 4 hours?"

### Viewing token usage

The token usage is displayed at the bottom of the FortiAI pane in FortiAI Ops. Mouse over the **Tokens remaining** bar to view the following in a tooltip:

- Total Tokens
- Consumed Tokens

## FortiAI Example Tasks

The following are some example tasks that can be performed using the FortiAI assistant:

### Example 1: Finding under performing Access Points

Use FortiAI to identify which active Access Points (APs) are causing a poor user experience.

FortiAI analyzes a wide range of performance metrics for every AP and compares them against a performance baseline. It then flags any AP that deviates significantly from these healthy norms.

**Prompt: Which APs are under performing?**

12:37:18 PM

Which APs are under performing?

12:37:18 PM

Summary of Underperforming APs (Last 2 Hours):  
Grouped by AP and Issue Type:

1. 1.83x-3F-  
  - Issues: Wi-Fi Interference, Poor Coverage, Distant Client
  - Impacted Clients: 4e:fc:b7:22:6e:11:11:11, IND-KU-11-11-NB, M210-11-11, da:c6:11:11:11:43, iPhone, etc.
  - SSIDs: Forti-Corp-F
  - Impacted Channels: 44
2. 2.FAP\_433F\_KU\_Cube  
  - Issue: Poor Coverage
  - Impacted Clients: 4e:fc:b7:22:6e:11:11:11, IND-KU-11-11-NB, M210-11-11, da:c6:11:11:11:43, etc.
  - SSIDs: Forti-Corp-
  - Impacted Channels: 44, 60
3. 3.83x-3F-  
  - Issue: Wi-Fi Interference
  - Impacted Clients: None
4. 4.83x-  
  - Issue: Wi-Fi Interference
  - Impacted Clients: None
5. 6.83x-  
  - Issue: Wi-Fi Interference
  - Impacted Clients: None

Key Points:

- 1.83x-3F- is experiencing multiple issues (Wi-Fi Interference, Poor Coverage, Distant Client) and is impacting several clients.
- 2.FAP\_433F\_KU\_Cube is experiencing Poor Coverage affecting multiple clients.
- 3.83x-3F-, 4.83x-, and 6.83x- have reported Wi-Fi Interference but no impacted clients.

Etc.

## Example 2: Diagnosing Device-Specific Issues

You can use FortiAI to diagnose network issues affecting a specific device. FortiAI will identify if a problem exists, provide a list of possible root causes, and recommend actionable steps to resolve the issue.

**Prompt: Is there any issue with <MAC address>?**

Hi admin, How can I assist you today?

03:35:58 PM

is there any issue with 08:9d:...

03:35:58 PM

Summary of Network Issues for Device 08:9d:... (Last 2 Hours):

- Device Details: 08:9d:... connected to device 4.83x-3F-Pioneer.
- Issue Detected: Asymmetric uplink and downlink rates for some clients.
- Possible Causes:
  - Asymmetric power between client and AP.
  - High channel contention or excessive retries.
  - Physical obstructions affecting Wi-Fi data exchanges.
- Recommended Remedial Actions:
  - Check and update the client driver if necessary.
  - Inspect the AP and client areas for any physical obstructions.
  - Review MBO and 802.11kvr settings for the AP's SSIDs.

These steps should help resolve the asymmetric rate issue observed for device 08:9d:...

### Example 3: Outage Detection and Impact Analysis

FortiAI reports when any network component such as a device, port, access point, or SD-WAN link is down. The information includes specific details of the offline component and an analysis of the impact caused by the outage.

**Prompt: Are any ports currently down?**

Hi admin, How can I assist you today?

03:14:48 PM

Any ports currently down?

03:14:48 PM

Summary of Ports Currently Down:

- Switch: 3FHR-...
  - Port: port2 (Disabled)
  - Impacted Clients: FortiAP, etc.

No other ports reported as down in the last 2 hours.

### Example 4: Analyze Client Impact due to SD-WAN Performance Issue

FortiAI can determine how specific SD-WAN performance issues impact clients. It reports the type of performance issue, devices impacted and the list of clients impacted by the issue. This information is grouped

by the SD-WAN issue for clear, concise analysis and efficient troubleshooting.

**Prompt: Are any clients affected due to SD-WAN performance issues?**

Are any client affected due to SD-WAN performance issues?

11:54:23 AM

**Summary of SD-WAN Performance Issues Affecting Clients (Last 2 Hours):**

**1. Devices / Firewalls Involved:**

- FGTs: office [redacted]

**2. Impacted SD-WAN Interfaces and Associated Issues:**

- exit-int-2
  - Issue: External Server Issue
  - Impacted Clients:
    - IND-PR6 [redacted]
    - IND-ARF [redacted]
    - IND-34S [redacted]
    - IND-C34 [redacted]
    - IND-2QF [redacted]
    - etc.
  - Health Checks Impacted: wan\_ping\_sla
- exit-int-1
  - Issue: ISP or Server Performance Deviations
  - Impacted Clients:
    - IND-PR6 [redacted]
    - IND-2QF [redacted]
    - IND-NAI [redacted]
    - IND-MM [redacted]
    - IND-4C9 [redacted]
    - etc.
  - Health Checks Impacted: wan\_ping\_sla

**3. Clients Affected (Grouped and Deduplicated):**

- IND-PRE [redacted]
- IND-ARPI [redacted]
- IND-34SX [redacted]
- IND-C346 [redacted]
- IND-2QRC [redacted]
- IND-NAIR [redacted]
- IND-MMU [redacted]
- IND-4C9Z [redacted]
- etc.

## Example 5: Assistance with Device Setup

FortiAI can provide step-by-step instructions for adding a device, sourcing this information directly from the FortiAI Ops documentation. It lists all the necessary steps and includes a link to the relevant documentation for further details.

**Prompt: How do I add a FortiGate in FortiAI Ops?**

Hi admin, How can I assist you today?

03:32:53 PM

How do I add a FortiGate in FortiAI Ops?

03:32:53 PM

To add a FortiGate in FortiAI Ops:

1. Navigation: Inventory > Managed FortiGates > Add
2. Select Standalone or HA Cluster (if the FortiGate is an HA cluster).
3. Enter the IP Address or FQDN of the FortiGate controller.
4. (Optional) Enter a Description.
5. Enter the Username and Password for the controller.
6. Select the Device Group.
7. Specify the HTTPS port (default is 443).
8. Specify the Timeout duration in milliseconds (default is 3000 ms).
9. Click Add.

The FortiGate controller will now be listed under Managed FortiGates.

Refer to the link for more info: <https://docs.fortinet.com/document/fortiaio/2.1.0/user-guide/837521>

## Example 6: Tabular Format Display

FortiAI can provide the necessary details and analysis in a table format for easier handling of data. The complex network data is presented in a more user-friendly that minimizes effort and maximizes understanding of the information.

**Prompt: What are the issues observed by mac address <IP address> in a table format?**

what are the issues observed by mac address -"00:7[redacted]2", in a table format

11:48:03 AM

**Summary of Issues Observed for MAC Address: 00:[redacted]42 (Last 2 Hours)**

Network Type	Device Name	Port/Interface/Radio/Channel	Issue Description	Possible Cause / Recommended Action
Wireless	6.83x-3F-[redacted]	Not specified	Unknown client: Username used for authentication is not configured on the RADIUS server or invalid password entered.	Try with the correct username and password for the RADIUS profile used [Fortiguest].
Wired	3FHR-[redacted]	Switch S224DF3X1 [redacted]	High CPU usage: 15%, 16%, 17%, 18%, 19%, 20%, 21%	Check for high traffic, high device count, or other causes for high resource utilization.
Wired	3FHR-[redacted]	Switch S224DF3X1 [redacted]	High memory usage: 46%	Check for high traffic, high device count, or other causes for high resource utilization.
Wired	3FHR-[redacted]	Switch S224DF3X1 [redacted]	Device temperature high: 34.19°C, 34.25°C, 34.31°C, 34.38°C, 34.44°C, 34.50°C, 34.56°C, 34.88°C, 35.00°C, 35.06°C	Check and rectify any issues with fan; review the threshold value set for temperature alert.

**Key Points:**

- Wireless authentication failed due to RADIUS misconfiguration or invalid credentials on device 6.83x-3F-[redacted]
- Wired issues on device 3FHR-[redacted] (Switch S224DF3X1 [redacted]): high CPU and memory usage, and elevated device temperature.
- Recommended actions include verifying credentials, checking for high resource utilization causes, and reviewing hardware cooling and alert thresholds.

**Device Details:**

- 6.83x-3F-[redacted] (Wireless)
- 3FHR-[redacted] Switch S224DF3X1 [redacted] (Wired)

If further details are needed, please specify.

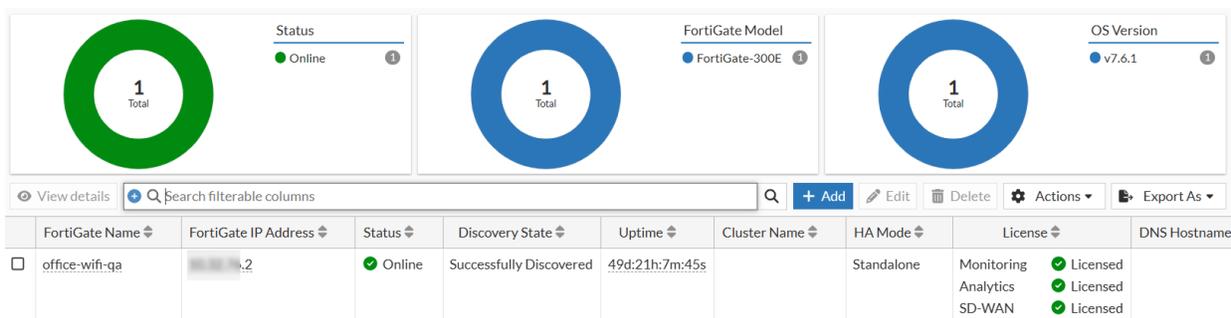
# Inventory

This section describes adding the FortiGate controllers to FortiAIOps, grouping them, and the management operations on the added controllers.

- [Adding and Managing FortiGates](#)
- [Device Groups](#)
- [VDOM Support](#)

## Adding and Managing FortiGates

This page provides a graphical representation of the FortiGate controllers deployed in your network. You can view and monitor the current status of the FortiGate controllers, the various FortiGate models in use, and the OS versions. The table beneath the charts provides the details of all FortiGate controllers; click on specific areas of the chart to filter data displayed in the table.



You can perform the following operations on this page.

- [Adding a FortiGate](#)
- [Importing and Exporting FortiGates](#)
- [Managing FortiGates](#)

## Adding a FortiGate

The communication between the FortiAIOps application and FortiGate is secured by SSL/TLS encryption. Therefore, FortiAIOps can successfully discover a FortiGate only if a valid certificate is installed in FortiGate. However, FortiAIOps can also discover FortiGates with a default certificate over a trusted connection. If a 3rd party certificate is installed in FortiGate for HTTPS/web server then the corresponding CA certificate should be installed in FortiAIOps for successful discovery. For more information see [Certificates](#) and [FortiGate Certificates](#).

The managed FortiGate IP address/FQDN configured in FortiAIOps must match the Subject Alternative Name (SAN) in the FortiGate certificate, else, the FortiGate discovery fails.

- If the FortiGate IP address is configured in FortiAIOps then the SAN attribute in the certificate should be the FortiGate IP address.
- If the FortiGate FQDN is configured in FortiAIOps then the SAN attribute in the certificate should be the FortiGate FQDN.
- If the FortiGate IP address or FQDN are configured in FortiAIOps then the SAN attribute in the certificate should include both the FortiGate IP address and FQDN.

**Notes:**

- FortiGate discovery fails if a certificate is from an unknown authority. Ensure to install specific CA certificate of FortiGate in FortiAIOps.
- If a new certificate is installed in a managed FortiGate then Fortinet recommends to re-add the FortiGate in FortiAIOps.
- For self-signed CA certificates generated in FortiGate, valid CA certificate should be installed in FortiAIOps.
- To use a *Let's Encrypt* certificate, ensure to download and install the CA certificate of *Let's Encrypt* in FortiAIOps. For more information see [Automated Certificate Management Environment \(ACME\)](#).

To manually add a FortiGate controller, click **Add** and provide the following details.

Add new device

**Details**

Device Type	<input checked="" type="radio"/> Standalone <input type="radio"/> HA Cluster
IP Address/Hostname	<input type="text" value="10.1.1.2"/>
Description	<input type="text" value="FortiGate"/>
Username	<input type="text" value="fortigate"/>
Password	<input type="password" value="••••••"/>
Confirm Password	<input type="password" value="••••••"/>
Device Group	<input type="text" value="1"/>
HTTPS port	<input type="text" value="443"/>
Timeout (milliseconds) <span style="font-size: small;">?</span>	<input type="text" value="5000"/>

1. Select **Standalone** or **HA Cluster** if the FortiGate is an HA cluster.
2. Enter the **IP Address** or FQDN of the controller and an optional **Description**.  
**Note:** If a 3rd party certificate is used by FortiGate then ensure to install a valid CA certificate in FortiAIOps.
3. Enter the **Username** and **Password** for the controller.
4. Select the **Device Group**. Controllers in the selected device group are added.
5. Specify the **HTTPS port**. The default is 443.
6. Specify the **Timeout** duration (milliseconds), that is, the maximum time allowed to establish a connection with FortiGate and obtain a response. The default value is 5000 milliseconds.

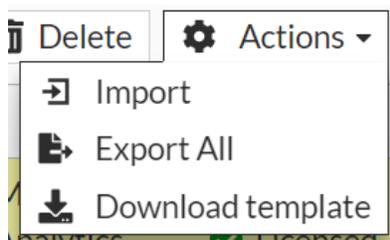
The added FortiGate controller is now listed.

## Importing and Exporting FortiGates

You can import details of FortiGate controllers from a .csv file to add them. Enter the details in the format depicted in the image here.

	A	B	C	D	E	F	G	H
1	Device Type	IP address	Description	Username	Password	Device Group	HTTPS port	Timeout (milliseconds)
2	Standalone	10.20.200.21	fortigate1	admin	fortigate1	guestgroup	443	3000
3	Standalone	10.20.200.22	fortigate2	admin	fortigate2	test2	10443	3000
4	Standalone	10.20.200.23	fortigate3	admin	fortigate3	guestgroup	443	3000

You can download a sample template for populating the FortiGate details, from the **Actions** drop-down menu.



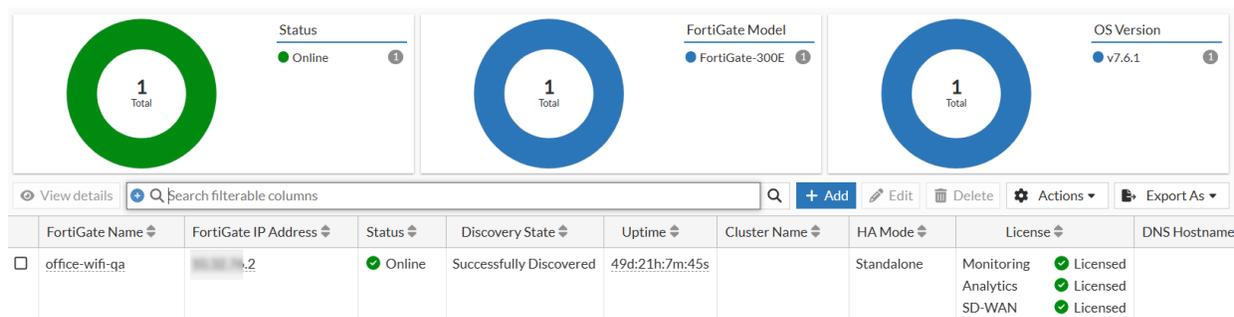
Select **Import** to upload the FortiGate configuration file.

You can export the configurations of all the existing FortiGate controllers added to FortiAIOps, in a .csv format. Click **Export All** and the file with details of the added FortiGate controllers is downloaded to your machine.

**Note:** The HA cluster addition does not work using the **Import** option.

## Managing FortiGates

This page provides analytical information related to the performance of various elements and processes in your network. The data is visually represented with interactive options to drill-down and filter specific information. This enables monitoring, diagnostic, and troubleshooting operations for connectivity issues, data usage, and enhancing performance.



You can perform the following operations on a FortiGate controller listed on this page.

- **Add** - Select to add a FortiGate controller manually. For more information, see [Adding a FortiGate](#).
- **Actions** - Click **Actions** to import and to download the template.
- **Export As** - Click to export the table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of

8 columns can be selected.

- **View Details** - Select a FortiGate and click **View details** to open **Diagnostics and Tools** pane. You can also right-click the FortiGate and click **View details**.

This pane displays details about the selected FortiGate and also provides diagnostic tools for your network.

- **CLI** - To open the CLI utility, right-click the FortiGate and select **CLI**.
- **Reboot** - Right-click the FortiGate and select **Reboot** to reboot the device.

## Performance

This tab displays the performance data for your network based on various parameters. You can filter the trends based on the selected duration or customized time slot; select a time window or define a Custom range. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**. The data in this tab is automatically refreshed every 60 seconds; the following options are available to manage the auto-refresh feature for this page.

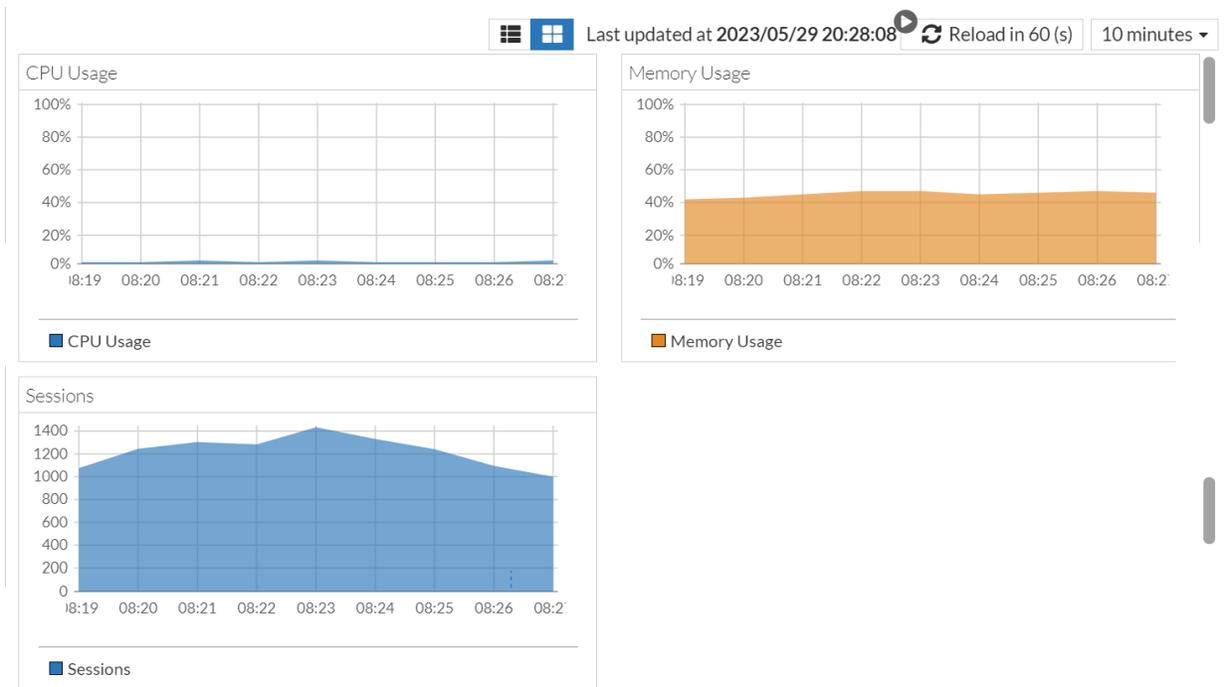
- Click to manually refresh data.
- Click to pause the auto-refresh.
- Click to resume the auto-refresh.

Performance is displayed for the following.

- [Environmental](#)
- [Wireless](#)
- [Clients](#)

## Environmental

This tab displays resource usage such as, the maximum CPU and memory usage levels, and the maximum number of sessions at a given time.

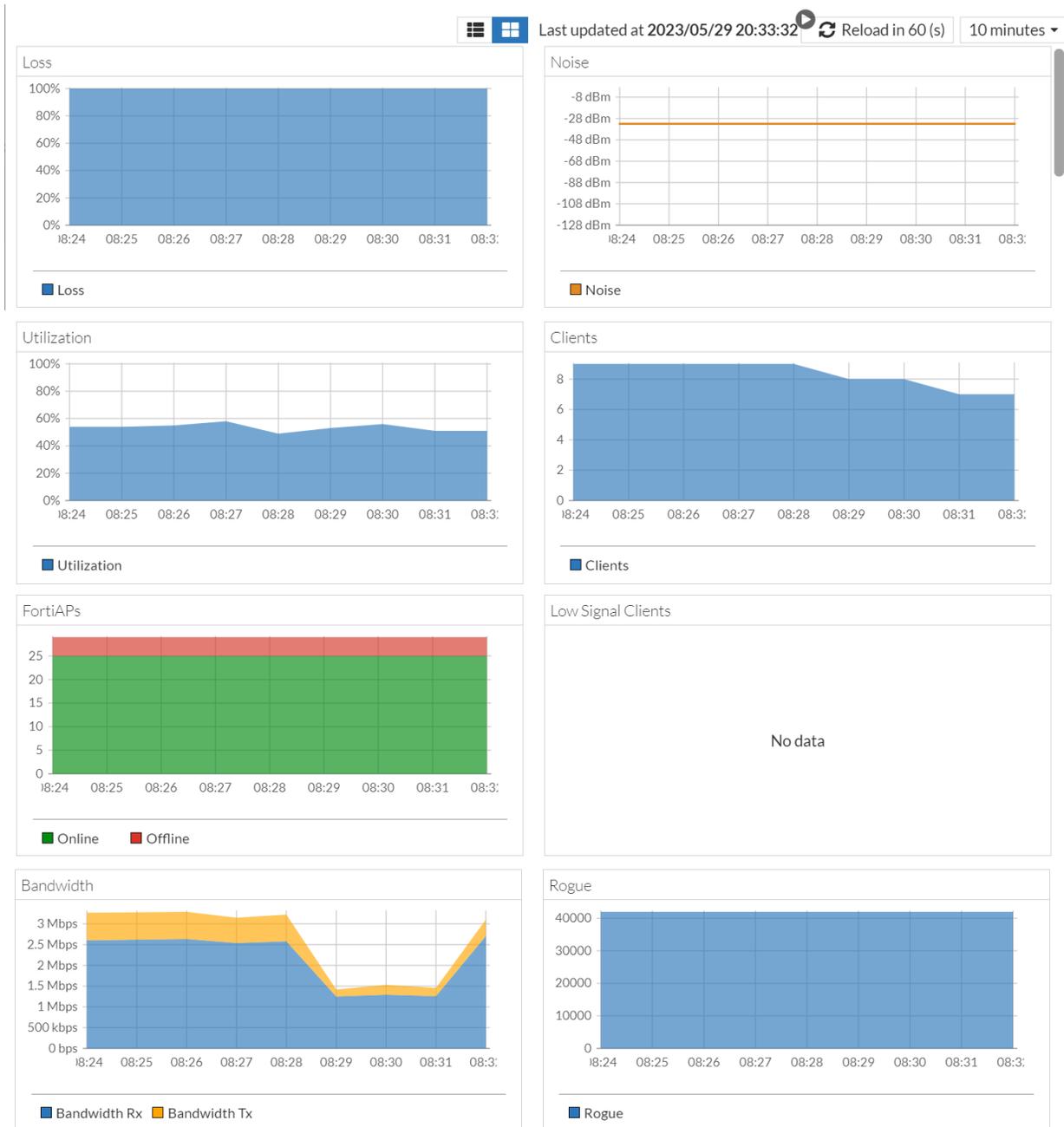


Hover over each of these graphs to view the current statistics and click on any of these graphs to view details.

Details <span style="float: right;">✕</span>			
<span style="font-size: 1.2em;">+</span> <input style="width: 90%; border: none; border-bottom: 1px solid #ccc;" type="text" value="Search"/> <span style="float: right; font-size: 1.2em;">🔍</span>			
Timestamp ↕	CPU Usage ↕	Memory Usage ↕	Sessions ↕
2023/04/05 15:27:22	34%	54%	181

### Wireless

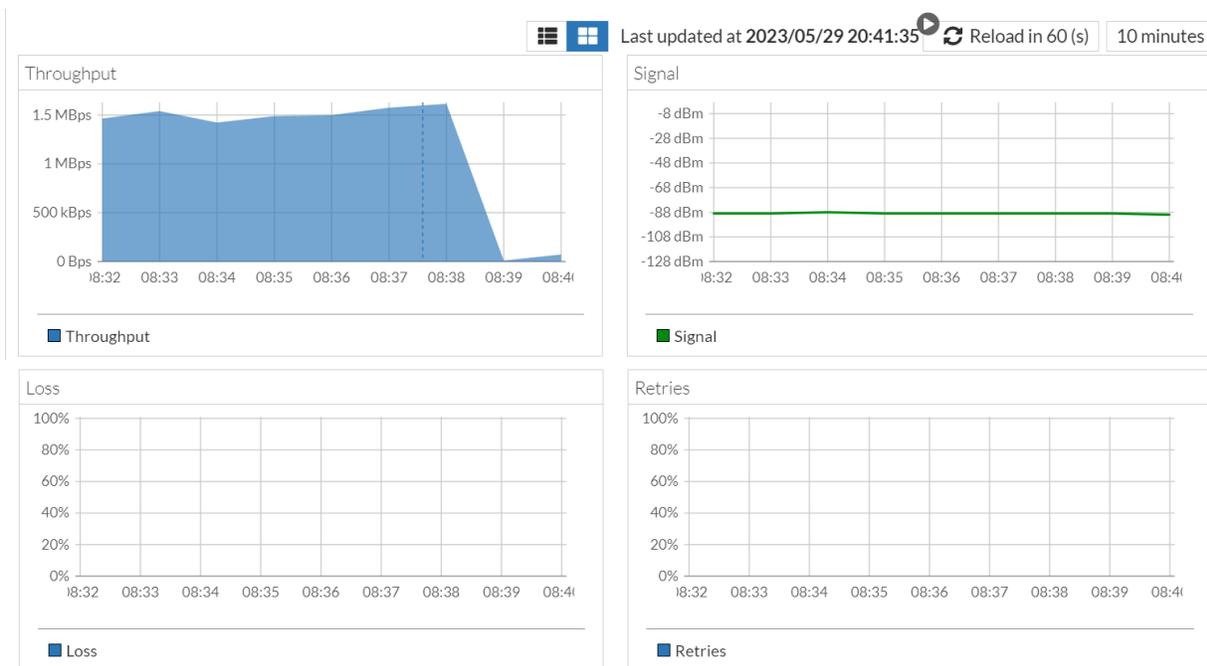
Displays detailed information about the health of the wireless connections in the network, such as, loss%, SNR, channel utilization %, number of stations, status of the FortiAPs, low signal stations, the average throughput at a given time, and the number of rogue APs at a given time.



Hover over each of these graphs to view the current statistics and click on any of these graphs to view details.

### Clients

This tab displays information about the clients connected to the network, such as, throughput, Loss (%), Retries (%), and SNR (dB) and throughput.



Hover over each of these graphs to view the current statistics and click on any of these graphs to view details.

### Channel Summary

This page provides granular insights into the performance of each channel with detailed statistics and trends. For more information, see [Channel Summary](#).

Channel	Max Channel Utilization	Clients	No. Of Radios	Average Utilization Severity	Average Interfering SS
2.4 GHz	Number of Clients-0				
1	90 %	0	5	Poor	Good
11	97 %	0	4	Poor	Good

### FortiAPs

This tab displays details about the selected access point with their status and details. To view the details, select an access point and click **View Details**. For more information on the diagnostic options and details see [Access Points](#).

### Clients

This tab displays the clients currently connected to the selected access point along with their details. To view the details, select a client and click **View Details**. For more information on the diagnostic options and details see [Wireless Clients on page 185](#).

## FortiSwitch

This tab displays a graphical snapshot of the FortiSwitch activity such as, the total number of FortiSwitches, their status (online/offline), and the deployed model details. To view the details, select a FortiSwitch and click **View Details**. For more information on the diagnostic options and details see [FortiSwitch](#).

Ports Cable Test Logs Statistics Clients

+ Search

Port	Trunk	Mode	Port Policy	Enabled Features	Native VLAN	Allowed VLANs
port1		Static		<ul style="list-style-type: none"> <li>Spanning Tree Protocol</li> <li>Edge Port</li> </ul>	native	bridge-static,guest,quara
port2		Static		<ul style="list-style-type: none"> <li>Spanning Tree Protocol</li> <li>Edge Port</li> </ul>	native	bridge-static,guest,quara
port3		Static		<ul style="list-style-type: none"> <li>Spanning Tree Protocol</li> </ul>	native	bridge-static,guest,quara

## Logs

This tab displays the detailed FortiGate event logs and each event is assigned a severity, that is depicted with a color code. Hover over the color bar in the **Level** column to view the severity.

Performance FortiAPs Clients FortiSwitch Logs Tools

+ Search Details

Date/Time	Level	Action	Message	SSID	Channel	Abs
1 minute ago	<span style="color: green;">■</span> <span style="color: yellow;">■</span> <span style="color: orange;">■</span> <span style="color: red;">■</span> <span style="color: grey;">■</span>	rogue-ap-detected	AP OnePlus 7T 8a:fa:27:58:0b:e8 chan ...	OnePlus 7T		
5 minutes ago	<span style="color: blue;">■</span>	antenna-defect-detected	AP PU323E5E18012353 radio 2 antenn...	N/A		
10 minutes ago	<span style="color: blue;">■</span>	antenna-defect-detected	AP PU323E5E18012353 radio 1 antenn...	N/A		

- Emergency, Critical (red)
- Alert (orange)
- Error, Warning (blue)
- Notice, Information, Debug (green)

Select an event row and click **Details** to view the detailed log information.

Performance FortiAPs Clients FortiSwitch Logs Tools

+ Search Details

Date/Time	Level	Action	Message	
2 minutes ago	<span style="color: green;">■</span> <span style="color: yellow;">■</span> <span style="color: orange;">■</span> <span style="color: red;">■</span> <span style="color: grey;">■</span>	rogue-ap-detected	AP OnePlus 7	<ul style="list-style-type: none"> <li>General</li> <li>Source</li> <li>Action</li> <li>Security</li> <li>Cellular</li> <li>Event</li> </ul>
6 minutes ago	<span style="color: blue;">■</span>	antenna-defect-...	AP PU323E5E	
11 minutes ago	<span style="color: blue;">■</span>	antenna-defect-...	AP PU323E5E	
17 minutes ago	<span style="color: blue;">■</span>	antenna-defect-...	AP PU323E5E	

- **General** - Generic information about the log event such as, the date and time of event logging, the associated virtual domain, and the log description.
- **Source** - The details of the associated access point such as the MAC address, interface, and SSID.

- **Action** - The reason for the log event generation.
- **Security** - The severity of the log event, the configured security mode, and the encryption type.
- **Event** - The serial number of the access point and the generated log message.
- **Other** - Generic information such as the log event time stamp, the timezone, log type, and so on.

## Tools

FortiAIOps provides various utilities that you can run on the FortiAP for **Connectivity Analysis, Network Analysis, and Enhanced Troubleshooting**.

- [Packet Capture](#)
- [ARP Table](#)
- [Routing Table](#)
- [DHCP](#)
- [DNS Lookup](#)
- [Reverse DNS Lookup](#)
- [Web CLI](#)
- [TAC Report](#)
- [Process Monitor](#)

### Packet Capture

You can use the packet capture tool to select a packet and view its header and payload information in real-time. Once completed, packets can be filtered by various fields or through the search bar. The capture can be saved as a PCAP file that you can use with a third-party application, such as Wireshark, for further analysis.

#### Packet Capture

 NPU hardware acceleration must be disabled on the respective firewall policy to see all packets. To do so, set "auto-asic-offload" to "disable" in the CLI.

Interface

Maximum captured packets

Filters

Filtering syntax

Host

Port

Protocol

Click **Run** and select the **Interface** and the **Maximum captured packets** (default is 10). You can enable filters, for a **Basic** filter, provide the **Host, Port,** and **Protocol Number** and for an **Advanced** filter, enter a string, such as *src host 172.16.200.254 and dst host 172.16.200.1 and dst port 443*. Click **Start capture**.

Packet Capture ✕

Source IP	Source Port	Destination IP	Destination Port	Protocol	Sequence Number	Ack
172.16.200.254	57224	172.16.200.1	443	TCP	1964315332	3719362240
172.16.200.254	57194	172.16.200.1	443	TCP	1964315332	3371865

0% 10

[Header](#) [Packet Data](#)

IP		L4	
Source IP	172.16.200.254	Ack	3719362240
Source Port	57224	Flags	ACK
Destination IP	172.16.200.1	Window	41488
Destination Port	443	Length	0
Protocol	TCP	Checksum	26989

### ARP Table

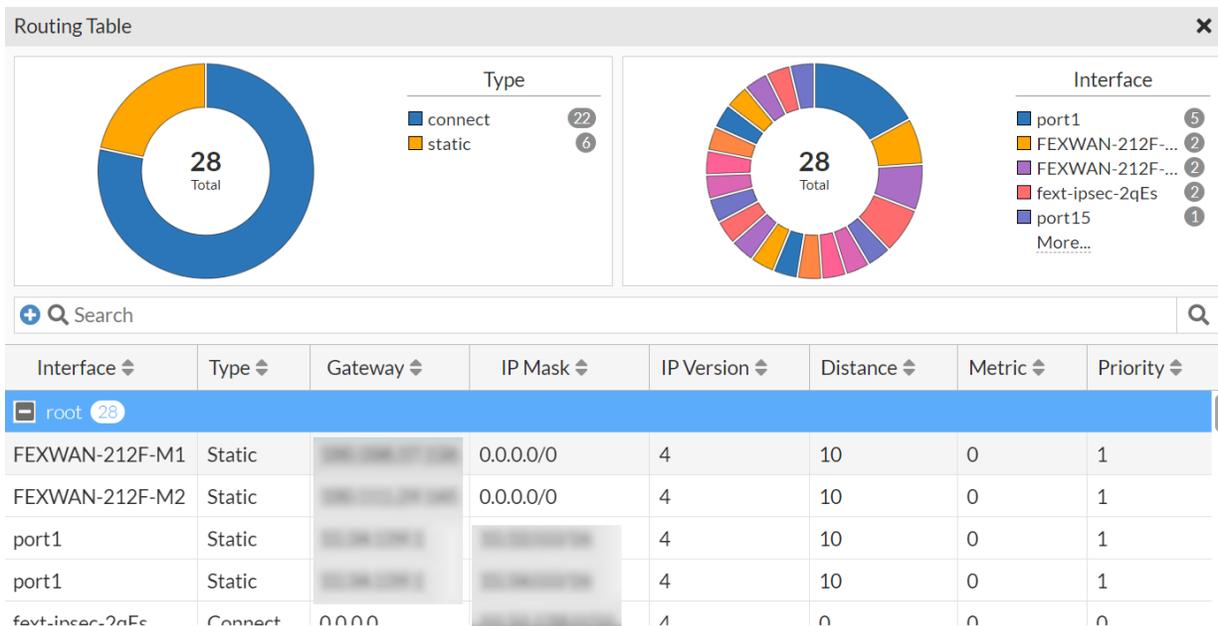
The ARP Table records the discovered MAC address - IP address pairs of devices connected to a network and the interface details. Each connected device has its own ARP table that stores the MAC-IP address pairs that the device has communicated with. Click **Run** to view the ARP table.

ARP Table ✕

Age	Interface	IP	MAC Address
root 4			
1m 24s	wan1	172.16.200.1	172.16.200.1
1s	25SSID-Coverage	172.16.200.1	172.16.200.1
0s	wan1	172.16.200.1	172.16.200.1
15s	wan1	172.16.200.1	172.16.200.1

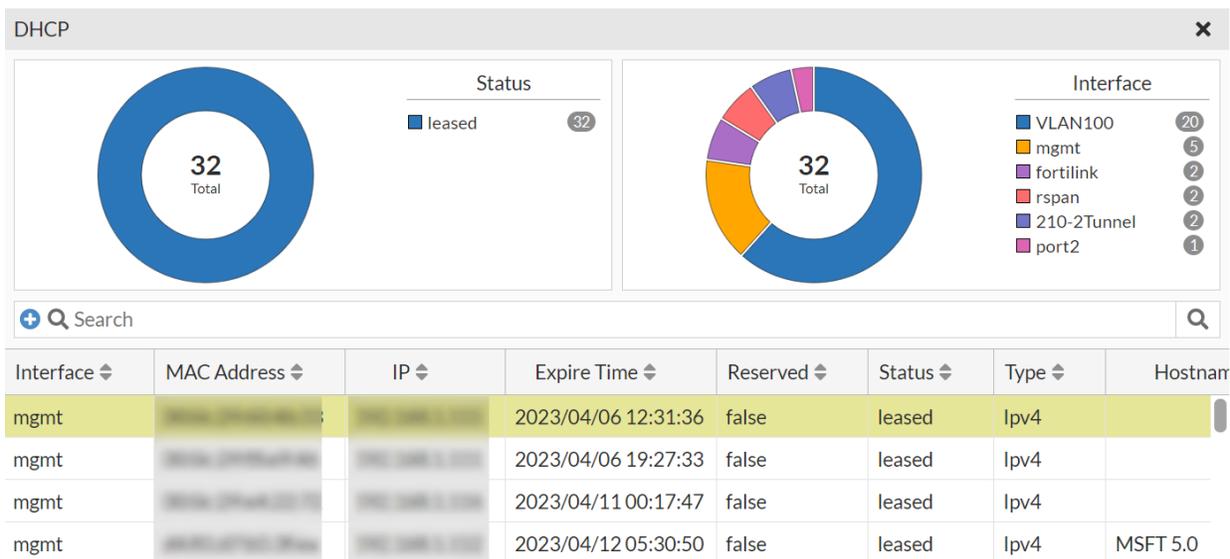
### Routing Table

You can view the routing table on the FortiGate, including all static and dynamic routing protocols.



### DHCP

The DHCP monitor shows all the addresses leased out by FortiGate's DHCP servers.



### DNS Lookup

Enter the domain name (FQDN) to view the IP addresses associated with it.

### DNS Lookup

FQDN

IP Address

### Reverse DNS Lookup

Enter the IP address to view the domain name (FQDN) associated with it.

### Reverse DNS Lookup

IP Address

FQDN

### Web CLI

Access the FortiGate's command line interface.

## Web CLI

```
FortiGate-300E # show
#config-version=FG3H0E-7.2.4-FW-build1396-230131:opmode=1:vdom=0:user=admin
#conf_file_ver=818427493209189
#buildno=1396
#global_vdom=1
config system global
    set admin-server-cert "self-sign"
    set admintimeout 480
    set alias "FortiGate-300E"
    set hostname "FortiGate-300E"
    set switch-controller enable
    set timezone 47
end
config system accprofile
    edit "prof_admin"
        set secfabgrp read-write
        set ftviewgrp read-write
        set authgrp read-write
        set sysgrp read-write
        set netgrp read-write
        set loggrp read-write
        set fwgrp read-write
--More--
```

### TAC Report

The Technical Assistance Center (TAC) report runs an exhaustive series of diagnostic commands for troubleshooting network issues. You are required to download the generated report (.txt) to view it; click

**Download report.**

## TAC Report



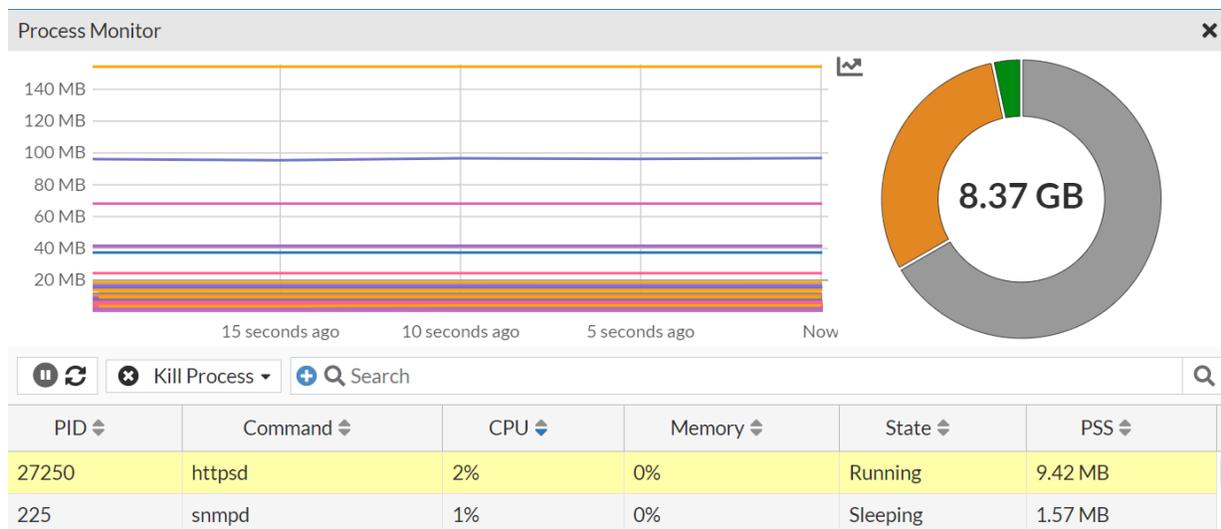
Report generated



Download report

### Process Monitor

The process monitor displays running processes with their CPU and memory usage levels. You can sort, filter, and terminate processes within the process monitor pane.



Select a process to perform any of the following operations.

- **Kill Process** - The standard kill option that produces one line in the crash log (diagnose debug crashlog read).
- **Force Kill** - The equivalent to *diagnose sys kill 9 <pid>*. This can be viewed in the crash log.
- **Kill & Trace** - The equivalent to *diagnose sys kill 11 <pid>*. This generates a longer crash log and backtrace. A crash log is displayed afterwards.

For more information on the FortiGate commands and related information, see [FortiGate documentation](#).

## Device Groups

You can group FortiGate controllers for ease of management. Each controller can belong to only one group; if a controller is added to a second group, it is automatically removed from the previous group. Device groups allow administrators to manage devices in a certain way, such as, provide specific access to a set of devices. The *admin* user have access to all the device groups and devices within them. System administrators and users assigned the *super user* role can only create and configure device groups.

Group Name	Description
Default	Default Device group

If you do not set up device groups, all controllers remain assigned to the *Default* device group.

1. Navigate to **Device Groups** and click **Add**.
2. Provide a unique **Device Group Name** and an optional **Description**.
3. A list of controllers managed by FortiAIOps is displayed. Select from the listed controllers and click **Create**. The controllers are added to the device group.

Add new device group
✕

☰
Details

Device Group Name

group\_1

Description

FortiGate Group

☰
Devices

+
🔍

🔍

Selected	FortiGate Name	FortiGate IP Address	Status	Serial Number	OS Version
<input checked="" type="checkbox"/>	office-wifi-qa	10.32.192.2	Online	FG3H0E193H0E193H0E193H0E	v7.2.4

You can switch the device group from the bar on the top-right of the GUI; click **Device Group** and select the available group. To add a FortiGate controller to an existing device group or move a FortiGate to a different group, select the device group where you want to add/move the FortiGate to and click **Edit**. The FortiGate controllers are listed, select the FortiGate you want to add to this group and click **Update**.

## VDOM Support

VDOMs are used to divide a FortiGate into two or more virtual units that function independently. VDOMs can provide separate security policies and, in NAT mode, completely separate configurations for routing and VPN services for each connected network. When a FortiGate is in multi-VDOM mode, a VDOM can be configured as an *Admin*, *Traffic*, or LAN extension type VDOM. For more information to add a VDOM, see [Virtual Domains](#).

### Adding/Managing VDOMs in FortiAIOps

To add and manage FortiGate VDOMs in FortiAIOps, note the following.

- Add the FortiGates using the root VDOM IP address/hostname.
- The FortiAPs, FortiSwitches, and client information displayed in FortiAIOps dashboards is retrieved from all the VDOMs.

The VDOM information is displayed in the following pages of the FortiAIOps GUI. You can view VDOM information in the **VDOM** column.

#### • *Wireless > Access Points*

	AP Name	FortiGate	AP Status	VDOM	SSID	Band	Channel	Clients
<input type="checkbox"/>	FP431GTY	office-wifi-qa	Online	root	R2 JK_TEST_CORP R3 None	R2 5 GHz R3 6 GHz	R2 36 R3 N/A	6
<input type="checkbox"/>	83x_3F_	office-wifi-qa	Online	root	R1 Corp_FortiPresence_PSK R2 Corp_FortiPresence_PSK	R1 2.4 GHz R2 5 GHz	R1 11 R2 44	0
<input type="checkbox"/>	3.83x-3F	office-wifi-qa	Online	root	R2 Corp-Fortiguest-CP-3F_2,Forti-Corp-Peap-3F...	R2 5 GHz	R2 44	4

#### • *Wireless > Clients*

	MAC Address	FortiGate	IP Address	AP Name	AP Serialnumber	VDOM	SSID	Device
<input checked="" type="checkbox"/>	F8:E4:E3:	FG3H0E	192.168.1.10	5.83x-3F	FP831FTF	root	Corp-Fortiguest-CP-3F	IND-9H3
<input type="checkbox"/>	F8:5E:A0:	FG3H0E	10.32.192.10	1.83x-3F	FP831FTF	root	Corp_AIOps_test	IND-JKIN
<input type="checkbox"/>	F0:D4:15:	FG3H0E	10.32.192.10	3.83x-3F	FP831FTF	root	Forti-Corp-Peap-3F	IND-F195
<input type="checkbox"/>	F0:D4:15:	FG3H0E	10.32.192.10	7.83x-3F	FP831FTF	root	Corp_AIOps_test	DESKTOP

- **Switch > FortiSwitch**

	Name	FortiSwitch Serial Number	FortiGate	Status	Model	VDOM	Firmware Version	Connecting From
<input checked="" type="checkbox"/>	3FHR-AP-SW1	S224DF3X	office-wifi-qa	Online	S224DF	root	S224DF-v7.4.0-build767,230602 (GA)	10.32
<input type="checkbox"/>	GFHR-AP-SW1	S248DF3X	office-wifi-qa	Online	S248DF	root	S248DF-v3.6.12-build436,230614 (GA)	10.32
<input type="checkbox"/>	2FSR-AP-SW1	S548DF50	office-wifi-qa	Online	S548DF	root	S548DF-v7.4.0-build767,230602 (GA)	10.32

- **Switch > FortiSwitch Clients**

	Device	MAC Address	FortiSwitch	VDOM	Port	VLAN	Software OS	Hardware
<input type="checkbox"/>	FortiAP-	74:78:a6	S424EFTF2	Vin	port13	_default.36	FortiAP OS	AP
<input type="checkbox"/>	80:80:2c	80:80:2c	S424EFTF2	Vin	port8	_default.10	FortiAP OS	AP
<input type="checkbox"/>	FortiAP-	80:80:2c	S424EFTF2	Vin	port8	_default.10	FortiAP OS	FortiAP

The following limitations apply on VDOM usage in this release of FortiAIOps.

- Monitoring and managing individual VDOMs is not supported currently; hence, data from all VDOMs is displayed in FortiAIOps.
- Moving a FortiGate between device groups moves all the VDOMs.
- The AI Insights dashboards do not display VDOM separation.

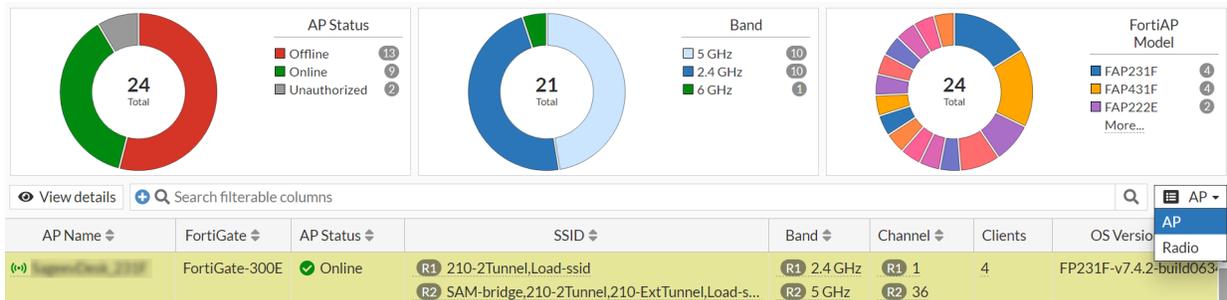
# Wireless

The Wireless section of the FortiAIOps provides a comprehensive set of tools for managing and monitoring wireless networks.

- [Access Points](#)
- [Clients](#)
- [Channel Summary](#)
- [Applications](#)
- [Location Services Monitor](#)
- [Heat Maps](#)
- [Rogue APs](#)
- [Map Management](#)

## Access Points

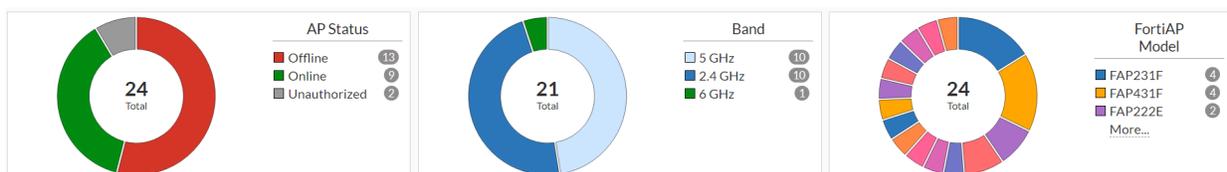
The Access Points page displays essential information about the APs in use and consists of two views - AP and Radio view. To switch between the AP and Radio views, select the desired view from the dropdown menu located at the middle of the Access Points page. By default, the AP is displayed when the page loads.



- [AP](#)
- [Radio](#)
- [Diagnostics and Tools](#)

## AP

The AP view displays information related to the Access Point and consists of three widgets - FortiAP status, Channel Utilization, and FortiAP model.



## FortiAP Status

The FortiAP Status widget provides information about the status of each AP listed on the page. It displays the current status of the AP, which can be either **Online**, **Offline** or **Unauthorized**.

## Band

The band widget provides the number of channels for the 2.4GHz, 5GHz and 6GHz bands. Hovering over the chart displays the number of APs in that band and the percentage of the total channels that they comprise of.

## FortiAP Model

The FortiAP Model widget displays the model number of each AP listed on the page. It provides information about the hardware model of the AP and its associated count. This widget is useful for identifying the different models of APs being used in the network.

**Note:** Click the donut chart in the widgets, to filter the AP table. To reset the filter, click the widget name.

The APs are listed with their relevant details, including the AP name, FortiGate, FortiAP status, SSID, channel, clients, OS version, FortiAP profile and license. To view detailed information about an AP, select the desired AP from the list and click **View Details**. See, [Diagnostics and Tools](#).

Right-click on the header of the table to select the desired columns to add to the table, and then click **Apply** to update the table with the selected columns.

AP Name	FortiGate	FortiAP Status	SSID	Channel	Clients	OS Version
	FortiGate-300E	Online	R1 210-...-Ext... R2 Test	R1 132 R2 1	2	PU431F-v6.2-build03...
	FortiGate-300E	Online	R1 210-...	R1 120	1	PU433F-v6.2-build03...

Best Fit Columns  
Reset Table

Select Columns

- AP Name
- FortiGate
- FortiAP Status
- SSID
- Channel
- Clients
- OS Version
- FortiAP profile
- License
- Channel Utilization
- Connected via
- FortiAP Model
- FortiGate IP Address
- FortiGate Serialnumber
- LLDP
- MAC Address

Apply Cancel

To reset the table to its default state, click **Reset** button. Click **Best Fit Columns** to automatically adjust the column width to fit the data displayed in the table.

To filter the AP list based on the column data, click the filter icon in the column header next to the title, select the value to be filtered and click **Apply**.

Type in the search term in the search bar located at the top of the AP list. The search term can be a specific AP name, client name, or any other relevant information.

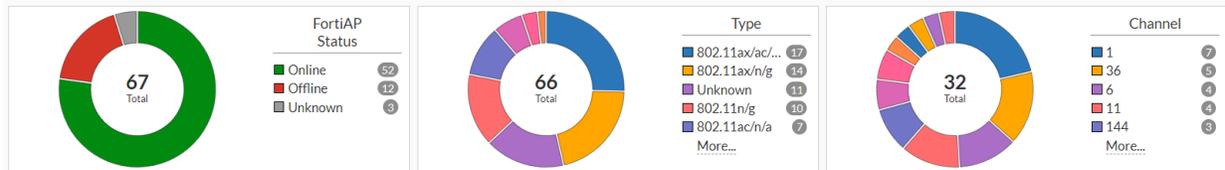
Click the plus icon located to the left of the search bar to perform a more specific search based on a particular column. Select the desired column, and then enter the search term to narrow down the search results to specific criteria.

Click **Export As** to export the table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.

## Radio

The Radio view displays information related to the radios in the AP and consists of three widgets - Status, Type and Channel.



### Status

The Status widget displays the current status of each radio, either Online or Offline.

### Type

The Type widget displays the type of each radio, such as 802.11a/n/ac or 802.11b/g/n, 802.11ax, 802.11ax-6G, or unknown. This information is useful for identifying the capabilities and features of each radio within the AP.

### Channel

The Channel widget displays the channel being used by each radio. This information is important for optimizing the network's performance and minimizing interference between radios within the AP.

The radios are listed with their relevant details, including the AP name, AP serial number, FortiGate, FortiAP status, SSID, channel, No of clients, FortiAP profile, Band, Type, Radio ID, AP mode, Channel Utilization and license.

To view detailed information about an AP, select the desired AP from the list and click **View Details**. See, [Diagnostics and Tools](#).

Right-click on the header of the table to select the desired columns to add to the table, and then click **Apply** to update the table with the selected columns.

FortiGate	Status	AP Name	Radio ID	FortiAP profile	SSID	Clients	Band
FortiGate (blurred)	Online	FAP431F-2000000000	1	FAP431F-default	5ghz-2000000000	0	2.4 GHz
FortiGate (blurred)	Online	FAP42E-2000000000	2	FAP42E-neighbour	Radio-2000000000	0	5 GHz

Best Fit Columns  
 Remove All Filters  
 Reset Table

Select Columns

- FortiGate
- Status
- AP Name
- Radio ID
- FortiAP profile
- SSID
- Clients
- Band
- Mode
- Channel Utilization
- License
- AP Serialnumber
- Channel
- Type

To reset the table to its default state, click **Reset** button. Click **Best Fit Columns** to automatically adjust the column width to fit the data displayed in the table.

To filter the AP list based on the column data, click the filter icon in the column header next to the title, select the value to be filtered and click **Apply**.

Type in the search term in the search bar located at the top of the AP list. The search term can be a specific AP name, client name, or any other relevant information.

Click the plus icon located to the left of the search bar to perform a more specific search based on a particular column. Select the desired column, and then enter the search term to narrow down the search results to specific criteria.

Click **Export As** to export the table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.

## Access Points Diagnostics and Tools

The *Diagnostics and Tools* pane displays the details about the selected Access Point/Radio and allows you to run diagnostic tests.

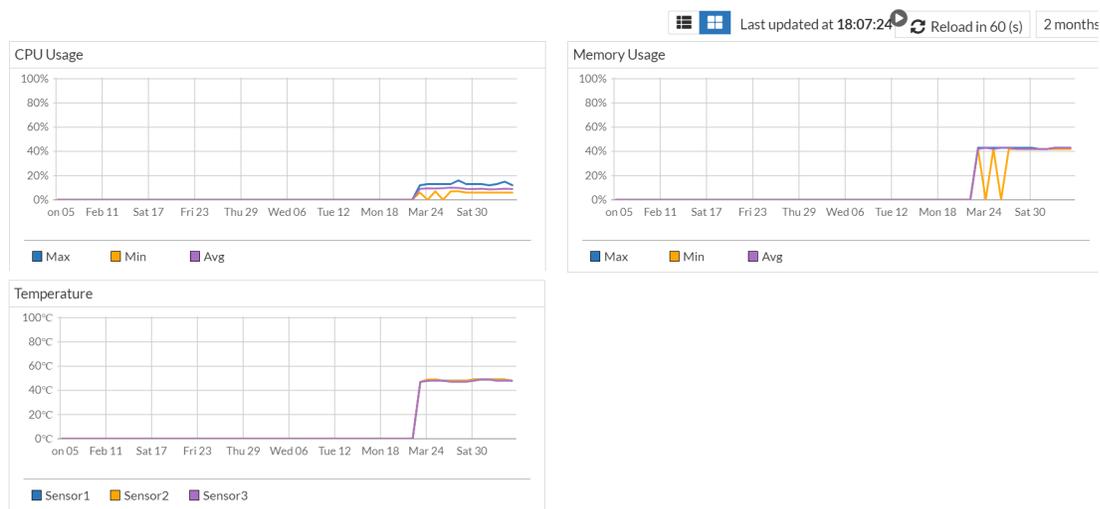
- [Performance](#)
- [Channel Summary](#)
- [Clients](#)
- [Interfering SSIDs](#)
- [Logs](#)
- [Spectrum Analysis](#)
- [VLAN Probe](#)

## Performance

The performance tab displays trends for the FortiAP health, wireless, and wired clients for selected interval. You can filter the trends based on the selected duration or customized time slot; select a time window or define a custom range. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**. The minimum, maximum, and average values are displayed when a time interval of more than 6 hours is selected.

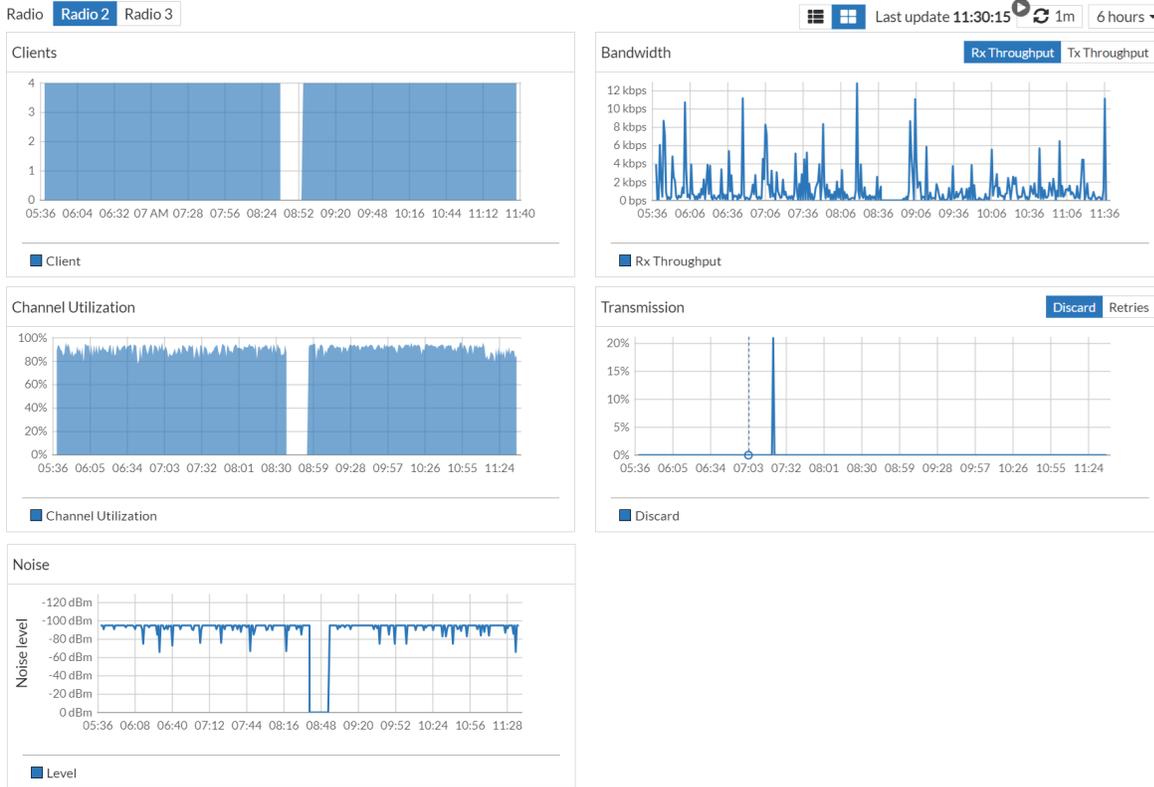
## AP Health

This tab monitors and displays the CPU and memory usage by the FortiAP over the selected time interval. At any given point in time, you can view the maximum, minimum, and average CPU and memory usage. This tab also displays the operating temperature of the FortiAP collected by various sensors. The temperatures recorded by all sensors are displayed.

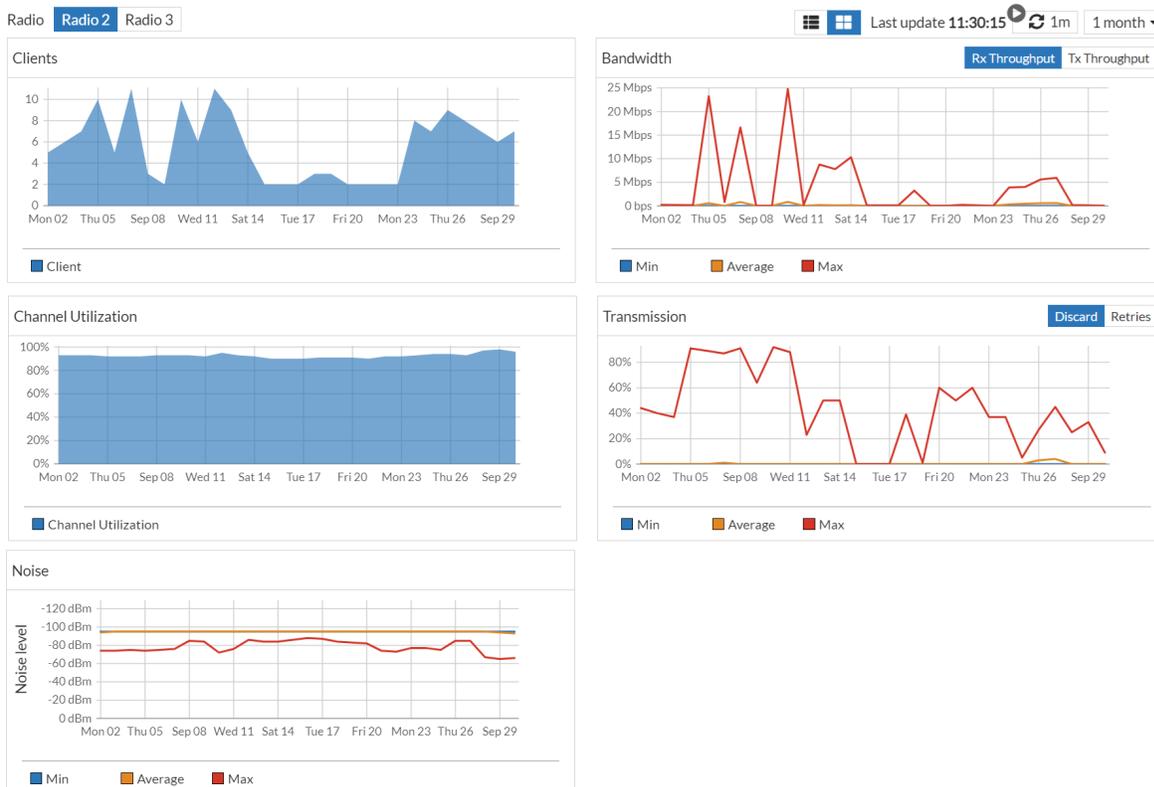


## Wireless

It includes charts for clients, bandwidth, channel utilization, transmission discard, retries, and noise levels on the respective radio interface. The default interval is 10 minutes and can be changed according to your requirements.



The minimum, maximum, and average values are displayed in the **Bandwidth, Transmission and Noise** panels when the selected time interval is more than 6 hours, as depicted in the following image.



Click on the graphs for a specific time to view details. The following image depicts the details displayed for an interval of less than 6 hours.

Details							
<input type="text" value="Search filterable columns"/>							
Timestamp	Clients	Noise	Channel Utilization	Throughput Rx	Throughput Tx	Transmission Retry	Transmission Discard
2024/09/29 21:15:56	4	-76 dbm	84 %	273 bps	349 bps	44 %	0 %

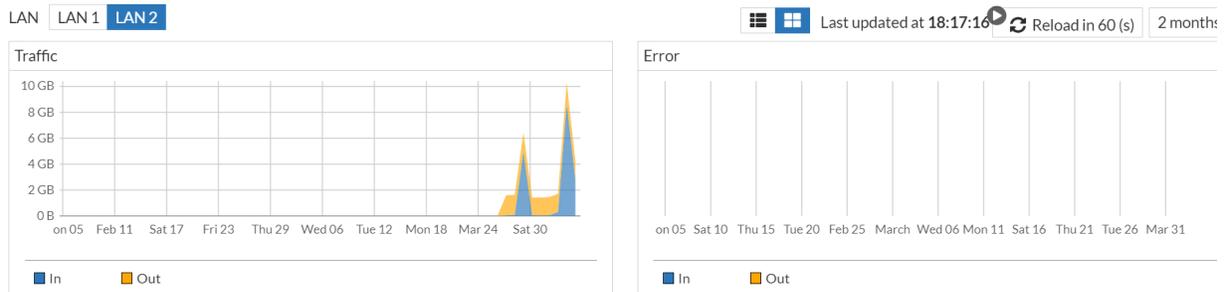
The following image depicts the details displayed for an interval of more than 6 hours.

Details							
<input type="text" value="Search filterable columns"/>							
Timestamp	Clients	Noise	Channel Utilization	Throughput Rx	Throughput Tx	Transmission Retry	Transmission Discard
2024/09/07 00:00:00	11	Min : -95 dbm Average : -95 dbm Max : -76 dbm	92 %	Min : 0 bps Average : 814.21 kbps Max : 16.64 Mbps	Min : 227 bps Average : 1.05 Mbps Max : 24.21 Mbps	Min : 0 % Average : 932 % Max : 46740 %	Min Average Max

### Wired

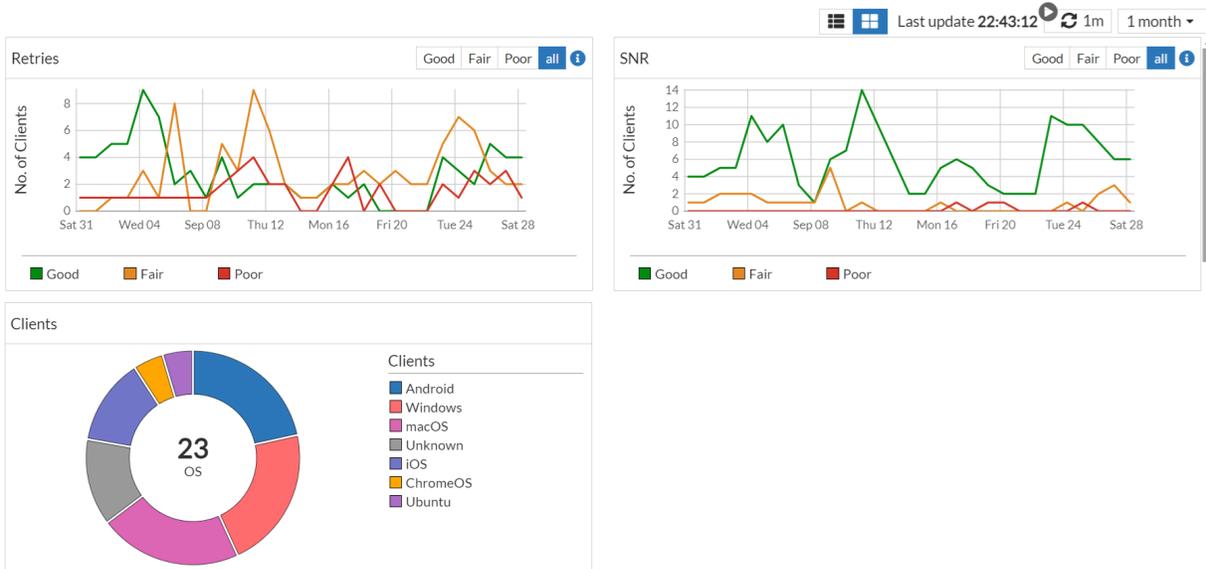
The LAN port statistics are now displayed for access points. You can view the traffic coming into a LAN port and the traffic leaving it at a given point in time. Also, the error statistics for both incoming and outgoing traffic is displayed.

**Note:** The LAN port status is not displayed for FAP-421E and FAP-423E.



### Clients

The **Clients** tab helps you monitor your network, based on the retries percentage, SNR, and client distribution. This data is displayed per OS for the selected time interval.



- [Retries](#)
- [SNR](#)
- [Clients](#)

## Retries

The statistics for retries are categorized as good, fair, and poor based on the following criteria.

- **Good** - Retries are less than 30%
- **Fair** - Retries are between 31% - 70%
- **Poor** - Retries are more than 70%

## SNR

The statistics for SNR are categorized as good, fair, and poor based on the following criteria.

- **Good** – SNR is equal to or greater than 25 dB
- **Fair** – SNR between 15 and 24 dB
- **Poor** – SNR is less than 15 dB

## Clients

This panel provides the total number of clients and also the number of clients associated with each OS type. Hover over the graph or the OS name to view details.

To view details for each of the 3 panels, click on the retries and SNR graphs, or on the OS name to view details. The **Details** page displays data such as, the host name, access point and radio details, associated SSID, OS type, throughput, noise, retries, and so on.

Details								
+ Q Search filterable columns								
	Timestamp	Access Point	Radio ID	MAC Address	Hostname	IP Address	SSID	Radio Type
<input type="checkbox"/>	2024/09/11 05:30:00	FP431GT	2	a8:db:	a8:db:	192.168	JK_TEST_CORP	802.11ax/ac/n/z
<input type="checkbox"/>	2024/09/11 05:30:00	FP431GT	2	0e:d0:	0e:d0:	192.168	JK_TEST_CORP	802.11ax/ac/n/z
<input type="checkbox"/>	2024/09/11 05:30:00	FP431GT	2	36:ec:	36:ec:	192.168	JK_TEST_CORP	802.11ax/ac/n/z

## Channel Summary

This page provides granular insights into the performance of each channel with detailed statistics and trends. For more information, see [Channel Summary](#).

View details Trends + Q Search filterable columns					
Channel	Max Channel Utilization	Clients	No. Of Radios	Average Utilization Severity	Average Interfering SS
2.4 GHz 3 Number of Clients-0					
1	90 %	0	5	Poor	Good
11	97 %	0	4	Poor	Good

## Clients

The Clients tab displays a list of clients currently connected to the selected AP, along with details such as the client MAC address, FortiGate and IP Address, FortiAP name, associated SSID, user name, operating channel and the radio details, Tx and Rx bandwidth, signal strength and noise, VLAN ID, RF band, the wireless standard, and the time of association. This information is useful for identifying any clients that may be experiencing connectivity issues or data usage problems. To view detailed information of a client, select the client and click **View details**.

View details Search								
MAC Address	FortiGate	IP Address	Forti AP	SSID	Device	User	Channel	Band
	FortiGate-300E			210-2Tunnel	FTNT-THINK-2		132	18.27
	FortiGate-300E			210-Bridge	FortiAlsQAsMini		132	0

## Interfering SSIDs

The Interfering SSIDs tab displays the details of interfering SSIDs associated with an AP; the interfering SSID page displays the associated SSID, related AP BSSID, operating channel, signal strength and the radio details are displayed in the AP dashboard. To view the interfering SSID details, ensure that the AP radio is using Radio Resource Provisioning or a WIDS profile in FortiGate (Managed FortiAP Profile).

SSID	AP BSSID	Channel	Signal	Type
Radio Id: 1 156				
1A_no_vlan		11	-27 dBm 	Other
#####iperf_SSID		11	-61 dBm 	Other
test		11	-51 dBm 	Other
test		11	-64 dBm 	Other

## Logs

The Logs tab provides detailed logs of events related to the selected AP/Radio. To view detailed information, select log and click **Details**.

Search filterable columns				Q	Details
Date/Time	Level	Action	Message	General	
2024/04/12 21:...		auth-req	AP received autf	Absolute Date/Time	2024/04/12 21:11:47
2024/04/12 21:...		auth-req	AP received autf	Time	21:11:47
2024/04/12 21:...		auth-req	AP received autf	Virtual Domain	root
2024/04/12 21:...		auth-req	AP received autf	Log Description	Authentication request from wireless station

## Spectrum Analysis

Spectrum Analysis tab provides visual spectrum analysis capabilities that scan radios for RF channel conditions and sources of interference which can potentially impact WLAN efficiency. Based on the spectrum analysis data, corrective measures such as determining optimal channel planning, debugging client related connectivity issues and automatic transmit power settings are initiated. This facilitates quality wireless service levels by ensuring the optimal usage of the channels considering the information provided by the FortiAI Ops spectrum analyzer. Both 802.11 and non-802.11 sources of interference can be detected and analyzed by the spectrum analyzer.

### Notes:

- Spectrum analysis is supported for all channels when the radio is in the dedicated monitor mode, and for selected channels when the radio is in the AP mode.
- FortiAP supports spectrum analysis and is online.

Select the channels to be scanned and configure the scan duration, the spectrum analysis is performed on 2.4 GHz, 5 GHz, and 6 GHz frequency bands. The spectrum analyzer result displays widgets with the type of interference, signal strength, impacted channels, and wireless spectrum current utilization, start and end time and duration of the interference. It classifies wireless & non-wireless interferences to easy identification of the source.

- You can select the **AP**, **Radio**, and **Channels** to be scanned for interferences.
- The **Scan Duration** can be set to 1, 5, 30, or 60 minutes.
- The **Sampling Interval** and the number of **Spectrogram Samples** cannot be modified.

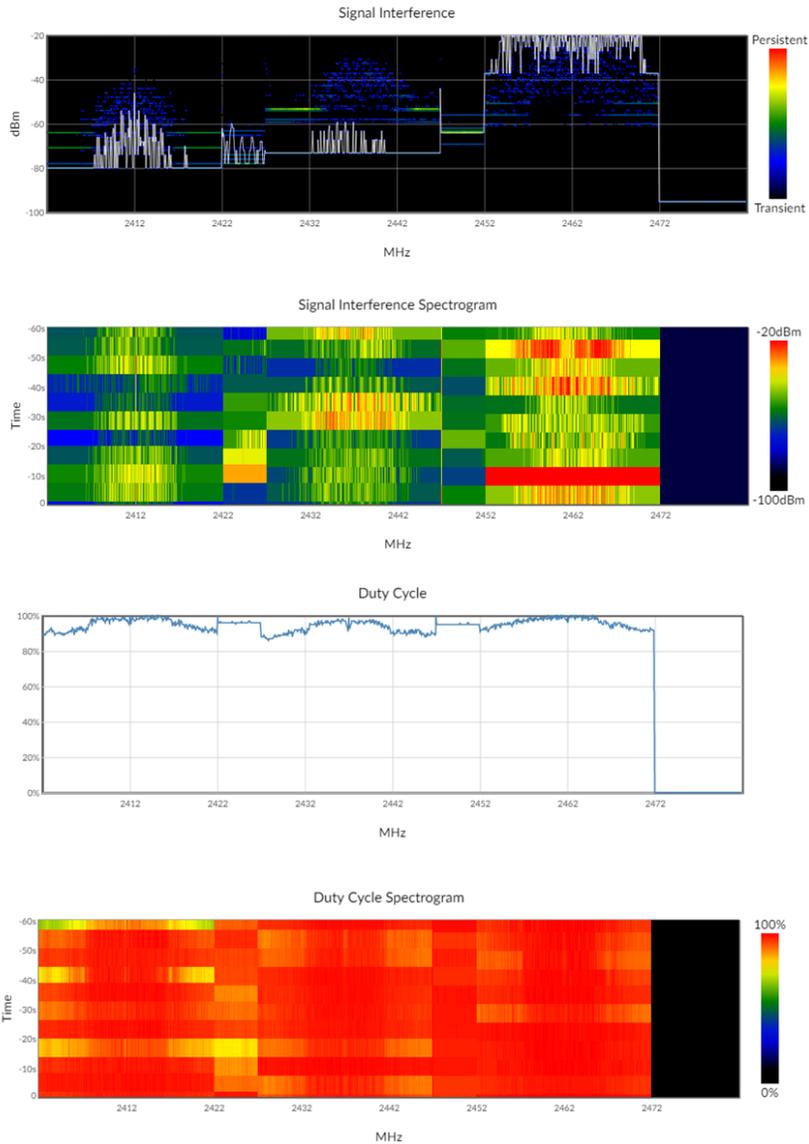
Select **Start** and the GUI periodically polls the spectrum analysis data based on the fixed sampling interval of 1000 milliseconds. Data is visualized as 4 charts representing signal interference marking the noise levels for each channel, signal interference spectrogram representing 60 samples for different channels at specific time

intervals, the duty cycle charts marking the extent to which a non-WiFi device/neighbouring AP is interfering, and the duty cycle spectrogram representing 60 such duty samples for each channel over a period of time.

The tabular data for non-WiFi interference displays the time and frequency of last detection and any of the following type of devices causing the interference.

- Microwave ovens
- Video bridges
- Wi-Fi, DSSS cordless phones
- Bluetooth, FHSS cordless phones

The tabular data for WiFi interference displays the online neighbouring AP's BSSID, SSID, maximum signal strength, and channel and time of last detection.



## VLAN Probe

VLAN probe tab enables FortiAPs to probe connected VLANs and subnets. It sends DHCP probes from the FortiAP's Ethernet interface to specific VLANs on the wired interface and returns information on their availability and subnet details. This helps diagnose and troubleshoot WiFi deployment issues.

- **Probe Retries** – Configure the number of retries before timeout. The valid range is 1 to 10 with a default value of 6.
- **Timeout** – Configure the timeout for the VLAN probe. The valid range is 1 – 60 seconds with a default value of 10 seconds.
- **VLAN Range** – Select the range of VLANs to probe. The valid range is 1 - 4094.

Select **Start** to initiate VLAN probe as per configurations.

Performance Channel Summary Clients Interfering SSIDs Logs Spectrum Analysis **VLAN Probe**

Probe Retries

Timeout  Seconds

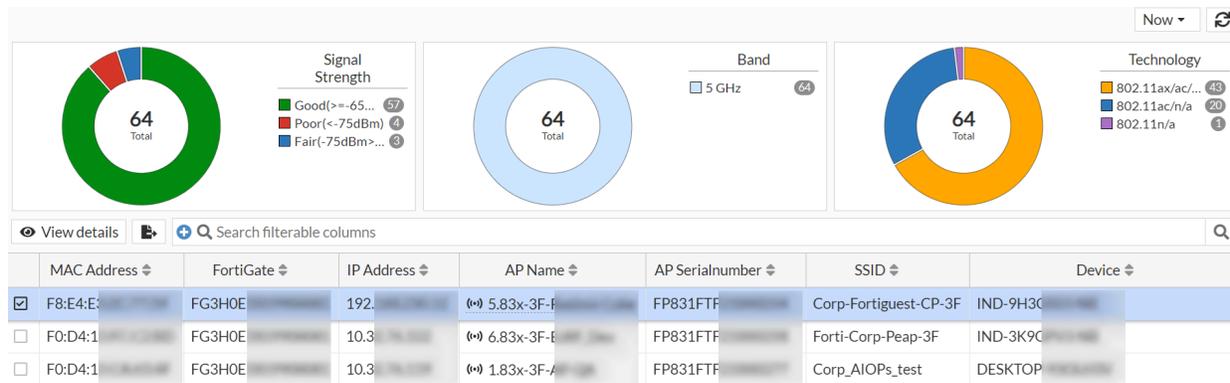
VLAN Range  To

**Start**

## Wireless Clients

The Clients page provides information about the clients connected to the wireless network and consists of three widgets - signal strength, band, and technology.

- You can filter the wireless client data for a selected duration or a customized time slot. The **Custom range** allows the selection of a minimum of 1 hour and maximum of 1 week, the option of **Now** displays data for the last 1 minute.



### Signal Strength

The signal strength widget provides information about the strength of the signal between each client and the access point. It displays the signal strength in dBm, which is a measure of signal power. A higher dBm value indicates a stronger signal, while a lower dBm value indicates a weaker signal.

## Band

The band widget displays the band that each client is connected to. It indicates whether the client is connected to the 2.4 GHz, 5 GHz or 6 GHz band.

## Technology

The technology widget displays the technology that each client is using to connect to the wireless network. It indicates whether the client is using 802.11a/b/g/n or 802.11ac technology.

The clients are listed with their relevant details, including the MAC address, FortiGate, IP address, FortiAP, SSID, channel, bandwidth, and signal strength. To view detailed information about a client, select the desired client from the list and click **View Details**. See, [Clients Diagnostics and Tools](#).

Click **Export As** to export the table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.

Right-click on the header of the table to select the desired columns to add to the table, and then click **Apply** to update the table with the selected columns.

MAC Address ↕	FortiGate ↕	IP Address ↕	Forti AP ↕	SSID ↕	Channel ↕	Bandwidth Tx/Rx ↕	Signal Strength/Noise ↕	Signal S
94:00:00:00:00:00	FortiGate-300E	192.168.1.1	FW-300E-300E-300E	210 Channel	161	2.49 kbps	7 dB	-88 dBm
94:00:00:00:00:00	FortiGate-300E	192.168.1.2	FW-300E-300E-300E	210 Bridge	132	0 bps	50 dB	-42 dBm
94:00:00:00:00:00	FortiGate-300E	192.168.1.3	FW-300E-300E-300E	210 Bridge	120	0 bps	56 dB	-43 dBm

Best Fit Columns

Reset Table

Select Columns

- MAC Address
- FortiGate
- IP Address
- Forti AP
- SSID
- Channel
- Bandwidth Tx/Rx
- Signal Strength/Noise
- Signal Strength
- Association Time
- FortiAP Radio
- VLAN ID
- Authentication
- Band
- Bandwidth Rx
- Bandwidth Tx
- Device
- Device OS
- Encryption
- FortiAP IP

Apply Cancel

## Wireless Clients Diagnostics and Tools

The *Diagnostics and Tools* pane displays the details about the selected Client and allows you to run diagnostic tests.

- [Performance](#)
- [Applications](#)
- [Destinations](#)
- [Policies](#)
- [Logs](#)

Diagnostics and Tools
✕

Device	210-2Tunnel
SSID	210-2Tunnel
FortiAP	FP431GTY22000103
Channel	161
Association Time	2023/04/04 19:11
IP Address	192.168.16.7

-87 dBm

5 GHz

8.0 dB

0

Signal Strength

Band

Signal Strength/Noise

Transmission Discard/Retry

## Performance

The **Performance** tab displays information about the client's performance, including data charts for bandwidth, signal strength, and transmission discards and retries. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range**. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**.

Diagnostics and Tools
✕

Performance
Applications
Destinations
Policies
Logs
▼

🗨️ 🖼️

Last updated at 2023/04/20 17:02:11
🔄 Reload in 60 (s)
12 hours ▼

**Bandwidth**

3 MBps  
2.5 MBps  
2 MBps  
1.5 MBps  
1 MBps  
500 KBps  
0 Bps

1:52 12:19 12:46 01:13 01:40 02:07 02:34 03:01 03:28 03:55 04:22

Tx Throughput
  Rx Throughput

**Signal Strength/Noise**

50  
40  
30  
20  
10  
0

1:52 12:16 12:40 01:04 01:28 01:52 02:16 02:40 03:04 03:28 03:52 04:16 04:40

Signal Strength/Noise

**Transmission Discards and Retries**

80  
60  
40  
20  
0

1:52 12:16 12:40 01:04 01:28 01:52 02:16 02:40 03:04 03:28 03:52 04:16 04:40

Transmission Retry
  Transmission Discard

Close

## Applications

The Applications tab displays a list of applications in use by the selected client, along with details such as the application name, category, risk, data usage, session and bandwidth details.

Performance Applications Destinations Policies Logs						
Now						
+ Search filterable columns						
<input type="checkbox"/>	Application	Category	Risk	Bytes	Sessions	Bandwidth
<input type="checkbox"/>	QUIC	Network.Service	<span style="color: green;">█</span>	141.97 kB <span style="color: green;">█</span>	5 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	Google.Push.Notification	General.Interest	<span style="color: green;">█</span>	118.65 kB <span style="color: green;">█</span>	4 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	Facebook	Social.Media	<span style="color: orange;">█</span>	5.25 kB   <span style="color: orange;">█</span>	2 <span style="color: green;">█</span>	48 B/s   <span style="color: orange;">█</span>
<input type="checkbox"/>	Google.Services	General.Interest	<span style="color: blue;">█</span>	75.92 kB <span style="color: green;">█</span>	3 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	SSL_TLSv1.3	Network.Service	<span style="color: orange;">█</span>	54.65 kB <span style="color: green;">█</span>	3 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	Google.Analytics	Business	<span style="color: green;">█</span>	3.15 kB   <span style="color: green;">█</span>	1 <span style="color: green;">█</span>	736 B/s <span style="color: green;">█</span>

## Destinations

The Destinations tab displays a list of network destinations accessed by the selected client, along with details such as the destination IP address, application name, data usage, session and bandwidth details.

Performance Applications Destinations Policies Logs					
Now					
+ Search filterable columns					
<input type="checkbox"/>	Destinations	Application	Bytes	Sessions	Bandwidth
<input type="checkbox"/>	74.128.130.100	Google.Push.Notification	104.63 kB <span style="color: green;">█</span>	2 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	142.250.190.100	QUIC	71.79 kB <span style="color: green;">█</span>	2 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	157.140.2.2	Facebook	5.25 kB   <span style="color: orange;">█</span>	2 <span style="color: green;">█</span>	0 B/s
<input type="checkbox"/>	dns.google	SSL_TLSv1.3	16.87 kB   <span style="color: orange;">█</span>	2 <span style="color: green;">█</span>	1.22 kB/s   <span style="color: orange;">█</span>
<input type="checkbox"/>	116.203.223.223	WhatsApp_File.Transfer	196.72 kB <span style="color: green;">█</span>	1 <span style="color: green;">█</span>	409.83 kB/s <span style="color: green;">█</span>
<input type="checkbox"/>	172.217.14.100	Google.Services	14.86 kB   <span style="color: orange;">█</span>	1 <span style="color: green;">█</span>	0 B/s

## Policies

The Policies tab displays information about any policies applied to the selected client, such as policy name, policy type, source interface, destination interface, data usage, session and bandwidth details.

Performance Applications Destinations Policies Logs							
Now							
+ Search filterable columns							
<input type="checkbox"/>	Policy	Policy Type	Source Interface	Destination Interface	Bytes	Sessions	Bandwidth
<input type="checkbox"/>	Tunnel_PSK-port1	policy	Tunnel_PSK	<span style="color: green;">█</span> port1	1.27 MB <span style="color: green;">█</span>	24 <span style="color: green;">█</span>	296 B/s <span style="color: green;">█</span>

## Logs

The Logs tab displays detailed logs of events related to the selected client, allowing you to troubleshoot any issues. To view detailed information, select log and click **Details**.

Diagnostics and Tools						
Performance Applications Destinations Policies <u>Logs</u>						
+ Search						Details
Date/Time	Level	Action	Message	SSID	Channel	Absolute
19 seconds ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
19 seconds ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
10 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
10 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
20 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
20 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
20 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
20 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
30 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
30 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
40 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
40 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
50 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		
50 minutes ago	■■■■ □□□□	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from ...	Forti-Corp-NAC-Peap-4F		

0% 831 | Updated: 17:01:50

Close

## Channel Summary

The Channel Summary window provides information categorized within the following sub-tabs:

- [Summary](#)
- [Events](#)
- [Insights](#)

To access, navigate to **Wireless > Channel Summary**.

### Summary

The **Summary** window displays information regarding channel distribution and power distribution.

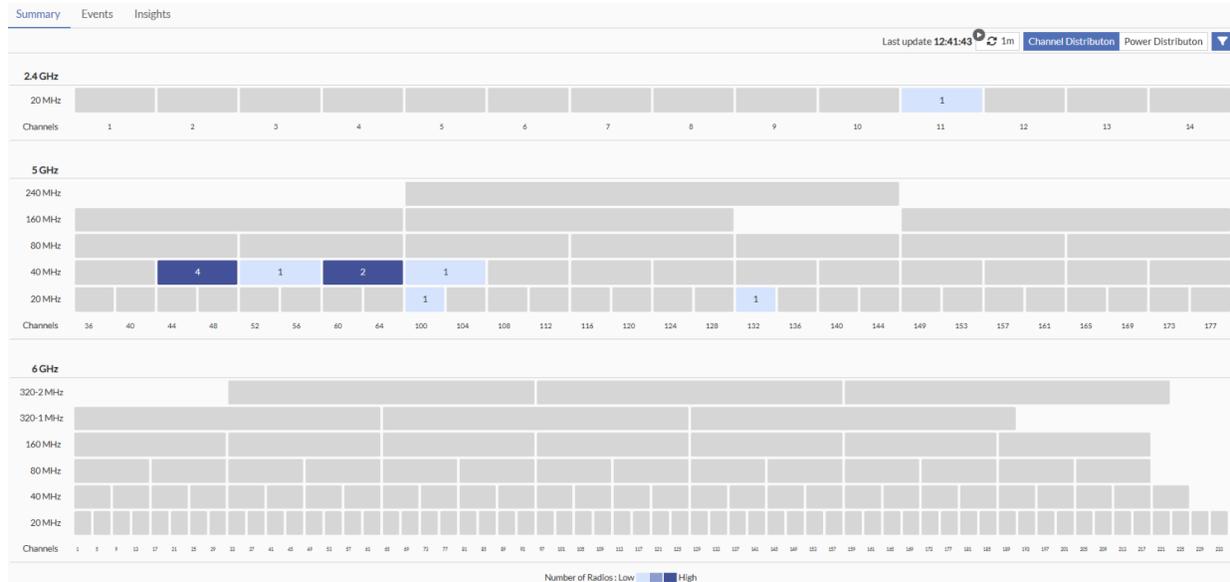
Toggle between the **Channel Distribution** and **Power Distribution** options for relevant information.

#### Channel Distribution

The **Channel Distribution** tab provides information about how the wireless network channels are utilized across different frequency bands. The information is categorized into three categories based on band namely – 2.4 GHz, 5 GHz, and 6GHz. Each band is further divided into different channel width - 20 MHz, 40 MHz, 80 MHz, 160 MHz, and so on. Hover over a channel number to view the number of radios operating on that channel.

The intensity of the channel colour indicates the number of radios present - a darker colour signifies more radios, and a lighter colour signifies fewer radios.

Use the **Filter** option to select FortiAPs and Radios at specific location such as Site, Building, and Floor.



**Note:**

- By default, data from all FortiAPs and radios within the logged-in device group is displayed.
- To view the data, you must have a valid monitoring license.

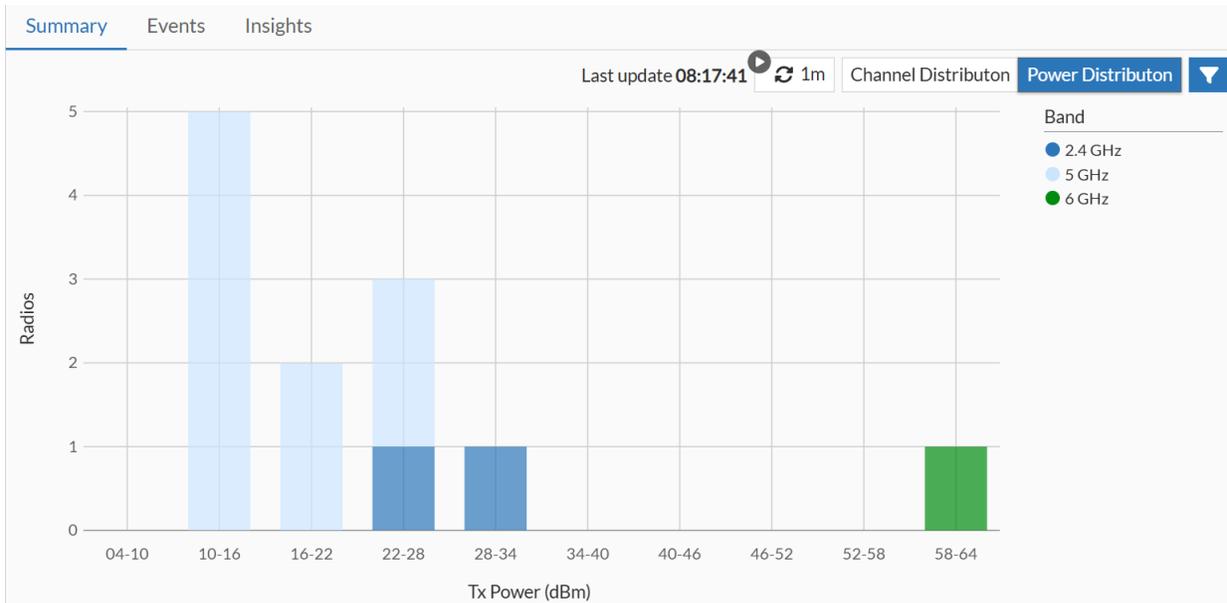
**Power Distribution**

Power distribution information shows how power is being used by the different radios in your access points. Each bar displays how many radios are transmitting at different power levels.

The vertical side (Y-axis) displays the number of radios operating at a specific power level and the horizontal side (X-axis) shows the amount of power each radio is using to send out signals, measured in dBm.

Power distribution is shown in three categories based on frequency band (2.4 GHz, 5 GHz, 6 GHz), with each band represented by a different colour.

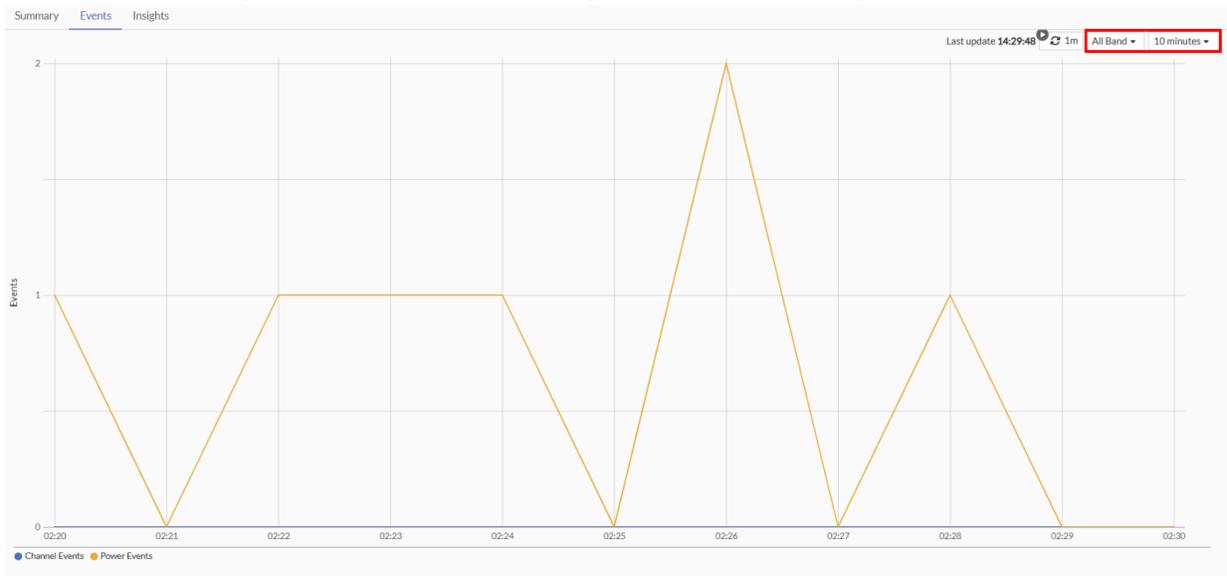
Use the **Filter** option to select FortiAPs and Radios at specific location such as Site, Building, and Floor.



**Note:** By default, data from all FortiAPs and radios within the logged-in device group is displayed.

## Events

The Events tab displays the channel and power change events over time using a bar chart.



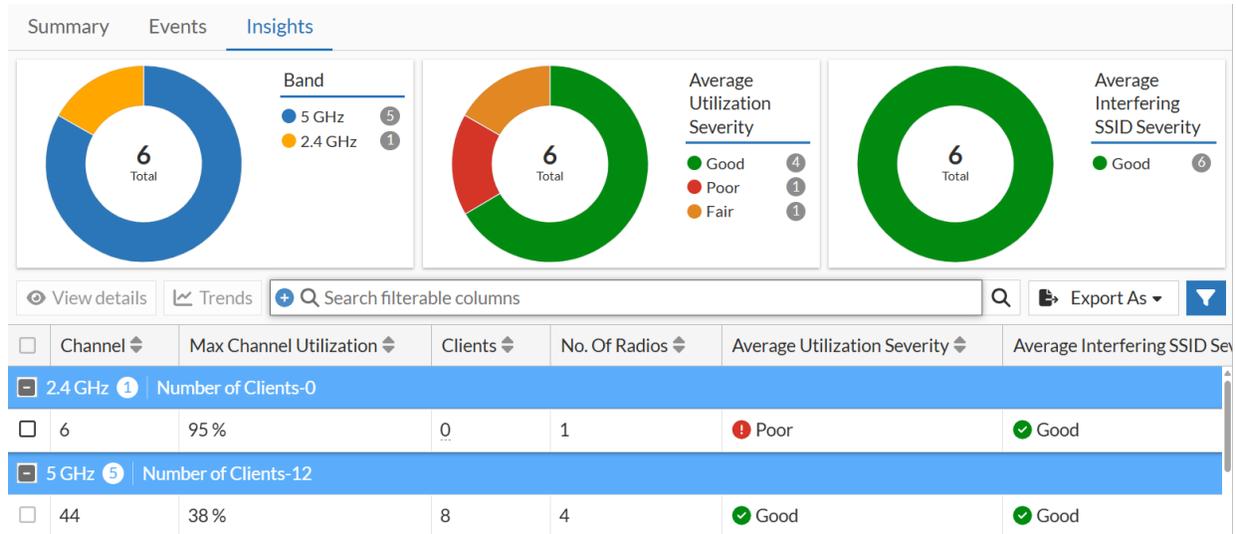
Select the desired bands and time period for the chart using the drop-down menus.

## Insights

This page provides granular insights into the performance of each channel with key insights into critical statistics, that are key in determining the health of your wireless network. This facilitates effective resolution of

any potential network stability issues due to the operating channel. FortiAIOps retrieves and aggregates all channel related statistics from the FortiAPs operating in your network and multiple radios operating on various channels.

**Note:** All data and trends displayed on this page are for the last 1 minute.



You can filter based on specific deployment locations such as **Site**, **Building**, and **Floor**.

**Floor Section**

Site:

Building:

Floor:

The following charts are available:

- [Band](#)
- [Average Utilization Severity](#)
- [Average Interfering SSID Severity](#)

**Band**

This chart provides channel count based on RF bands of 5 GHz, 2.4 GHz, and 6 GHz. The total number of channels for each band are displayed along with what percentage of the total channels used by the wireless network they comprise of. Click on any band to filter channel details and view them in the table below the charts.

**Average Utilization Severity**

This chart provides the channel count based on the average utilization severity over the last 60 seconds. FortiAIOps automatically categorizes the channels as **Good** or **Poor**, and **Fair**. The total number of channels for each severity are displayed along with what percentage of the total channels used by the wireless network they comprise of. Click on any severity to filter channel details and view them in the table below the charts.

## Average Interfering SSID Severity

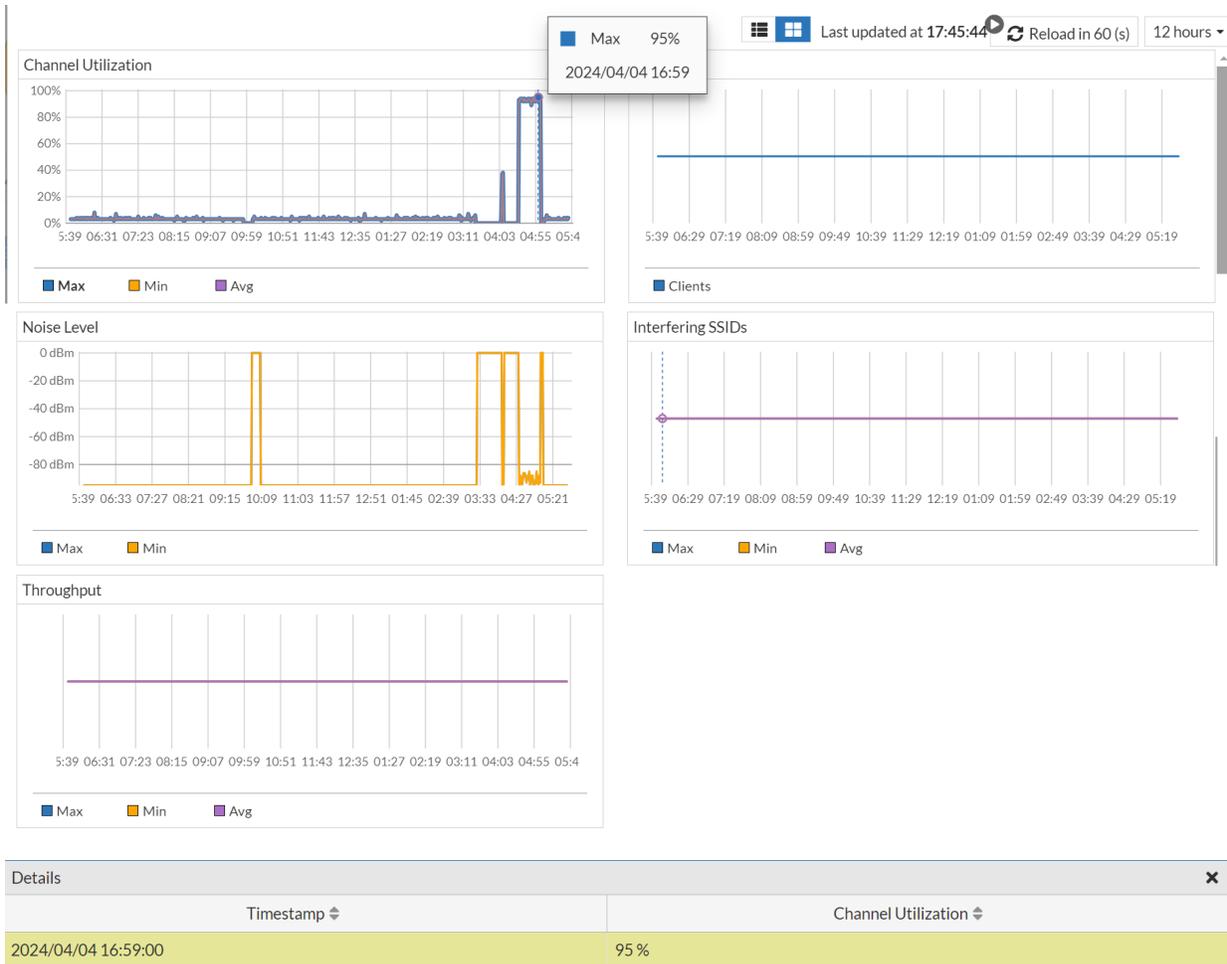
This chart provides the channel count based on the average interfering SSID severity over the last 60 seconds. FortiAIOPS automatically categorizes the channels as **Good** or **Poor**, and **Fair**. The total number of channels for each severity are displayed along with what percentage of the total channels used by the wireless network they comprise of. Click on any severity to filter channel details and view them in the table below the charts.

The channel data in the tabular format categorizes channels based on the RF band. To view radio level details for a particular channel number, select it and click **View details**.

Channel-6(2.4 GHz)							
Search filterable columns							
FortiGate Name	AP Name	Radio	Channel Utilization	Clients	Throughput	Utilization Severity	Interfering SSID Severity
FGT_PRIMARY	HA_3flab	1	3%	0	0 B/s	Good	Good

Field	Description
<b>FortiGate Name and AP Name</b>	The names of the FortiGate controller and FortiAP associated with the selected channel.
<b>Radio</b>	The radio operating on the selected channel.
<b>Channel Utilization</b>	Total channel utilization (in percentage) per radio.
<b>Clients</b>	The number of clients connected per radio.
<b>Throughput</b>	The total throughput of traffic passing per radio.
<b>Utilization Severity</b>	The average utilization severity of the selected channel.
<b>Interfering SSID Severity</b>	The average interfering SSID severity of the selected channel.
<b>SSIDs</b>	The SSIDs associated with the radio.
<b>Noise Level</b>	The noise level detected by the by the radio.
<b>Health Assessment</b>	FortiAIOPS evaluates a assigns the health status of each radio.

To view trends and patterns to assess the performance of specific channels, select a channel and click **Trends**. You can view a graphical representation of the channel statistics over a period of time. These trends can be filtered for the last **10 minutes**, **1 hour**, or **12 hours**. Hover over the charts or click on a them to view the related statistics at a specific time. For example, the following image depicts a maximum channel utilization of 95% with the time stamp, clicking on this point provides similar data in a tabular format. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range**. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**. The minimum, maximum, and average values are displayed when a time interval of more than 6 hours is selected.

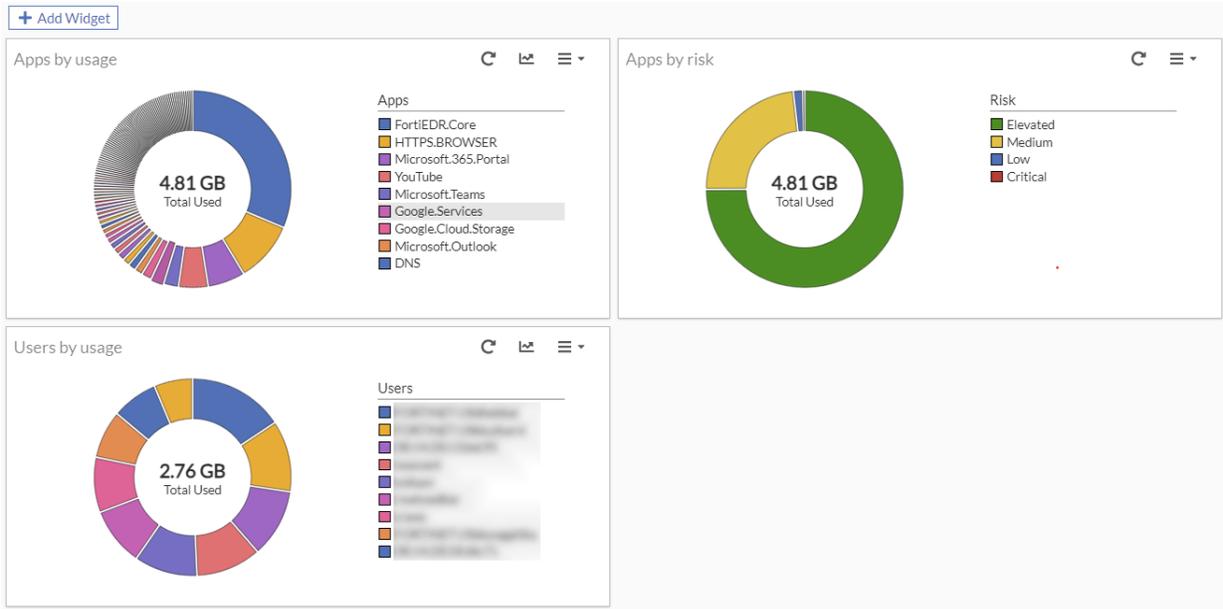


Click **Export As** to export the table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.

## Applications

The Applications page provides information about the applications used by clients on the wireless network. This page consists of three widgets - Apps by usage, Apps by risk, and Users by usage.

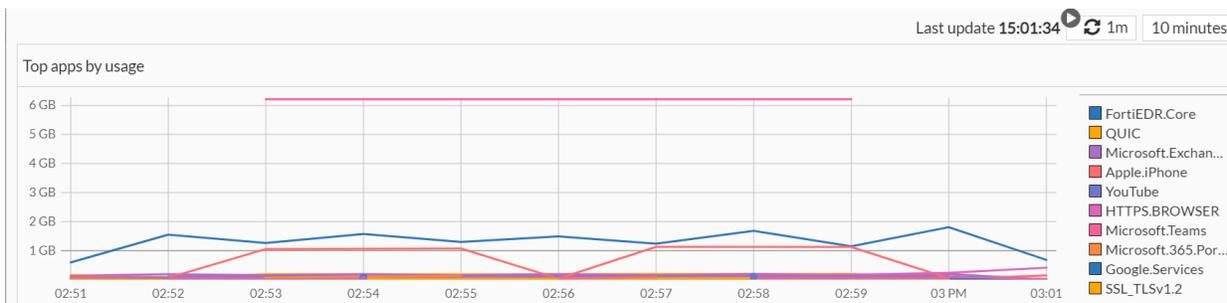


### Apps by usage

The Apps by Usage widget displays a list of applications in use on the network, sorted by the amount of data each application is using.

Top Applications By Usage							
+ Search filterable columns							
<input type="checkbox"/>	Application	Users	Access Points	SSID	Usage	Risk Level	Status
<input type="checkbox"/>	HTTPS.BROWSER	58	16	1	694.69 MB	Medium	Detected
<input type="checkbox"/>	Microsoft.Portal	44	13	1	52.44 MB	Elevated	Detected
<input type="checkbox"/>	Google.Services	43	15	1	130.99 MB	Elevated	Detected
<input type="checkbox"/>	Microsoft.Teams	50	16	1	150.12 MB	Elevated	Detected
<input type="checkbox"/>	Microsoft.365.Portal	39	13	1	343.59 MB	Elevated	Detected

Click on the trends icon  to view the application usage trends. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range**. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**.



## Apps by risk

The Apps by Risk widget displays a list of applications in use on the network, sorted by their risk level.

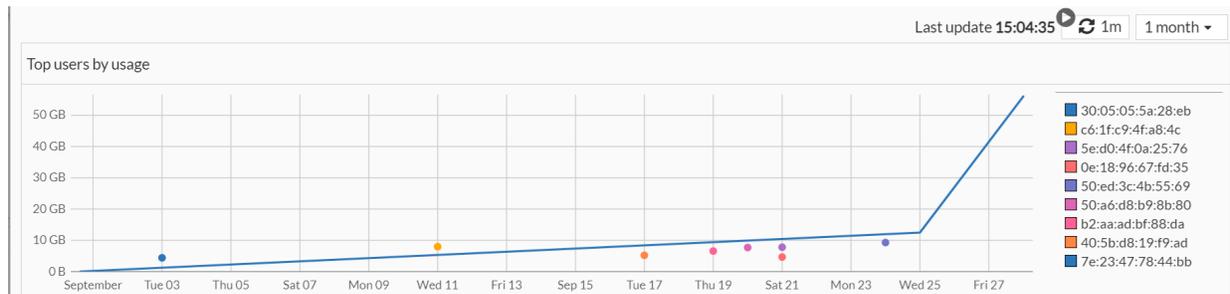
Top Applications By Risk				
Search filterable columns				
Application	Usage	Risk Level	Users	
HTTPS.BROWSER	524.02 MB	Medium	56	
Facebook	81.95 MB	Medium	9	
Microsoft.Outlook	76.69 MB	Medium	11	
Microsoft.Exchange.Server	62.39 MB	Medium	42	

## User by usage

The User by usage widget displays a list of clients on the network, sorted by the amount of data each client is using.

Top Users By Usage					
Search filterable columns					
User	Applications	Access Points	SSID	Usage	
	16	1	1	637.68 MB	
	20	1	1	414.89 MB	
	21	1	1	398.02 MB	
	21	2	1	328.01 MB	

Click on the trends icon  to view the application user trends. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range**. The custom range allows the selection of a minimum of 1 day and the maximum is the duration of log retention configured in **System > Settings**.



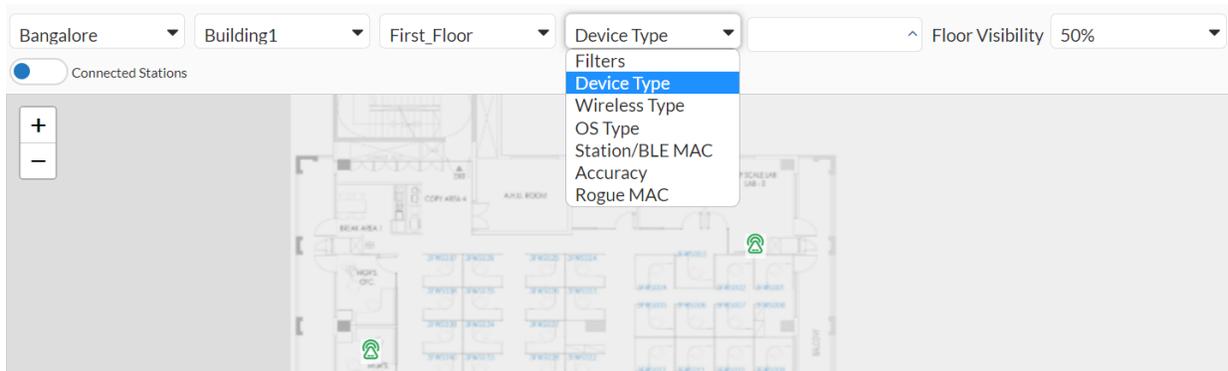
## Location Services Monitor

The Location Services Monitor page plots the current location of all stations and rogue APs on the floor map imported into FortiAIOps. FortiAIOps plots the current location based on the location feed received from FortiGates (which are in turn connected to APs) and does not display the movement of the stations.

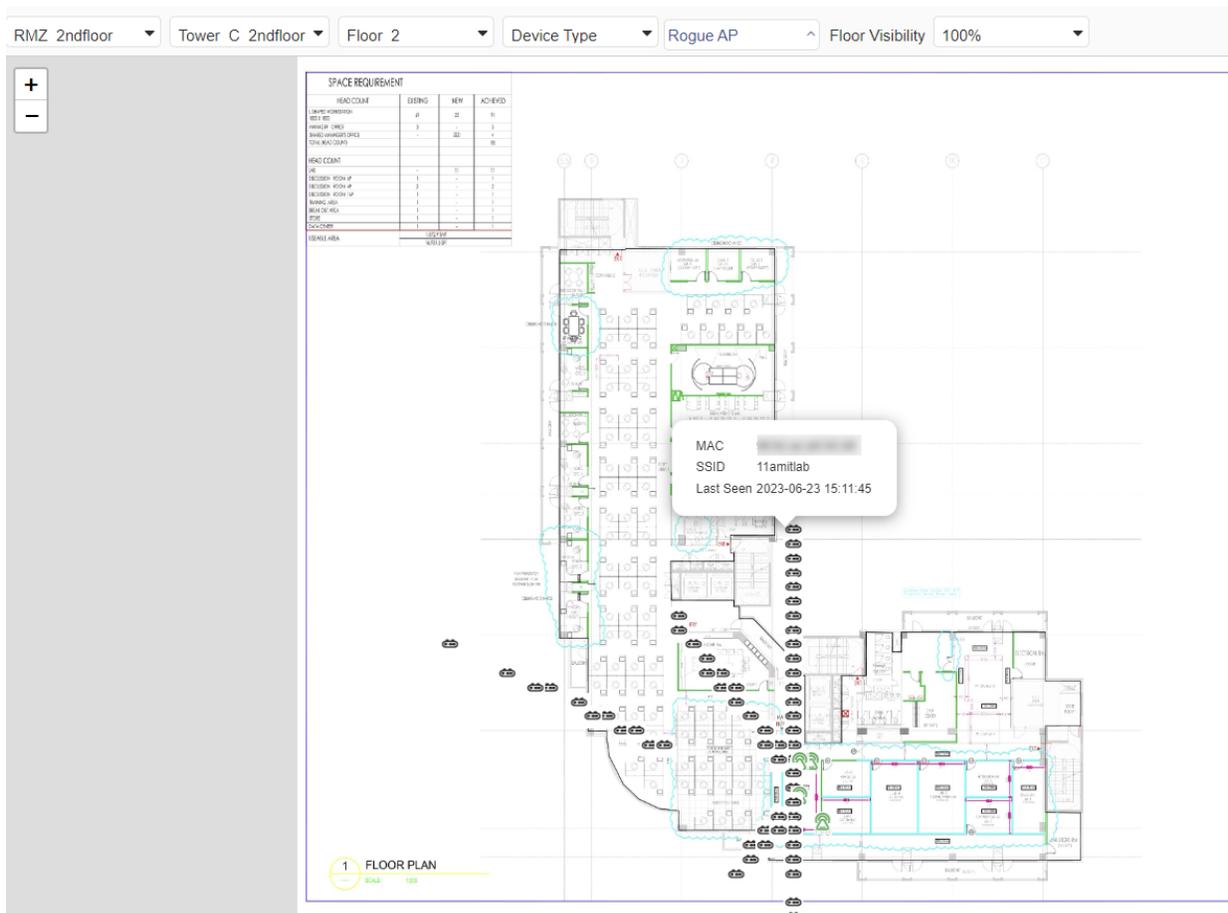
You can filter and view device locations based on the site, building, and floor. The following filters can be applied.

- Device Type
- Wireless Type
- OS Type
- Station/BLE MAC
- Accuracy
- Rogue MAC

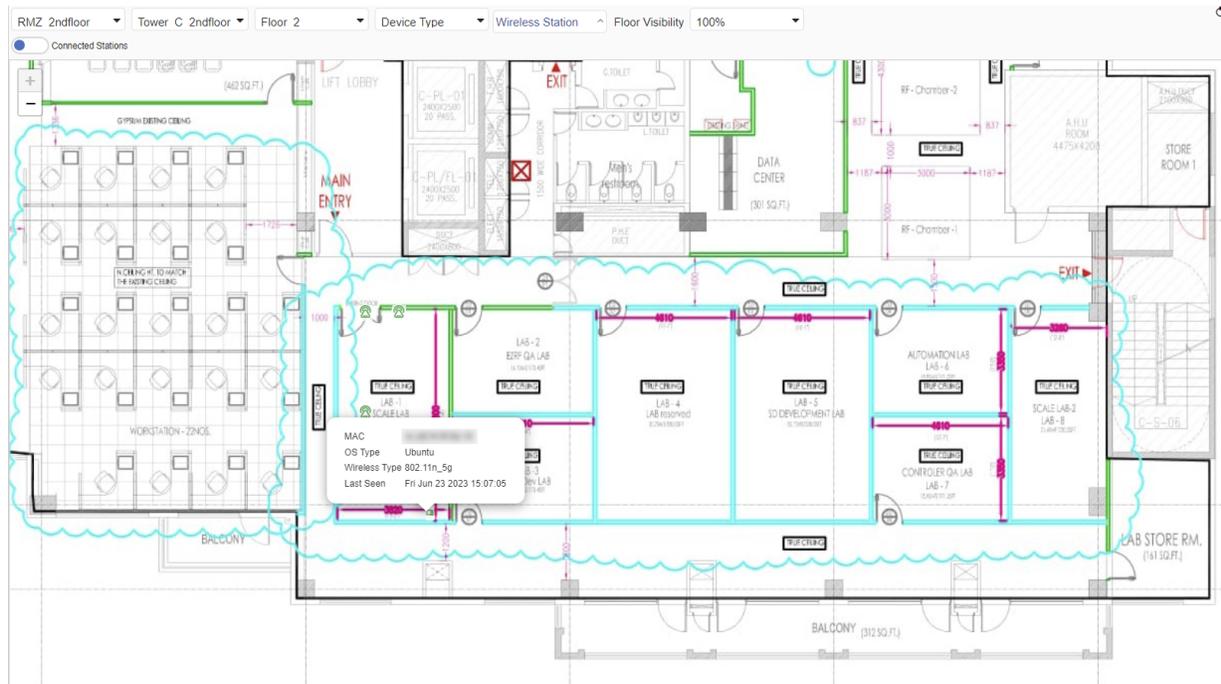
You can set the Floor Visibility and magnify the floor view.



Select **Rogue AP** as the **Device Type**, to view the rouge AP location.



Select **Wireless Station** as the **Device Type**, to view the stations location.



Click **Connected Stations** toggle to switch to **Connected & Discovered Stations** view.

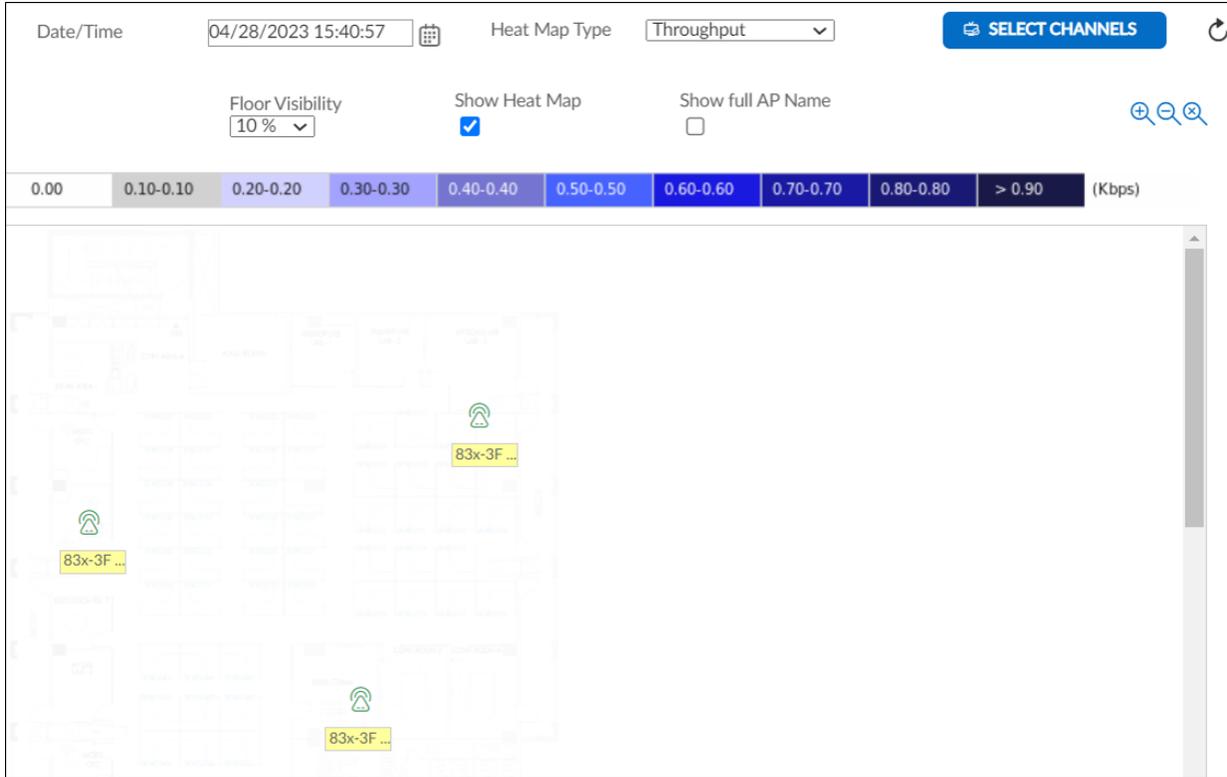
## Heat Maps

The heat map allows you to verify the coverage and performance of your WLAN APs. You can also use the maps to visually locate APs sending alarms. Use the map editor to set up your site maps.

- In the Network Heat Maps screen, select a Location from the menu on the left to see the corresponding map.
- Hover the mouse pointer over the objects on the screen to see details. For example, for this throughput map, by hovering the mouse pointer on an AP icon displays the Name, model, Mac Address, status of the AP and throughput value. If you change the Heat Map Type, be sure to click Refresh icon.
- In the Network Heat Maps screen select a floor. The following five types of heat maps can be viewed.

### Throughput Heat Map

Throughput maps display the AP throughput over the represented area. The APs on the map are differentiated by using different colors to represent the corresponding AP throughput value.



Hover over AP to view the AP information including name, AP model, MAC address, AP status, and throughput in Kbps.

Name:	[REDACTED]
AP Model:	FAP433G
AP MAC:	[REDACTED]
Throughput (Kbps):	0

Right click on AP icon for details

To view AP and Station details in any of the heat maps, right-click an AP icon and click **Show Details**

- **AP Details:** AP ID, AP Name, AP MAC Address, AP IP Address, Controller, Total Stations.
- **Station Details:** MAC Address, IP Address, Last Known Association, User Name, Throughput, Loss%, RSSI, Airtime Utilization, L2 State, L3 State.
- To view Station Trend Dashboard, click MAC Address.

The filtering option comprises of All, 2.4 GHz [default], 5 GHz, 6 GHz and selected channels within the three bands.

AP Information at: 05/25/2023 23:16:06 ✕

AP ID: 17      AP Name: FP433G\_6GHZ      AP MAC: XXXXXXXXXX  
 AP IP Address: XXXXXXXXXX      Controller: FGT\_HW-1\_AIOPS      Total Stations: 1

Following are the stations Associated to the AP. Station performance parameters (such as Loss, Throughput, Airtime Utilization ) are different from similar parameters of an AP.  
 <Prev (1 - 1 of 1) Next>

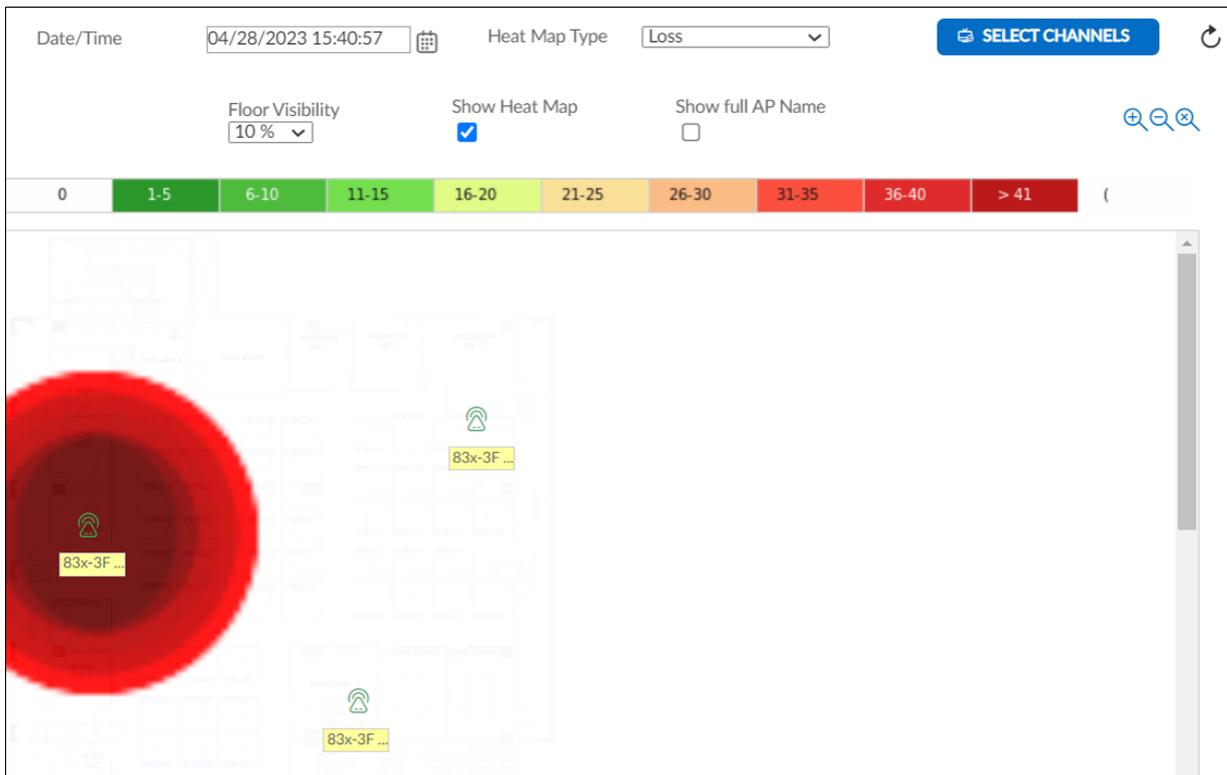
MAC ADDRESS	IP ADDRESS	IPV6 ADDRESS	LAST KNOWN ASSOCIATION	USER NAME	THROUGHPUT (Kbps)	LOSS%	RSSI (dBm)	AIRTIME UTILIZATION (%)	L2 STATE	L3 STATE
<span style="background-color: #ccc; padding: 2px;">XXXXXXXXXX</span>	<span style="background-color: #ccc; padding: 2px;">XXXXXXXXXX</span>	<span style="background-color: #ccc; padding: 2px;">XXXXXXXXXX</span>	5/24/2023 06:44:48		0	0	-29	0	None	Clear Active

CLOSE

## Loss Heat Map

Loss maps show the AP loss over the represented area. The APs on the map are differentiated by using different colors to represent the corresponding AP Loss% value.

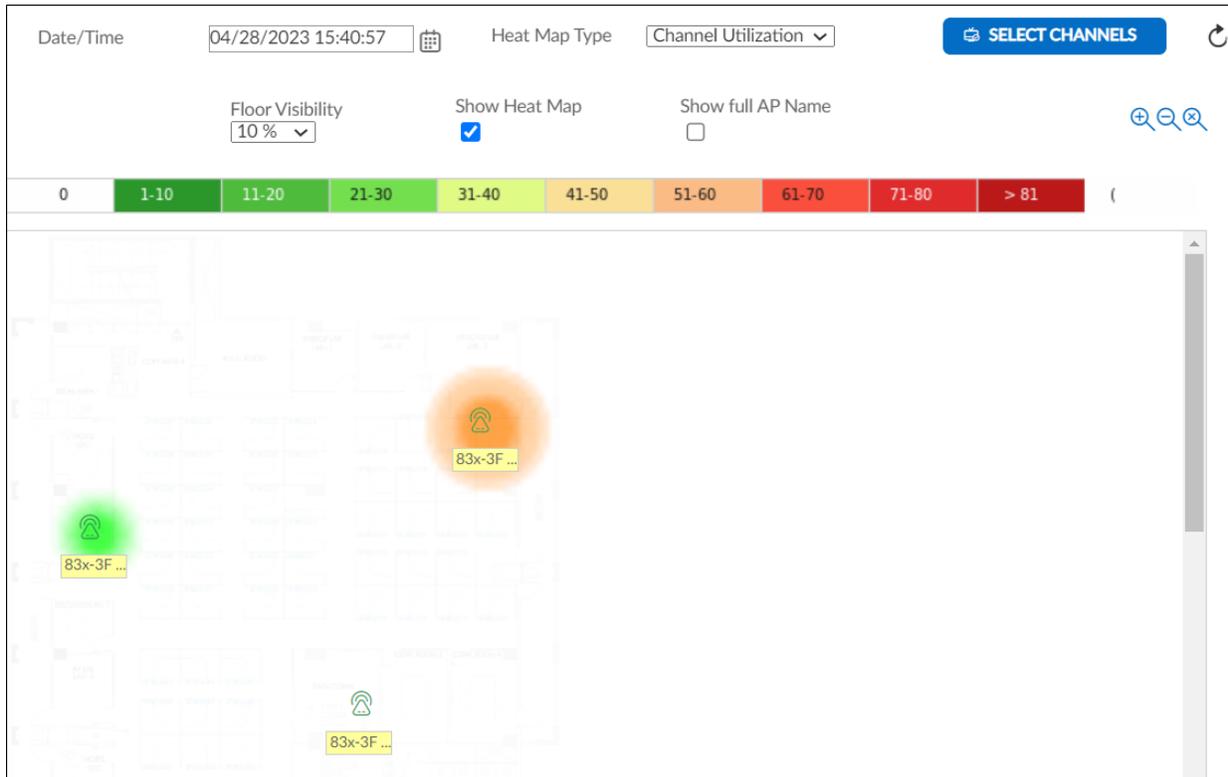
Hover over AP to view the AP information including name, AP model, MAC address, AP status, and loss %. Right click on AP icon and click **Show Details** to view detailed information.



## Channel Utilization Heat Map

The Channel Utilization maps differentiate APs on the map by using different colors for the regions around APs corresponding to the AP channel utilization value.

Hover over AP to view the AP information including name, AP model, MAC address, AP status, and channel utilization (%). Right click on AP icon and click **Show Details** to view detailed information.



## Number of Stations Heat Map

The Number of Stations Heat Map, represents the low signals over the area represented by the map. The Number of Stations maps differentiate APs on the map by using different colors for the regions around APs corresponding to the number of stations per AP.

Hover over AP to view the AP information including name, AP model, MAC address, AP status, and number of stations.

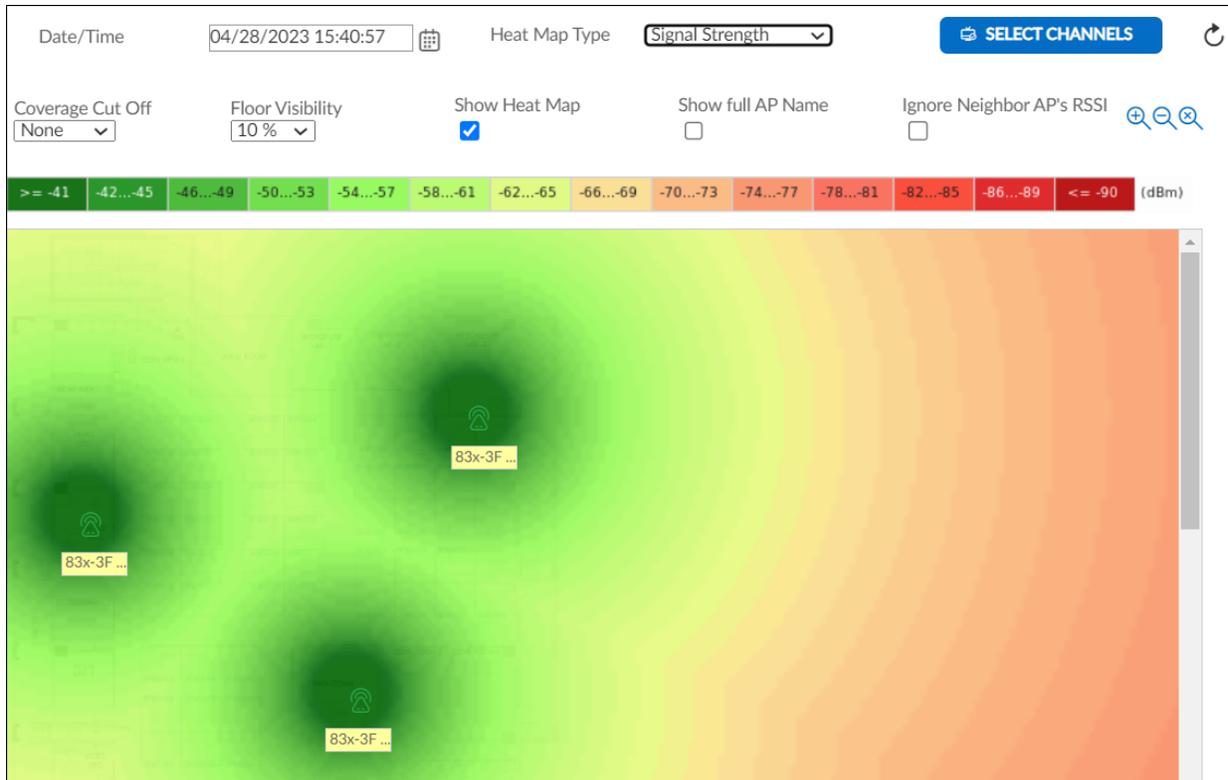


## Signal Strength Heat Map

Signal strength heat map provides a distribution of signal quality over the floor map. The signal strength is represented in dBm and is divided into color buckets. The Signal Strength maps display the availability of signal over the area represented by the map. Select different cut-off values to view the signal coverage.

**Note:** The signal strength heat map allows you to view the signals of all the APs on the floor. Due to this, the FortiAI Ops displays heat map for all APs irrespective of whether the logged in user has scope for those APs or not. This enables you to capture accurate signal value for all APs located on the floor.

Hover over AP to view the AP information including name, AP model, MAC address, AP status, and signal strength.



With signal strength heat map having smooth transition in colors, the color at a given point may not exactly match with the bucket colors. For such cases, it should be interpreted as a value that is greater/lower than the nearest bucket color.

**Coverage Cut Off:** Coverage cutoff [default being none] can be used to see the signal coverage region within the cutoff value specified. The cutoff range is from -42dBm to -90dBm.

To view the signal strength heat map of a floor, follow these steps:

- Ensure that the APs are placed accurately through the map management feature.
- Click on **Heat maps** and select the desired floor.
- Select the RF band or relevant channel from the menu.
- Choose a cutoff of interest.
- Click on the **Refresh** icon.

## Rogue APs

The Rogue APs page provides detailed information about rogue access points (APs) on the wireless network and consists of three widgets - Interfering APs, SSID, and Vendor Info.



- Place AP icons on the map to represent the WLAN network topology. See [Add APs, Floor APs, and Landmarks to Maps](#).
- View the map. See [Viewing Maps](#).

## Importing a Map Image

Follow these steps to import a topology map:

1. Navigate to **Wireless > Map Management**.
2. Select a floor.
3. Click **Change Image** in the Floor Map section.
4. Select Image Type as Floor and Operation as Upload. Select the Image File by using the browse tab and click on Upload.

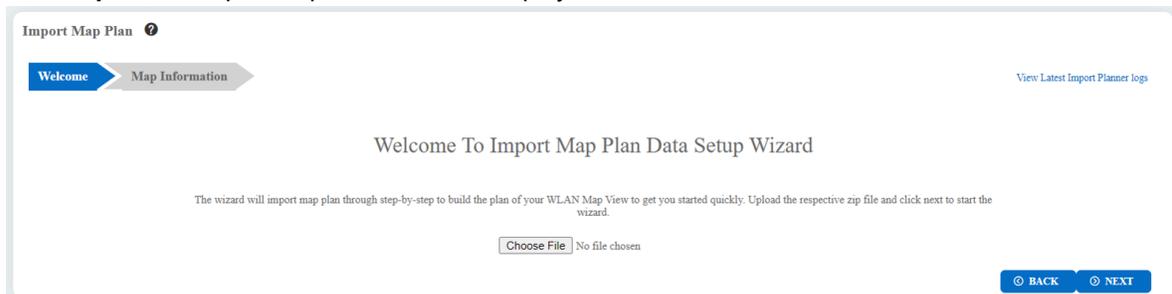
Next, add controllers and APs to the map.

## Importing a Floor Map

FortiAIOps supports importing a floor map plan created on and exported from the FortiPlanner. Once the floor plan is created in the FortiPlanner, select Export in the project menu. The floor map to be imported is a .zip file.

**Note:** Only exported .zip files from the FortiPlanner can be imported. Contact the Customer Support to obtain the relevant version of the FortiPlanner. For more information on creating floor plans on the FortiPlanner, see the *FortiPlanner User Guide*.

1. Navigate to **Wireless>Map Management** page.
2. Click **Import**, the Import Map Plan screen is displayed.



3. Browse to the .zip file on your system and click **Next**. A summary of map information is displayed.
4. Map the unassigned APs and click **Finish**.
5. The planner for each site is displayed. On the **Map Management** screen, you can add and delete floors in the map and manage the APs on each floor of the site.

In case of errors importing the map, click [View Latest Import Planner logs](#), to view the error logs.

You can perform the following operations on each floor:

- **Add APs** - Select the APs to be added to the floor map.
- **Floor APs** - Select the APs to be deleted from the floor map.
- **Landmarks** - Add or delete landmarks on the floor map.
- **Change Image** - Upload a new image or delete an existing image from the floor map.

Click **Save** to save changes to the map

## Adding a Site, Building, and Floor to the Map

To create a new location (site, building, floor) in the enterprise, follow these steps:

1. Navigate to **Wireless > Map Management** page. All current maps are displayed on the Map Management page.
2. To add a new site, click on the **Site Details** section and then click on **Add**. A new site can only be added to the top level, Enterprise, which is the default.

SITE DETAILS (1) (NOT SAVED)		
<span>+</span> ADD <span>🗑</span> DELETE		
SITE	DESCRIPTION	SORT ORDER
(1 - 50 CHARS)	(0 - 250 CHARS)	(0 - 99)
<input type="checkbox"/> Site_1		0

3. Provide a name, description, and sort order for the site.
4. Click **Save Changes**.
5. In the left pane, double-click on the name of the new site you just created.
6. Click on the Buildings icon. In the Building Details pop-up, click **Add**.

Manage Site Buildings <span>⊗</span>		
Building Details (1)		
<span>+</span> ADD <span>🗑</span> DELETE		
BUILDING	DESCRIPTION	SORT ORDER
(1 - 50 CHARS)	(0 - 250 CHARS)	(0 - 99)
<input type="checkbox"/> Building_1		0

7. Provide a name, description, and sort order for the building.
8. Click **Save Changes**.
9. In the left pane, double-click on the name of the new building you just created.
10. In the Floor Details section, click **Add**.

FLOOR DETAILS (1) (NOT SAVED)				
<span>+</span> ADD <span>🗑</span> DELETE				
FLOOR	LENGTH ↔ X-AXIS	WIDTH ↕ Y-AXIS	METRIC	SORT ORDER
(1 - 50 CHARS)	(1 - 1500)	(1 - 1500)		(0 - 99)
<input type="checkbox"/> Floor_1			Feet <span>▼</span>	0

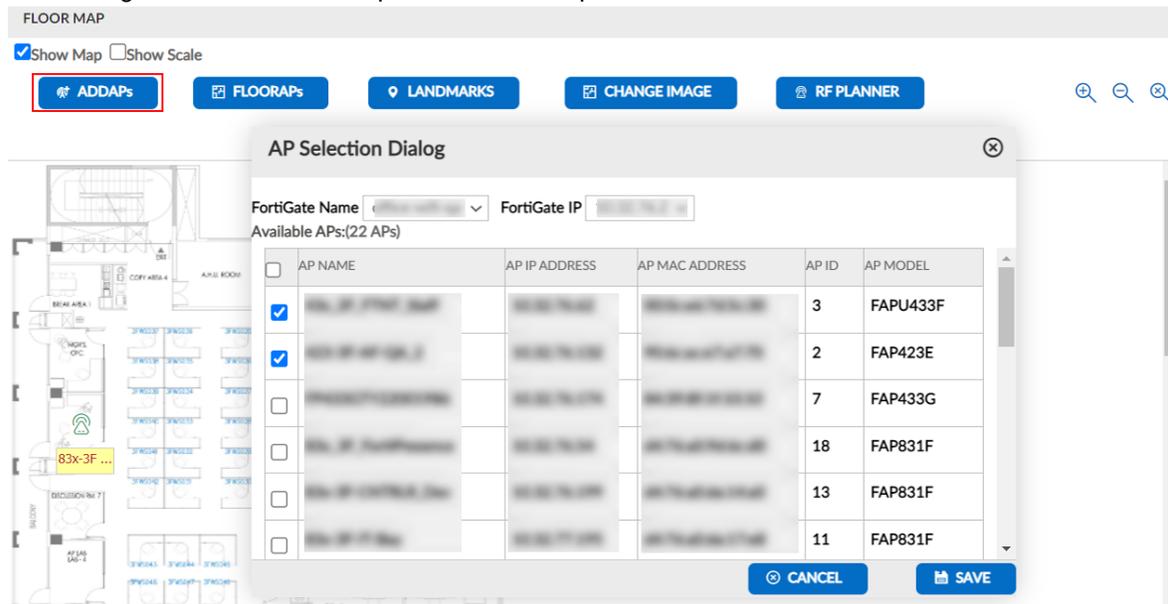
11. Provide a floor name, length, width, metric, and sort order for the floor.
12. Click **Save Changes**.

## Adding APs, Floor APs, and Landmarks to Maps

To create the network map of your site, follow these steps:

1. Once a map image has been imported, add the APs to the map as close as possible to their actual physical location.
2. Select a floor by its heading in the left column to see a map of the floor. If the floor does not have a corresponding map, complete the steps to Import a Map Image.
3. Optionally, alter the map using the options Show Map and Show Scale in the Image Map section.

- Click **Add APs** and select the APs to add from the drop-down list on the AP selection pop-up, then click **Save**. Drag the selected APs into position on the map.



- To add landmarks to the map, click Landmarks > Add.
- Once you have finished making changes, click **Save Changes**.

## Editing AP Details

To edit the details of an access point (AP), follow these steps:

- In the Map Management screen, click **APs** to display the AP list.
- Select the AP you want to edit by clicking on its icon on the map or by selecting it from the AP list.
- Click **Edit** to open the AP details window.
- Edit the required fields, such as the AP name or its location coordinates.
- Click **Save** to save the changes made to the AP details.
- Click **Cancel** to discard any changes and close the AP details window.

## Viewing Maps

You can view the placement of APs on a map or view Heat Maps that show the following five attributes of those APs:

- Throughput
- Loss
- Channel Utilization
- Number of Stations
- Signal Strength

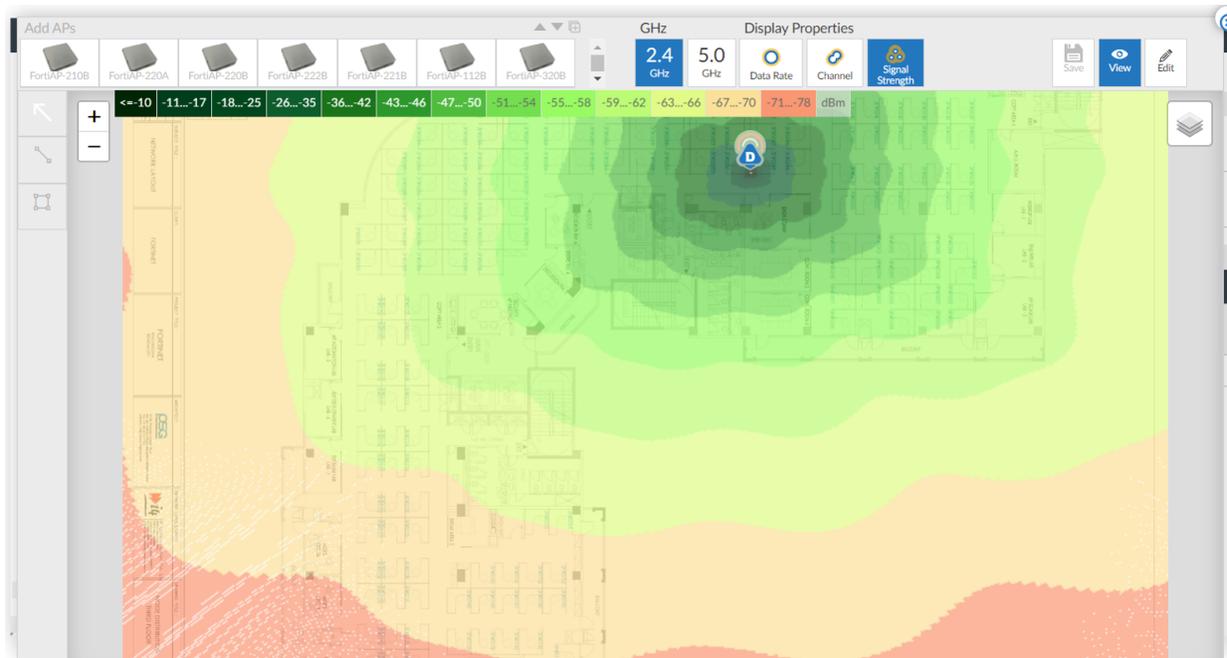
Heat map coloring depends on the distance between APs and selected attribute (throughput, loss, channel utilization, or stations) for all the APs on the floor. If there is only one AP on the floor, the entire floor will show the same coverage. See [Heat Maps](#).

To view maps and heat maps, follow these steps:

1. Click on **Wireless > Heat Maps**.
2. Select a floor to display the map.
3. Optionally, alter the map using the options Floor Visibility or Show Heat Map.
4. To limit the map, click Select Channels, select channels, and then click **Save Changes**.
5. After any changes, click on the Refresh icon.

## RF Planner

The RF planner is a tool that enables you to plan for new access points, areas, and obstacles (walls, shafts, etc.). It allows you to place APs and draw walls or columns in both View and Edit modes.



To use the RF planner, follow these steps:

1. Navigate to Map Management > RF Planner.
2. Add the required access points to the floor map and generate a heat map to predict the expected signal strength throughout the coverage area.
3. Adjust the placement of your APs based on the predicted signal strength and try out different placements for the APs before installing them.
4. Draw a floor plan of the coverage area and place the APs on your floor plan.
5. Run heat maps to predict the signal strength.

**View Mode:** In View mode, the floor map displays the coverage pattern, data rate, channel, and signal strength of the access points. You can select the 2.4GHz, 5GHz, or 6GHz frequency to view the access point details.

**Edit Mode:** In Edit mode, you can add or edit new access points. To do this, drag the required access point from the "Add APs" panel and place it on the floor map. Right-click on an access point and edit its configuration, such as the access point transmission power in dBm, channel, orientation, placement direction (in angles), ceiling, wall, and desk.

To draw walls and columns on the floor map, use the provided widgets. Select the required widget and draw the wall or column on the map. A column is a closed drawing with four walls, while a wall is demarcated as lines.

Right-click on the created walls and columns to specify the composition or material used to construct them. Each material has a different attenuation value.

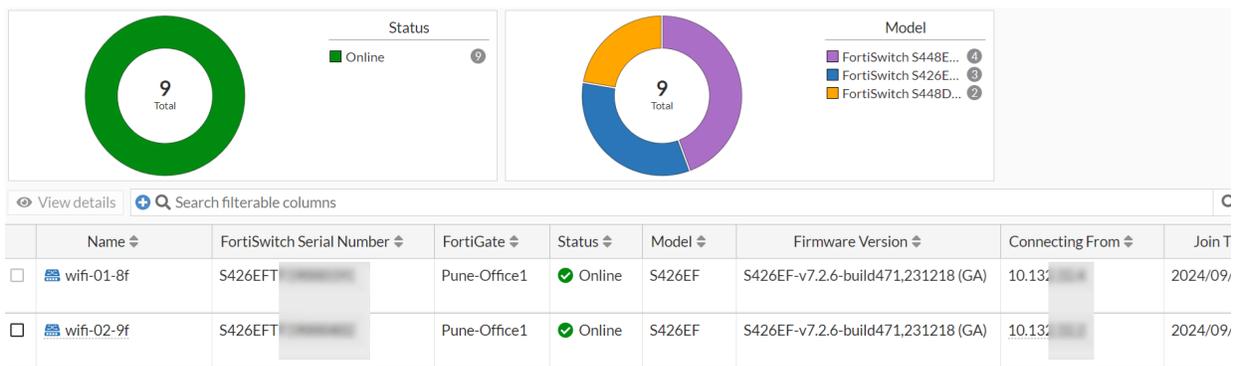
# Switch

This section describes the FortiSwitch statistics and the FortiSwitch client details.

- [FortiSwitch](#)
- [Wired Clients](#)

## FortiSwitch

You can monitor the FortiSwitches in your network that are in the purview of FortiAIOps. This page displays a graphical snapshot of the FortiSwitch activity such as, the total number of FortiSwitches, their status (online/offline/unauthorized), and the deployed model details.

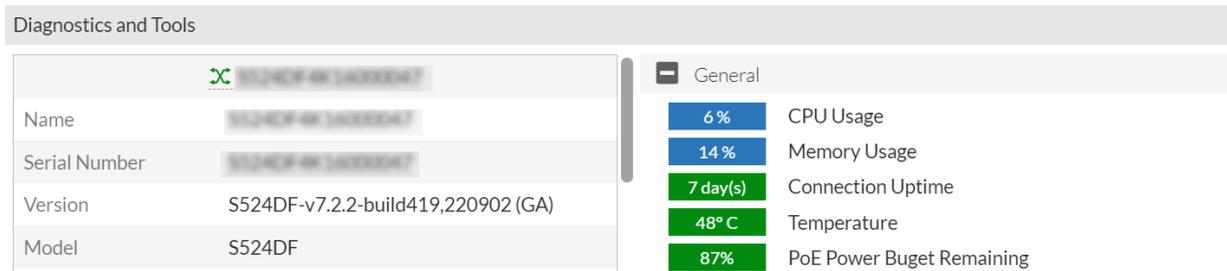


Click **Export As** to export a table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.

### Diagnostics and Tools

To view the FortiSwitch statistics and diagnostics in detail, select a row and click **View Details**. The **Status** including the FortiSwitch face plate, hardware summary, general status and statistics, and configuration details is displayed.



- [Ports](#)
- [Cable Test](#)
- [Logs](#)
- [Statistics](#)
- [Clients](#)

## Ports

This tab displays each port details of the specific FortiSwitch unit.

Ports	Cable Test	Logs	Statistics	Clients			
<input type="text" value="Search filterable columns"/>							
Port	Trunk	Mode	Port Policy	Enabled Features	Native VLAN	Allowed VLANs	Dynamic
<input checked="" type="checkbox"/> port24		Static		<input checked="" type="checkbox"/> Spanning Tree Protocol <input checked="" type="checkbox"/> Edge Port	vsw.WIFI	qtn.WIFI	
<input type="checkbox"/> port23		Static		<input checked="" type="checkbox"/> Spanning Tree Protocol <input checked="" type="checkbox"/> Edge Port	Native	Bridge_Static,Guest,Users,VLAN_Pool1,VLAN_...	
<input type="checkbox"/> port22		Static		<input checked="" type="checkbox"/> Spanning Tree Protocol <input checked="" type="checkbox"/> Edge Port	VLAN64_Native	Bridge_Static,VLAN_Pool3,qtn.WIFI	

Each entry in the port list displays the following information.

Parameter	Description
<b>Port</b>	The name of the port (red for port down, green for port up)
<b>Trunk</b>	The associated trunk that the port is a member of.
<b>Mode</b>	The configured access mode of the port.
<b>Port Policy</b>	The configured port policy.
<b>Enabled Features</b>	The features enabled on the port.
<b>Native VLAN</b>	The native VLAN assigned to the port.
<b>Allowed VLANs</b>	The allowed VLANs set for the port.
<b>Dynamic VLAN</b>	The dynamic VLAN assigned to the port.
<b>DHCP Snooping</b>	The status of DHCP snooping status
<b>Transceiver</b>	The transceiver information.
<b>Description</b>	The port description
<b>LLDP Profile</b>	The associated LLDP profile.
<b>Loop Guard</b>	The status of the Loop Guard (enabled/disabled)
<b>QoS Policy</b>	The assigned QoS policy.
<b>Security Policy</b>	The assigned security policy.
<b>STP</b>	The status of STP (enabled/disabled).
<b>STP BPDU</b>	The status of STP BPDU Guard (enabled/disabled).
<b>STP Root Guard</b>	The status of STP Root Guard (enabled/disabled).

## Cable Test

This is a diagnostic and troubleshooting tool to check the state of cables between the FortiSwitch and the devices connected to its physical ports. This tool does not work on fiber ports and on very short or very long cables (more than 100 meters).

All available external physical ports of the FortiSwitch are displayed. Select one or more ports and click **Diagnose**.

Ports	Error Range	Pair A	Pair B	Pair C	Pair D
port1	+/- 10 meters	Ok / 4 meters	Ok / 2 meters	Ok / 2 meters	Ok / 2 meters

**Note:** Running the cable diagnostic test on a port disables it briefly. The network traffic is affected for a few seconds.

## Logs

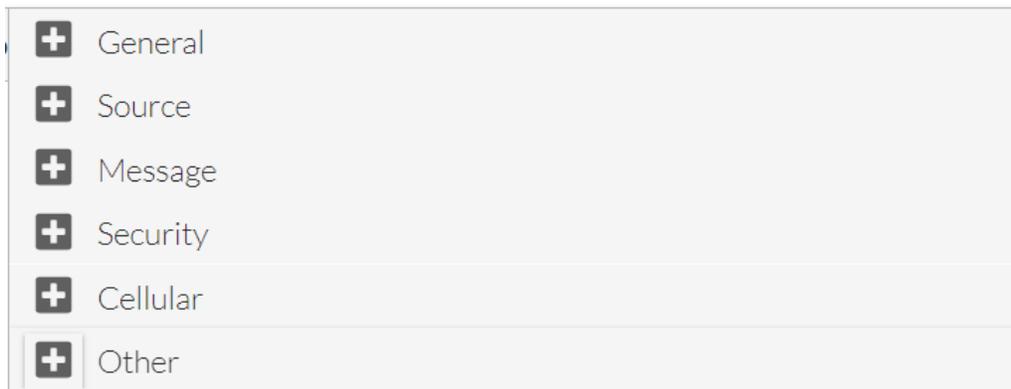
This tab displays the FortiSwitch log messages and the associated details.

Date/Time	Level	Message	Log Description	Fortigate Serialnumber	FortiSw
36 seconds ago	Info	primary port port19 instance 0 changed ...	FortiSwitch spanning Tree	FG140E181P00001	S524I
38 seconds ago	Info	primary port port19 instance 0 changed ...	FortiSwitch spanning Tree	FG140E181P00001	S524I
38 seconds ago	Info	primary switch port port19 has come up	FortiSwitch link	FG140E181P00001	S524I
1 minute ago	Info	primary port port23 instance 0 changed ...	FortiSwitch spanning Tree	FG140E181P00001	S524I

Each log entry displays the following information.

Parameter	Description
<b>Date/Time</b>	The Date/time of log event generation.
<b>Level</b>	The log severity level. <ul style="list-style-type: none"> <li>Emergency, Critical (red)</li> <li>Alert (orange)</li> <li>Error, Warning (blue)</li> <li>Notice, Information, Debug (green)</li> </ul>
<b>Message</b>	The event log message that is generated.
<b>Log Description</b>	The description of the event log.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate controller.
<b>FortiSwitch Serial Number</b>	The serial number of the associated FortiSwitch.
<b>Relative Date/Time</b>	The time lapsed since the event log was generated.
<b>Source</b>	The event source IP/MAC address.

Select a log message and click **Details** to view specific related information. This view provides the following information.



- **General** - Generic information about the log event such as, the date and time of event logging, the associated virtual domain, and the log description.
- **Source** - The details of the user.
- **Message** - The generated log message.
- **Security** - The severity level of the log event.
- **Cellular** - The serial number of the FortiSwitch.
- **Other** - Generic information such as the log event time stamp, the timezone, log type, and so on.

## Statistics

This tab displays the FortiSwitch and the associated port statistics.

Ports    Switch

View Trends    Search

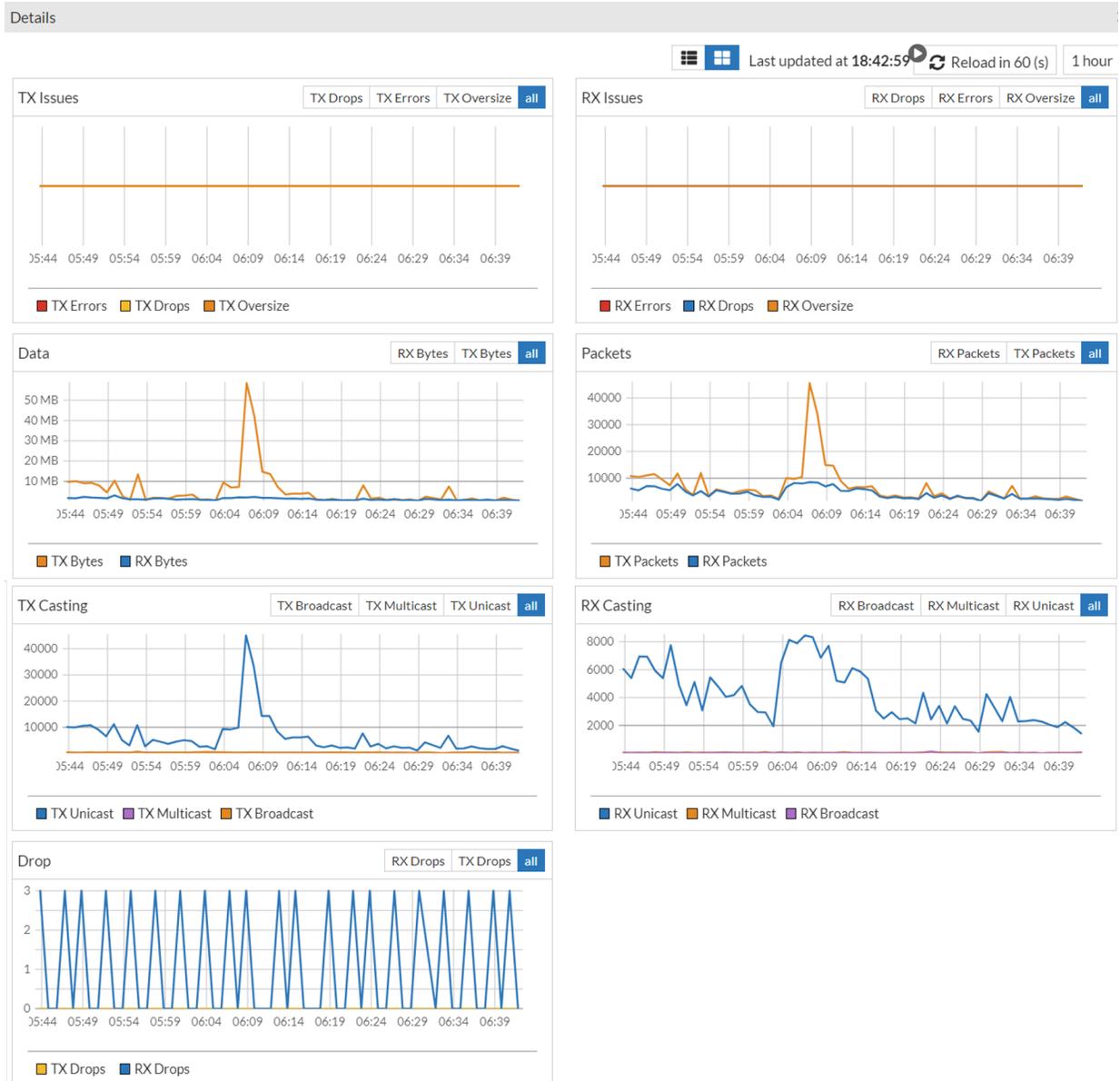
Port	TX Bytes	TX Packets	TX Unicast	TX Multicast	TX Broadcast	TX Errors
internal	1.62 GB	618,772,760	618,772,760	0	0	0
port1	3.56 GB	9,955,125	5,103,792	2,643,865	2,207,468	0
port2	215.61 MB	748,903	73,070	313,059	362,774	0

The **Ports** view provides the following information.

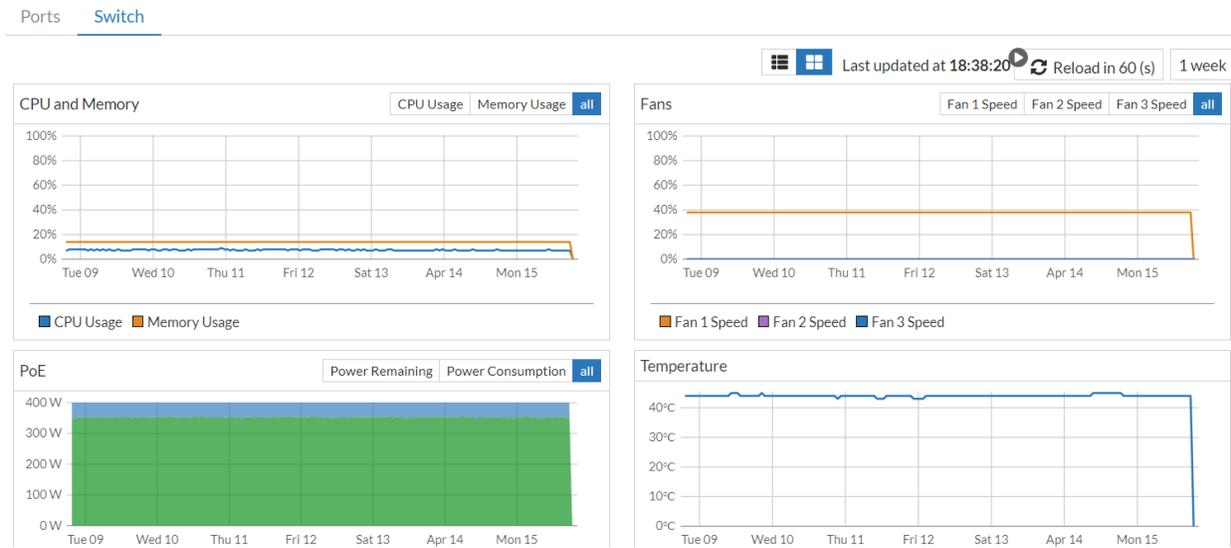
Parameter	Description
<b>TX Bytes</b>	The transmitted bytes.
<b>TX Packets</b>	The transmitted packets.
<b>TX Unicast</b>	The transmitted unicast packets.
<b>TX Multicast</b>	The transmitted multicast packets.
<b>TX Broadcast</b>	The transmitted broadcast packets.
<b>TX Errors</b>	The errors in transmitted packets.

Parameter	Description
<b>TX Drops</b>	The dropped packets in transmitted packets.
<b>TX Oversize</b>	The oversized packets in transmitted packets.
<b>RX Bytes</b>	The received bytes.
<b>RX Packets</b>	The received packets.
<b>RX Unicast</b>	The received unicast packets.
<b>RX Broadcast</b>	The received broadcast packets.
<b>RX Errors</b>	The errors in received packets.
<b>RX Drops</b>	The dropped packets in received packets.
<b>RX Oversize</b>	The oversized packets in received packets.
<b>Undersize</b>	The number of undersized packets.
<b>Fragments</b>	The number of fragments.
<b>Jabbers</b>	The number of jabbers.
<b>Collisions</b>	The number of packet collisions.
<b>CRC Alignments</b>	The number of CRC/alignment errors.
<b>L3 Packets</b>	The number of layer-3 packets.

Select a particular port and click **View Trends** to view a graphical representation of the trends in FortiSwitch statistics over a period of time. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range** not exceeding 6 months. The minimum, maximum, and average values are displayed when a time interval of more than 6 hours is selected.



The **Switch** view provides a graphical representation of the trends in FortiSwitch statistics over a period of time. You can filter the trends based on the selected duration or customized time slot; select a time window or define a **Custom range** not exceeding 6 months. The minimum, maximum, and average values are displayed when a time interval of more than 6 hours is selected.



## Clients

This tab displays the details of the FortiSwitch clients. The following information is displayed.

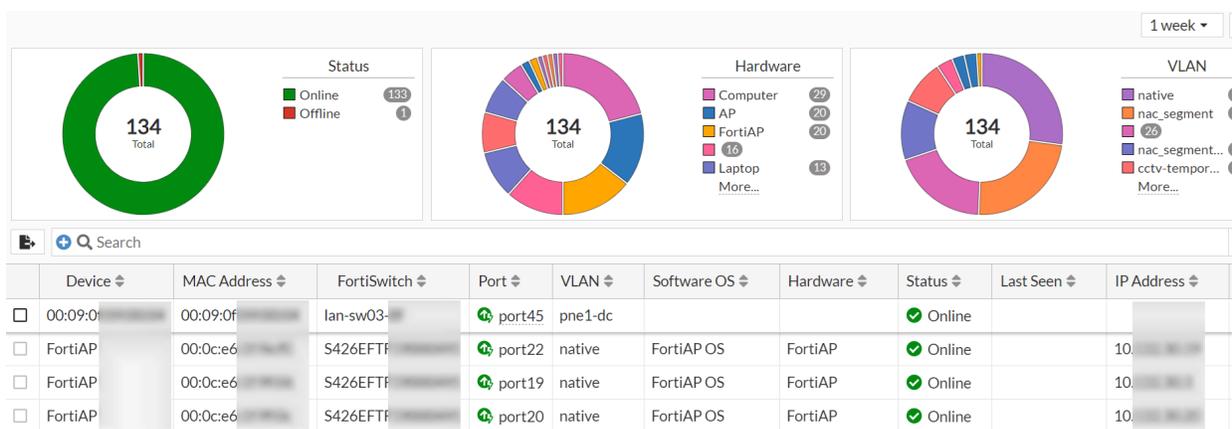
Parameter	Description
Device	The client device name.
Port	The associated port details.
VLAN	The associated VLAN details.
Software OS	The client device software OS.
Hardware	The client device hardware details.

## Wired Clients

You can monitor the FortiSwitch clients associated with the FortiSwitches deployed in your network. This page displays a graphical snapshot of client activity such as, the total number of FortiSwitch clients, their status (online/offline), the client device details, and the associated VLANs. Hovering over the charts provides specific statistics and clicking on a specific area on the chart filters the data displayed on this page.

- You can filter the switching client data for a selected duration or a customized time slot. The **Custom range** allows the selection of a minimum of 1 hour and maximum of 1 week, the option of **Now** displays data for the last 1 minute.
- Click **Export As** to export a table in CSV, JSON, Plaintext, or PDF format. You can export either filtered data or all data in the available formats.

**Note:** You customize your exports by choosing which columns to be included in the export. A maximum of 8 columns can be selected.



The table beneath the chart displays the client details.

Parameter	Description
<b>Device</b>	The name of the client device.
<b>FortiSwitch</b>	The host name or serial number of the FortiSwitch that the client is associated with.
<b>Port</b>	The associated port details of the FortiSwitch unit.
<b>VLAN</b>	The type of the VLAN.
<b>Software OS</b>	The software OS used by the client device.
<b>Hardware</b>	The hardware used by the client device.
<b>Status</b>	The status of the client (online/offline).
<b>Last Seen</b>	The time that the client was last seen online.
<b>IP Address</b>	The IP address of the client.
<b>EMS Serial Number</b>	The FortiClient EMS serial number.
<b>EMS Tenant ID</b>	The FortiClient EMS tenant ID.
<b>Endpoint Tags</b>	The endpoint (client) tags monitored by FortiGate.

# SD-WAN

SD-WAN section enables interface monitoring for SD-WAN devices.



To ensure the charts display accurate values, configure the necessary prerequisites and consider the recommendations provided. If the prerequisites are not configured, both the SD-WAN dashboard and Forecast will appear empty.

- [Prerequisites](#)
- [Recommendations](#)

## Prerequisites

The following configurations are necessary to enable proper monitoring:

- The SD-WAN SLA monitors and measures the health of links that are connected to SD-WAN members based on SLA log messages (pass and fail), to predict the performance. Configure the SD-WAN health check in FortiGate as shown in the following example:

```
config system sdwan
config health-check
edit "<Health Check Name>"
set sla-fail-log-period 60
set sla-pass-log-period 60
```

For more details, see [FortiGate Administration Guide](#).
- Enable Application Control to ensure accurate computation of SD-WAN traffic, along with detailed reporting of SD-WAN rule utilization, application usage, and bandwidth consumption. For more information, see [FortiGate Administration Guide](#).

## Recommendations

Fortinet recommends the following for best usage of the FortiAIOps capabilities:

- To ensure all health checks are accurately monitored by FortiAIOps, configure the SD-WAN Health Check parameters `sla-fail-log-period` and `sla-pass-log-period` on the FortiGate. It is recommended to set both to a 60-second interval for higher accuracy. For information, see [FortiGate Administration Guide](#).
- Enable NTP sync for accurate SD-WAN forecast and anomaly detection.
- To enable accurate reporting of bandwidth consumption and capacity failures for SD-WAN interfaces, the estimated upstream and downstream bandwidth values must be configured. For information on how to configure, see [FortiGate Administration Guide](#).
- SD-WAN Network Monitor license must be installed on the FortiGate to measure the estimated bandwidth accurately.

The SD-WAN section enables you to configure baselines to monitor SD-WAN metrics and provides valuable insights about the network health:

- [Insights](#)
- [Forecast](#)

## Insights

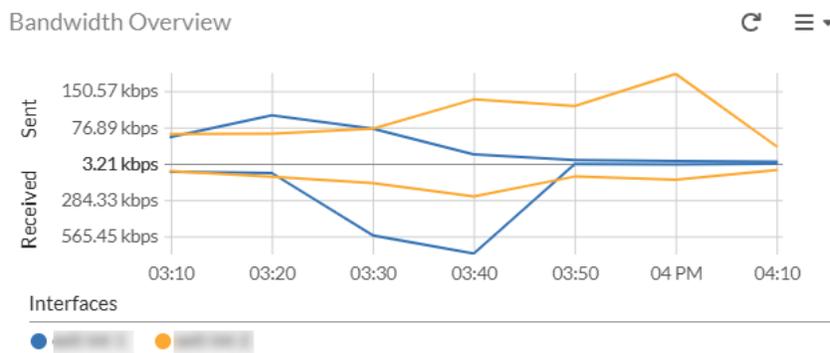
The Insights page provides valuable insights into your network's health and performance with the charts:

- [Bandwidth Overview](#)
- [Available Bandwidth](#)
- [Used Bandwidth](#)
- [Performance Status](#)
- [Rules Utilization](#)
- [Applications Utilization](#)
- [MOS Score](#)
- [SLA Performance Issues](#)

### Bandwidth Overview

This chart displays the trend of bandwidth usage for both sent and received traffic for the selected duration for the selected/all SD-WAN interfaces on the selected FortiGate device.

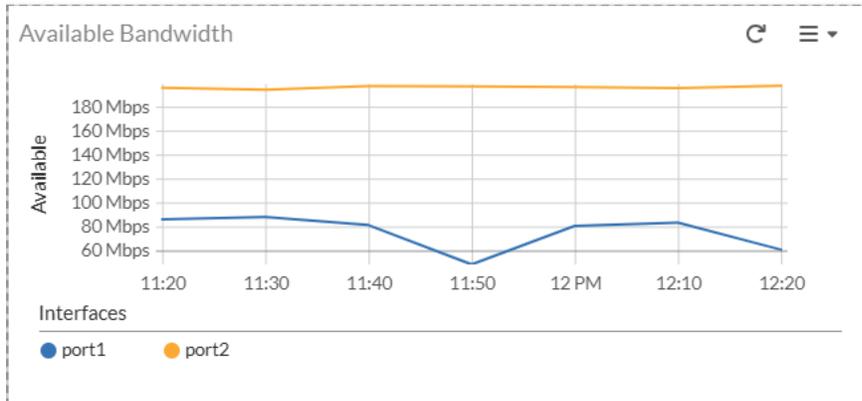
Hover over the points on graph to view sent/receive data.



### Available Bandwidth

This chart shows the total bandwidth available for the SD-WAN Interfaces over time. This is based on the Estimated Bandwidth configured in SD-WAN Interface configuration and used to estimate the WAN Utilization.

Hover over the points on graph to view Available Bandwidth information.

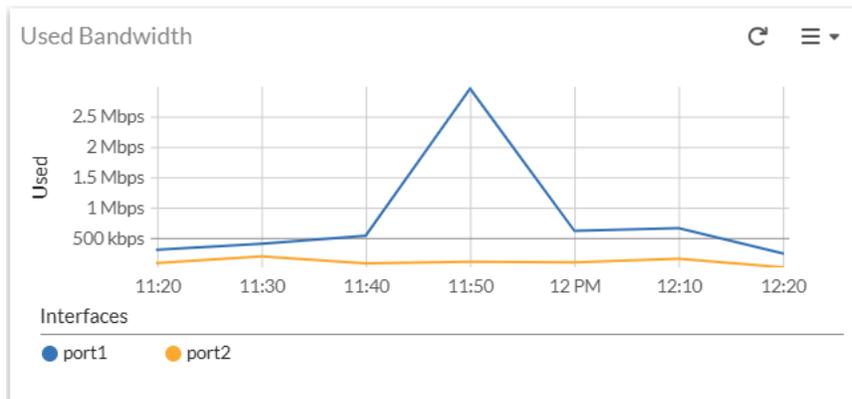


**Note:** Configure **Estimated Bandwidth** to estimate accurate WAN utilization. If not configured, the maximum capacity of the link is inserted as **Available Bandwidth**. For more information, see [FortiGate Administration Guide](#).

### Used Bandwidth

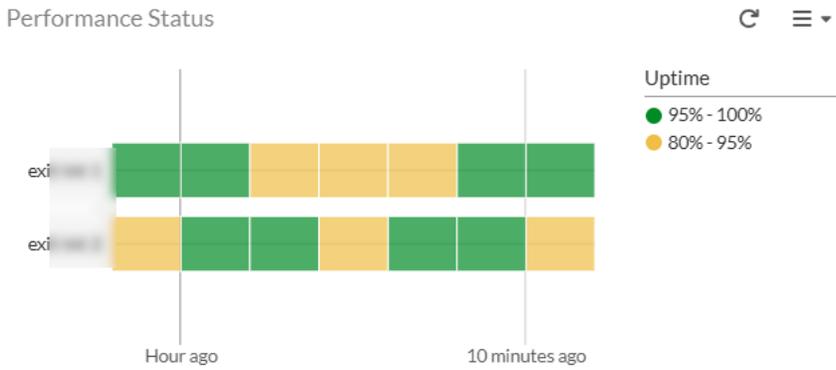
This chart displays the amount of bandwidth consumed by the SD-WAN interfaces over a period of time.

Hover over the points on graph to view Used Bandwidth information.



### Performance Status

This chart shows the overall status of the SD-WAN interface for the selected FortiGate device, based on the uptime of each monitored health check within the specified time frame.



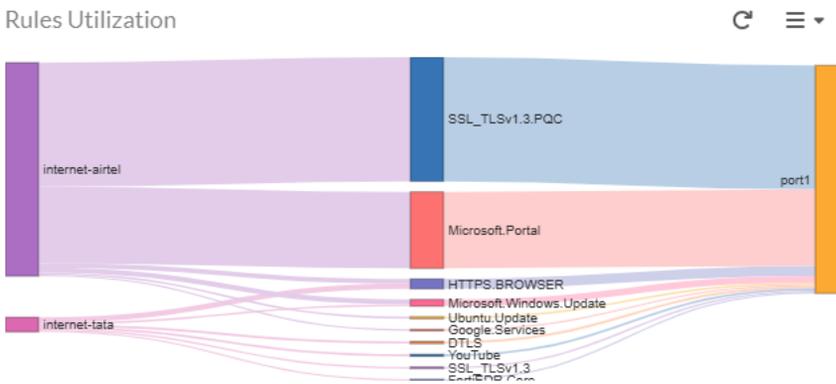
Color-coded indicators represent uptime percentages:

- Green – Up time of more than 95%
- Yellow – Up time between 80% to 95%
- Orange – Up time between 50% to 80%
- Red – Up time for less than 50%

For detailed information, click a health check status to open the **Details** pane, displaying FortiGate name, health check type, uptime, and interface. To view in-depth analytics, click the **Health Check** name to access the **Dashboard > SD-WAN** window.

### Rules Utilization

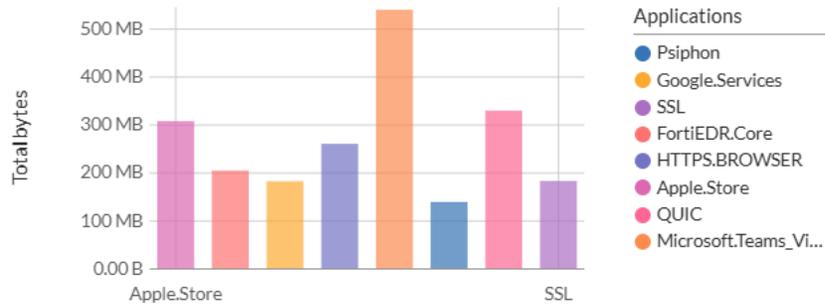
This chart shows how SD-WAN rules, which govern traffic routing across SD-WAN interfaces, are utilized. It presents a detailed view of traffic distribution, displaying data for both the interface through which the traffic flows and the applications generating the traffic. Hover your cursor over the data points for a more detailed information.



### Applications Utilization

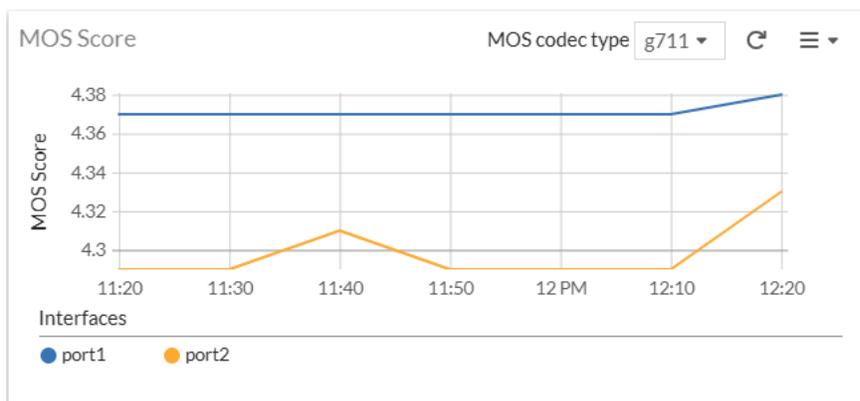
This chart displays a detailed overview of bandwidth consumption, showing the top 10 applications and their respective bandwidth distribution across the configured SD-WAN interfaces. Hover your cursor over the data points for a more detailed information.

Applications Utilization



## MOS Score

The Mean Opinion Score (MOS) is used to evaluate the quality of voice and video transmissions, particularly in telecommunications applications like VoIP and video conferencing.



The MOS rating for the quality of video and Audio traffic through the SD-WAN Interface are listed below:

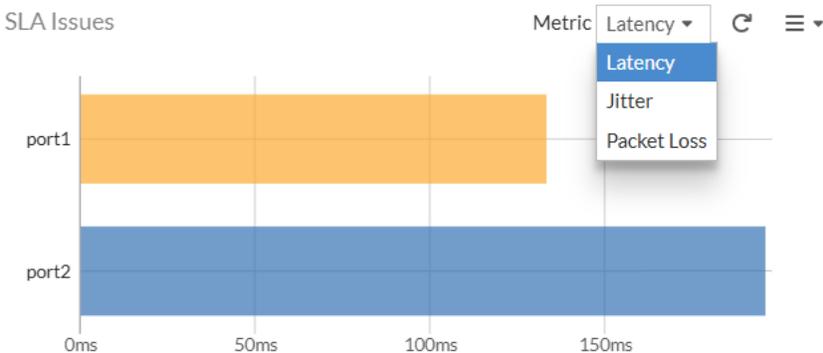
- MOS 4.3-5.0: Excellent
- MOS 4.0-4.3: Good
- MOS 3.6-4.0: Fair
- MOS 3.1-3.6: Poor
- MOS 2.6-1.0: Bad

The chart presents MOS score data for SD-WAN interfaces across a time frame, based on the selected **MOS codec type**.

## SLA Performance Issues

The chart displays the maximum and average SD-WAN performance values for each metrics of Interfaces— Latency, Jitter, and Packet Loss for the selected time period.

Hover over to view performance metric value for selected time frame.



Select the desired **Metric** from the drop-down.

## Forecast

The **Forecast** page helps to monitor and measure the health of links connected to your SD-WAN member interfaces by tracking latency, jitter, and packet loss. It provides a comprehensive summary of network health and performance in the form of statistics and trends for latency, jitter, and packet loss. The page offers detailed link quality measurements with insights to predict potential issues in your SD-WAN links. This crucial insight enables the selection of optimal links for traffic routing thus preventing data from being sent to broken connections and improving overall network performance and reliability.

FortiAIOps establishes a baseline for acceptable link performance based on historical data, detecting and reporting anomalies when SLA breaches occur. This forecasting capability enables you to proactively address performance issues that could impact network health.

FortiAIOps monitors and forecasts latency, jitter, and packet loss for the upcoming week based on available SLAs, tracking real-time network performance to report any changes in SD-WAN link performance.

Navigate to **SD-WAN > Forecast** and select the FortiGate, corresponding health check, and the interface that you want to analyze.

- [Configure Baselines](#)
- [Performance Summary](#)
- [Health Check Trends](#)
- [Anomalies](#)

### Configure Baselines

Performance SLA baselines are used as the benchmark to analyze the network, forecast its performance, and detect anomalies. You can enable static or dynamic thresholds for assessing the performance of the SD-WAN links. Click **Manage Baselines**.

## Manage Baseline

Choose Baseline computation mode.

Static Baseline 

Select for fixed baseline settings sourced from FortiGate

Dynamic Baseline 

Select for adaptive baseline settings that change dynamically every week

- **Static Baseline** - These baselines are SLA targets configured in FortiGate or FortiAIOps default thresholds, for jitter, packet loss, and latency. If the SLA targets are not specified in FortiGate, then the following default baselines are used for all the 3 metrics.

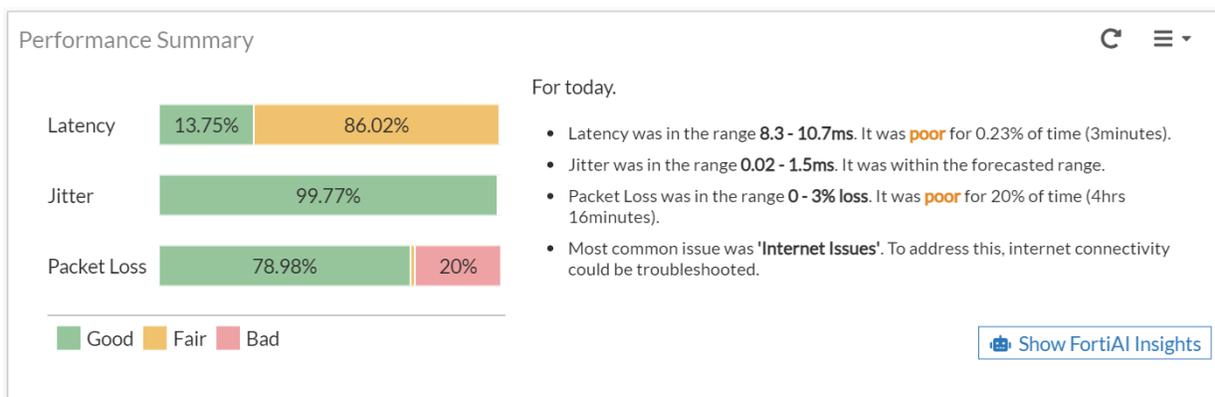
- Latency - 100 ms
- Jitter - 30 ms
- Packet Loss - 1 %

**Dynamic Baseline** - These baseline values are calculated using real-time data from the previous week and are updated dynamically, every week, for jitter, packet loss, and latency. This is the default baseline mode.

**Note:** Fortinet recommends to use SLA targets for the Performance SLA, when static mode is used. The SLA targets are a set of constraints that are used in SD-WAN rules to control the paths that traffic takes. The constraints are configured using the FortiGate GUI and CLI. For more information, see [Link health monitor](#).

### Performance Summary

The **Performance Summary** panel provides the statistics for the WAN interface's performance based on the jitter, packet loss, and latency metrics. The events reported are categorized as good, fair, and bad, based on the metric performance with respect to the configured or calculated thresholds. This shows overall summary of the performance metrics, availability of network, and issues for the selected interval. Hover the cursor over the chart to see the break-up of the statistics.



To learn more about the SD-WAN interface performance prediction based on the FortiAI insights, click **Show FortiAI Insights**.

 FortiAI Insights (1)  

 Interested in knowing more about SD-WAN performance prediction?

What are the most common issues on the selected interface?

How do the types of issues in the last week compare to those in the current week?

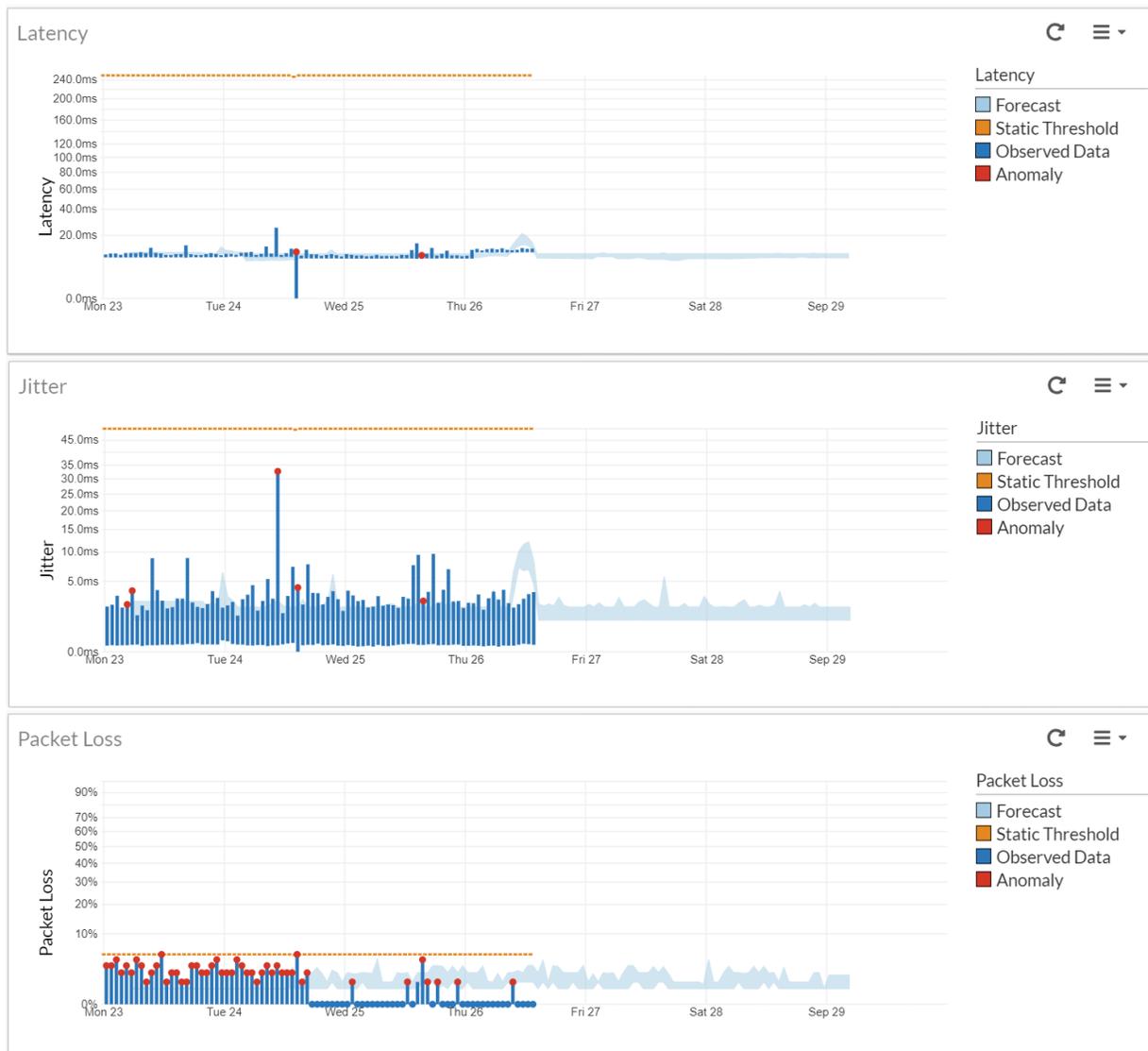
How does the predicted network performance compare to past week?

When is the peak jitter, latency and packet loss expected in the next 24 Hrs?

## Health Check Trends

The health check graphs display the performance trends for packet loss, latency, and jitter against the predicted/forecasted values, with the anomalies for the selected interface. A comparative view between the following statistics is offered.

**Note:** The trends displayed are on an hourly basis.



- **Forecast** - This is indicative of the range predicted by FortiAI Ops based on historical statistics.
- **Observed Data** - This is the range of real time statistics observed in a given hour.
- **Anomaly** - Anomalies are reported when FortiAI Ops observes a deviation in the data exceeding the usual variation in the network, or exceeds the static/dynamic baselines.
- **Static Threshold** - Static SLA baselines are SLA targets that are configured in FortiGate or FortiAI Ops default thresholds.

Hover the cursor over the graph to view the statistics for each performance metric. Clicking on anomaly point in the trend graph displays the details.

- **Insights** - This provides the impact analysis for the anomaly that includes the performance summary categorizing the events as good, bad, and fair, the statistics for the impacted clients and the duration of the impact. FortiAI Ops lists the cause of the anomaly with the recommended action. The incident timeline provides statistics for when the metric exceeds the threshold values and the observed variation thresholds.

Anomaly detected

[Insights](#) [General Information](#)

Impact Analysis

Performance Summary	Impacted Clients	Duration of Impact
<div style="display: flex; align-items: center;"> <div style="width: 98.33%; height: 15px; background-color: #28a745; margin-right: 5px;"></div> <span>98.33%</span> </div> <div style="display: flex; margin-top: 5px;"> <span style="width: 10px; height: 10px; background-color: #28a745; margin-right: 5px;"></span> Good           <span style="width: 10px; height: 10px; background-color: #ffc107; margin-left: 10px; margin-right: 5px;"></span> Fair           <span style="width: 10px; height: 10px; background-color: #dc3545; margin-left: 10px;"></span> Bad         </div>	4	0h 1m 0s

Recommendation and Action

Here is the list of cause, ranked from high impacting to low impacting.

Internet Service Provider / Server side Issue 100.00%
✕ Remedy

Check the issue with Internet Service Provider/ Server side

Incident timeline ⓘ

<input type="checkbox"/>	Timestamp ⌵	Jitter ⌵	Jitter Threshold ⌵	Variation ⌵	Variation Threshold ⌵
<input type="checkbox"/>	2024/09/29 04:53:15	▲ 3.11ms	0.98ms	▲ 3.07ms	0.17ms

- **General Information** - This provides general information about the detected anomaly such as, the duration, the FortiGate host name, interface, configured health check, and so on.

Anomaly detected

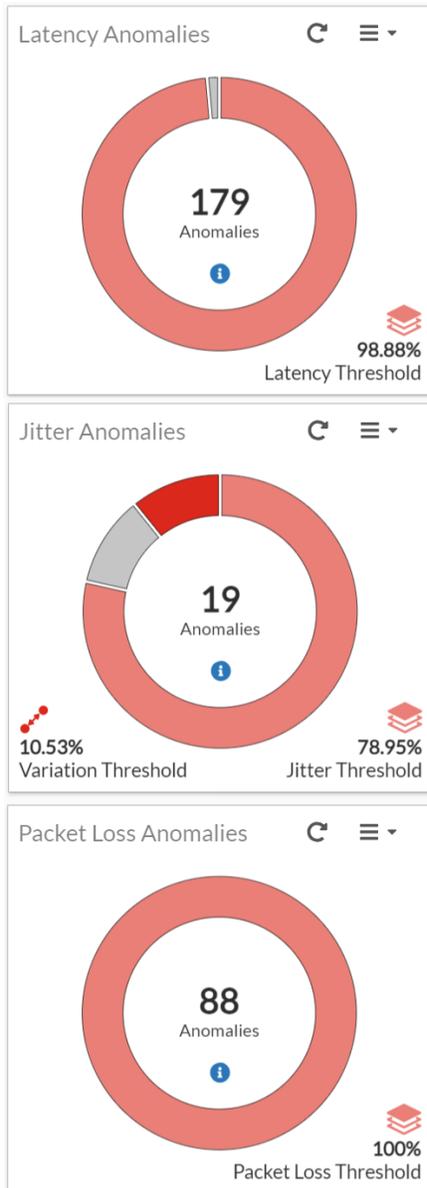
[Insights](#) [General Information](#)

Type

Time Period	2024/09/20 13:30:00 - 2024/09/20 14:30:00
Anomaly	18
Maximum Observed Value	12%
Minimum Observed Value	0%
FortiGate Hostname	[Redacted]
Health Check	[Redacted]
Interface	exit-int-1

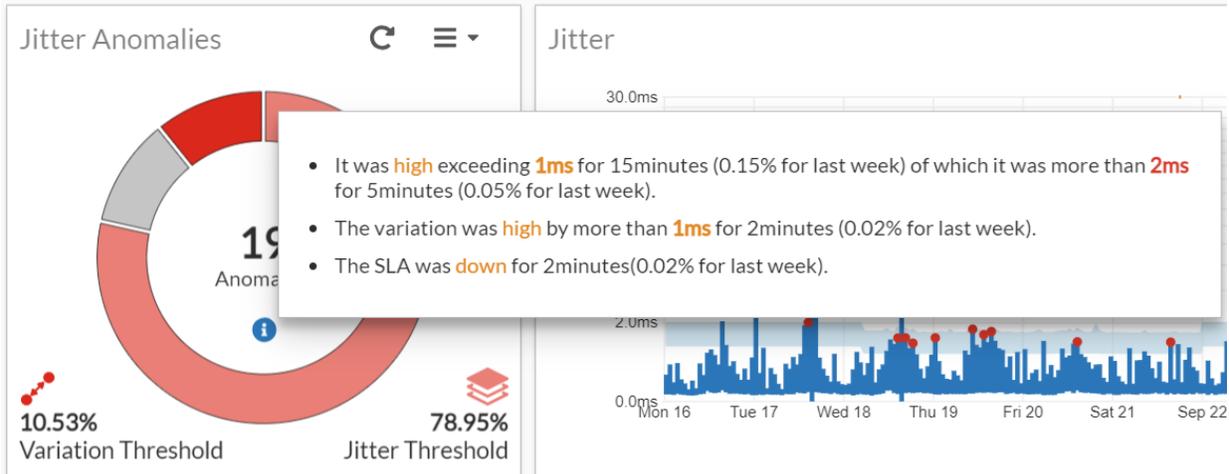
## Anomalies

As mentioned earlier, anomalies are reported when a **High Variation** in performance is detected as compared to the usual variations in the network or when the performance exceeds the configured **Upper Threshold** for static or dynamic baselines. The details of these anomalies is displayed in the trend graphs, offering an in-depth analysis of the overall health of the jitter, latency, and packet loss metrics.



Using the anomaly charts, you can view the total number of anomalies classified into high variation, SLA down, and above expected thresholds for the selected duration. Click on the  icon for additional information.

- **Latency/Jitter/Packet Loss Threshold** - Anomaly observed due to data exceeding the expected threshold.
- **Variation Threshold** - Anomaly observed due to variation exceeding the expected variation.
- **SLA Down** - Anomaly observed due to performance SLA being down.



# Security Fabric

The Security Fabric page represents the topology, that illustrates the logical placement of the wireless service and the physical placement of hardware devices. The hardware devices include FortiGates, APs, and wireless clients in your network.

**Note:** The physical and logical topologies provide wireless client information.

- [Physical Topology](#)
- [Logical Topology](#)

## Physical Topology

The physical topology provides a visualization/illustration of the physical placement of devices, such as, FortiGate controllers, APs, and clients connected to each radio in your network, in an hierarchical pattern. The physical topology is representational; you cannot modify the placement of devices on this page.

You can filter and view selective devices in the topology chart, the filter options available are FortiGate controllers (**Devices**), FortiAPs (**APs**), and device OS. You can also enable viewing of online devices only, in the topology (**Show online devices**). To apply the filter settings, click **Apply Filter**.

Physical Topology Filters
✕

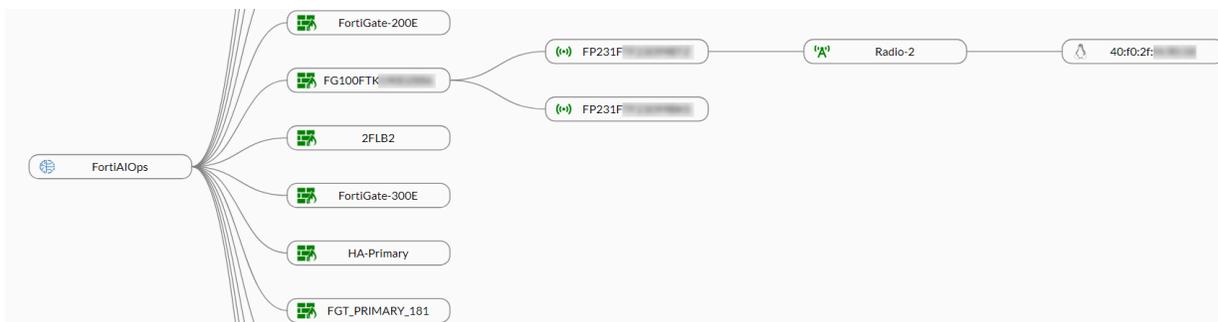
Select Devices	<div style="border: 1px solid #ccc; padding: 2px;">2FLB2</div> <div style="text-align: center; margin-top: 5px;">+</div>	✕
Select APs	<div style="border: 1px solid #ccc; padding: 2px;">PS223E: [REDACTED]</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">PS423E: [REDACTED]</div> <div style="text-align: center; margin-top: 5px;">+</div>	✕ ✕
Select OS	<div style="border: 1px solid #ccc; padding: 2px;">Android12</div> <div style="border: 1px solid #ccc; padding: 2px; margin-top: 2px;">Windows</div> <div style="text-align: center; margin-top: 5px;">+</div>	✕ ✕

Show online devices

The devices/OS set in the applied filters are also displayed at the top of the topology page, hover over each of these to view the complete list.

Access Points : FP321E!
FP431FTF200...
Devices : 2FLB2, HA-Primary
OS : Android12, Windows
Online devices : Yes

The collapsible/expandable hierarchy of devices in the physical topology is **FortiGate~ FortiAP ~ radio ~ client**; each of the devices displayed is click-able to display the next level of hierarchy.



Hover over the device name to obtain additional information. The status of the FortiGate controllers and APs is marked using a color legend.

- *Green*: Online and active
- *Red*: Offline

## Logical Topology

The logical topology provides a visualization/illustration of the logical placement of the configured wireless service, the associated ESS pushed through the wireless service, VLAN (if applicable), and the stations connected to each ESS in a hierarchical pattern. The logical topology is representational; you cannot perform any operations on this page.

You can filter and view selective entities, the filter options available are ESS and VLANs. To apply the filter settings, click **Apply Filter**.

Logical Topology Filters

Select ESS

+

Select VLANs

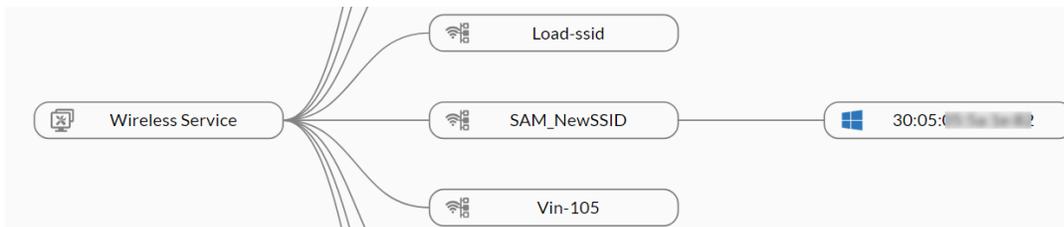
+

The ESS and VLANs set in the applied filters are also displayed at the top of the topology page, hover over each of these to view the complete list.

ESS : Load-ssid

VLANs : All

The collapsible/expandable hierarchy of entities in the logical topology is wireless service ~ **ESS** ~ **VLAN** ~ **client**; each of the entities displayed is click-able to display the next level of hierarchy.



**Note:** The physical and logical network topology views differ based on the browser.

# Logs and Reports

This section describes the WiFi and FortiSwitch event logs and the generation of the FortiAIOps reports.

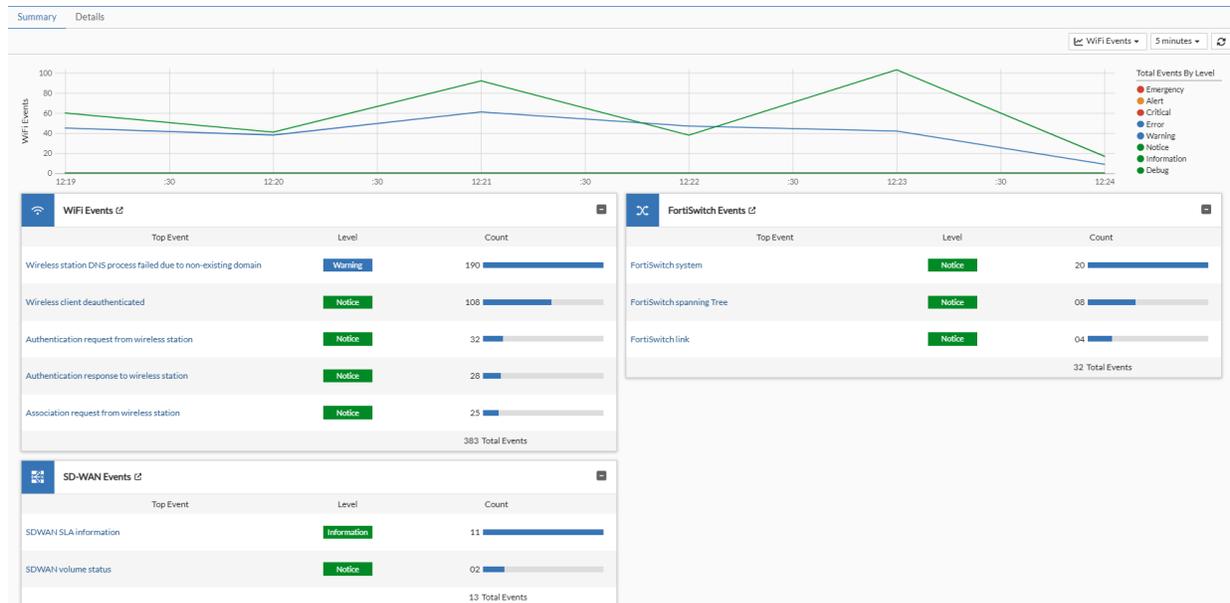
- [Event Logs](#)
- [Local Logs](#)
- [Reports](#)

## Event Logs

The FortiAIOps provides a robust logging environment that enables you to monitor, store, and report WiFi events, FortiSwitch events, and SD-WAN events. The **Summary** tab displays the top five most frequent events in each type of event log along with the severity level and the total count. A line chart displays aggregated events by each severity level. Clicking on a peak in the line chart displays the specific event count for the selected severity level.

The following event logs are available:

- [WiFi Events](#)
- [FortiSwitch Events](#)
- [SD-WAN Events](#)



Clicking on any event type title opens the **Details** page for that event type filtered by the selected time span. You can select the time frame to view the logs from the top-right corner of the GUI.

The **Details** tab displays individual, detailed log views for event type. By default, all event details are displayed on this page, you can filter the **WiFi Events** or **FortiSwitch Events** or **SD-WAN Events** data on this page.

## WiFi Events

Summary		Details												
Log Description == Wireless station DNS process failed due... X Q Search														
Date/Time	Level	Action	Message	SSID	Station MAC	Log ID	FortiGate Serial Number	Hostname	FortiAP	Relative Date/Time				
2025/06/12 12:50:38	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 18:1b:1b failed with non-existing domain	Forti-C	18:1b:1b	0104043673	FG3H-381	office	FP8-	38	22 seconds ago			
2025/06/12 12:50:37	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 08:a8:a8 failed with non-existing domain	Forti-C	08:a8:a8	0104043673	FG3H-381	office	FP8-	77	24 seconds ago			
2025/06/12 12:50:36	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 44:ba:ba failed with non-existing domain	Forti-C	44:ba:ba	0104043673	FG3H-381	office	FP8-	57	25 seconds ago			
2025/06/12 12:50:36	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 44:ba:ba failed with non-existing domain	Forti-C	44:ba:ba	0104043673	FG3H-381	office	FP8-	57	25 seconds ago			
2025/06/12 12:50:33	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 08:a8:a8 failed with non-existing domain	Forti-C	08:a8:a8	0104043673	FG3H-381	office	FP8-	77	28 seconds ago			
2025/06/12 12:50:33	Notice	DNS-no-domain	DNS lookup of wpad.fortinet-us.com from client 08:a8:a8 failed with non-existing domain	Forti-C	08:a8:a8	0104043673	FG3H-381	office	FP8-	77	28 seconds ago			

The following log details are displayed for each event.

Parameter	Description
<b>Date/Time</b>	The Date/time of log event generation.
<b>Level</b>	The log severity level. <ul style="list-style-type: none"> <li>Emergency, Critical (red)</li> <li>Alert (orange)</li> <li>Error, Warning (blue)</li> <li>Notice, Information, Debug (green)</li> </ul>
<b>Action</b>	The action leading to the event generation.
<b>Message</b>	The event log message that is generated.
<b>SSID</b>	The SSID that the client connected to.
<b>Station MAC</b>	The client MAC address.
<b>Log ID</b>	A unique identifier assigned to the event log.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate controller.
<b>Hostname</b>	Name of the device.
<b>FortiAP</b>	The serial number of the access point that the client associated with.
<b>Relative Date/Time</b>	The time lapsed since the event log was generated.
<b>Absolute Date/Time</b>	The actual date/time the event log was generated.
<b>Channel</b>	The channel associated with the access point.
<b>Log Description</b>	The description of the event log.
<b>Serial Number</b>	The serial number of the access point.
<b>Source</b>	The event source IP/MAC address.
<b>Status</b>	Status of the access point.
<b>User</b>	The user name/details.
<b>VDOM</b>	Virtual domain name.

Select a log message and click **Details** to view specific related information.

**Log Details**

**General**

Absolute Date/Time 2025/06/12 14:56:35  
 Time 14:56:36  
 Virtual Domain root  
 Log Description Wireless client deauthenticated

**Source**

MAC Address 3e:72:xxxx:c8  
 Interface 2  
 SSID Forti-C-xxxx-F  
 User N/A

**Action**

Action deauth  
 Reason Reserved 0

**Security**

Level ■ ■ ■ ■ ■ ■ ■  
 Security Mode WPA2 Enterprise  
 Encryption AES

**Cellular**

Serial Number FP831FTF21000244

**Event**

Physical AP FP8-xxxx-244  
 Message AP sent deauthentication frame to client  
 3e:72:xxxx:c8

**Other**

Log event original timestamp 1749720395809895450  
 Timezone +0530  
 Log ID 0104043575  
 Type event  
 Sub Type wireless

### FortiSwitch Events

Summary		Details	
Date/Time	Level	Message	Log Description
2025/06/12 14:10:15	<span style="color: green;">■</span>	error:0A000126-SSL routines:unexpected eof while reading --	FortiSwitch system
2025/04/12 14:09:51	<span style="color: green;">■</span>	error:0A000126-SSL routines:unexpected eof while reading --	FortiSwitch system
2025/06/12 14:09:41	<span style="color: green;">■</span>	The ntp server 208.91.112.60 is determined unreachable at Thu Jun 12 14:09:41 2025	FortiSwitch system
2025/06/12 14:09:29	<span style="color: green;">■</span>	error:0A000126-SSL routines:unexpected eof while reading --	FortiSwitch system
2025/06/12 14:09:25	<span style="color: green;">■</span>	error:0A000126-SSL routines:unexpected eof while reading --	FortiSwitch system

The following log details are displayed for each event.

Parameter	Description
<b>Date/Time</b>	The Date/time of log event generation.
<b>Level</b>	The log severity level. <ul style="list-style-type: none"> <li>Emergency, Critical (red)</li> <li>Alert (orange)</li> </ul>

Parameter	Description
	<ul style="list-style-type: none"> <li>• Error, Warning (blue)</li> <li>• Notice, Information, Debug (green)</li> </ul>
<b>Message</b>	The event log message that is generated.
<b>Log Description</b>	The description of the event log.
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate controller.
<b>Hostname</b>	Name of the device.
<b>FortiSwitch</b>	The serial number of the associated FortiSwitch.
<b>Absolute Date/Time</b>	The actual date/time the event log was generated.
<b>Action</b>	The action leading to the event generation.
<b>Channel</b>	The channel associated with the access point.
<b>Destination</b>	The destination interface name.
<b>FortiAP</b>	The serial number of the access point that the client associated with.
<b>Log ID</b>	A unique identifier assigned to the event log.
<b>Serial Number</b>	The serial number of the access point.
<b>Source</b>	The event source IP/MAC address.
<b>SSID</b>	The SSID that the client connected to.
<b>Station MAC</b>	The client MAC address.
<b>Status</b>	Status of the access point.
<b>User</b>	The user name/details.
<b>User Interface</b>	User interface associated with the event.
<b>VDOM</b>	Virtual domain name.

Select a log message and click **Details** to view specific related information.

**Log Details**

**General**

Absolute Date/Time: 2025/06/12 14:53:41  
 Time: 14:53:41  
 Virtual Domain: root  
 Log Description: FortiSwitch system

**Source**

User: Fortilink

**Message**

Message: The ntp server 206.190.2.62 is determined unreachable at Thu Jun 12 14:53:41 2025

**Security**

Level: █ □ □ □ □ □ □ □ □

**Cellular**

Serial Number: S248DF3X16000551

**Other**

Log event original timestamp: 1749720221204851006  
 Timezone: +0530  
 Log ID: 0115032699  
 Type: event  
 Sub Type: switch-controller  
 User Interface: N/A  
 Name: S248DF3X16000551

### SD-WAN Events

Date/Time	Level	Log Description	Message	Log ID	FortiGate Serial Number	Hostname	Interface	Health Check	VDOM
2025/06/12 14:36:33	Information	SDWAN SLA information	Health Check SLA status.	0113022925	FG3100000001	office-1	exit-in	wan_ping_sla	root
2025/06/12 14:36:31	Information	SDWAN SLA information	Health Check SLA status.	0113022925	FG3100000001	office-1	exit-in	wan_ping_sla	root
2025/06/12 14:35:33	Information	SDWAN SLA information	Health Check SLA status.	0113022925	FG3100000001	office-1	exit-in	wan_ping_sla	root
2025/06/12 14:35:31	Information	SDWAN SLA information	Health Check SLA status.	0113022925	FG3100000001	office-1	exit-in	wan_ping_sla	root

The following log details are displayed for each event.

Parameter	Description
<b>Date/Time</b>	The Date/time of log event generation.
<b>Level</b>	The log severity level. <ul style="list-style-type: none"> <li>Emergency, Critical (red)</li> <li>Alert (orange)</li> <li>Error, Warning (blue)</li> <li>Notice, Information, Debug (green)</li> </ul>
<b>Log Description</b>	The description of the event log.
<b>Message</b>	The event log message that is generated.
<b>Log ID</b>	A unique identifier assigned to the event log.

Parameter	Description
<b>FortiGate Serial Number</b>	The serial number of the associated FortiGate controller.
<b>Hostname</b>	Name of the device.
<b>Interface</b>	User interface associated with the event.
<b>Health Check</b>	Health check status of the SD-WAN.
<b>VDOM</b>	Virtual domain name.

Select a log message and click **Details** to view specific related information.

**Log Details**

**General**

Absolute Date/Time	2025/06/12 14:36:33
Time	14:36:34
Virtual Domain	root
Log Description	SDWAN SLA information

**Source**

Interface	exit-i
Health Check	wan_ping_sla

**Message**

Message	Health Check SLA status.
---------	--------------------------

**Security**

Level	█□□□□□□□
-------	----------

**Other**

Log event original timestamp	1749719193775663143
Timezone	+0530
Log ID	0113022925
Type	event
Sub Type	sdwan
Jitter	0.495
Latency	6.874
Packet Loss	0.000
MOS Value	4.400
MOS Coder	g711
Used Upstream	1.07Mbps
Available Upstream	0kbps
Used Downstream	5.45Mbps
Available Downstream	0kbps
Used Bandwidth	6.52Mbps
Available Bandwidth	0kbps

## Local Logs

The local logs that provide key insights into the system, configuration, reports, license, SAM, and mail events. Navigate to **Logs & Reports > Local Logs** and select the time interval to access the logs for. The **Summary** tab displays the top five most frequent events in each type of event log along with the severity level and the total count. A line chart displays aggregated events by each severity level. Clicking on a peak in the line chart displays the specific event count for the selected severity level.



The **Details** page for that event type filtered by the selected time span. You can select the time frame to view the logs from the top-right corner of the GUI.

The figure is a screenshot of the 'Details' tab showing a table of log entries. The table has columns for Date/Time, Level, Message, Log Description, and Log ID. There are three entries, all with a level of Notice and a message about diagnostics files being created successfully. The Log ID for all entries is 0006018001.

	Date/Time	Level	Message	Log Description	Log ID
<input type="checkbox"/>	2024/09/28 18:07:20	Notice	Diagnostics file for fortiaioops created successfully.	Diagnostics and Tools	0006018001
<input type="checkbox"/>	2024/09/28 18:07:20	Notice	Diagnostics file for application created successfully.	Diagnostics and Tools	0006018001
<input type="checkbox"/>	2024/09/28 18:07:20	Notice	Diagnostics file for system created successfully.	Diagnostics and Tools	0006018001

## Reports

You can create and view multiple report categories and types on FortiAIOps. Each report displays specific data based on the configurations and can be viewed or downloaded in multiple formats.

- [Creating Reports](#)
- [Viewing Reports](#)
- [Scheduled Reports](#)
- [PCI Reports](#)

### Creating Reports

FortiAIOps allows you to define new reports and generate one-time reports. You can select and combine multiple report categories and the subsequent report types (maximum 5) to generate a single report instead of

generating multiple reports for each category. These are saved as *Report Templates* and can be scheduled similar to other reports.

### Basic Information

This section allows you to choose a **Category** of report, **Report Type**, provide a **Name** and **Report Title**.

The following categories of reports are supported.

- [Station Reports](#)
- [AP Reports](#)
- [Inventory Reports](#)
- [Service Reports](#)
- [Application Visibility Reports](#)

### Station Reports

The following types of station reports are supported.

Category	Description
<b>Station RF and Channel Distribution</b>	<p>Provides the station RF and channel distribution based on the OUI (Organizationally Unique Identifier). A graphical summary of the stations distributed by RF type, stations distributed across 2.4GHz and 5GHz bands and station density on each channel over time is displayed. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• <b>Graphs</b> - The graphs are of the following types.                             <ul style="list-style-type: none"> <li>• <i>Station Density on each Channel Over Time</i> - This graph displays the station density on each of the channels over time plotted against the time in weeks.</li> <li>• <i>Station Distribution Across 2.4 GHz, 5GHz, and 6GHz Bands</i> - This graph displays the station distribution based on the 2.4GHz, 5GHz, and 6GHz.</li> <li>• <i>Station Distribution by RF Type</i> - This graph displays the station distribution based on the RF Type.</li> </ul> </li> <li>• <b>Station RF and Channel Distribution Details</b> - This section provides each station's OUI, Date/Time (GMT), Station MAC, RF Type, AP Name, AP Radio, SSID and Channel.</li> </ul>

Category	Description
<b>Station Session Details</b>	<p>Provides the average station session trend details. A graphical summary of the station session trend details of throughput, loss, airtime utilization and noise for a connected station is displayed. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• Graphs - The three types of <i>Station Session Details</i> graphs are displayed as follows.                             <ul style="list-style-type: none"> <li>• <i>Trend On Throughput</i> - This graph displays the trend of Throughput for the selected station.</li> <li>• <i>Trend On Loss</i> - This graph displays the trend of Loss for the selected station.</li> <li>• <i>Trend On Airtime Utilization</i> - This graph displays the trend of Airtime Utilization for the selected station.</li> </ul> </li> <li>• Station Session Details - This section provides each station's Date/Time, IP4 Address, IP6 Address, Controller, AP ID, SSID, User, Throughput (Kbps), Loss%, Airtime Utilization% and AP Name.</li> </ul>
<b>Top Stations</b>	<p>The <i>Top Stations</i> report type generates reports for the busiest stations based on the <i>Throughput</i> and Airtime Utilization. This report type generates the top N stations based on the number of bytes transferred and received and total Rx/Tx. The information includes each station's Station Mac, Controller, AP Id, SSID, Throughput (Kbps) and Date/Time (GMT).</p>
<b>Unique Stations</b>	<p>Provides the unique station details based on all stations connected to a network within the reporting interval. A graphical summary of the stations distributed by RF type, stations distributed across 2.4GHz, 5GHz, and 6GHz bands, stations distributed by OUI, stations distributed by device type, and stations distributed by OS type is displayed. The <i>Unique Station</i> reports are available to all groups and list stations connected to network during last 24 hours. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• Summary - This section provides the total number of Unique Stations.</li> <li>• Graphs - The graphs are of the following types.                             <ul style="list-style-type: none"> <li>• <i>Finger Print OS Distribution</i> - This graph displays the station distribution based on the OS Type.</li> <li>• <i>Finger Print Device Distribution</i> - This graph displays the station distribution based on the Device Type.</li> <li>• <i>OUI Distribution</i> - This graph displays the station distribution based on the OUI.</li> <li>• <i>Station Distribution</i> - This graph displays the station distribution based on the RF Type.</li> </ul> </li> <li>• Unique Station Details - This section provides the station's OUI, Date/Time (CST), Station MAC, User, IPv4 Address, IPv6 Address, RF Type, SSID, Device Type, OS Type and Floor.</li> </ul>
<b>EAP-AKA Error</b>	<p>The EAP-AKA Error type generates a report with details of EAP-AKA errors associated with specific ESSIDs and on specific stations connected to network within the reporting interval. The following details are displayed.</p>

Category	Description
	<ul style="list-style-type: none"> <li>• User selected Top 5 EAP-AKA Errors - The top 5 most common EAP-AKA errors with the number of stations the errors were reported on and the number of EAP authentication failures for each station.</li> <li>• User selected Top 5 Station by Errors - The top 5 stations (MAC addresses) with highest EAP-AKA errors reported and the number of EAP authentication failures for each station.</li> <li>• EAP-AKA Errors - The list of EAP-AKA errors within the reporting interval. The details displayed are, date and time of the error, associated controller, access point, station MAC address, and the ESSID, and the error description/reason.</li> </ul>

### AP Reports

The following types of AP reports are supported.

Category	Description
<b>Rogue Details</b>	<p>The <i>Rogue Details</i> report type generates the report on the individual rogue. It displays the rogue mobility trend. The trend is plotted against time and APs detecting the rogue. The data displayed is a Max of hourly data sample. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• Summary - This section provides the details of the selected rogue</li> <li>• Rogue Mobility Trend graph - Trend is plotted against AP which detects rogues with high strength and its time as samples.</li> <li>• Rogue Details - This section provides details about the APs detecting the rogue along with Date/Time, Controller, AP Detecting Rogue, AP Location, SSID, Channel and RSSI.</li> </ul>
<b>Rogue Summary</b>	<p>Summarizes the rogue device information on the trend of the number of rogues reported on a per controller basis, per hour. The rogue APs and rogue station count is displayed. A graphical summary of the trend on rogue AP, trend on rogue station, and trend on controllers is displayed. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• Summary - This section provides the details of the total number of rogues.</li> <li>• Graph - The graphs are of the following types. <ul style="list-style-type: none"> <li>• <i>Rogue Trend By Type</i> - The two types of <i>Rogue Trend By Type</i> graphs are displayed as follows. <ul style="list-style-type: none"> <li>• <i>Trend on Rogue Station</i> - This graph displays the trend type based on the number of rogue Stations.</li> <li>• <i>Trend On Rogue AP</i> - This graph displays the trend type based on the number of rogue APs.</li> </ul> </li> <li>• <i>Rogue Trend By Controllers</i> - This graph displays the top 10 controllers with the highest number of rogues.</li> </ul> </li> <li>• New Rogues Detected During Reporting Interval - This section provides the details of the new rogues detected during reporting</li> </ul>

Category	Description
	interval. The details are Date/Time, Controller, AP Detecting Rogue, AP Location, Rogue MAC, Rogue Type and Channel RSSI.
<b>Top Radio</b>	The Top Radio report type generates a report displaying all the Top N Radios based on Station Count, Throughput, and High Loss. The top radio report type displays the AP Name, Radio, Controller Name, AP Location, Station and Date/Time (GMT).

## Inventory Reports

The following types of inventory reports are supported.

Category	Description
<b>Access Points Inventory</b>	<p>This report type generates the AP inventory summary reports for any access points that are accessible. The following details are displayed.</p> <ul style="list-style-type: none"> <li>• Summary - This section provides the total number of Access Points.</li> <li>• AP Model Distribution graph - This provides the pictorial representation of the distribution of Access Points.</li> <li>• AP Inventory Summary - This section provides the details of Access Point Inventory. The details are Name, Mac address, Model, Software Version, IP Address, Controller, Availability State, Connectivity Preference and Floor.</li> </ul>
<b>Controller Inventory</b>	<p>Lists and tracks all the controllers, with its model and software versions on the network.</p> <ul style="list-style-type: none"> <li>• Summary - This section provides the total number of Controllers.</li> <li>• Graph - The graphs are of the following types.                             <ul style="list-style-type: none"> <li>• <i>Controller Software Version Distribution</i> - This graph displays the Controllers based on the controller software version distribution.</li> <li>• <i>Controller Model Distribution</i> - This graph displays the Controllers based on the controller model distribution.</li> </ul> </li> <li>• Controller Inventory Summary - This section provides the details of Controller Inventory. The details are Hostname, IP Address, Mac address, Node Name, Software Version, Model, Description, Availability State, Management State and Location.</li> </ul>
<b>Device Availability</b>	<p>Lists all the controllers and access points with its availability, uptime and down time of each of them. This report generates the report for each Controller and AP. It displays the Device Name, UP Duration, Down Duration time and Availability(%) for the AP and Controller.</p>

## Service Reports

The following types of service reports are supported.

Category	Description
<b>Service Usage Summary</b>	<p>Provides the service usage summary based on the ESSIDs. A graphical summary of the top SSIDs based on throughput and number of stations is displayed.</p> <ul style="list-style-type: none"> <li>Graph - The graphs are of the following types. <ul style="list-style-type: none"> <li><i>Top SSIDs Based on Throughput</i> - This graph displays the top SSIDs based on the throughput.</li> <li><i>Top SSIDs Based on Number Stations</i> - This graph displays the top SSIDs based on number of stations.</li> </ul> </li> <li>Network Usage Summary - The Network Usage Summary displays the ESSID, Average Station Count, Max Station Count, Time When Max Station Occurred, Total Unique Stations and Maximum Throughput are displayed.</li> </ul>
<b>Service Usage Trend</b>	<p>Provides the service usage trends based on the ESSIDs. A graphical summary of the top SSIDs based on throughput and number of stations is displayed.</p> <ul style="list-style-type: none"> <li>Server Usage Trend graphs - These are displayed with a trend of Max, Minimum and Average stations connected and stations throughput on hourly basis during reporting interval. This is a graphical report represented with a line chart having two lines, one for Max and second one for Average station count.</li> <li>Service Usage Trend Details - The service usage trend report type displays Date/Time (GMT), Max Stations Connected, Min Stations Connected, Avg Stations Connected and Throughput (Kbps).</li> </ul>

### Application Visibility Reports

The application visibility reports provide the following information.

Category	Description
<b>Application Visibility</b>	<p>This report provides the top 10 applications and the top 10 users in your network which allows you to monitor application usage.</p> <ul style="list-style-type: none"> <li>Top 10 applications graph - For each application, it provides total number of connected users, ESSIDs and traffic utilization.</li> <li>Top 10 users graph - For each of the user, it displays the client MAC address, applications connected by the client, ESSIDs and traffic utilization.</li> </ul>

### Scope

This section allows you to define the scope of a report by performing the device selection followed by the service (SSID) selection.

SCOPE

**Device Selection**

Default  Devices  AP

Select

**Service (SSID) Selection**

423\_test\_fgt

Select    Remove

Update the following fields as per your requirement.

- **Default** - By choosing default, report is generated for all the controllers mapped to the FortiAIOps.
- **Devices** - Select one of multiple FortiGate controllers.
- **AP** - Select one or multiple access points.

### Reporting Interval

These fields depict the time period to be covered by the selected report. These fields are supported for most report types. When these fields do not appear, the report considers the current status. Select the **Schedule** option of the **Recurrence** section, the following options in the *Reporting Interval* section is enabled.

REPORTING INTERVAL

Last One Day  Last One Week  Last One Month

- **Last one day** - The last one day's report is generated.
- **Last one week** - The last one week's report is generated.
- **Last one month** - The last one month's report is generated.

### Recurrence

This section allows you to select the time of report recurrence. Select the **Schedule** option and the following get enabled.

RECURRENT

One Time  Schedule

Time

Daily

Weekly Every

Monthly Every  Day of Month [2-28]

- **One Time** - Instant report is generated for the selected reporting interval.
- **Schedule** - This option allows you to define a specific time for report creation. These schedule fields establish the time that a report runs, independent of the **Scope** and **Reporting Interval**.
- **Daily** - This option allows you to generate daily reports.
- **Weekly** - This option allows you to generate weekly reports, select this option followed by selecting the day of the report generation from the **Every** drop-down list.
- **Monthly** - This option allows you to generate monthly reports, select this option and enter the day of month; 1-31 is the valid range.

### Report Generation Options

You can save the generated reports in any of the following formats and email the generated reports to the specified address.

REPORT GENERATION OPTIONS

File Format  HTML  PDF  CSV

Email To:

**Customize**

- **File Format** - Choose one of the following formats.
  - **HTML** - Select the HTML option to export and save the report to HTML format. The generated report is saved with the naming convention, *<report type>\_report\_datetime.html*.
  - **PDF** - Select the PDF option to export and save the report to PDF format. The generated report is saved with the naming convention, *<report type>\_report\_datetime.pdf*.
  - **CSV** - Select the CSV option to export and save the report to CSV format. The generated report is saved with the naming convention, *<report type>\_report\_datetime.csv*.
- **Limit Report Size To** - This option is applicable only to the *Top Stations*, *Top Radio*, *Device Availability*, and *Application Visibility* reports. The maximum report size for the *Application Visibility* report is 100.

## Viewing Reports

This screen displays a list of all the reports that are generated. These reports can be generated in HTML, CSV, or PDF format. They can be viewed, printed or saved locally.

REFRESH DELETE							
REPORT TYPE	NAME	CREATION TIME	FILE FORMAT	STATUS	SIZE(KB)	ACTIONS	
<input type="checkbox"/>	Template	Report Template	11 Apr 2023 13:21:15	HTML	Completed	349	
<input type="checkbox"/>	Template	Report Template	11 Apr 2023 13:19:53	HTML	Completed	351	
<input type="checkbox"/>	Template	Report Template	11 Apr 2023 13:18:05	HTML	Completed	350	
<input type="checkbox"/>	Station RF and Channel Distribution Details	Station RF and Channel Distribution Details	11 Apr 2023 12:21:57	HTML	Completed	348	
<input type="checkbox"/>	Station RF and Channel Distribution	Station RF and Channel Distribution	11 Apr 2023 12:21:30	HTML	Completed	348	

## Scheduled Reports

This page displays a list of current running reports and reports scheduled to run in the future. In case of recurring reports, the next run time is displayed. To create a new report, click **Add**.

REFRESH ADD EDIT DELETE					
REPORT TYPE	NAME	SCHEDULE	LAST RUN	NEXT RUN	
<input checked="" type="checkbox"/>	Template	Report Template	Daily At 00:00	29 May 2023 00:15:00	30 May 2023 00:00:00

## PCI Reports

You can validate FortiAIOps against specific PCI requirement compliance. To run a compliance test, enable **Run PCI Test**. Select the tests to validate FortiAIOps and click **Run Test**.

PCI REQ ?

Run PCI Test  Yes

Requirement	Compliance
Immediately revoke access for any terminated users.	<input checked="" type="checkbox"/> Yes
Remove/disable inactive user accounts within 90 days.	<input checked="" type="checkbox"/> Yes
Restrict physical access to wireless access points, gateways, handheld devices, networking/communications hardware, and telecommunication lines.	<input checked="" type="checkbox"/> Yes

After the test is successfully completed, the page is refreshed to show the list of PCI requirements that are validated. The validation results are marked with green ticks if they are fully validated and in red if the compliance is not validated or fails. Click **Download PDF Report** to get a copy of the validation results in PDF format.

PCI REQ

Run PCI Test  Yes

**PCI TEST REPORTS**

Show  entries Search:

REQID ▲	Validated Items	FortiAIOps Validation
<input type="text" value="Search REC"/>	<input type="text" value="Search Validated Items"/>	
2.1.1	For wireless environments connected to the cardholder data environment or transmitting cardholder data, change ALL wireless vendor defaults at installation, including but not limited to default wireless encryption keys, passwords, and SNMP community strings.	✓
2.3	Encrypt all non-console administrative access using strong cryptography. Use technologies such as SSH, VPN, or TLS for web-based management and other non-console administrative access.	✓
4.1	Use strong cryptography and security protocols (for example, TLS, IPSEC, SSH, etc.) to safeguard sensitive cardholder data during transmission over open, public networks, including the following: Only trusted keys and certificates are accepted. The protocol in use only supports secure versions or configurations. The encryption strength is appropriate for the encryption methodology in use.	✓

# System

The System section includes several pages that offer valuable insights into various aspects of system management, such as users, user groups, backup and restore, maintenance, licensing, and location services.

- [User Management](#)
- [Backup and Restore](#)
- [Settings](#)
- [Upgrade](#)
- [Licensing](#)
- [FortiGuard](#)
- [Location Services](#)
- [Network Interface](#)
- [Certificates](#)

## User Management

The User Management in the System allows you to view the users and configure user groups and provide the access permissions.

- [Users](#)
- [User Groups](#)

## Users

The FortiAIOps allows administrators to create users, who will subsequently be available in the FortiAIOps application.

User profiles within FortiAIOps are consistent across both the Command Line Interface (CLI) and the Graphical User Interface (GUI). Users can use the same password for both CLI and GUI access.

### Note:

- GUI usernames must begin with a lowercase letter or an underscore (`_`) and can include special characters like hyphens (`-`) or underscores (`_`), along with alphanumeric characters (`a-z`, `A-Z`, `0-9`).
- After upgrading to version 3.0.0, GUI user names starting with a capital letter will be marked as invalid, preventing CLI synchronization.
- If a user that exists in both CLI and GUI have different passwords, they will retain their respective passwords even after the upgrade.
- Upon upgrading to release 3.0.0, all pre-existing user configurations will be automatically synchronized between the CLI and GUI.

User permissions are indirectly assigned through their membership in user groups. By default, all users are members of the *Default* user group. The *admin* user and all device groups are automatically members of the *Super User* user group, and cannot be moved to any other user group. All users must belong to at least one user

group. It is recommended to assign both the device group and users to the user group upon its creation to ensure that users have access to the assigned device group. If a user is removed from a user group, they will be moved to the *Default* user group.

**Note:** User Management configuration can only be performed by users with the *System Administrator* and *Super User* roles.

+ Add   Edit   Delete   Search filterable columns   Reload					
☐	Username	Role	Full name	Authentication Type	Server Name
<input checked="" type="checkbox"/>	admin	System Administrator	admin	LOCAL	Local Server

- [Adding a New User](#)
- [Editing User Information](#)
- [Deleting User Information](#)

## Adding a New User

Perform the following steps to add a new user:

1. Click **+Add User**.
2. Enter the user information such as Full Name, and Username.
3. In the **Type** field, select the type of server. Choose between LOCAL, RADIUS, LDAP, Microsoft Active Directory, SAML SSO, or Microsoft ADFS SAML IDP.
4. Select the server from the **Server** drop-down menu.
 

**Note:** If the **Type** selected is LOCAL, enter a password in the **Password** field and confirm the same in the **Confirm Password** field.
5. Enable **Match all users on remote server** to add all users from an remote server. All users specified in the remote server will be able to access FortiAIOPS with the selected Admin Profile.
 

**Note:** This option is not available for User Type **LOCAL**.
6. Specify the role. FortiAIOPS supports **Guest**, **Standard\_User** and **Super\_User** roles.

User Role	Access Level
Guest	Read only access to all features in the system except system settings.
Standard_User	Read/Write privilege to all configurations and features except system settings .
Super_User/ System Administrator	Read/Write access across system. All super users will have access to all device groups, all devices, all system settings.

7. Click **Save**.

### Notes:

- Once you have created users in FortiAIOPS, it is necessary to refresh the FortiAIOPS application portal in order for the users list to be updated and displayed in the **User Groups** page.
- The super user or system administrator can provide device group access to a user by choosing the device group and the users in the user group option in FortiAIOPS application portal. See [User Groups](#).
- Users created in GUI will be synced to CLI and vice versa.
- By default, user created in CLI will have super-user access, and can be changed from GUI.

### Editing User Information

Select a user and click **Edit** to modify user information. This includes changing the user's full name, role or password.

### Deleting User Information

To delete a user, select the user and click **Delete**. This action will remove the user from both the GUI and CLI.

## User Groups

The FortiAIops access assigned to a user group determines what users in that user group can do.

User Group	Description	Users	Device Groups
default	Default Users group	simig	default

### Adding a User Group

To add a user group, perform the following steps:

1. Navigate to User Groups.
2. Click **+ Add**.
3. Enter a name and description.
4. Select the Device Group that the users should be part of.
5. Select the Users from the list to be added.
6. Click **Create**.

Add UserGroup

- Details

Name

Description

- Others

Select Device Groups  ✕

+

Select Users  ✕

+

To edit an user group, select an existing user group from the list and click **Edit**.

To delete an user group, select the user group and click **Delete**.

## User Sessions

The User Sessions sub-menu under **User Management**, provides a centralized view of all active user sessions. This window displays crucial details for each session, including the username, IP address, authentication server, login time, connection duration, user agent, and assigned role.

To access, navigate to **Systems > User Sessions**.

User	Client IP Address	Authentication Server	Login Time	Connected Duration	User Agent	User Role
<input checked="" type="checkbox"/> admin	10.32.1.100	LOCAL	2025/04/25 07:15:55	3h 9m	Chrome	System Administrator
<input type="checkbox"/> [redacted]	10.32.1.100	LOCAL	2025/04/25 07:19:55	3h 5m	Chrome	Super_User
<input type="checkbox"/> [redacted]	10.32.1.100	LOCAL	2025/04/25 07:36:34	2h 48m	Chrome	Super_User
<input type="checkbox"/> [redacted]	10.32.1.100	LOCAL	2025/04/25 08:04:47	2h 20m	Chrome	Super_User
<input type="checkbox"/> admin	10.32.1.100	LOCAL	2025/04/25 09:26:20	58m 36s	Chrome	System Administrator
<input type="checkbox"/> admin	10.32.1.100	LOCAL	2025/04/25 10:23:44	1m 12s	Chrome	System Administrator

Administrators can now manually terminate active sessions. To disconnect a user, select their session from the displayed table and click the **Disconnect Session** button.

For enhanced control, you can limit the maximum number of concurrent active user sessions. Access this setting by clicking the **Settings** button.

Users Sessions limit ✕

Number of active Sessions \*

In the **User Sessions Limit** pane, enter your desired value in the **Number of active Sessions** field.

**Note:**

1. By default 100 user sessions are supported.
2. The configurable user session limit is from 10 - 1000.

## Backup and Restore

The **Backup and Restore** page provides valuable tools for managing and maintaining backups of the FortiAI Ops configuration. This page includes options for taking, uploading, restoring, downloading, and deleting backups.

**Note:** This release supports the backup and restore function only for FortiAI Ops configuration. CLI configurations are saved using the `execute backup config` command and it does not include any FortiAI Ops specific configurations.

File Name	Status	Timestamp	File Size
Backup-fortiaios_v2.0.0-build0031-admin-2023-04-04-01-05-01.tar	Available	2023/04/04 06:35	50.7M

## Take Backup

The **Take Backup** function allows you to take a backup of the FortiAIOps configuration. This information can be saved as a file (.tar) and used to restore the configuration and settings at a later time.

To perform the backup operation, perform the following steps:

1. Navigate to **System > Backup and Restore**.
2. Click **+ Take Backup**.
3. Select **Backup Option** as **Configuration only**. Backing up only the configuration includes information like maps, controller details, and AP details except statistics data.
4. Select the **Backup Type**. Choose between **Disable Backup**, **Backup now** or **Schedule for later**.
5. If schedule for later is selected, select backup schedule, day, hour and number of backups to preserve.
6. Click **Save**.

Backup

Backup Type: Disable Backup Backup now Schedule for later

Backup Option: Configuration only

Backup Schedule: Daily Weekly

Backup Day: Sunday Monday Tuesday Wednesday Thursday Friday Saturday

Backup Hour: 5 PM

Number of backups to preserve: 1 2 3

## Upload

To upload an existing backup file, perform the following steps:

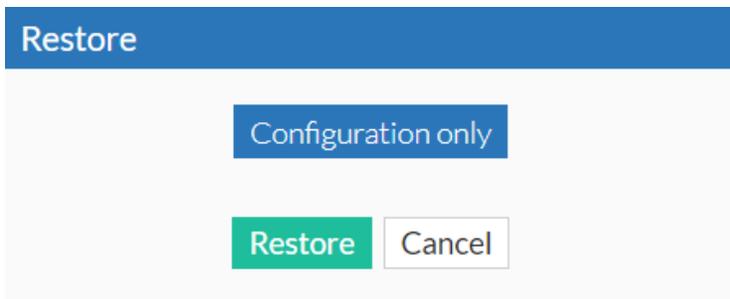
1. Navigate to **System > Backup and Restore**.
2. Click **Upload**.
3. Browse and select the backup file (.tar) file.
4. Click **Upload**.

## Restore

To restore a backup, select the a backup from the list and click **Restore**.

### Notes:

- When restoring a backup file on a different FortiAIOps machine, it is necessary to configure the latest FortiAIOps IP address in the FortiGate syslog settings.
- Admin credentials are retained after restoring the backup file.



## Download

To download a backup file to your local machine, select the backup file from the list and click **Download**.

## Delete

To delete a backup file, select the backup file from the list and click **Delete**.

# Settings

This page provides the following network and server maintenance parameters to be configured.

- [Network Settings](#)
- [Statistics](#)
- [Administration Settings](#)
- [OUI Update](#)
- [General Logs](#)
- [Mail Server](#)
- [Authentication Servers](#)

## Network Settings

This section allows you to configure various system settings. Click  icon to edit the system settings.

	Network Settings
Hostname	FAOESX 
System Time	2024/09/27 09:26:57 

The **Hostname** displays the hostname of the system currently in use.

Edit Hostname

Hostname

The **System Time** displays the current system time. This setting allows you to select timezone, set time and configure NTP server.

**Edit System Time**

Current System Time 2023/10/13 16:05

Time Zone (GMT+5:30) Chennai, Kolkata, Mumbai,...

Time Setting method **Synchronize with NTP Server**

Set Server(s)

1 pool.ntp.org

2 ntp2.fortiguard.com remove

Add more servers

#### Notes:

- Both FortiAIOPs and FortiGate must be synchronized with an NTP server.
- Reboot the system (execute `reboot` command) after the NTP and timezone settings are configured.

#### Statistics

This section allows you to configure data retention period in FortiAIOPs. All monitoring data is stored based on dynamically allocated or manually configured duration.

- **Auto config duration to keep Statistics data** - This feature allows FortiAIOPs to dynamically configure the statistics retention period based on daily data accumulation and the available space for maximum data storage. This is enabled by default for a period of 3 weeks, but based on daily monitoring of the data accumulation and available space, FortiAIOPs automatically adjusts the statistics retention period.
- **Duration to keep statistics data** - Manually configure the weeks or months to retain and preserve the statistics data. The permissible range is 1 to 3 weeks or 1 to 6 months. The statistics data older than the time period specified in this field from the current date, is automatically deleted from the FortiAIOPs server. If the duration configured here requires more than the available space for statistics retention, then FortiAIOPs throws an error.

**Statistics**

Auto config duration to keep Statistics data i 🟢

Duration To Keep Statistics Data 2 weeks ▾

#### Notes:

- You are allowed to configuring the statistics retention duration manually only based on the available disk space.
- The AI Insight statistics are stored for a maximum period of 1 week.
- Post-upgrade, the configured **Duration to Keep Statistics Data** is retained with **Auto config duration to keep Statistics data** enabled. Based on daily analysis, FortiAIOPs configures the statistics retention period automatically.

### Administration Settings

You can select and apply a certificate that is generated/imported in **System > Certificates** and click **Apply Certificate**.

**Administration Settings**

Certificate

### OUI Update

This section allows you to view and manage the OUI details.

- **Last update time** - Displays the date and time of the OUI details updated the last time.
- **Parsing status** - Displays the status of parsing.
- **Automatically update every week** - This option when enabled, will allow the system to automatically update the OUI details every week.
- **Upload OUI File** - To upload OUI file, click **Choose File**, browse and select the OUI file, and click **Upload**.

**OUI Update**

Last update time

Parsing status completed

Automatically update every week

Upload OUI File

### General Logs

You can now configure forwarding FortiAI Ops local logs to a remote machine. Enable **Syslog logging** and enter the IP address/FQDN of remote machine where logs are to be stored.

**General Logs**

Syslog logging

IP address / FQDN

**Note:** If the configured syslog server IP address/FQDN is incorrect or not reachable, then the syslog messages are not logged.

### Mail Server

You can configure the SMTP server to receive email notifications for report generation.

**SMTP Server Configuration**

Name

Use default

Enable Email

Send Emails from

SMTP Server

SMTP Encryption None SSL TLS

SMTP Port

SMTP Authentication Login None

SMTP Username

SMTP Password

Confirm Password

Configure the following SMTP server settings.

- **Use default** - If enabled, the current configurations are used as the default for all SMTP server communication.
- **Send Emails from** - Enter the email address to trigger the email notifications from.
- **SMTP Server** - Enter the IP address or the hostname of the SMTP server.
- **SMTP Encryption** - Select the security mode as **SSL** or **TLS**. Select **None** to not use any encryption.
- **SMTP Port** - Enter the port number used to connect to the SMTP server.
- **SMTP Authentication** - Select the authentication via **Login** and enter the **SMTP Username** and **SMTP Password**. Select **None** to not use any authentication for the SMTP server.

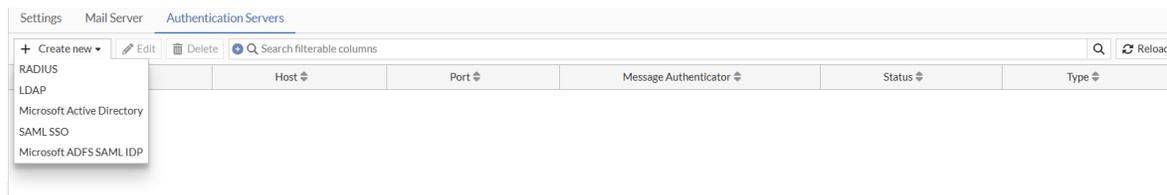
### Authentication Servers

Remote users can be authenticated using remote servers.

To use remote authentication, you must first configure the appropriate servers for each authentication server in your network. Remote authentication servers can be added, edited, and deleted.

To add an Authentication Server:

1. Navigate to **System > Settings > Authentication Servers** tab.
2. Click **Create New** and select the type of server to be added. Choose between **RADIUS**, **LDAP**, **Microsoft Active Directory**, **SAML SSO**, and **Microsoft ADFS SAML IDP**.



3. Configure the following settings for the server to be added:

• **LDAP Server:**

✕
LDAP Authentication Server

Name *	<input type="text" value="OpenLDAP1"/>
Host *	<input type="text" value="10.3.1.1"/>
Port *	<input type="text" value="389"/>
Encryption *	<input type="text" value="NONE"/>
Base DN *	<input type="text" value="dc=aioj,dc=com"/>
Anonymous Admin Allowed *	<input checked="" type="checkbox"/>
Admin Bind DN *	<input type="text" value="cn=it2,ou=IT,ou=Department,dc=aioj,dc=com"/>
Update Password	<input type="checkbox"/>
Admin Password	••••••••
Confirm Password *	••••••••

Name	Enter a name to identify the LDAP server.
Host	Enter the IP address of the LDAP server.
Port	Enter the port for LDAP traffic. The default port is 389.
Encryption	Select encryption from the drop-down. Choose between NONE and LDAPS.
Base DN	Enter the base Distinguished Name (DN) for the LDAP server. This specific entry in the directory hierarchy acts as the starting point for the search operations in the LDAP server.
Anonymous Admin Allowed	Enable to allow anonymous admin user.
Admin Bind DN	Enter the Admin user Distinguished Name (DN).
Admin Password	Enter a password for admin user.
Confirm Password	Enter the password again to confirm.

• **RADIUS Server:**

RADIUS Authentication Server
✕

Name \*

Server Name/IP Address \*

Port \*

Update Secret

Server Secret

Message Authenticator \*

Name	Enter a name to identify the RADIUS server.
Server Name/IP Address	Enter the IP address or fully qualified domain name of the RADIUS server.
Port	Enter the port for RADIUS traffic. The default port is 1812. Some RADIUS servers use port 1645.
Update Secret	Enable to update Server Secret.
Server Secret	Enter the RADIUS server secret. Click the eye icon to Show or Hide the server secret.
Test Connectivity	Click Test Connectivity to test the connectivity with the RADIUS server.
Test User Credentials	Click Test User Credentials to test the user credentials.
Message Authenticator	Enable or disable message authentication as required.

- **Microsoft Active Directory (AD):**

Microsoft Active Directory
✕

Name\*

Host\*

Port\*

Encryption\* NONE ▾

Base DN\*

AD Domain\*

AD Admin bind Username\*

Update Password

Admin Password

Confirm Password\*

Name	Enter a name to identify the AD server.
Host	Enter the IP address of the AD server.
Port	Enter the port for network traffic. The default port is 389.
Encryption	Select encryption from the drop-down. Choose between NONE and LDAPS.
Base DN	Enter the base Distinguished Name (DN) for the LDAP searches within your AD server. This specific entry in the directory hierarchy acts as the starting point for the search operations.
AD Domain	Enter the name of your Active Directory domain.
AD Admin bind Username	Enter the username of the Active Directory account that your system will use to authenticate (bind) to the AD server.
Update Password	Enable to update the password.
Admin Password	Enter a password for admin user.
Confirm Password	Enter the password again to confirm.

- **SAML SSO:**

<b>Name</b>	A user-defined name to identify this SAML SSO configuration.
<b>Server</b>	The IP address or FQDN of the Identity Provider (IdP) server where SAML authentication requests will be sent.
<b>Enabled</b>	Toggle button to enable or disable this SAML SSO configuration. If enabled, SAML SSO is active. If disabled, configuration is saved but inactive.
<b>Identity Provider</b>	
<b>Entity Id</b>	The unique identifier URL for the Identity Provider. This is usually the IdP metadata URL. For example - <code>http://&lt;IP address&gt;/saml-idp/corpaiops/metadata/</code>
<b>Single Sign-On Service Endpoint</b>	The URL where FortiAIOps will redirect users for authentication (IdP SSO login URL). For example - <code>https://&lt;IP address&gt;/saml-idp/corpaiops/login/</code>
<b>Single Logout Service Endpoint</b>	The URL where FortiAIOps will send SAML logout requests to log the user out from IdP as well. For example - <code>https://&lt;IP address&gt;/saml-idp/corpaiops/logout/</code>
<b>Select Identity Provider Signing Certificate</b>	Select the IdP's certificate used to sign the SAML responses. This ensures message integrity and authenticity. This certificate has to be uploaded in Local certificate of the FortiAIOps.
<b>Select Identity Provider Encryption</b>	Select the IdP's encryption certificate. The certificate

Certificate	must be uploaded under Local Certificate in FortiAIOps.
<b>Service Provider</b>	
Entity Id	The unique identifier URL for FortiAIOps as Service Provider (SP). For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/metadata</code>
Assertion Consumer Service Endpoint (ACS URL)	The URL where IdP will post SAML assertions after authentication. For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/acs</code>
Single Logout Service Endpoint	The URL where IdP can send logout requests to terminate FortiAIOps sessions. For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/slo</code>
Select NameID Format	The format of NameID used by IdP to uniquely identify the user.
Select Signature Algorithm For Party Trust	The algorithm used to sign SAML requests. Both IdP and SP must support the selected algorithm. For example - RSA-SHA-256
Select Digest Algorithm For Party Trust	Specifies the hashing algorithm used to compute the message digest before signing the SAML messages. It ensures data integrity and is part of the digital signature process. The Identity Provider (IdP) and Service Provider (SP) must support the same digest algorithm to validate signatures correctly. For example - RSA-SHA-256
<b>Additional SAML Attributes</b>	
Attribute used to identify username	The name of the attribute in the SAML assertion provided by the Identity Provider (IdP) which holds the username. This attribute should match on both SP and IDP.
Attribute used to identify email	The name of the attribute in the SAML assertion provided by the Identity Provider (IdP) which contains the email address.
Attribute used to identify groups	The name of the attribute in the SAML assertion provided by the Identity Provider (IdP) which contains the user's group memberships.
<b>Note:</b> You can enter either the fixed keywords username, email and groups or specify the exact attribute names as configured in your Identity Provider.	

- **Microsoft ADFS SAML IDP**

The screenshot shows the configuration page for a Microsoft ADFS SAML IDP. It is titled "Microsoft ADFS SAML IDP". The form contains the following sections:

- Name:** FQDN\_SAML
- Server:** adfs.ap[redacted].com
- Enabled:** A toggle button that is currently turned on.
- Identity Provider:**
  - Entity Id:** http://adfs.ap[redacted].com/adfs/services/trust
  - Single Sign-On Service Endpoint:** https://adfs.ap[redacted].com/adfs/ls/
  - Single Logout Service Endpoint:** https://adfs.ap[redacted].com/adfs/ls/
  - Select Identity Provider Signing Certificate:** SAML\_ADFS
  - Select Identity Provider Encryption Certificate:** SAML\_ADFS
- Service Provider:**
  - Entity Id:** https://[redacted].n/1/servers/saml/act/sp/metadata
  - Assertion Consumer Service Endpoint:** https://[redacted].n/1/servers/saml/act/sp/acs
  - Single Logout Service Endpoint:** https://[redacted].n/1/servers/saml/act/sp/slo
  - Select NameID Format:** Unspecified
  - Select Signature Algorithm For Party Trust:** RSA-SHA-256
  - Select Digest Algorithm For Party Trust:** RSA-SHA-256
- Additional SAML Attributes:**
  - Attribute used to identify username:** username
  - Attribute used to identify email:** email
  - Attribute used to identify groups:** groups

At the bottom of the form, there are "Save" and "Close" buttons.

<b>Name</b>	A user-defined name to identify this ADFS SAML IDP configuration.
<b>Server</b>	The IP address or FQDN of the Identity Provider (IdP) server where SAML authentication requests will be sent.
<b>Enabled</b>	Toggle button to enable or disable this ADFS SAML IDP configuration. If enabled, ADFS SAML IDP is active. If disabled, configuration is saved but inactive.
<b>Identity Provider</b>	
<b>Entity Id</b>	The unique identifier URL for the ADFS Identity Provider. This usually corresponds to the ADFS federation metadata address. For example - <code>https://&lt;Server&gt;/adfs/services/trust</code>
<b>Single Sign-On Service Endpoint</b>	The URL to which FortiAI Ops redirects users for authentication (the ADFS SSO login URL). For example - <code>https://&lt;Server&gt;/adfs/ls/</code>
<b>Single Logout Service Endpoint</b>	The URL where FortiAI Ops sends logout requests to sign out users from ADFS. For example - <code>https://&lt;Server&gt;/adfs/ls/</code>
<b>Select Identity Provider Signing Certificate</b>	The certificate used by ADFS to sign SAML assertions. This certificate must be uploaded into FortiAI Ops local certificate.
<b>Select Identity Provider Encryption Certificate</b>	The certificate used to encrypt SAML assertions from ADFS. This certificate must be uploaded into FortiAI Ops local logs.

<b>Service Provider</b>	
Entity Id	The unique identifier for FortiAIOps as the Service Provider. For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/metadata</code>
Assertion Consumer Service Endpoint (ACS URL)	The endpoint URL where ADFS will send SAML authentication responses after successful login. For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/acs</code>
Single Logout Service Endpoint	The endpoint URL where ADFS can send logout requests to terminate the FortiAIOps user session. For example - <code>https://&lt;IP address&gt;/v1/servers/saml/act/sp/slo</code>
Select NameID Format	The format of the NameID used by ADFS to identify the user.
Select Signature Algorithm For Party Trust	The algorithm used for signing SAML messages. Both IdP and SP must support the same algorithm.
Select Digest Algorithm For Party Trust	Specifies the hashing algorithm used to compute the message digest before signing the SAML messages. It ensures data integrity and is part of the digital signature process. The Identity Provider (IdP) and Service Provider (SP) must support the same digest algorithm to validate signatures correctly. Ex - RSA-SHA-256
<b>Additional SAML Attributes</b>	
Attribute used to identify username	The name of the attribute in the SAML assertion provided by ADFS which contains the username.
Attribute used to identify email	The name of the attribute in the SAML assertion provided by ADFS which contains the email address.
Attribute used to identify groups	The name of the attribute in the SAML assertion provided by ADFS which contains the user's group memberships.
<b>Note:</b> You can enter either the fixed keywords username, email and groups or specify the exact attribute names as configured in your Identity Provider.	

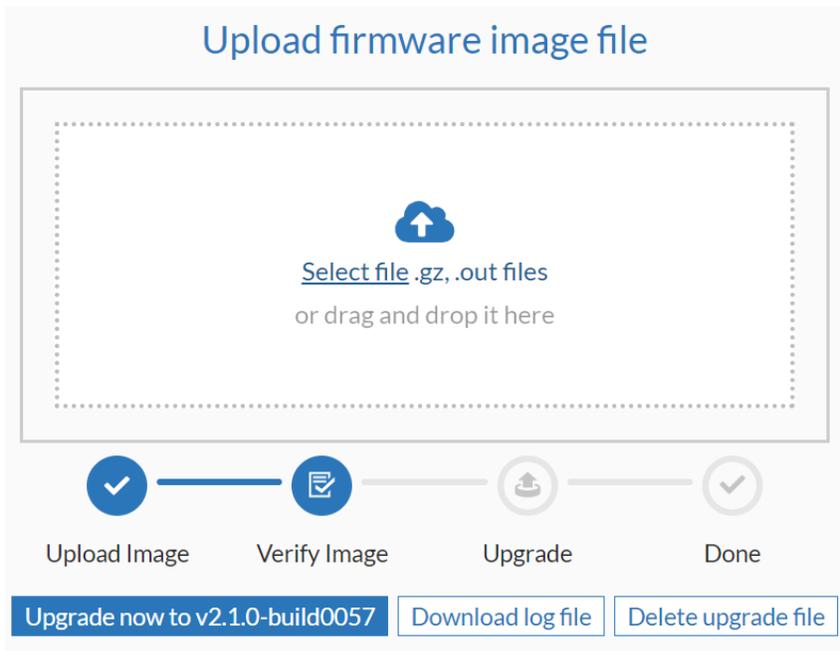
4. Click **Save**.

**Note:**

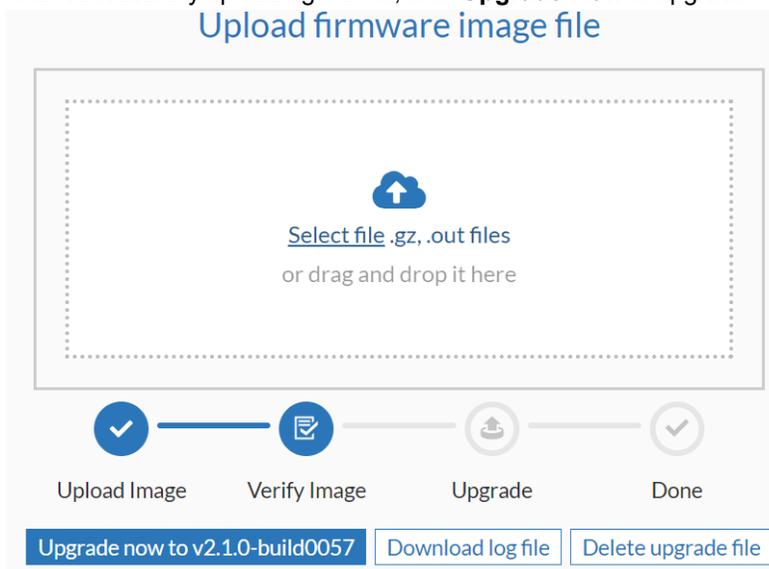
- To make changes to an Authentication Server, choose the desired server and then select the **Edit** option.
- To remove a server from the configuration, select it and then choose the **Delete** option.
- After adding the authentication server details, configure user accounts to utilize this server for remote authentication. For more information, see [Users](#).

## Upgrade

Navigate to **System > Upgrade** to upload the FortiAI Ops image file and upgrade FortiAI Ops.



1. Browse to the image file or drag and drop it in the upgrade window. Click **Upload**.
2. After successfully uploading the file, click **Upgrade Now** to upgrade FortiAI Ops to the uploaded version.



You can also choose to cancel an ongoing upload or delete the uploaded file. To download the log file with the upgrade status, click **Download log file**.

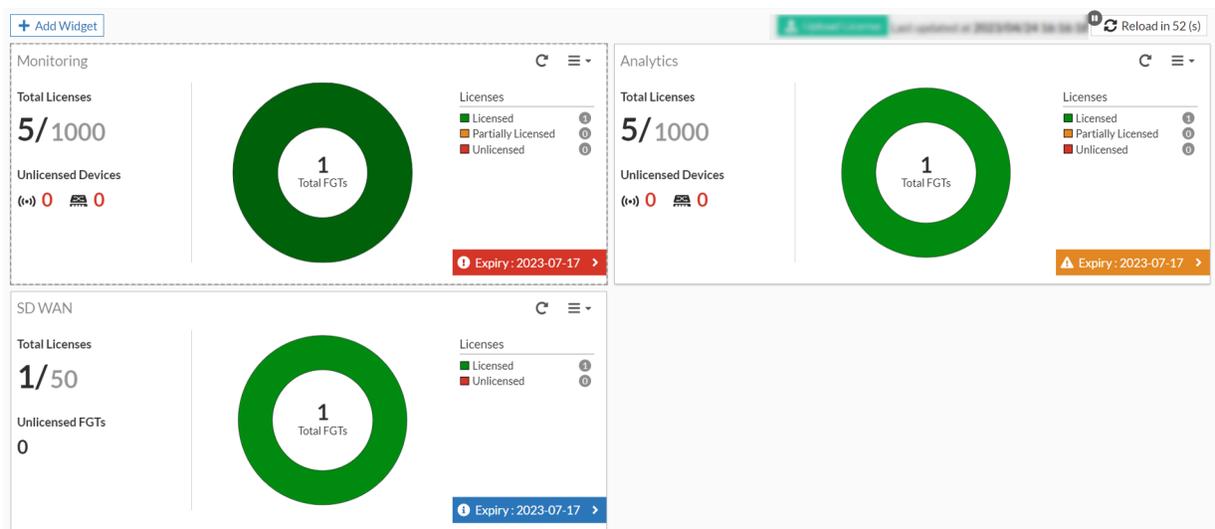
## Licensing

The licensing page displays the license information including the current license status, expiration date, and the number of Monitoring, Analytics and SD-WAN licenses.

- **Monitoring** - displays the number of license consumed for monitoring and the number of switches or APs that are unlicensed. The doughnut chart shows the count of FortiGates that are licensed, partially licensed and unlicensed. Click on the filters to view license information in detail. For monitoring license, the consumption is based on the number of switches or APs added.
- **Analytics** - displays the number of license consumed for analytics and the number of switches or APs that are unlicensed. The doughnut chart shows the count of FortiGates that are licensed, partially licensed and unlicensed. Click on the filters to view license information in detail. For analytics license, the consumption is based on the number of switches or APs added.
- **SD-WAN** - displays the number of license consumed for SD-WAN and the number of FortiGates that are unlicensed. The doughnut chart shows the count of FortiGates that are licensed and unlicensed. Click on the filters to view license information in detail. For SD-WAN license, the consumption is based on the number of FortiGates added.

### Notes:

- If you buy additional licenses or extend the existing ones through FortiCare, the expiration date displayed will show the nearest expiry and will not include the newly added license. To see the accurate license details, please check FortiCare portal.
- To purchase a co-term license or add any required extra devices to current licenses, please contact your distributor or Fortinet renewal team.

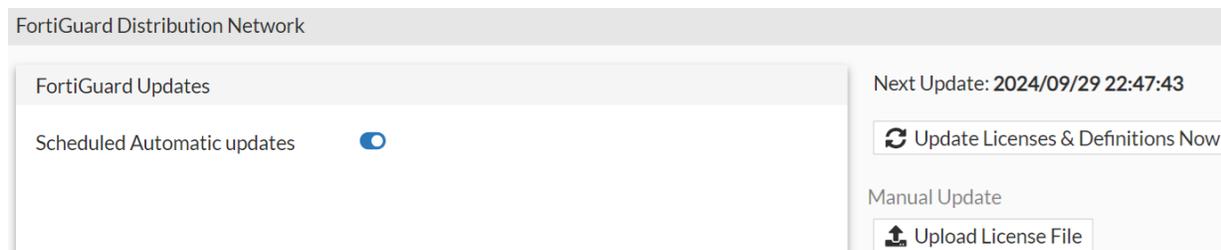


## FortiGuard

You can enable automatic updates for the FortiGuard Distribution Network (FDN) license, for accurate license data synchronization. Navigate to **System > FortiGuard** and enable **Scheduled Automatic updates**.

FortiAI Ops displays the time for the next scheduled update, if you require an immediate update, click **Update License and Definitions Now**.

After successfully obtaining the license file from Fortinet, you can upload it on this page. Click **Upload License File**.



## Location Services

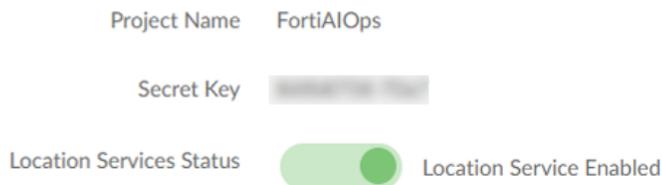
Enable location service on this page and configure the following the FortiAP Profile in your FortiGate. To configure the location services, you should perform all necessary configurations within FortiGate. However, the location service status can be enabled or disabled within FortiAI Ops.

To configure location based services:

1. Navigate to Location Based Services > FortiAI Ops.
2. In the Project Name field, enter **FortiAI Ops**.
3. In the Password field, enter the secret key displayed in System>Location Services.
4. In the FortiAI Ops server IP field, enter the FortiAI Ops IP address.
5. In the FortiAI Ops server Port field, enter 4013.
6. Enable the Report Rogue APs option.
7. Configure the Report transmit frequency (seconds) as desired.

**Note:** that a minimum of 3 APs must be placed on the map for the locationing service to detect them.

### Location Services ?



For information on the FortiGate configuration, see the [Configuration Guide](#).

## Network Interface

You can configure FortiAIOps with 4 active physical interfaces for VM deployments. The administrators can configure access protocols like HTTP, HTTPS, and so on, on a per interface basis. Navigate to **System > Network**.

Edit Interface
✕

Name	<input style="width: 90%;" type="text" value="port1"/>	
Mode	<input type="radio"/> DHCP <input checked="" type="radio"/> <b>Static</b>	
IP Address	<input style="width: 90%;" type="text" value="10.34. [REDACTED]"/>	
Netmask	<input style="width: 90%;" type="text" value="255.25 [REDACTED]"/>	
Type	<input type="radio"/> Logical <input checked="" type="radio"/> <b>Physical</b>	
AllowAccess	<input checked="" type="checkbox"/> HTTP <input checked="" type="checkbox"/> PING <input checked="" type="checkbox"/> SSH	<input checked="" type="checkbox"/> HTTPS <input checked="" type="checkbox"/> SNMP <input checked="" type="checkbox"/> TELNET

Select a port and click **Edit** to modify the following settings as required.

- **Mode** - Configure the port IP address mode; **Static** or **DHCP**.
- **IP Address & Netmask** - Enter the IPv4 address and netmask associated with this interface.
- **AllowAccess** - Select the allowed administrative access protocols from the following.
  - SSH
  - HTTP
  - HTTPS
  - Ping
  - SNMP
  - Telnet

Click **Update**.

In the **Static Routes** tab, you can create a default route to your network gateway on the interface that connects to the gateway. You can create, edit, or delete routes as required.

## Create Route

Device	port2
Destination	10.1.1.1
Gateway	10.2.1.1

- **Device** - Select the network interface that connects to the gateway.
- **Destination** - The destination IP address and netmask for this route.
- **Gateway** - Enter the IP address of the next hop router to which this route directs traffic

You can configure the DNS server settings. Enter the IP addresses for the **Primary DNS Server** and **Secondary DNS Server**.

Interfaces	Static Routes	<b>DNS</b>
Primry DNS Server	208.91.229.100	
Secondary DNS Server	208.91.229.100	

## Certificates

The Certificates page allows you to manage both local and CA certificates. Certificates provide security assurance validated by a Certificate Authority (CA).

- [Local Certificates](#)
- [CA Certificates](#)

### Local Certificates

The Local Certificates section allows you to install certificate key pair by uploading a zip file containing a certificate and a private key file. The supported zip file formats include *.tar*, *.tar.gz*, *tgz*, *zip*, *tar.xz*, and *.xz*. Also you can generate a Certificate Signing Request (CSR).

Server certificates are generated based on a specific CSR. The CSR is a request sent from an applicant to a CA in order to apply for a digital identity certificate. When a CSR is generated, the associated private key to sign and/or encrypt connections is also generated. Click on the **Generate CSR** button and fill in the required information to generate a CSR for your certificate. In the **Certificate Signing Request** window, enter the following.

- **Certificate Type** - The type of the certificate, either CA signed or self signed.
- **Certificate Name** - A name for the certificate.
- **Common Name** - The FQDN or IP address of the server.
- **Organization** - The name of your establishment or organization.

- **Locality** - The city or area where your organization is located.
- **State or Province** - The state or province of the above mentioned area.
- **Key Size** - Either 2048 or 4096.
- **Subject Alternative Name (SAN)** - It is mandatory to provide SAN.
- Optionally, you can enter the **Organization Unit** and the **Country**.
- Click **Generate**.

Generate a Certificate Signing Request

Complete this form to generate a new CSR and private key.

Certificate Type*	Self Signed
Certificate Name*	Cert-01
Common Name*	10.1.1.1
Organization Unit	e.g. Marketing
Organization	My Company
Locality	Enter Locality
State/Province	Enter state
Country/Region	Enter country code
Email Address	Enter valid email address
Subject Alternative Name*	alt
Key Size*	2048

[Reset](#) [Generate](#) [Cancel](#)

## CA Certificates

The CA Certificates section allows you to install and manage your CA certificate. To install a CA certificate, click **Install CA Certificate** and upload your CA certificate (.pem or .cer file). You can view details, download, or delete selected CA certificate after installation.

### Notes:

- To upload certificates, the Root CA, server certificate, and key file must be bundled together and uploaded in any of the supported formats.
- Certificates can only be uploaded in PEM or CER formats. Other formats are not supported. If the certificate is in any other format, such as P12 or PFX, it must be converted to a supported format before uploading.
- When using CA2, the intermediate and root CA content must be combined into a single text file (.pem file). This is necessary because only three files can be included in the bundle uploaded: Root CA, server certificate, and key file.
- To access FortiAIOps using a custom domain name, you must install the required CA and Server certificates for the domain configured on FortiAIOps.

# SAM

Service Assurance Manager (SAM) is a predictive diagnostic software with trouble-prevention capability. It diagnosis the health of the wireless network and reports the issue before the users are impacted. The FortiAIOPS infrastructure is used to perform on-demand end-to-end system tests. The SAM mode is activated in FortiAP during SAM tests. In this mode, FortiAP radios operate as a client and perform tests against another AP. Once baseline network performance is established, any schedule tests that deviate from the baseline/threshold are marked based on the SAM test values. Multiple tests can be configured with SAM.

- Connectivity tests to measure packet loss
- Throughput tests to measure performance

The tests can be configured to run on a WPA2 PSK SSIDs available in the FortiGate. SSIDs can only be configured in FortiGate.

## Notes:

- The SAM is supported only for the following.
  - F-series, G-series, and K-series FortiAPs. Currently only radio 1 (2.4GHz) and radio 2 (5GHz) are supported for SAM operations.
  - Bridge mode SSIDs
  - WPA2 PSK security mode
  - Radios in AP mode.
- SAM tests are not supported on radio 3 of the K-series and G-series FortiAP models.
- While running SAM tests, FortiAIOPS modifies the FortiAP Profile that is configured on the Access Point in FortiGate. As a result, the CAPWAP on the FortiAP is restarted.
- Creating a SAM test causes the following changes to your WLAN network, and these changes impact the clients connected to the FortiAP.
  - New FortiAP profiles are created to run the SAM tests.
  - Schedule and baseline tests are run immediately.
- [Trends](#)
- [Completed Tests](#)
- [Baseline Tests](#)
- [Schedule Tests](#)

## Trends

The Trends page in the Service Assurance section of FortiAIOPS provides a comprehensive overview of network test performance. You can analyze the total number of tests performed, their categorization as Good, Fair, or Bad, and gain insights into interface-specific data such as Interface IDs and Maximum Packet Loss values.

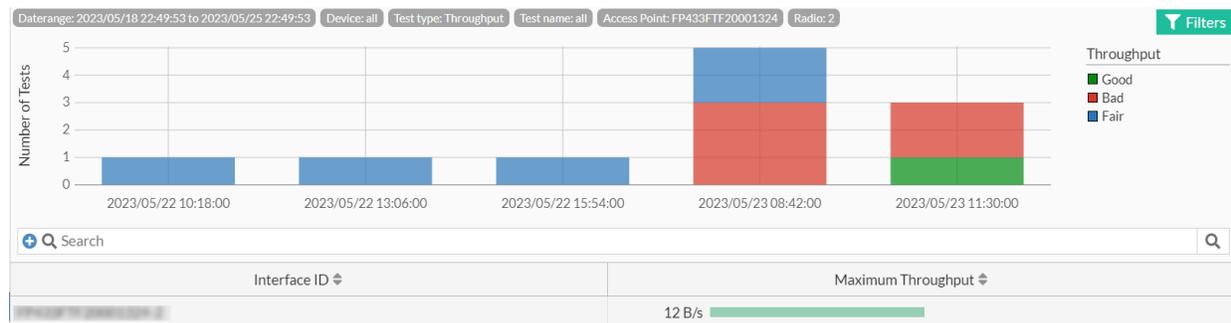
The bar chart classifies the total number of tests performed into three categories: *Good*, *Fair*, and *Bad*. This classification allows you to quickly assess the overall performance of the network based on the test results.

Each bar represents a specific time period, enabling you to identify trends and patterns in test performance over time.

If the **connectivity** test type is selected, the Trends page presents a table with the *Interface ID* and the *Maximum Packet Loss* for each interface.



If the **throughput** test type is selected, the Trends page displays a table with the *Interface ID* and the *Maximum Throughput* for each interface.



To filter the results in the bar chart, click the desired Interface ID.

## Trend Filters

The Trends page offers various filters to refine the displayed data and narrow down the analysis. The available filters include:

- **Select Device** - Select a specific device from the available options to filter the test results associated with that device.
- **Test Type** - Choose between the *Connectivity* or *Throughput* test types to filter the relevant test results.
- **Test Name** - Select a specific test name to filter the test results associated with that particular test.
- **Start Date and End Date** - Specify a start date and end date to filter the test results within a specific time range.

## Trend Filters

Select Device

Test Type  Connectivity  Throughput

Test Name

Start date

End date

## Completed Tests

Results page provides a comprehensive overview of the Connectivity/ Throughput test results, including completed tests and tests in progress.

### Completed Tests

Name	SSID	Test Type	Device Name	End Time	Result
Sch_thput	sar...	Throughput	FGT_PRIMARY_SSI	2023/05/20 16:05:20	0 1 0 0
Sch_thput_TCP	sar...	Throughput	FGT_PRIMARY_SSI	2023/05/20 16:23:37	0 1 0 0
Sch_conn_instant	sar...	Connectivity	FGT_PRIMARY_SSI	2023/05/20 16:27:56	0 1 0 0
Sch_conn_cont	sar...	Connectivity	FGT_PRIMARY_SSI	2023/05/20 16:37:06	1 0 0 0

Best Fit Columns  
Reset Table  
Select Columns

- Name
- SSID
- Test Type
- Device Name
- End Time
- Result
- Bad Results
- Device IP Address
- Device Serial
- Fair Results
- Good Results
- Start Time
- Unknown Results

Apply Cancel

The Completed Tests panel displays a list of tests that have been completed. It includes the following information for each test:

- **Test Name** - The name of the test performed.
- **SSID** - The SSID associated with the test, indicating the network or wireless access point being tested.
- **Test Type** - The type of test conducted, such as *Connectivity* or *Throughput*.
- **Device Name** - The name of the device used to perform the test, allowing users to track the source of the test data.
- **End Time** - The timestamp indicating when the test was completed.
- **Result** - The result field represents the outcome of the test. It is color-coded and displays the number of results categorized as *Good*(Green), *Bad*(Red), *Fair*(Orange), or *Unknown*(Blue). Click on the test results

to view more detailed information.

Test name	Test Type	AP name	SSID	Radio ID	Band	FortiGate Name	Serial Number
Sch_conn_101F	Connectivity	(*)	sa	1	2.4GHz		

- **Bad Results** - The number of bad results.
- **Device IP Address** - IP address of the device.
- **Device Serial** - The serial number of the device.
- **Fair Results** - The number of fair results.
- **Good Results** - The number of good results.
- **Start Time** - The timestamp indicating when the test was started.
- **Unknown Results** - The number of unknown results.

## Tests in Progress

Name	SSID	Test Type	Sweep Mode	Device Name	State
test_conn_binary	sam	Connectivity	recurring	10.1.1.1	Waiting
sch_cont_VenkatFGT	sam wpa	Connectivity	recurring	FortiGate 2000	Running
Throuput_cont	sam out	Throughput	recurring	10.1.1.1	Running
Sch_HA_conn	sam	Connectivity	recurring	10.1.1.1	Waiting

The Tests in Progress panel provides users with a list of tests that are currently in progress or scheduled. It includes the following information for each test:

- **Test Name** - The name of the test performed.
- **SSID** - The SSID associated with the test, indicating the network or wireless access point being tested.
- **Test Type** - The type of test conducted, such as *Connectivity* or *Throughput*.
- **Sweep Mode** - The sweep mode configured for the test, either recursive or baseline.
- **Device Name** - The name of the device designated to perform the test.
- **State** - The current state of the test.

## Baseline Tests

Baselines serve as reference points for evaluating the health and performance of the wireless network. Baselines play an important role in detecting deviations from expected network behavior. SAM allows for the configuration of multiple tests, including connectivity tests to measure packet loss and throughput tests to assess overall performance.

Name	Test Type	Baseline Type	Device Name	Device Serial	Device IP Address	Status	Start Time
Base_24	Connectivity	Measured	10.1.1.1	10.1.1.1	10.1.1.1	Completed	2023/05/24 12:43:06

## Add a Baseline

You have two options to execute the baseline tests.

- **Configured Test:** This option allows you to create a baseline test by providing theoretical values.
- **Measured Test:** This option allows you to create a baseline test by providing the actual baseline values. It is important to run a measured baseline when the wireless network is operating either normally or under optimal conditions, as it is used to evaluate subsequent tests.

### Connectivity Baseline

To create a connectivity baseline, perform the following steps:

1. Navigate to **SAM > Baseline**.
2. Click **+ Add**.
3. Provide the following details:

Add baseline test
✕

▢ Details

Name

Test Type Connectivity Throughput

Device

AP Radios  ✕

+

Baseline Type Configured Measured

SSID

Pre-shared Key

Ping Server

**Important Note:**

clicking on "Add" will result in following changes to your WLAN Network, which will impact connected clients on Forti AP.

- New FortiAP Profiles will be created to run Service Assurance Tests
- Baseline Test will be **executed immediately**.

Are you sure you want to proceed?

Add
Cancel

- **Name:** Name for the baseline.
- **Test Type:** Select **Connectivity** as Test Type to measure packet loss.
- **Device:** Select the device.

- **AP Radios:** Select AP radios.
- **Baseline Type:** Select baseline type, **Configured** or **Measured**
- **SSID:** Enter SSID name. SSID must be configured on a neighboring AP in FortiGate.
- **Pre-shared Key:** Enter the pre-shared key for the SSID.
- **Packet Loss(%):** Enter packet loss value in %.  
**Note:** Packet Loss(%) field is displayed only when **Configured** is selected as baseline type.
- **Ping Server:** Enter **IP address** or **FQDN** of the ping server to perform connectivity tests.

4. Click **Add**.

### Throughput Baseline

To create a throughput baseline, perform the following steps:

1. Navigate to **SAM > Baseline**.
2. Click **+ Add**.
3. Provide the following details:

Add baseline test
✕

-
Details

Name

Throughput\_baseline

Test Type

Connectivity
Throughput

Device

office-[REDACTED]

AP Radios

1.8: [REDACTED] 1
✕

+

Baseline Type

Configured
Measured

SSID

SSID-1

Pre-shared Key

●●●●●●●●

Protocol

TCP
UDP

iPerf Server

10.: [REDACTED]

Port

8001

**Important Note:**

clicking on "Add" will result in following changes to your WLAN Network, which will impact connected clients on Forti AP.

- New FortiAP Profiles will be created to run Service Assurance Tests
- Baseline Test will be **executed immediately**.

Add

Cancel

- Name: Name for the baseline.
- Test Type: Select **Throughput** as test type to measure performance.  
**Note:** Ensure that the network should have Iperf server running iperf3 traffic.

- Device: Select the device.
- AP Radios: Select AP radios.
- Baseline Type: Select baseline type, **Configured** or **Measured**.
- SSID: Enter SSID name. SSID must be configured on a neighboring AP in FortiGate.
- Pre-shared Key: Enter the pre-shared key for the SSID.
- Protocol: Select the protocol, **TCP** or **UDP**.
- iPerf Server: Enter iPerf server details. iPerf server generates TCP and UDP data streams which can be used to measure throughput.
- Port: Enter the port number.
- Throughput(MB/s): Enter throughput value in MB/s.

**Note:** Throughput(MB/s) field is displayed only when **Configured** is selected as baseline type.

#### 4. Click **Add**.

To view the detailed information of a baseline, navigate to *SAM > Baseline*, select the desired baseline from the list and click View Details.

Baseline test details						
Name = base_24 <span>×</span> <span>+</span> <span>Q</span> Search <span>Q</span>						
Name <span>⌵</span>	AP name <span>⌵</span>	SSID <span>⌵</span>	Radio ID <span>⌵</span>	Band <span>⌵</span>	Channel <span>⌵</span>	Packet Loss <span>⌵</span>
Base_24		sam_1	2	5GHz	36	100%

To delete a baseline, navigate to *SAM > Baseline*, select the desired baseline from the list and click **Delete**.

## Schedule Tests

The tests are the central activity of the SAM application that is dealt the most. A baseline test is performed occasionally, but the scheduled tests and their results are monitored constantly.

Scheduled tests are measured against a baseline test for Connectivity and Throughput using the configurations provided while creating the test. Only APs and SSIDs within the baseline test is measured in subsequent tests.

### Add a Scheduled Test

To add a Scheduled Test, follow these steps:

1. Navigate to **Service Assurance>Schedule**.
2. Click **+ Add**.
3. Provide the following details:
  - a. Enter a name for the test.
  - b. Select Test Type, either **Connectivity** or **Throughput**.  
**Note:** Based on the test type selection the advanced options filed changes.
  - c. Select a device.
  - d. Select a Baseline test.
  - e. Select Interval. **Instant** option enables to run the scheduled test once, immediately after it is saved.  
**Continuous** option enables to execute the scheduled test continuously till you disable the test.

#### 4. Configure Advance Options:

- If Connectivity is selected as Test Type, you can configure the following fields:

Field	Description
Packet Loss Good Threshold	Type a value for Packet Loss Good Threshold. If the measured packet loss is above this threshold and baseline, the test result is classified as <i>Bad</i> . If it falls between the threshold and the baseline, it is considered <i>Fair</i> , while values below the threshold and baseline are categorized as <i>Good</i> .

Add baseline test

[-] Details

Name	<input type="text" value="Testbaseline"/>
Test Type	<input checked="" type="radio"/> Connectivity <input type="radio"/> Throughput
Device	<input style="border-bottom: none; border-right: none; border-top: none; border-left: none; width: 100%;" type="text" value="FGT-latest-version"/> ▼
AP Radios	<input style="border-bottom: none; border-right: none; border-top: none; border-left: none; width: 100%;" type="text" value="F432FRTF23000305-3"/> <span style="float: right; border: 1px solid #ccc; padding: 2px;">×</span> <div style="text-align: center; margin-top: 5px;">+</div>
Baseline Type	<input checked="" type="radio"/> Configured <input type="radio"/> Measured
SSID	<input type="text" value="SAM_SSID"/>
Pre-shared Key	<input type="text" value="••••••••"/>
Packet Loss(%)	<input type="text" value="0"/>
Ping Server	<input type="text" value="8.8.8.8"/>

**Important Note:**

clicking on "Add" will result in following changes to your WLAN Network, which will impact connected clients on Forti AP.

- New FortiAP Profiles will be created to run Service Assurance Tests
- Baseline Test will be **executed immediately**.

Are you sure you want to proceed?

 Advanced Options

Packet Loss Good Threshold(%)

Redo Failed Tests

Retires

- If Throughput is selected as Test Type , you can configure the following fields:

Field	Description
Protocol	Select TCP or UDP.
Throughput Good Threshold (MB/s)	Type a value for the Throughput Good Threshold in MB/s. If the measured throughput is above this threshold, the test result is classified as <i>Good</i> . If it falls between the threshold and the baseline, it is considered <i>Fair</i> , while values below the threshold are categorized as <i>Bad</i> .

✕
Add new schedule test.

▢ Details

Name

Test Type  Connectivity  Throughput

Device

Baseline Test

Interval  Instant  Continuous

▢ Advanced Options

Protocol  TCP  UDP

Throughput Good Threshold (MB/s)

**Important Note:**

clicking on "Add" will result in following changes to your WLAN Network, which will impact connected clients on Forti AP.

- New FortiAP Profiles will be created to run Service Assurance Tests
- Schedule Test will be **executed immediately**.

Are you sure you want to proceed?

To delete a schedule, select a schedule from the list and click **Delete**.

To start a scheduled test, click start test icon under **Actions** field. To stop a running scheduled test, click stop test icon under **Actions** field.

Name	SSID	Test Type	Device Name	Baseline	Status	Interval	Action
Thput_UDP_2	sam_1	Throughput	FGT-latest-version	Throughput_UDP_HA	Running	Continuous	⊘
Thput_TCP_2	sam_1	Throughput	FGT-latest-version	Thput_TCP_HA	Stopped	Continuous	⬆

