# SD-WAN Orchestrator MEA - Administration Guide

Version 6.4.1.r7

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Email: techdoc@fortinet.com

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SD-WAN Orchestrator MEA 6.4.1.r7 Administration Guide
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# TABLE OF CONTENTS

# Change Log

| Date | Change Description |
|---|---|
| 2021-06-25 | Initial release of 6.4.1.r7. |
| 2021-08-13 | Added Address group change on page 91. |
| 2021-08-25 | Updated Address group change on page 91 and Intranet IP pool addresses on page 91. |

# Introduction

When enabled, SD-WAN Orchestrator MEA is installed on FortiManager. SD-WAN Orchestrator MEA is a management extension application (MEA) that is released and signed by Fortinet to run on FortiManager.

SD-WAN Orchestrator MEA 6.4.1.r7 requires FortiManager 6.4.1 or later, and you must be in a 6.4 ADOM to access SD-WAN Orchestrator MEA.

You can use SD-WAN Orchestrator MEA to configure and monitor SD-WAN networks on FortiGates that are managed by FortiManager. SD-WAN Orchestrator MEA is available only with FortiManager, and it supports several FortiGate models. For a list of supported FortiGate models, see the SD-WAN Orchestrator MEA 6.4.1.r7 Release Notes on the Docs Library. The release notes also identify any limitations of SD-WAN Orchestrator MEA.

This section contains the following topics:

- Simplified SD-WAN deployment on page 8
- SD-WAN Orchestrator MEA use cases on page 9
- Key concepts
- How SD-WAN Orchestrator MEA works with FortiManager

## Simplified SD-WAN deployment

SD-WAN Orchestrator MEA simplifies the configuration of an SD-WAN network by automating tasks and making some decisions for you. It is ideal for a multi-region enterprise network, where hub and edge devices interconnect to create a complex mesh of underlays and VPN overlays. SD-WAN Orchestrator MEA automates the configuration based on profiles that you define for hub and edge devices, allowing you to scale your SD-WAN deployment with ease.

This section describes what components contribute to the automation and when the automation occurs.

The first step is to create the following shared resources for SD-WAN Orchestrator MEA to use for its automation:

- Profile for primary hub devices
- Profile for secondary hub devices, if using
- Profile for edge devices
- Region for hub and edge devices

When you add a FortiGate device to SD-WAN Orchestrator MEA, you specify whether it is a primary hub device, secondary hub device, or an edge device by selecting a profile, and you specify its region by selecting a region. SD-WAN Orchestrator MEA uses this information to automatically perform the following tasks:

- Create full-mesh overlay links between all hub devices
- Create VPN tunnels between hub and edge devices in the same region
- Apply policy templates for SD-WAN from the profiles

After you install the configuration to FortiGate devices, you can monitor the SD-WAN network by using the *Monitor* tab in SD-WAN Orchestrator MEA. On the *Monitor* tab, you have real-time visibility across regions, and you can view network performance.

Another way to use automation is zero-touch provisioning. With zero-touch provisioning, you can add a model device to SD-WAN Orchestrator MEA where you specify the profile and region and what action to take when the device first comes online. For example, you can set up the model device to automatically retrieve and install the configuration and upgrade to the accepted firmware version before automatically joining the overlay mesh of the SD-WAN network. Alternately with zero-touch provisioning, you can allow administrators to approve the device when it first comes online before it automatically joins the SD-WAN network.

## SD-WAN Orchestrator MEA use cases

Although SD-WAN Orchestrator MEA is available with FortiManager, FortiManager also includes SD-WAN network configuration options. You can access the two SD-WAN configuration methods in FortiManager as follows:

- *FortiManager > Device Manager > SD-WAN*
- *FortiManager > Management Extensions > SD-WAN Orchestrator MEA*

Each SD-WAN configuration method has its strengths and limitations. The following table summarizes the strengths and limitations of each method and identifies when to use each method.

| | FortiManager SD-WAN | SD-WAN Orchestrator MEA |
|---|---|---|
| Strengths | • Full SD-WAN feature set<br>• Scales to 10K plus sites<br>• No additional license required | • VPN overlay and routing automatically configured<br>• Simplified provisioning workflow<br>• Better SD-WAN charts and graphs |
| Limitations | • VPN and routing need separate configurations | • Supports up to 1000 sites<br>• Does not expose all configurations<br>• Flexible per appliance license |
| Best suited to | • Large, complex SD-WAN deployments<br>• Customers requiring advanced WAN remediation<br>• NOC and SOC team collaboration<br>• Large enterprise, MSSP, and carrier customers | • Simple SD-WAN deployments<br>• Customers looking for intelligent traffic steering<br>• Mid-sized enterprise customers |

## Key concepts

This section contains information about the following key concepts and features of SD-WAN Orchestrator MEA:

- FortiGate devices on page 10
- Regions and links on page 10
- Normalized interfaces on page 12
- Underlay and overlay links on page 12

- Profiles on page 12
- Configuration installation on page 12
- Global routing on page 12
- Global analysis and visibility on page 13
- Device analysis and visibility on page 13
- Business rules on page 13

## FortiGate devices

SD-WAN Orchestrator MEA supports FortiGate devices. For SD-WAN Orchestrator MEA to configure and manage SD-WAN networks on FortiGate devices, the devices must be added to both FortiManager and SD-WAN Orchestrator MEA.

After the FortiGate devices are added to both products, SD-WAN Orchestrator MEA works with FortiManager to configure and monitor SD-WAN networks on the devices. See also How SD-WAN Orchestrator MEA works with FortiManager on page 13.

In general, you should add devices to both products in the following order:

1. FortiManager
2. SD-WAN Orchestrator MEA

However, in some cases you can add FortiGate devices to SD-WAN Orchestrator MEA first. For example, see Adding model devices on page 37 and Importing devices on page 46.

SD-WAN Orchestrator MEA supports FortiGate devices in high availability (HA) active-passive (AP) mode.

## Regions and links

Each region can have a primary hub, secondary hub, and multiple edge devices. The secondary hub is optional and provides redundancy.

SD-WAN Orchestrator MEA automatically creates links between devices based on settings in the assigned profiles.

### Links between hub devices

SD-WAN Orchestrator MEA automatically builds full-mesh overlay links between all primary and secondary hub devices. Primary hubs have higher priority than secondary hubs.

When a hub receives incoming traffic destined to the edge subnet of a local region, but links between hub and edge devices are down, SD-WAN Orchestrator MEA uses the links to forward traffic to another hub.

If LAN port communication is also configured between hubs in a region, the LAN port is also used.

### Links between hub and edge devices in the same region

In the same region, the connection between the hub devices (primary and secondary hubs) and edge devices depends on the VPN mode. The VPN mode is configured in profiles, and a profile is assigned to each primary hub, secondary hub, and edge device when you add it to SD-WAN Orchestrator MEA. The following VPN modes are available:

- Site-to-site VPN
- Dialup VPN

- Dialup full-mesh VPN

The following table summarizes how the VPN modes affect the connection between hub and edge devices:

| VPN Mode | Description |
|---|---|
| Site-to-site VPN | Overlay links are full-mesh between the hub devices and edge devices in the same region.<br>Edge devices from the same region communicate with each other by forwarding packets through their region's hubs. |
| Dialup VPN | Overlay links are one-to-one between hub devices and edge devices in the same region. In other words, one WAN port on each edge device establishes an IPsec tunnel only with one WAN port on hub devices.<br>In Dialup VPN mode, ADVPN is supported to create shortcut tunnels between edge devices.<br>On hub devices, select one of the following options:<br>• *NONE* - ADVPN is disabled. Edge devices from the same region will communicate with each other by forwarding packets through their region's hub.<br>• *INSIDE_REGION* - Shortcut tunnels are triggered by traffic and established only inside a region.<br>On edge devices, toggle *ADVPN* on to enable ADVPN. Toggle off to disable ADVPN. |
| Dialup full-mesh VPN | Overlay links are full-mesh between WAN ports on hub devices and WAN ports on edge devices in the same region. |

When a region contains both a primary hub and secondary hub, edge devices establish overlay links with both hubs in the region. Overlay links between edge devices and the primary hub have higher priority than overlay links between edge devices and secondary hubs.

When overlay links between edge devices and the primary hub are down, links between the edge device and the secondary hub are used to forward traffic. However when a business rule has the *Dual Hub Load Mode* option set to *ACTIVE_ACTIVE*, the links between the edge device and the secondary hub might be used, even if the links between the edge device and the primary hub are up.

If LAN port communication is configured between primary and secondary hubs in a region, traffic is forwarded by using the LAN port communication.

## Edge device communication between regions

When site-to-site VPN mode is enabled, edge devices in one region can communicate with devices in another region by using the following method:

1. Edge devices send packets to their region's hub.
2. The hub forwards the packet to the hub of the destination region.
3. The hub from the destination region forwards the packet to the final destination.

## Normalized interfaces

SD-WAN Orchestrator MEA 6.4.1 and later automatically creates the following normalized interfaces with per-platform mappings in FortiManager:

- overlay_edge2hub
- overlay_hub2edge
- overlay_hub2hub
- underlay
- sdwan_loopback

You can view normalized interfaces in FortiManager by going to *Policy & Objects* > *Object Configuration* > *Normalized Interface*.

The normalized interfaces are used by the policy blocks that SD-WAN Orchestrator MEA automatically creates. You can also use normalized interfaces with custom policies.

## Underlay and overlay links

Underlay links are data links rented or bought from an ISP. These links consist of Internet, MPLS, and 3G/LTE links.

Overlay links are virtual tunnels built on top of underlay links. These links form an IPsec secured connection between two FortiGate devices.

You specify underlay and overlay links when you configure profiles.

## Profiles

Profiles are templates that you can use to define settings for primary hub, secondary hub, and edge devices. You can also define settings for FortiGate devices in high availability (HA) clusters in active-passive (AP) mode. In a profile, you can configure settings for VPN mode, system resources, network settings, and business rules.

After creating a profile, you can apply it to multiple FortiGate devices.

You can override profile settings for individual devices.

## Configuration installation

You can configure profiles of configuration settings on SD-WAN Orchestrator MEA before setting up a device. Once the device is set up, you can install the profile of configuration settings via SD-WAN Orchestrator MEA to the device.

## Global routing

SD-WAN Orchestrator MEA automatically maintains the LAN and static subnet routes for all the devices it manages.

## Global analysis and visibility

SD-WAN Orchestrator MEA collects and aggregates information from connected FortiGate devices to provide a global traffic and health status view for the SD-WAN network.

## Device analysis and visibility

SD-WAN Orchestrator MEA provides you with information on device resource usage, underlay and overlay traffic, network health status, as well as traffic statistics based on source IP, destination IP, applications, and event logs.

## Business rules

Business rules define routing policies between subnets in SD-WAN networks or how traffic from SD-WAN subnets accesses the Internet. SD-WAN Orchestrator MEA includes predefined business rules in profiles. You can also create business rules.

# How SD-WAN Orchestrator MEA works with FortiManager

SD-WAN Orchestrator MEA works with FortiManager to configure and monitor SD-WAN networks on FortiGates.

You use SD-WAN Orchestrator MEA to configure SD-WAN networks and assign configurations to FortiGate devices. When you use SD-WAN Orchestrator MEA to apply the configuration to FortiGates, SD-WAN Orchestrator MEA uses the following method to work with FortiManager to install the configurations to FortiGates:

1. SD-WAN Orchestrator MEA automatically generates CLI scripts of the configuration.
   You can view the scripts in FortiManager on the *Device Manager* > *Scripts* pane.
2. SD-WAN Orchestrator MEA installs the CLI scripts to the *Device Manager* database in FortiManager.
3. FortiManager receives the CLI scripts, and FortiManager installs the configurations to the FortiGates.
   When the configuration is installed to FortiGates, the overlay and underlay links between all devices in the SD-WAN network are automatically created.

   SD-WAN Orchestrator MEA creates the normalized interfaces for generated tunnel interfaces. The normalized interfaces use per-platform mapping interface, and you can use them in FortiManager when you create policies. SD-WAN Orchestrator MEA also creates two policy blocks in FortiManager: one for hub devices and one for edge devices. The policy blocks include the necessary firewall policies to allow health check traffic through the VPN tunnels. You can view the policy blocks in FortiManager by going to *Policy & Objects* > *Policy Packages*.

You should use SD-WAN Orchestrator MEA for all configuration and monitoring of SD-WAN networks. You should not use FortiManager to configure SD-WAN networks on FortiGates when SD-WAN Orchestrator MEA is already enabled and configured.

However you can use FortiManager to configure firewall policies and objects for the FortiGate units in the SD-WAN network after SD-WAN is configured.

# Quick start

SD-WAN Orchestrator MEA is a flexible application. Although you must add FortiGate devices to both SD-WAN Orchestrator MEA and FortiManager, you can add the devices using several different methods, depending on need. This section describes one method, which is to add the FortiGate device to FortiManager first, and then add the device to SD-WAN Orchestrator MEA second. See also FortiGate devices on page 10.

This section provides a summary of how to get started with SD-WAN Orchestrator MEA:

1. Enable SD-WAN Orchestrator MEA. See Enabling SD-WAN Orchestrator MEA on page 14.
2. Plan your SD-WAN network. See Planning your network on page 15.
3. Create shared resources. See Creating shared resources on page 15.
4. Create profiles for hub and edge devices. See Creating profiles for all roles on page 15.
5. Add FortiGate devices to FortiManager. See Adding devices to FortiManager on page 16.
6. Add devices to SD-WAN Orchestrator MEA and install SD-WAN configurations. See Adding devices to FortiManager on page 16.
7. Install firewall policies to FortiGate devices in SD-WAN networks. See Installing firewall policies on page 16.
8. Monitor the SD-WAN network. See Monitoring devices and network traffic on page 17.

## Enabling SD-WAN Orchestrator MEA

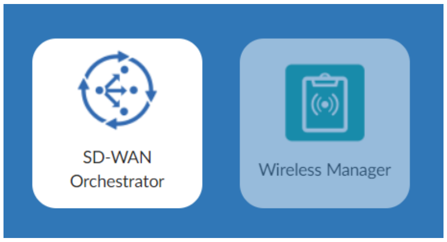
FortiManager provides access to the SD-WAN Orchestrator MEA application that is released and signed by Fortinet.

Only administrators with a *Super_User* profile can enable management extensions.

A CA certificate is required to install management extensions on FortiManager.

**To enable SD-WAN Orchestrator MEA:**

1. Ensure you are using ADOM version 6.4 or later.
2. Go to *Management Extensions*.
3. Click the grayed out tile for SD-WAN Orchestrator MEA to enable the application.
   Grayed out tiles represent management extensions. In the following example, *SD-WAN Orchestrator MEA* is enabled, and *Wireless Manager* is disabled.



4. Click *OK* in the dialog that appears. It may take some time to install the application.

## Planning your network

While individual network requirements might vary, you should consider the following principles when planning your network topology:

- Regions - Depending on how your network is structured geographically, you might need multiple regions.
- Devices - Each FortiGate device should be added to its corresponding region. In addition, each FortiGate device must be able to connect to FortiManager.
- Hub and edges - You can identify one FortiGate device from each region to act as a primary hub and another to act as a secondary hub. Each region can have one primary hub device and one secondary hub device, but multiple edge devices are allowed in each region.
  SD-WAN Orchestrator MEA automatically establishes overlay links between all hubs. Each hub also establishes tunnels to every edge device in the same region.

  If you choose not to identify a hub device, SD-WAN Orchestrator MEA does not set up an overlay network for the region.

## Creating shared resources

Before you create profiles, you can create a number of shared resources that you can select in profiles. You can create the following shared resources:

- Network resources, such as DHCP servers, DHCP relays, DNS servers, intranet IP pools, SNMP hosts, and VPN address pools.
  It is recommended to create intranet IP pools that SD-WAN Orchestrator MEA can use when it creates the SD-WAN network for selected devices.

  ISP links are automatically created when a WAN port is enabled in a profile.
- Service level agreements (SLA), such as quality levels and servers.
- Servers, such as NTP, FortiGuard, and email, that SD-WAN Orchestrator MEA can use.
- Health threshold settings

For more details, see Shared resources on page 91.

## Creating profiles for all roles

Profiles are templates that define general, system, network, and business policies for devices in SD-WAN networks. It is recommended to create the following profiles at a minimum:

- Profile for primary hub devices and secondary hub devices - see Creating profiles for hub devices on page 53
- Profile for edge devices - see Creating profiles for edge devices on page 55

See also Profile on page 53.

## Adding devices to FortiManager

Devices must be added to FortiManager and SD-WAN Orchestrator MEA. For details about adding devices to FortiManager, see the *FortiManager Administration Guide*.

## Adding devices to SD-WAN Orchestrator MEA and installing configurations

After you have planned the network, created shared resources, created profiles, and added FortiGate devices to FortiManager, you are ready to add the FortiGate devices to SD-WAN Orchestrator MEA. When you add FortiGate devices to SD-WAN Orchestrator MEA, you select profiles and install configurations to the devices to automatically create the SD-WAN network. This step executes your network plan.

Following is a summary of the process:

1. Ensure that you have created profiles for hub and edge devices.
   You should create a profile for the primary hub role and a profile for the edge role. If you are using secondary hub devices, ensure you have created a profile for the secondary hub role too.
2. Ensure that you have added FortiGate devices to FortiManager.
3. Add the FortiGate devices to SD-WAN Orchestrator MEA by adding a region.
   When you add a region to SD-WAN Orchestrator MEA, you can specify a region name, and select the devices for hub and edge roles. You can also select profiles for each device in the region.

   When you finish adding a region, SD-WAN Orchestrator MEA works with FortiManager to automatically install the configurations to the devices and create the SD-WAN network. For more information, see How SD-WAN Orchestrator MEA works with FortiManager on page 13.

   For more details about adding devices, see Device on page 33.
4. After the configurations are installed, the SD-WAN network is configured between the devices, and you can monitor the global network as well as individual devices. For details, see Monitor on page 18.

## Installing firewall policies

Although SD-WAN Orchestrator MEA is used to configure SD-WAN networks, you use FortiManager to define and install firewall policies to the FortiGates in an SD-WAN network. It is recommended to configure the SD-WAN network before you install firewall policies to FortiGate devices.

Before installing firewall policies, it is recommended to insert the policy block *SDWAN_Overlay_PB_EDGE* and *SDWAN_Overlay_PB_HUB* to policy packages, and move the policy blocks to the top. The policy block is automatically maintained by SD-WAN Orchestrator MEA. The policy block allows health-check packets and negotiation packets for IPsec tunnels between devices.

For details about using FortiManager to install firewall policies, see the *FortiManager Administration Guide*.

# Monitoring devices and network traffic

After the configurations are installed, the SD-WAN network is configured between the devices, and you can monitor the global network and individual devices:

- For global analysis and visibility, see Dashboard on page 20, Traffic on page 25 and SLA on page 27.
- For device analysis and visibility, see Devices on page 28.

# Monitor

After you have configured an SD-WAN network, you can monitor the global network as well as individual devices in the network by using the *Monitor* tree menu.

From the *Monitor* tree menu, you can access the following panes:

- Monitor status on page 18
- Dashboard on page 20
- Traffic on page 25
- SLA on page 27
- Devices on page 28
- Logs on page 31

## Monitor status

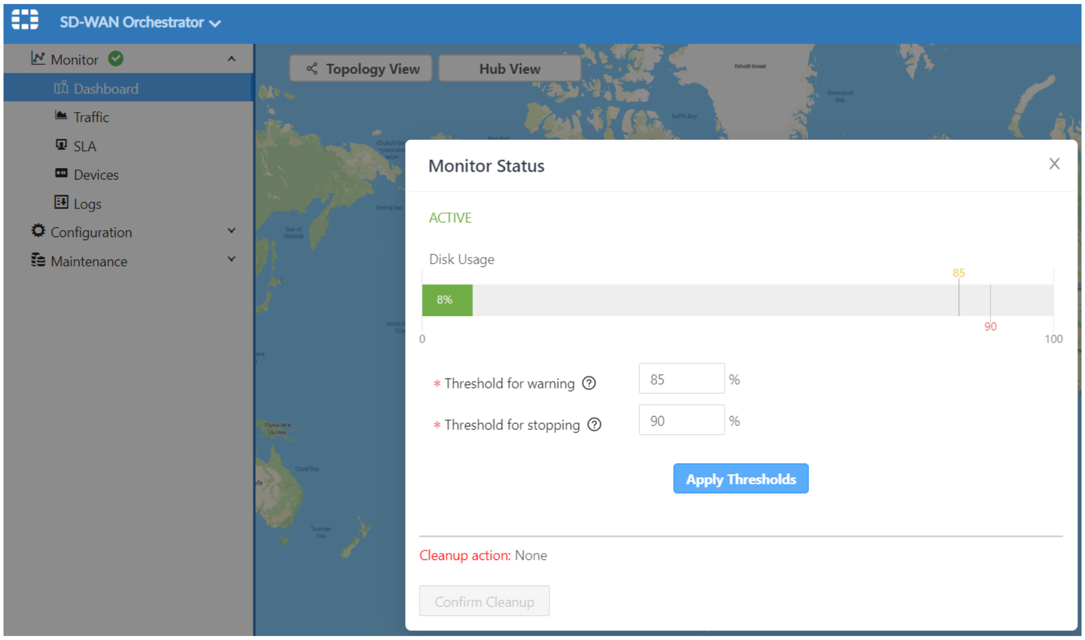
A status icon displays beside the *Monitor* tree menu to indicate one of the following monitoring statuses:

- Active (checkmark in green circle) - Monitoring is active and operating below the disk usage warning threshold. No cleanup is required.
- Warning (exclamation mark in yellow triangle) - Monitoring is active, but disk usage has passed the warning threshold. Click *Confirm Cleanup* to clear old monitoring data and reduce disk usage.
- Stopping (vertical lines in red circle) - Monitoring is stopped because disk usage has passed the stopping threshold. You must manually check disk usage.

You can adjust the warning and stopping thresholds.

**To view Monitor status details:**

1. Go to *Monitor*, and click the status icon in the tree menu.
   In the following example, the *Active* status is indicated by a checkmark in a green circle. Click the checkmark to display the *Monitor Status* dialog box.



Monitor Status

ACTIVE

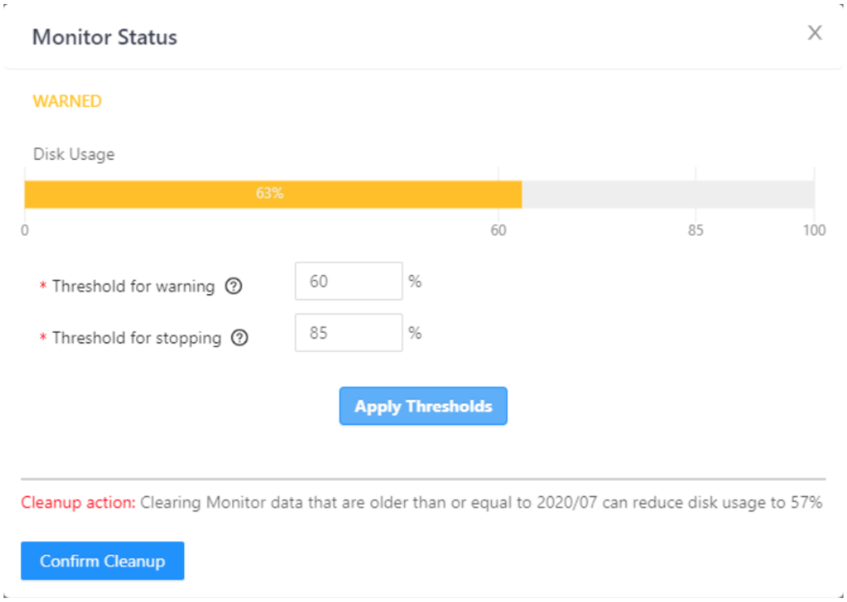
Disk Usage

* Threshold for warning: 85 %

* Threshold for stopping: 90 %

Cleanup action: None

The following example shows the *Warning* status.



Monitor Status

WARNED

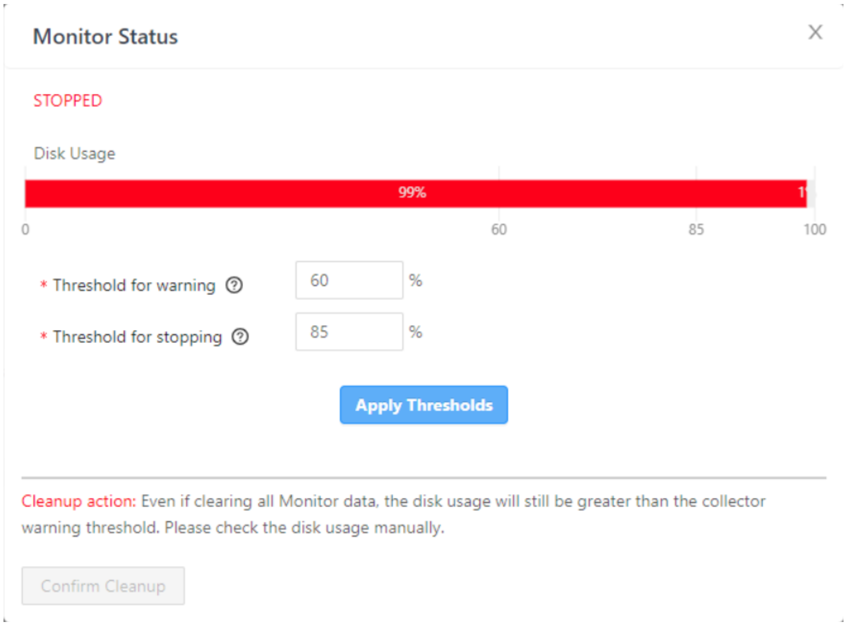
Disk Usage

* Threshold for warning: 60 %

* Threshold for stopping: 85 %

Cleanup action: Clearing Monitor data that are older than or equal to 2020/07 can reduce disk usage to 57%

The following example shows the *Stopping* status.



Monitor Status

STOPPED

Disk Usage

99%

* Threshold for warning: 60 %

* Threshold for stopping: 85 %

Cleanup action: Even if clearing all Monitor data, the disk usage will still be greater than the collector warning threshold. Please check the disk usage manually.

2. In the *Threshold for warning* and *Threshold for stopping* boxes, type new numbers, and click *Apply Thresholds* to change the warning and stopping thresholds.
3. When available, click *Confirm Cleanup* to clear old monitoring data and reduce disk usage.
4. Click *X* to close the dialog box.

# Dashboard

The *Dashboard* pane provides global analysis and visibility into all connected devices in the SD-WAN network. From the *Dashboard* pane, you can switch between the *Topology View*, *Map View* and *HubView*.

This section contains the following topics:

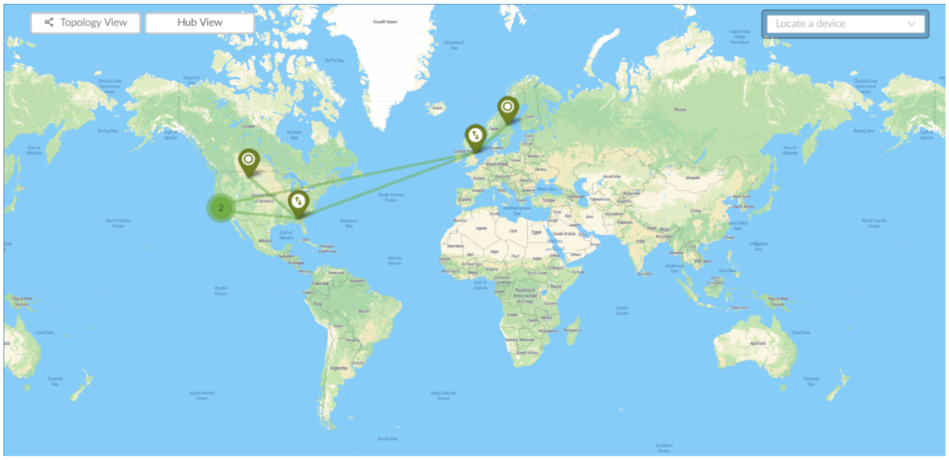
- Viewing devices on the world map on page 21
- Viewing device topology on page 21
- Viewing shortcut overlays (ADVPN) on page 22
- Viewing hub devices on page 22
- Viewing regions on page 23

When you have both a primary hub and a secondary hub in a region, only one hub icon displays on the maps. When you access details about the hub icon on a map, you can view information about both the primary and secondary hubs.

If you want to view details about individual devices in the SD-WAN network, see Devices on page 28.

## Viewing devices on the world map

*Map View* is the default, global view when you open SD-WAN Orchestrator MEA. Map view displays connected devices across the globe. You can move device icons by clicking and dragging them across the map.

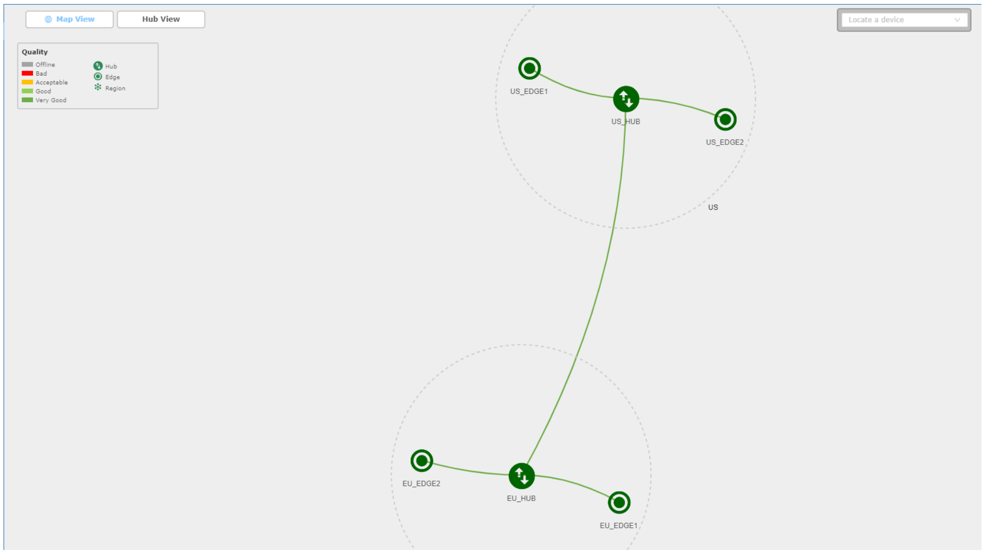


## Viewing device topology

The *Topology View* displays all connected devices across the globe in the SD-WAN network, regardless of geographical distance. Any unknown peers are also displayed.

**To view device topology:**

1. Go to *Monitor* > *Dashboard*, and click *Topology View* at the top of the map.
   The following example shows the topology view of two regions and two hubs. The color shows the quality, and the lines show the VPN tunnels between the devices. The width of the lines indicates the amount of traffic passing through the tunnel.



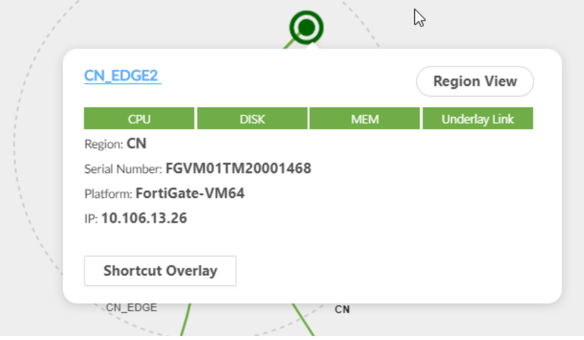
2. Click the lines to view link information, including the inbound and outbound bandwidth.

## Viewing shortcut overlays (ADVPN)

From the *Topology View*, you can view the shortcut overlay for an edge device.

**To view shortcut overlays (ADVPN):**

1. Go to *Monitor* > *Dashboard*, and click *Topology View* at the top of the map.
   The topology is displayed.
2. In the topology, click an edge device.
   A summary of the device is displayed.



CN_EDGE2

Region: CN

Serial Number: FGVM01TM20001468

Platform: FortiGate-VM64

IP: 10.106.13.26

3. Click the *Shortcut Overlay* button.
   The shortcut view is displayed.
4. Click the *Exit Shortcut View* button to exit the view.

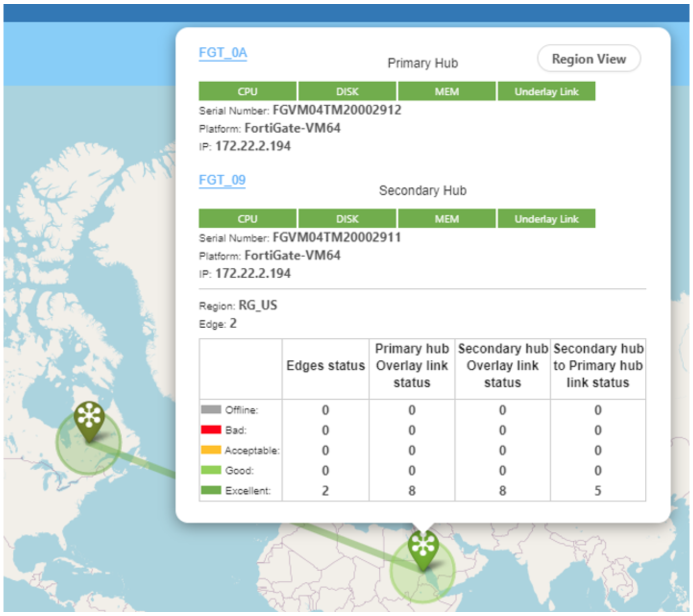
## Viewing hub devices

You can view all hub devices across the globe in the SD-WAN network on the *Hub View* pane.

When you have both a primary hub and a secondary hub in a region, only one hub icon displays on the map. When you access details about the hub icon on a map, you can view information about both the primary and secondary hubs.

**To view hub devices:**

1. Go to *Monitor* > *Dashboard*, and click *Hub View*.
2. Click a hub to view status information, including *Edges status* and *Overlay link status*.
   When the region includes both a primary hub and a secondary hub, the status displays information for both hubs. In the following example, *FGT_0A* is the primary hub, and *FGT_09* is the secondary hub.



FGT_0A Primary Hub Region View

Serial Number: FGVM04TM20002912
Platform: FortiGate-VM64
IP: 172.22.2.194

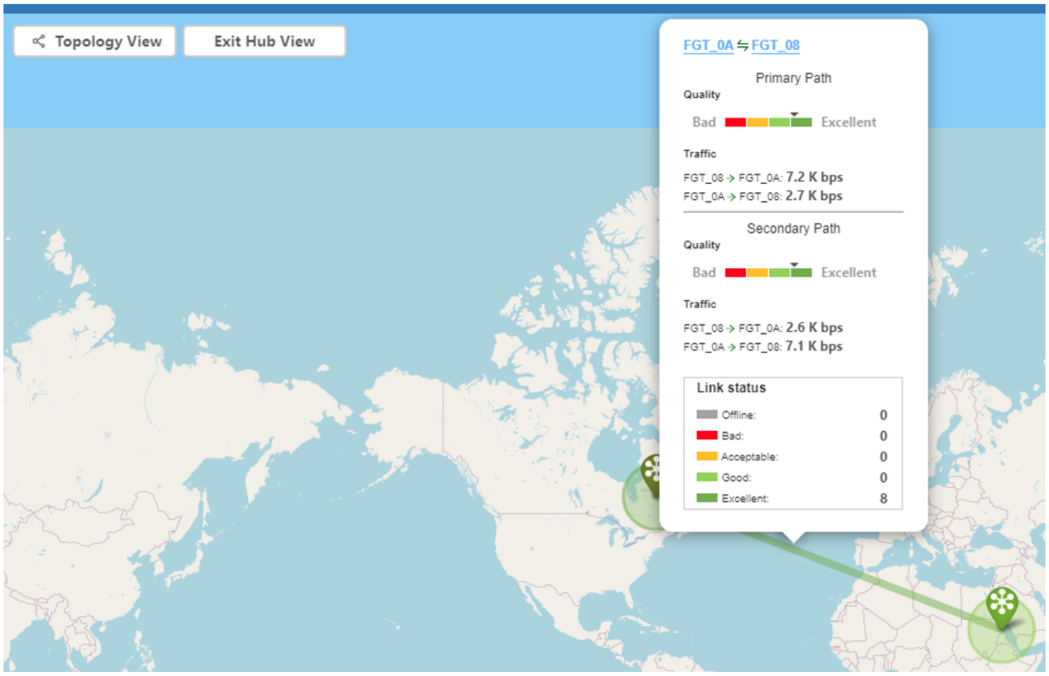
FGT_09 Secondary Hub

Serial Number: FGVM04TM20002911
Platform: FortiGate-VM64
IP: 172.22.2.194

Region: RG_US
Edge: 2

| | Edges status | Primary hub Overlay link status | Secondary hub Overlay link status | Secondary hub to Primary hub link status |
|---|---|---|---|---|
| Offline: | 0 | 0 | 0 | 0 |
| Bad: | 0 | 0 | 0 | 0 |
| Acceptable: | 0 | 0 | 0 | 0 |
| Good: | 0 | 0 | 0 | 0 |
| Excellent: | 2 | 8 | 8 | 5 |

3. Click the lines between hubs to view link information.
   When the region includes both a primary hub and a secondary hub, information about links for both hubs is displayed. In the following example, information about the *Primary Path* and the *Secondary Path* is displayed.



FGT_0A ⇋ FGT_08

Primary Path

Quality

Traffic

FGT_08 → FGT_0A: 7.2 K bps
FGT_0A → FGT_08: 2.7 K bps

Secondary Path

Quality

Traffic

FGT_08 → FGT_0A: 2.6 K bps
FGT_0A → FGT_08: 7.1 K bps

| Link status | |
|---|---|
| Offline: | 0 |
| Bad: | 0 |
| Acceptable: | 0 |
| Good: | 0 |
| Excellent: | 8 |

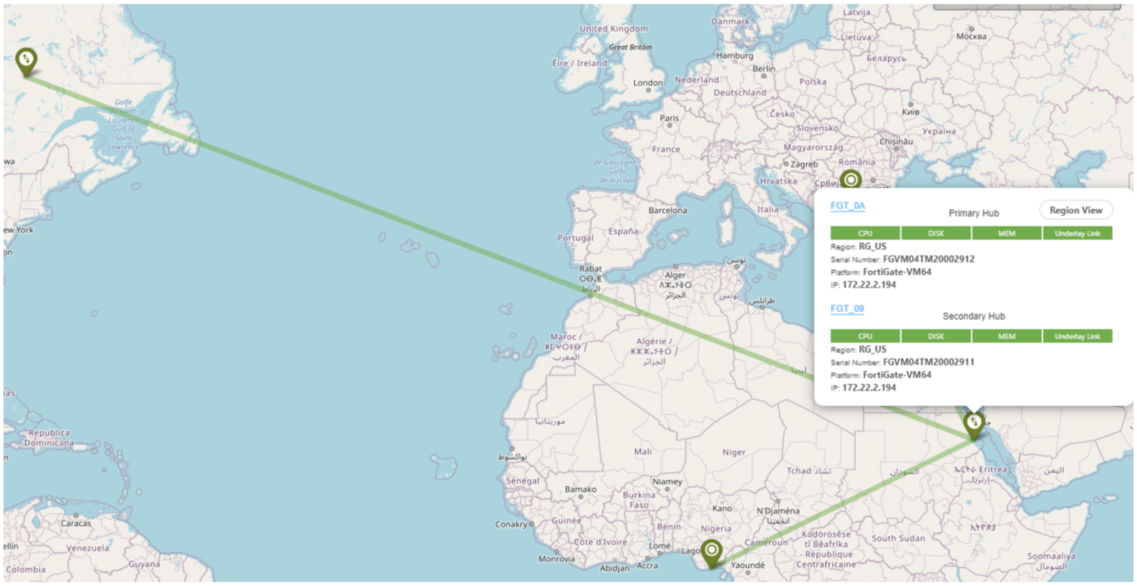
## Viewing regions

You can view the details of each region in the SD-WAN network.

When you have both a primary hub and a secondary hub in a region, only one hub icon displays on the map. When you access details about the hub icon on a map, you can view information about both the primary and secondary hubs.

**To view regions:**

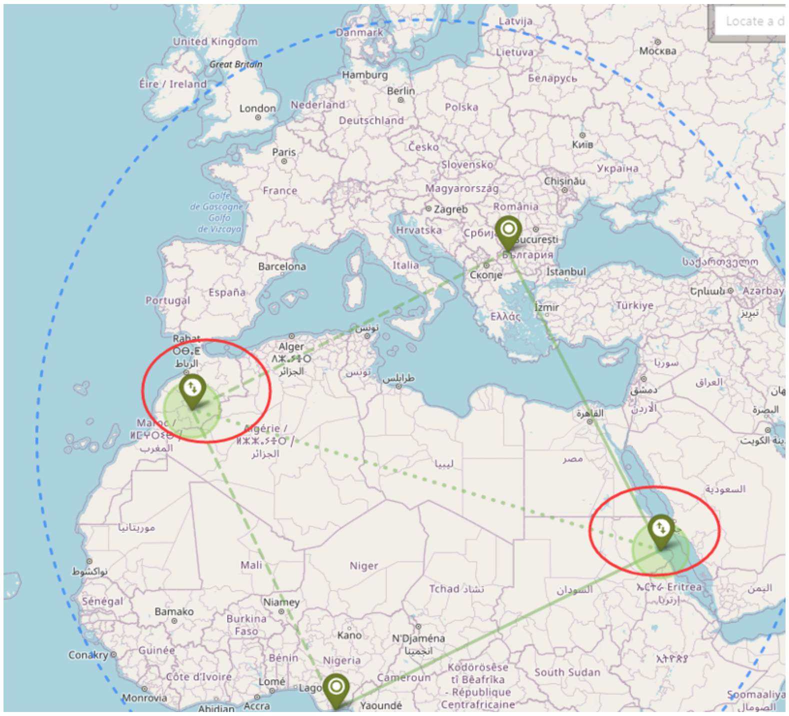
1. Go to *Monitor* > *Dashboard*, and click *Hub View*.
2. Click a hub to view status information.
   Status information is displayed, and the dialog box includes a *Region View* button.



Region: RG_US
Serial Number: FGVM04TM20002912
Platform: FortiGate-VM64
IP: 172.22.2.194

Region: RG_US
Serial Number: FGVM04TM20002911
Platform: FortiGate-VM64
IP: 172.22.2.194

3. In the dialog box, click *Region View*.
   Details about the region are displayed. In the following example, the region includes both a primary hub and a secondary hub.



# Traffic

You can view global traffic reports for all devices in the SD-WAN network by using the *Traffic* tree menu. You can also export traffic reports to PDF.

This section includes the following topics:

- Viewing global network traffic reports on page 25
- Exporting global traffic reports on page 26

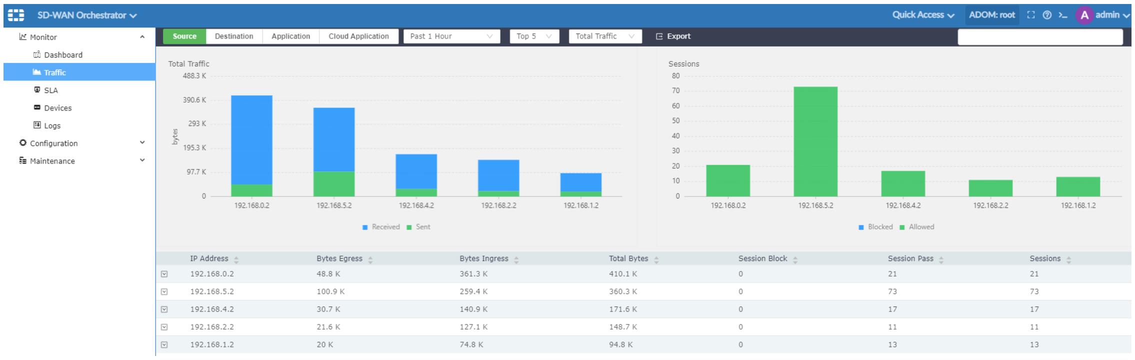
## Viewing global network traffic reports

You can view several types of reports and filter data for all traffic in the network. You can also search global traffic for specific values.

After navigating and filtering the desired traffic statistics, you can export the report to PDF. See Exporting global traffic reports on page 26.

**To view network traffic reports:**

1. Go to *Monitor* > *Traffic*.
2. Click each of the following tabs to display information about the different types of traffic: *Source*, *Destination*, *Application*, *Cloud Application*.
   Each tab contains charts and tables.



| IP Address | Bytes Egress | Bytes Ingress | Total Bytes | Session Block | Session Pass | Sessions |
|---|---|---|---|---|---|---|
| 192.168.0.2 | 48.8 K | 361.3 K | 410.1 K | 0 | 21 | 21 |
| 192.168.5.2 | 100.9 K | 259.4 K | 360.3 K | 0 | 73 | 73 |
| 192.168.4.2 | 30.7 K | 140.9 K | 171.6 K | 0 | 17 | 17 |
| 192.168.2.2 | 21.6 K | 127.1 K | 148.7 K | 0 | 11 | 11 |
| 192.168.1.2 | 20 K | 74.8 K | 94.8 K | 0 | 13 | 13 |

| Report | Description |
|---|---|
| **Source** | The statistics generated in the report are based on the source IP of the traffic. The report contains two statistical charts (*Total Traffic* and *Session*), and a statistical table.<br>Click *Source* in the table to view drill-down information.<br>You can filter the report by time frame, top sources, and total traffic. |
| **Destination** | The *Destination* pane reports the destination traffic information for all the devices deployed on the SD-WAN network.<br>The pane contains two statistical charts (*Total Traffic* and *Sessions*), and a statistical table.<br>Click a destination in the table to view drill-down information.<br>You can filter the report by time frame and top destinations, and sort the report by total traffic or sessions. |
| **Application** | The statistics generated in the report are based on application traffic. The pane contains two statistical charts (*Total Traffic* and *Sessions*), and a statistical table.<br>Click an application name in the table to view drill down information.<br>You can filter the report by time frame and top sources, and sort the report by total traffic or sessions. |
| **Cloud Application** | The statistics generated in the report are based on application traffic. The report contains four statistical charts (*File size*, *File number*, *Sessions*, and *Videos Number*), as well as a statistical table.<br>Click an application name in the table to view drill down information.<br>You can filter the statistics by time frame and top applications, and sort the report by total traffic or sessions. |

3. Hover over the charts to display additional details.
4. Expand the rows for each application to display additional details.
5. Click the predefined values in the toolbar to filter the charts based on time, priority, and all traffic or sessions.
6. Click the search box to select a filter, and type a value to search for.

## Exporting global traffic reports

After you display the desired traffic details on the *Traffic* pane, you can export the traffic report to PDF.

### To export traffic reports:

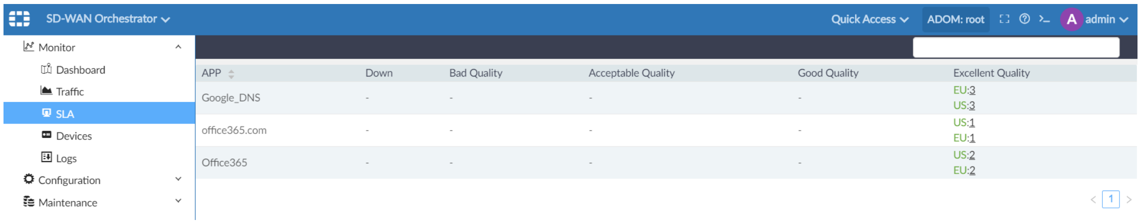
1. Go to *Monitor* > *Traffic*.
2. Display the desired traffic report. See Viewing global network traffic reports on page 25.
3. In the toolbar, click *Export*.
   A PDF of the traffic report is exported to your computer.

## SLA

You can view information about service level agreements for all regions in the SD-WAN network by using the *SLA* tree menu.

### To view SLA:

1. Go to *Monitor* > *SLA*.
   The quality rating for the devices in each region is displayed by application. The number of devices in each region is displayed as <region name>:<number of devices>, for example *EU:3*.

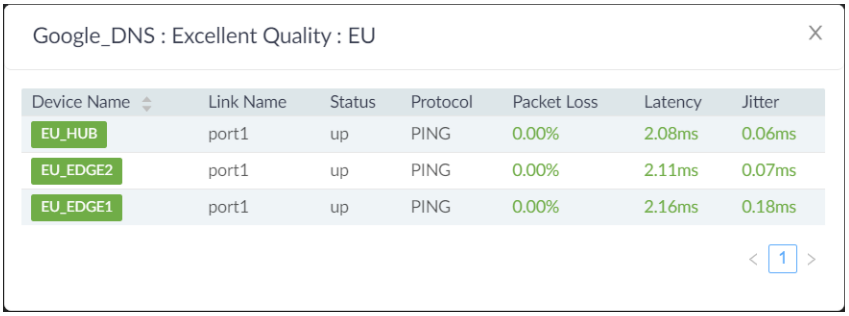


| APP | Down | Bad Quality | Acceptable Quality | Good Quality | Excellent Quality |
|---|---|---|---|---|---|
| Google_DNS | - | - | - | - | EU:3<br>US:3 |
| office365.com | - | - | - | - | US:1<br>EU:1 |
| Office365 | - | - | - | - | US:2<br>EU:2 |

   The following table identifies the SLA criteria for each rating.

| SLA quality rating | SLA criteria |
|---|---|
| Down | Down |
| Bad Quality | - |
| Acceptable Quality | Meets low criteria |
| Good Quality | Meets medium criteria |
| Excellent Quality | Meets high criteria |

2. Click the <number of devices> to view details.
   A dialog box with information about *Link Name*, *Status*, *Protocol*, *Packet Loss*, *Latency*, and *Jitter* is displayed.



Google_DNS : Excellent Quality : EU

| Device Name | Link Name | Status | Protocol | Packet Loss | Latency | Jitter |
|---|---|---|---|---|---|---|
| EU_HUB | port1 | up | PING | 0.00% | 2.08ms | 0.06ms |
| EU_EDGE2 | port1 | up | PING | 0.00% | 2.11ms | 0.07ms |
| EU_EDGE1 | port1 | up | PING | 0.00% | 2.16ms | 0.18ms |

3. Click *X* to close the dialog box.

# Devices

You can view information about each device in the SD-WAN network by using the *Devices* tree menu.

This section contains the following topics:

- Viewing device overviews on page 28
- Viewing device link reports on page 28
- Viewing device traffic reports on page 30
- Viewing device SLA on page 30
- Viewing device local branches on page 31

If you want to view information about all devices in the SD-WAN network, see Dashboard on page 20.

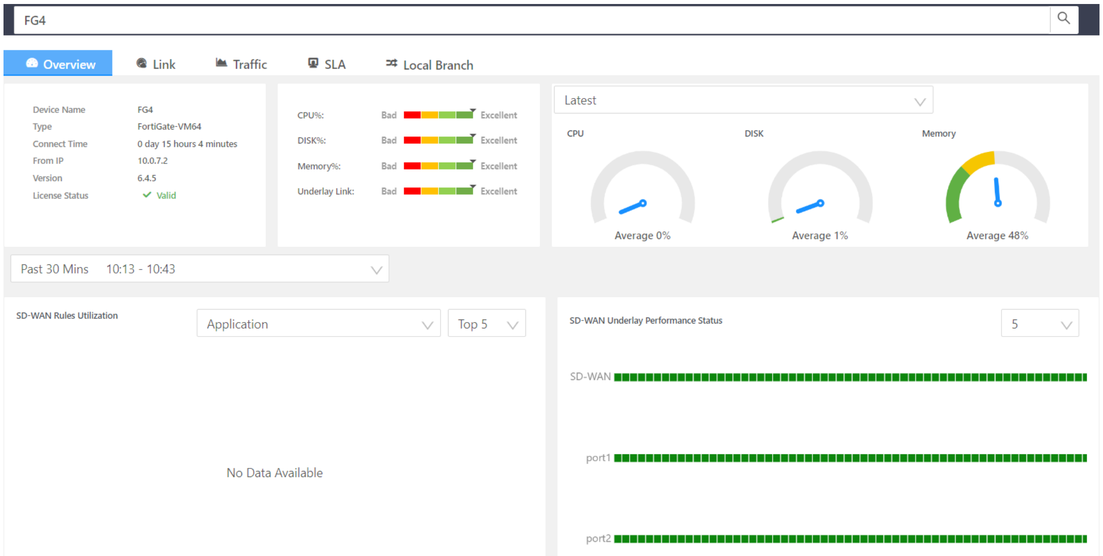
## Viewing device overviews

You can use the *Devices* > *Overview* tab to monitor SD-WAN rules utilization, performance status, disk utilization, traffic, and more for each device in the SD-WAN network.

When a device is part of an HA cluster, information about the devices in the cluster is displayed.

### To view device overviews:

1. Go to *Monitor* > *Devices* > *Overview*.
   You can switch between devices by using the dropdown menu in the toolbar at the top of the page.



FG4

| | |
|---|---|
| Device Name | FG4 |
| Type | FortiGate-VM64 |
| Connect Time | 0 day 15 hours 4 minutes |
| From IP | 10.0.7.2 |
| Version | 6.4.5 |
| License Status | ✓ Valid |

Past 30 Mins 10:13 - 10:43

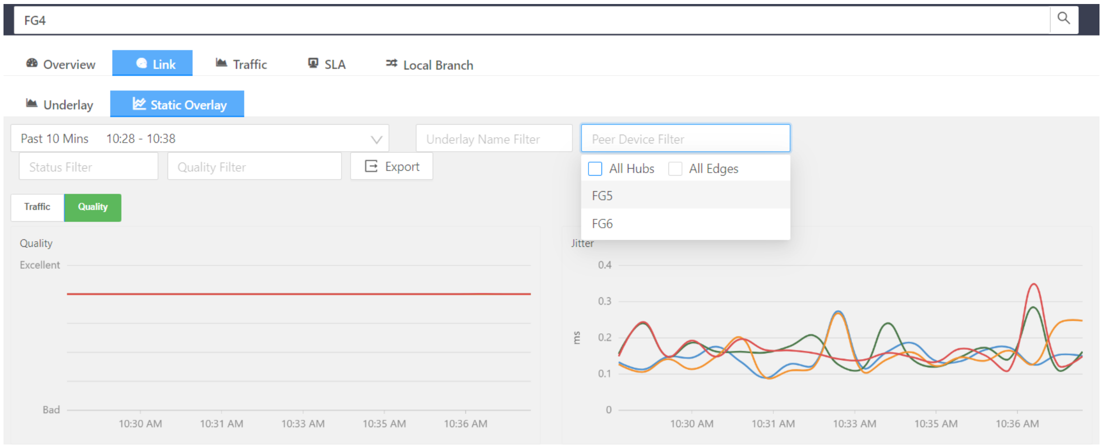
2. Hover over each chart to display additional detail.
3. You can also filter data in some charts by selecting a filter from the dropdown menu.

## Viewing device link reports

The *Devices* > *Link* tab contains information about the underlay, static overlay, and shortcut overlay links.

**To view device link reports:**

1. Go to *Monitor* > *Devices* > *Link*.
   The *Static Overlay* tab displays for the selected device. You can also click the *Underlay* or *Shortcut Overlay* tabs.
   You can switch between devices by using the dropdown menu in the toolbar at the top of the page.



| Report | |
|---|---|
| **Static Overlay** | The *Static Overlay* pane is the default view of the *Link* page and includes the views:<br>• **Quality**: Contains reports of quality evaluation, jitter, latency, and packet loss in the device overlay links.<br>• **Traffic**: Contains reports about the total inbound/outbound throughput and session. |
| **Underlay** | The Underlay pane includes the following views:<br>• **Traffic**: Contains reports about the total inbound and outbound throughput, and session ramp-up of the SD-WAN underlay links. The table features information about the device's status, inbound/outbound bytes, and session of the underlay link.<br>• **Quality**: Contains reports about performance status, packet loss, jitter, and latency for the device overlay links. |
| **Shortcut Overlay** | Available when ADVPN is enabled on devices, and shortcut links are established.<br>The charts monitor the total inbound and outbound throughput of the shortcut overly links.<br>The table features information about peer devices, inbound/outbound bytes, and bandwidth.<br>You can also view unknown peer devices and unknown peer ports. |

2. Set one or more of the following filters to change the view.
   Not all filters are available on all tabs.

| Filter | |
|---|---|
| **Time** | From the time dropdown menu, select a time range. |

| Filter | |
|---|---|
| **Underlay Name Filter** | Click the *Underlay Name Filter* box to select an underlay port. |
| **Peer Device Filter** | Click the *Peer Device Filter* box to select one of the following filters:<br>• *All hubs*<br>• *All edges*<br>Alternately, you can select one or more of the individual devices displayed in the filter list. |
| **Status Filter** | Click the *Status Filter* box to select *Up* or *Down* status. |
| **Quality Filter** | Click the *Quality* box to select one of the following filters:<br>• *Disconnected*<br>• *Bad*<br>• *Acceptable*<br>• *Good*<br>• *Excellent* |

3. Click the *Export* button to export the report to PDF.

## Viewing device traffic reports

The *Devices* > *Traffic* tab displays traffic reports for the selected device in the SD-WAN network.

For more information about traffic reports, see Viewing global network traffic reports on page 25.

**To view device traffic reports:**

1. Go to *Monitor* > *Devices* > *Traffic*.
   The *Source* tab displays for the selected device. You can also click the *Destination*, *Application*, *Cloud Application*, and *Internet Service* tabs to display additional reports for the selected device.

   You can switch between devices by using the dropdown menu in the toolbar at the top of the page.
2. After you display the desired traffic details, you can export the report to PDF by clicking *Export*.
   A PDF of the traffic report is exported to your computer.

## Viewing device SLA

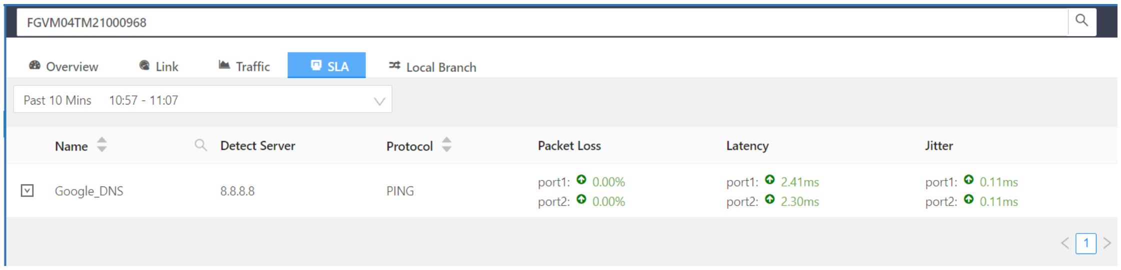
The *Devices* > *SLA* tab displays information about service level agreements for the selected device in the SD-WAN network.

**To view device SLA:**

1. Go to *Monitor* > *Devices* > *SLA*.
   The *SLA* tab displays for the selected device.

   You can switch between devices by using the dropdown menu in the toolbar at the top of the page.

   You can select a different history range from the dropdown menu in the *SLA* content pane. The default is *Past 10 Mins*.



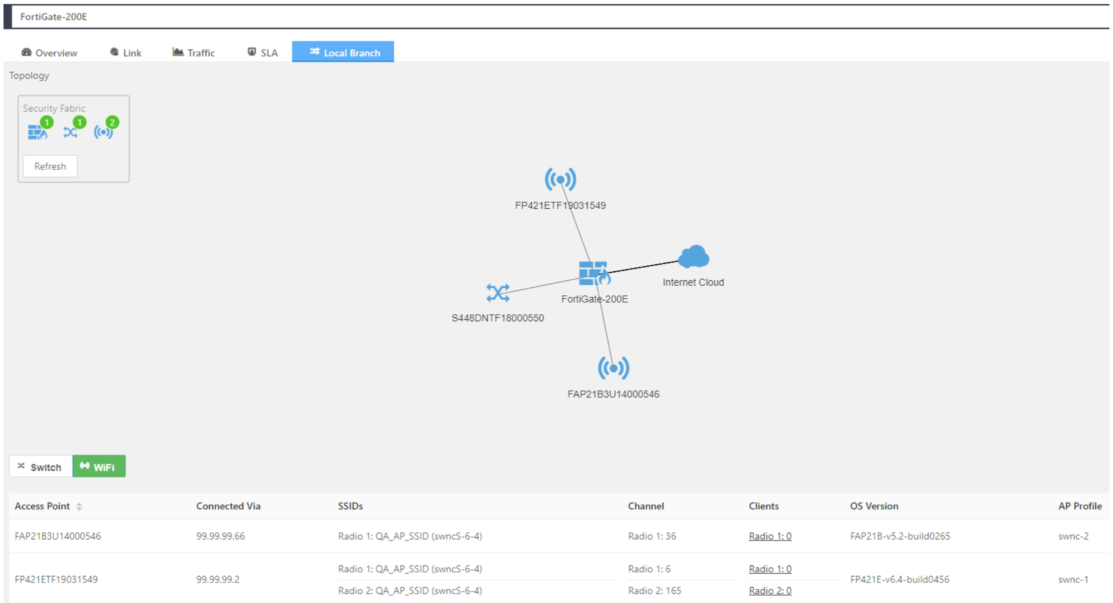
| Name | Detect Server | Protocol | Packet Loss | Latency | Jitter |
|---|---|---|---|---|---|
| Google_DNS | 8.8.8.8 | PING | port1: 0.00%<br>port2: 0.00% | port1: 2.41ms<br>port2: 2.30ms | port1: 0.11ms<br>port2: 0.11ms |

## Viewing device local branches

The *Devices* > *Local Branch* tab displays topology and statistics for connected FortiSwitch and FortiAP devices.

### To view device local branches:

1. Go to *Monitor* > *Devices* > *Local Branch*.
   The *Local Branch* tab displays the topology for the selected device.
   You can switch between devices by using the dropdown menu in the toolbar at the top of the page.

   | Access Point | Connected Via | SSIDs | Channel | Clients | OS Version | AP Profile |
   |---|---|---|---|---|---|---|
   | FAP21B3U14000546 | 99.99.99.66 | Radio 1: QA_AP_SSID (swncS-6-4) | Radio 1: 36 | Radio 1: 0 | FAP21B-v5.2-build0265 | swnc-2 |
   | FP421ETF19031549 | 99.99.99.2 | Radio 1: QA_AP_SSID (swncS-6-4)<br>Radio 2: QA_AP_SSID (swncS-6-4) | Radio 1: 6<br>Radio 2: 165 | Radio 1: 0<br>Radio 2: 0 | FP421E-v6.4-build0456 | swnc-1 |

2. In the *Security Fabric* box, hover the move over the *FortiGate*, *FortiSwitch*, and *FortiAP* icons to display information about connected devices.
3. At the bottom of the page, click the *Switch* tab to display information about connected FortiSwitch devices.
4. At the bottom of the page, click the *WiFi* button to display connected FortiAP devices.

# Logs

Some logs are visible only in the root ADOM, and the root ADOM must be version 6.4 or later.

You can view event logs for SD-WAN Orchestrator MEA by using the *Logs* tree menu. The log displays the time, type, sub type, and message for events. You can filter the logs, and download a zip file of filtered logs.

### To view and filter logs:

1. Go to *Monitor* > *Logs*.
2. For each log entry, click *Detail* to view more details.
3. Filter logs by setting the following options:

| | |
|---|---|
| Start | Click the *Start* box to select a start date. |
| End | Click the *End* box to select an end date. |
| Type | Click the *Type* box to select one or more log types. |
| Subtype | Click the *Subtype* box to display the log types, and then expand each log type to select one or more subtypes. |
| Device | Click the *Device* box to select a device. |

   Selected filters are applied immediately.
4. Remove filters:
   - Click the *x* above a selected filter to remove it.
   - Hover over each option with selected filters, and click the *x* in the top-right corner to remove all filters for the option.
5. Click *Download* to download a zip file of log information.
   Inside the zip file is a .csv file of log information.

# Configuration

You can configure SD-WAN networks by using the *Configuration* tree menu. From the *Configuration* tree menu, you can access the following panes:

- Device on page 33
- Profile on page 53
- Shared resources on page 91
- Global routing on page 101

## Device

You can add devices and regions to an SD-WAN network by using the *Device* tree menu. When you add a device to SD-WAN Orchestrator MEA, you assign a profile of configuration settings to it, and then install the configuration.

You can use several different methods to add devices to SD-WAN Orchestrator MEA.

It is recommended to configure profiles before you add devices to SD-WAN Orchestrator MEA. See Profile on page 53.

This section contains the following topics:

- Adding devices on page 34
- Adding devices in HA clusters on page 37
- Adding model devices on page 37
- Adding model devices in HA clusters on page 38
- Adding regions on page 40
- Adding unauthorized devices on page 41
- Adding devices with authorized FortiExtenders on page 43
- Synchronizing with FortiManager on page 45
- Installing configuration changes on page 46
- Importing devices on page 46
- Viewing configuration status on page 47
- Overriding device settings on page 48
- Adding static routes on page 49
- Creating BGP neighbors on page 50
- Updating regions on page 51
- Deleting regions on page 51
- Monitoring devices on page 52
- Replacing FortiGate serial numbers on page 52

## Adding devices

When you add a device to SD-WAN Orchestrator MEA, you also define the configuration and control when to install the configuration to the device.

Before you use this method to add devices to SD-WAN Orchestrator MEA, you must add the devices to FortiManager.

After you add the device, you can change the settings by editing the assigned profile or by overriding settings for each device.

**To add a device:**

1. Ensure that you have created profiles for hub and edge devices. See Profile on page 53.
2. Go to *Configuration* > *Device*.
3. In the toolbar, click + *Device*.
   The *Device* dialog box opens.

4. On the *General* tab, configure the following settings:

| Option | Description |
|---|---|
| **Device Name** | Enter the name of the device. |
| **Host Name** | Enter the host name. |
| **Profile Name** | Select a profile from the dropdown, or click *Create* to create a new profile. |
| **First Online Action** | Specify how to manage device configuration when the device comes online for the first time. Choose from:<br>• *NONE*: Select to disable automatic configuration action. Instead you can manually initiate configuration installation after adding the device to SD-WAN Orchestrator MEA.<br>• *RETRIEVE_CONFIG*: Select to import some of the configuration settings from the device when the device comes online for the first time. Settings such as host name, WAN port, WAN port IP, LAN/DMZ port, and static route are imported. WAN and LAN settings from the imported configuration automatically override the assigned WAN and LAN settings from the SD-WAN Orchestrator MEA profile. You should use the profile to assign additional settings.<br>• *SYNC_CONFIG*: Select to install the SD-WAN Orchestrator MEA configuration associated with the profile when the device comes online for the first time. |
| **Serial Number** | Enter the device serial number. |
| **Type** | The model is displayed after you enter the device serial number. |
| **Region** | Select a region from the dropdown, or click *Create Region* to create a new region. |
| **Password** | The *Password* option is displayed after the device serial number is added and recognized.<br>Specify how to handle the device password. Choose from:<br>• No change: Keep the original password of the newly added device.<br>• Manual: Specify the password of the device.<br>• Auto: Generate a random password for the device automatically. Click the eye icon to view the password. |

5. Click *OK*.

## Adding VDOMs

You can use VDOMs for primary or secondary hub devices as well as edge devices.

Before using this method to add VDOMs to SD-WAN Orchestrator MEA, you must:

- Create VDOMs on the FortiGate device
  This method adds the VDOM to SD-WAN Orchestrator MEA, so you must create the VDOM first.
- Configure interfaces for the VDOM by using FortiManager
  This method retrieves interfaces for the VDOM from FortiManager, so you must configure them first.

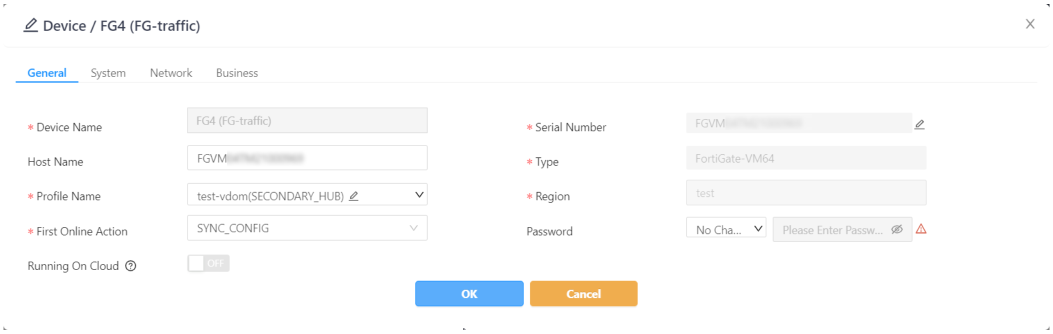
After you add the VDOM to SD-WAN Orchestrator MEA and retrieve VDOM interfaces, overrides are automatically enabled in the assigned profile for WAN and LAN settings.

### To add a VDOM:

1. Ensure that you have created a profile for a VDOM. See Creating profiles for VDOMs on page 56.
2. Go to *Configuration > Device*.
3. In the toolbar, click + *Device*.
   The *Device* dialog box opens.
4. On the *General* tab, configure the following settings:
   The following table identifies settings that are specific to adding a VDOM. You can set the remaining settings as desired.

| Option | Description |
|---|---|
| **Device Name** | Select the device VDOM. |
| **Profile Name** | Select a profile that is configured for VDOMs. |

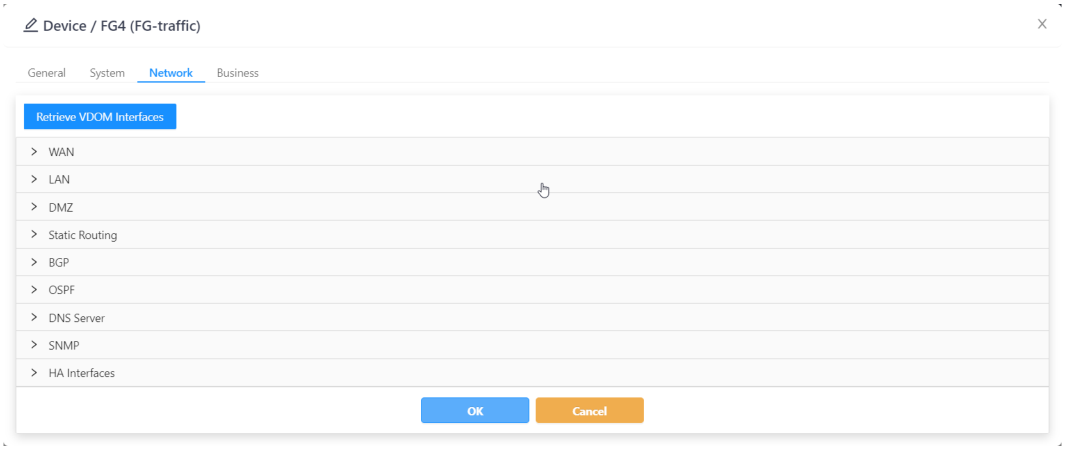
5. Click *OK*.
   The VDOM is added to the device list.
6. For the VDOM in the device list, click the *Update* button.
   The settings for the VDOM open for editing, and the *General* tab is displayed.



Device / FG4 (FG-traffic)

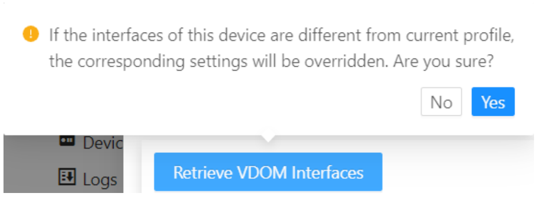
* Device Name: FG4 (FG-traffic)
Host Name: FGVM[redacted]
* Profile Name: test-vdom(SECONDARY_HUB)
* First Online Action: SYNC_CONFIG
Running On Cloud: OFF
* Serial Number: FGVM[redacted]
* Type: FortiGate-VM64
* Region: test
Password: No Cha... Please Enter Passw...

7. Go to the *Network* tab, and click *Retrieve VDOM Interfaces*.



Device / FG4 (FG-traffic)

A warning message is displayed.



If the interfaces of this device are different from current profile, the corresponding settings will be overridden. Are you sure?

8. Click *Yes* to proceed.
   Interfaces are retrieved, and the *Override* option is automatically toggled on for LAN and WAN ports in the associated profile.
9. On the *Success* message dialog box, click the *X* to close it.

## Adding devices in HA clusters

You can add managed FortiGates in a high availability (HA) cluster in active-passive (AP) mode to SD-WAN Orchestrator MEA.

Before you use this method to add an HA cluster to SD-WAN Orchestrator MEA, you must add the devices in the HA cluster to FortiManager.

Ensure that you have created profiles for devices in the HA cluster before you add the cluster to SD-WAN Orchestrator MEA. The profile defines the interface settings, and the *HA Monitor* and *Heartbeat Interface* settings in the profile should match the same settings in FortiManager.

After you add the cluster to SD-WAN Orchestrator MEA, you cannot change the cluster name or cluster members.

If the HA cluster is in a VM environment, ensure that you enable *Promiscuous mode* and *Mac address changes* in the vswitch.

### To add devices in HA clusters:

1. Ensure you have created profiles for devices in HA clusters. See Creating profiles for HA devices on page 58.
2. Perform a factory reset on the FortiGates in the HA cluster.
3. Add the managed devices to SD-WAN Orchestrator MEA. See Adding devices on page 34.

## Adding model devices

You can add an offline FortiGate device to SD-WAN Orchestrator MEA by using its serial number. This is called adding a model device.

When you add a model device to SD-WAN Orchestrator MEA, the model device is added to FortiManager too.

### To add devices by serial number:

1. Ensure that you have created profiles for hub and edge devices. See Profile on page 53.
2. Go to *Configuration* > *Device*.

3. In the *Device* menu, select + *Model Device*.
   The + *Model Device* dialog box opens.
4. Configure the following settings:

| Option | Description |
|---|---|
| **Serial Number** | Enter the serial number for the device. |
| **Device Name** | Enter a name for the device. |
| **Host Name** | Enter the host name. |
| **Type** | The model is displayed after you enter the device serial number. |
| **Profile Name** | Select a profile from the dropdown, or click *Create* to create a new profile. |
| **Region** | Select a region from the dropdown, or click *Create Region* to create a new region. |
| **First Online Action** | Specify how to manage device configuration when the device comes online for the first time. Choose from:<br>• *NONE*: Select to disable automatic configuration action. Instead you can manually initiate configuration installation after adding the device to SD-WAN Orchestrator MEA.<br>• *RETRIEVE_CONFIG*: Select to import some of the configuration settings from the device when the device comes online for the first time. Settings such as host name, WAN port, WAN port IP, LAN/DMZ port, and static route are imported. WAN and LAN settings from the imported configuration automatically override the assigned WAN and LAN settings from the SD-WAN Orchestrator MEA profile. You should use the profile to assign additional settings.<br>• *SYNC_CONFIG*: Select to install the SD-WAN Orchestrator MEA configuration associated with the profile when the device comes online for the first time. |
| **Enforce Firmware Version** | (Optional) Select the required FortiOS version for the device when it comes online. |
| **Password** | The *Password* option is displayed after the device serial number is added and recognized.<br>Specify how to handle the device password. Choose from:<br>• No change: Keep the original password of the newly added device.<br>• Manual: Specify the password of the device.<br>• Auto: Generate a random password for the device automatically. Click the eye icon to view the password. |
| **HA Mode** | Select *STANDALONE* to disable HA mode.<br>Select *AP* to enable active-passive HA mode. |

5. Click *OK*.

## Adding model devices in HA clusters

SD-WAN Orchestrator MEA supports active-passive (AP) HA mode, and the FortiGates in the cluster must be the same type of model.

You can add two or more offline FortiGate devices to a high availability (HA) cluster by using the device serial numbers. When you add model devices to SD-WAN Orchestrator MEA, the model devices are added to FortiManager too.

Interfaces for the HA cluster are defined in profiles, and you select a profile when you add model devices to SD-WAN Orchestrator MEA.

If you choose a profile without HA interface definitions, default ports are used.

#### To add model devices to HA clusters:

1. Ensure that you have created profiles for HA devices. See Creating profiles for HA devices on page 58.
2. Go to *Configuration* > *Device*.
3. In the *Device* menu, select + *Model Device*.
   The + *Model Device* dialog box opens.
4. Configure the following settings for the primary device and cluster:

| Option | Description |
|---|---|
| **Serial Number** | Enter the serial number for the primary device in the HA cluster. |
| **Device Name** | Enter a name for the primary device. |
| **Host Name** | Not available when *HA Mode* is set to *AP*. |
| **Type** | The model is displayed after you enter the device serial number. |
| **Profile Name** | Select a profile for HA devices from the dropdown, or click *Create* to create a new profile. |
| **Region** | Select a region from the dropdown, or click *Create Region* to create a new region. |
| **First Online Action** | Specify how to manage device configuration when the device comes online for the first time. Choose from:<br>• *NONE*: Select to disable automatic configuration action. Instead you can manually initiate configuration installation after adding the device to SD-WAN Orchestrator MEA.<br>• *RETRIEVE_CONFIG*: Select to import some of the configuration settings from the device when the device comes online for the first time. Settings such as host name, WAN port, WAN port IP, LAN/DMZ port, and static route are imported. WAN and LAN settings from the imported configuration automatically override the assigned WAN and LAN settings from the SD-WAN Orchestrator MEA profile. You should use the profile to assign additional settings.<br>• *SYNC_CONFIG*: Select to install the SD-WAN Orchestrator MEA configuration associated with the profile when the device comes online for the first time. |
| **Enforce Firmware Version** | (Optional) Select the required FortiOS version for the device when it comes online. |
| **Password** | The *Password* option is displayed after the device serial number is added and recognized.<br>Specify how to handle the device password. Choose from:<br>• No change: Keep the original password of the newly added device.<br>• Manual: Specify the password of the device.<br>• Auto: Generate a random password for the device automatically. Click the eye icon to view the password. |
| **HA Mode** | Select *STANDALONE* to disable HA mode.<br>Select *AP* to enable active-passive HA mode. |

| Option | Description |
|---|---|
| **Cluster Name** | Available when *HA Mode* is set to *AP*.<br>Type a name for the HA cluster. Minimum length is 1 character, and maximum length is 21 characters. The #,(,) characters are not supported. |
| **HA Password** | (Optional) Available when *HA Mode* is set to *AP*.<br>Specify a password for the HA cluster. Maximum length is 128 characters. |
| **Priority** | Type a high number between 0-255 to set the priority for the primary HA member. |
| **HA Secondaries** | Available when *HA Mode* is set to *AP*.<br>Click *Add* to add a secondary model device to the HA cluster by serial number.<br>In the *SerialNumber #1* box, type the serial number for the FortiGate device in the HA cluster. It should be the same type of serial number as the primary FortiGate in the HA cluster.<br>In the *Priority* box, type the priority restriction for the device in the HA cluster. Type a number between 0 and 255. |

5. Under *HA Secondaries*, add one or more secondary devices.
   a. Click +*Add*.
      A row of options for the first secondary device is displayed.
   b. In the *SerialNumber #1* box, type the serial number for a secondary device in the HA cluster.
   c. In the *Priority* box, type a number between 0-255 that is lower than the priority for the primary device.
      Configuration of the secondary device is complete.
   d. (Optional) *Click +Add* to add and configure another secondary device.
6. Click *OK*.

## Adding regions

A region refers to a cluster of devices in one geographical location. Each region has one primary hub device that is connected to one or more edge devices. You can also configure an optional secondary hub device in the region for redundancy.

When you create a region, you select the devices, assign the profiles of configuration settings, and install configurations to all devices in the region.

### To create a region:

1. Ensure that you have created profiles for hub and edge devices. See Profile on page 53.
2. Go to *Configuration* > *Device*.
3. In the toolbar, click + *Region*.
4. In the *Name* field, type a name for the region.
5. In the *Hub* table, select a device from the list.
6. In the *Edges* table, select one or more devices to connect to the hub.
7. (Optional) In the *Description* field, enter a description of the region.
8. Click *OK*.
   It may take a while to complete the configuration.

## Adding unauthorized devices

When unauthorized devices have been added to FortiManager, you can add them to SD-WAN Orchestrator MEA. Unauthorized devices are devices that have been added to *Device Manager* in FortiManager, but not yet authorized for management by FortiManager.

The + *Add Unauthorized Device* option is hidden in SD-WAN Orchestrator MEA when no unauthorized devices are available in FortiManager.

**To add unauthorized devices:**

1. Go to *Configuration* > *Device*.
2. In the toolbar, click + *Unauthorized Device <number>*.
   The *Add Unauthorized Devices* dialog box opens.
3. Configure the following settings:

| Option | Description |
|---|---|
| **ADOM** | Select the ADOM that contains the unauthorized device. |
| **Unauthorized** | Click the box, and select the device. |

4. Click *OK*.

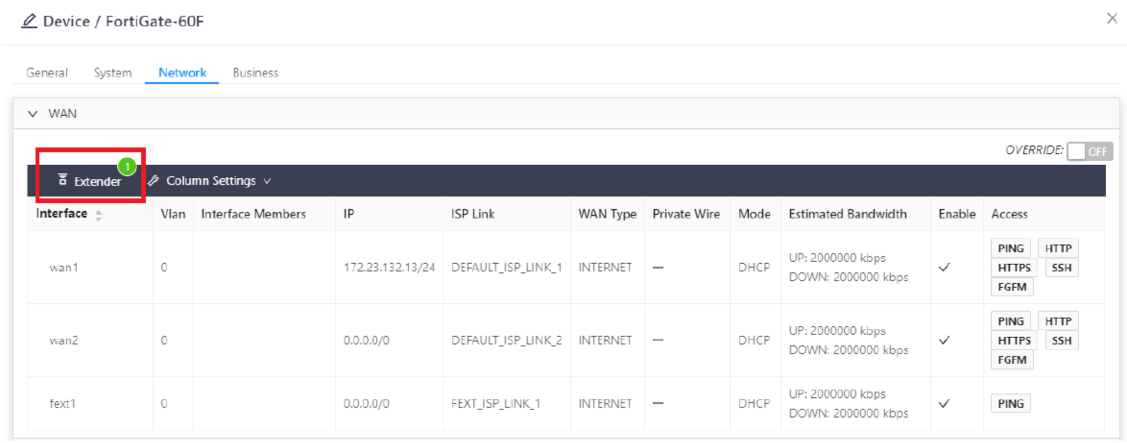
## Adding FortiExtenders to online devices

You can use FortiExtender as a WAN port. This topic describes how to add a FortiExtender to a device managed by SD-WAN Orchestrator MEA.

After you add FortiExtender settings to the profile, you can add FortiExtender to the device. SD-WAN Orchestrator MEA detects the FortiExtender, and you can authorize FortiExtender.

**To add FortiExtenders to online devices:**

1. Ensure that you have created a profile with a FortiExtender WAN port configured. See Creating profiles with FortiExtender WAN ports on page 57.
2. Attach FortiExtender to the managed device.
   FortiExtender is detected.
3. Authorize FortiExtender for the WAN port by overriding the profile settings for the device:
   a. Go to *Configuration* > *Device*.
   b. Double-click the device to open the profile for editing.
      The *General* tab is displayed.
   c. Go to the *Network* tab.
      An unauthorized FortiExtender has been detected.

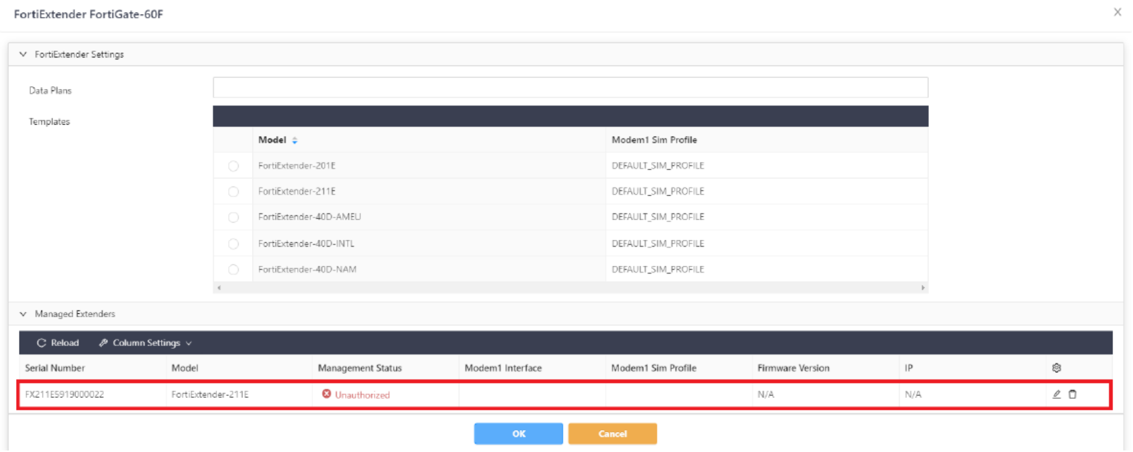


Device / FortiGate-60F

WAN

| Interface | Vlan | Interface Members | IP | ISP Link | WAN Type | Private Wire | Mode | Estimated Bandwidth | Enable | Access |
|---|---|---|---|---|---|---|---|---|---|---|
| wan1 | 0 | | 172.23.132.13/24 | DEFAULT_ISP_LINK_1 | INTERNET | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING HTTP<br>HTTPS SSH<br>FGFM |
| wan2 | 0 | | 0.0.0.0/0 | DEFAULT_ISP_LINK_2 | INTERNET | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING HTTP<br>HTTPS SSH<br>FGFM |
| fext1 | 0 | | 0.0.0.0/0 | FEXT_ISP_LINK_1 | INTERNET | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING |

**d.** Click *Extender*.
The *FortiExtender* dialog box is displayed.



FortiExtender FortiGate-60F

FortiExtender Settings

Data Plans

Templates

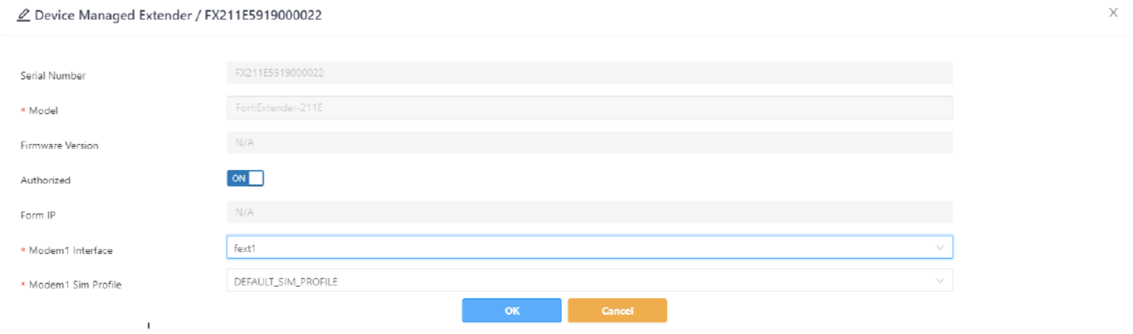
| | Model | Modem1 Sim Profile |
|---|---|---|
| ○ | FortiExtender-201E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-211E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-AMEU | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-INTL | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-NAM | DEFAULT_SIM_PROFILE |

Managed Extenders

| Serial Number | Model | Management Status | Modem1 Interface | Modem1 Sim Profile | Firmware Version | IP | |
|---|---|---|---|---|---|---|---|
| FX211E5919000022 | FortiExtender-211E | ☒ Unauthorized | | | N/A | N/A | |

**e.** Under *Managed Extenders*, click the *Update* button for the unauthorized device.
The *Device Managed Extender* dialog box is displayed.

**f.** Toggle *Authorized* to on, and click *OK*.



Device Managed Extender / FX211E5919000022

| | |
|---|---|
| Serial Number | FX211E5919000022 |
| * Model | FortiExtender-211E |
| Firmware Version | N/A |
| Authorized | ON |
| Form IP | N/A |
| * Modem1 Interface | fext1 |
| * Modem1 Sim Profile | DEFAULT_SIM_PROFILE |

The FortiExtender is authorized, and the *Device Managed Extender* dialog box is closed.

**g.** Click *OK*.
The *FortiExtender* dialog box is closed.

**h.** Click *OK*.
The profile override changes are saved.

4. Install the SD-WAN Orchestrator MEA profile changes to the device with authorized FortiExtender. See Installing configuration changes on page 46.

## Adding devices with authorized FortiExtenders

You can use FortiExtender as a WAN port. This topic describes how to add a device with an authorized FortiExtender to SD-WAN Orchestrator MEA.

After you create a profile with FortiExtender configured as a WAN port, you can add the device with authorized FortiExtender to SD-WAN Orchestrator MEA.

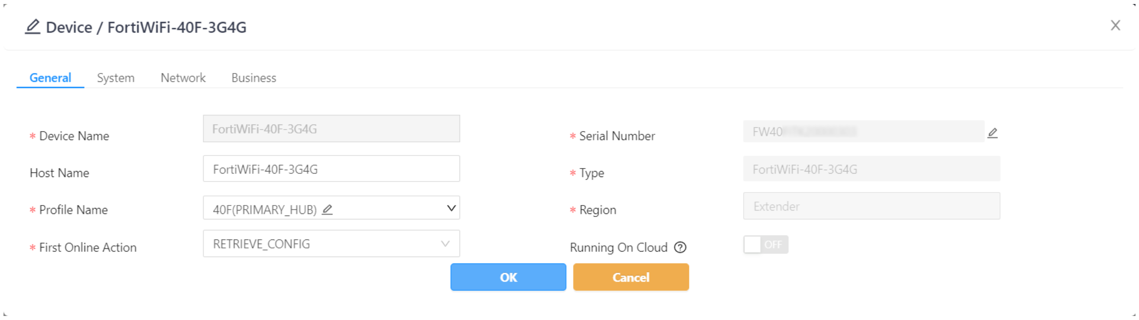
When you add the device to SD-WAN Orchestrator MEA, select the profile and enable the configuration to be retrieved. Wait for the configuration to be retrieved from the device. After the configuration is retrieved, FortiExtender is bound to the port and displays as authorized in the WAN settings.

### To add devices with authorized FortiExtenders:

1. Ensure that you have created a profile with a FortiExtender WAN port configured. See Creating profiles with FortiExtender WAN ports on page 57.
   When creating profiles for managed devices with authorized FortiExtenders, ensure that you use the same settings for FortiExtender in the SD-WAN Orchestrator MEA profile that you used in FortiOS because the profile will be applied to all authorized FortiExtenders.
2. Add the device with authorized FortiExtender to SD-WAN Orchestrator MEA:
   a. Go to *Configuration* > *Device*.
   b. In the toolbar, click + *Device*.
      The *Device* dialog box opens.
   c. On the *General* tab, configure the following settings:
      The following table identifies settings that are specific to adding FortiExtender as a WAN port. You can set the remaining settings as desired.

| Option | Description |
|---|---|
| **Device Name** | Select a model that supports FortiExtender, such as FortiWiFi-40F-3G4G. |
| **Profile Name** | Select a profile that is configured to use FortiExtender as a WAN port. |
| **First Online Action** | Select *RETRIEVE_CONFIG*. |

   d. Click *OK*.
      Wait for the configuration to be retrieved from the device.
3. Go to *Monitor* > *Logs* to view progress about the process.
   In time you should see a log subtype of *device_online* for the device and *retrieve_config*.
   After the configuration is retrieved, the FortiExtender displayed as authorized in SD-WAN Orchestrator MEA.
4. Check that FortiExtender is authorized for the WAN port.
   a. For the device, click the *Update* button to open the settings.
      The *General* tab is displayed.

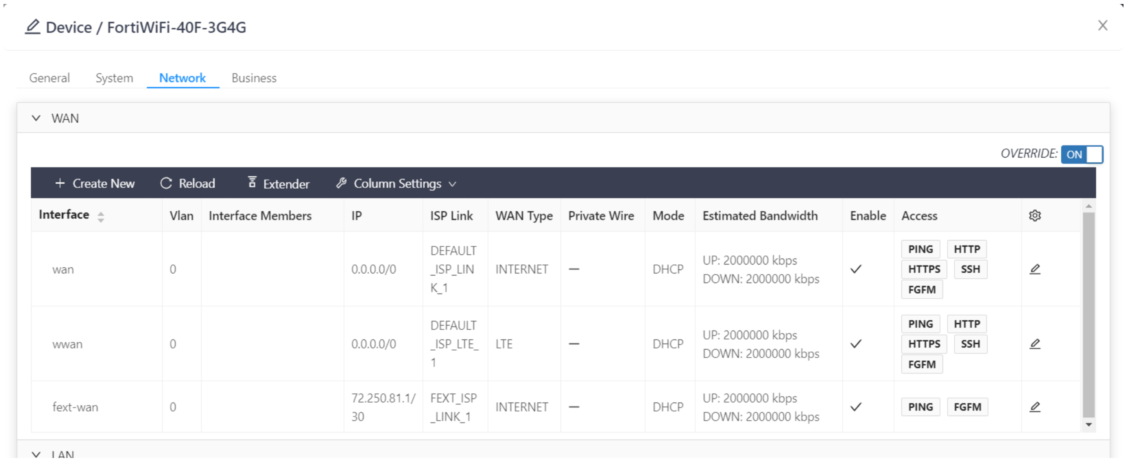


Device / FortiWiFi-40F-3G4G

General | System | Network | Business

| | | | |
|---|---|---|---|
| * Device Name | FortiWiFi-40F-3G4G | * Serial Number | FW40[redacted] |
| Host Name | FortiWiFi-40F-3G4G | * Type | FortiWiFi-40F-3G4G |
| * Profile Name | 40F(PRIMARY_HUB) | * Region | Extender |
| * First Online Action | RETRIEVE_CONFIG | Running On Cloud | OFF |

b. Go to the *Network* tab, and expand the *WAN* section.
FortiExtender displays in the interface list.



Device / FortiWiFi-40F-3G4G

General | System | Network | Business

WAN

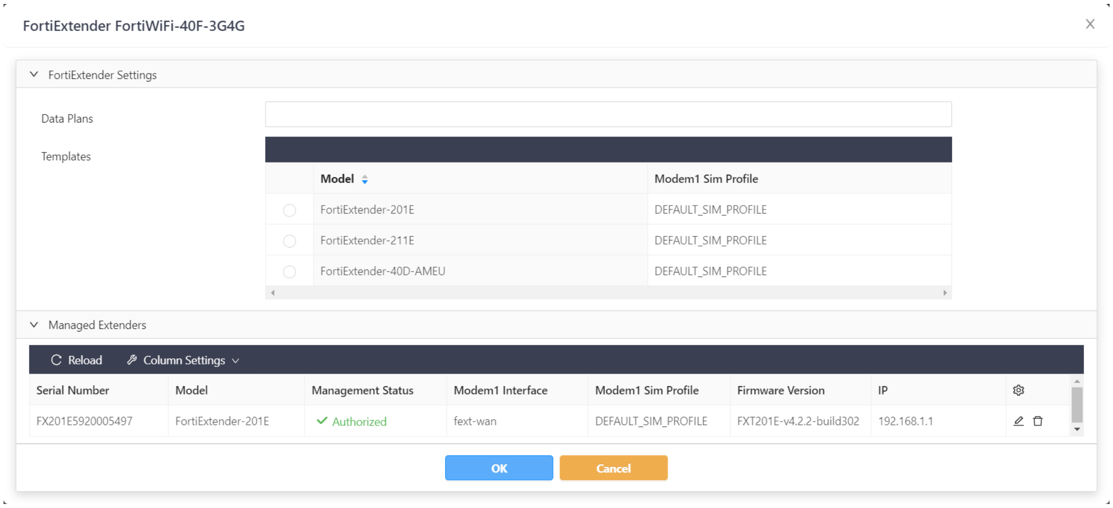
OVERRIDE: ON

| Interface | Vlan | Interface Members | IP | ISP Link | WAN Type | Private Wire | Mode | Estimated Bandwidth | Enable | Access |
|---|---|---|---|---|---|---|---|---|---|---|
| wan | 0 | | 0.0.0.0/0 | DEFAULT_ISP_LINK_1 | INTERNET | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING HTTP<br>HTTPS SSH<br>FGFM |
| wwan | 0 | | 0.0.0.0/0 | DEFAULT_ISP_LTE_1 | LTE | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING HTTP<br>HTTPS SSH<br>FGFM |
| fext-wan | 0 | | 72.250.81.1/30 | FEXT_ISP_LINK_1 | INTERNET | — | DHCP | UP: 2000000 kbps<br>DOWN: 2000000 kbps | ✓ | PING FGFM |

LAN

c. In the toolbar, click *Extender*.
The *FortiExtender Settings* dialog box is displayed.

d. Expand the *Managed Extenders* section, and ensure that FortiExtender is authorized.



FortiExtender FortiWiFi-40F-3G4G

FortiExtender Settings

Data Plans

Templates

| | Model | Modem1 Sim Profile |
|---|---|---|
| ○ | FortiExtender-201E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-211E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-AMEU | DEFAULT_SIM_PROFILE |

Managed Extenders

| Serial Number | Model | Management Status | Modem1 Interface | Modem1 Sim Profile | Firmware Version | IP |
|---|---|---|---|---|---|---|
| FX201E5920005497 | FortiExtender-201E | ✓ Authorized | fext-wan | DEFAULT_SIM_PROFILE | FXT201E-v4.2.2-build302 | 192.168.1.1 |

e. For the authorized FortiExtender, click the *Update* button.
The *Device Managed Extender* dialog box is displayed, and the *Modem 1 Interface* box displays the WAN port name.

f. Click *Cancel* to close the *Device Managed Extender* dialog box.

g. Click *Cancel* to close the *FortiExtender Settings* dialog box.

h. Click *Cancel* to close the *Device* dialog box.

FortiExtender is authorized as a WAN port.

5. Install the SD-WAN Orchestrator MEA profile changes to the device with authorized FortiExtender. See Installing configuration changes on page 46.

## Synchronizing with FortiManager

You can use the *Sync to FortiManager* option to send configuration scripts from SD-WAN Orchestrator MEA to FortiManager for additional configuration before installation on FortiGate devices. After the configuration scripts are synchronized to FortiManager, the *Config Status* of the device in SD-WAN Orchestrator MEA changes to *Synchronized_to_FortiManager*.

After FortiManager receives the scripts, you can use FortiManager to add additional configuration information, and then install the configuration changes to FortiGate devices. SD-WAN Orchestrator MEA periodically polls FortiGate devices for configuration information.

After changes from FortiManager are successfully installed on FortiGate devices, the *Config Status* of the devices in SD-WAN Orchestrator MEA changes to *Synchronized*.

This workflow is useful for a zero-touch provisioning (ZTP). You can use both SD-WAN Orchestrator MEA and FortiManager to provide configuration information, and the configuration is installed to FortiGate devices when they are online.

### To synchronize with FortiManager:

1. Go to *Configuration* > *Device*.
2. Perform one of the following actions:

| Goal | Method |
|---|---|
| Send all configuration changes for all regions and devices to FortiManager. | In the toolbar, from the *Install all configuration* menu, select *Sync to FortiManager*. |
| Send all configuration changes for all devices in a region to FortiManager. | For a region name, click the *Sync region configuration to FortiManager* button. |
| Send configuration changes to FortiManager for a device. | For a device, click the *Sync to FortiManager* button. |

3. View synchronization details for a device:
   a. When the *Config Status* column displays *Synchronized_to_FortiManager* for a device, click the *Show Sync Details* button.
   The *Config to be Synchronized to Device* dialog box is displayed.
   b. At the bottom of the pane, click the *Copy Message* button to copy the details.
   c. At the bottom of the pane, click *Close* to close the dialog box.
4. Go to FortiManager and continue making configuration changes.
5. In FortiManager, install the configuration to FortiGates.
   When the configuration installation is complete, and SD-WAN Orchestrator MEA receives confirmation that the configuration is successfully installed, the *Config Status* column displays *Synchronized* in SD-WAN Orchestrator MEA.

## Installing configuration changes

You can install configuration changes to all regions, to all devices in each region, or to individual devices.

A FortiGate managed by SD-WAN Orchestrator MEA must have a corresponding SD-WAN Orchestrator MEA license. Otherwise installation will fail with a warning message.

**To install configuration changes:**

1. Go to *Configuration* > *Device*.
2. Perform one of the following actions:

| Goal | Method |
|---|---|
| Install all configuration updates for all regions and devices. | In the toolbar, click *Install all configuration*. |
| Install all configuration changes for all devices in a region. | For a region name, click the *Install Region Configuration* button. |
| Install configuration changes to a device. | For a device, click the *Install Configuration* button. |

## Importing devices

You can import one or more devices to SD-WAN Orchestrator MEA by downloading a template in CSV format, adding devices to the CSV file, and then uploading the CSV file to SD-WAN Orchestrator MEA.

The CSV file uses the following fields:

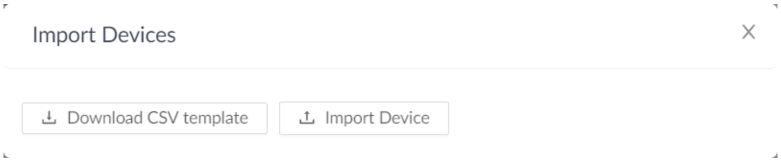
| | |
|---|---|
| **Region Name** | If regions are used, specify the name of the region defined in SD-WAN Orchestrator MEA. |
| **Serial Number** | Specify the serial number for the FortiGate. |
| **Device Name** | Specify the FortiGate model, such as FortiGate-100E. |
| **Profile Name** | Specify the name of the SD-WAN Orchestrator MEA profile to assign to the device. |
| **Sync First Time Online** | Specify how to manage device configuration when the device comes online for the first time. Choose from:<br>• *NONE*: Select to disable automatic configuration action. Instead you can manually initiate configuration installation after adding the device to SD-WAN Orchestrator MEA.<br>• *RETRIEVE_CONFIG*: Select to import some of the configuration settings from the device when the device comes online for the first time. Settings such as host name, WAN port, WAN port IP, LAN/DMZ port, and static route are imported. WAN and LAN settings from the imported configuration |

| | |
|---|---|
| | automatically override the assigned WAN and LAN settings from the SD-WAN Orchestrator MEA profile. You should use the profile to assign additional settings.<br>• *SYNC_CONFIG*: Select to install the SD-WAN Orchestrator MEA configuration associated with the profile when the device comes online for the first time. |
| **Host Name** | Specify the host name for the FortiGate. |

Each row in the CSV file identifies one device. Add a row of fields to the CSV file for each device that you want to import.

**To import a device:**

1. Ensure that you have created profiles for hub and edge devices. See Profile on page 53.
2. Go to *Configuration* > *Device*.
3. In the *Device* menu, select *Import Devices*.
   The *Import Devices* dialog box opens.



4. Click *Download CSV template*.
   A `TEMPLATES_IMPORT_DEVICES.csv` file is downloaded to your computer. The template contains details about devices already added to SD-WAN Orchestrator MEA.
5. Open the CSV file in Microsoft Excel, add a new row for each additional device you want to import, and save the file.
6. Click *Import Device*, select the `.csv` file, and click *Open*.

## Viewing configuration status

You can view the SD-WAN configuration status for each region and each device in the SD-WAN network.

| Status | Description |
|---|---|
| Modified | The configuration in SD-WAN Orchestrator MEA differs from the configuration installed on the device. |
| Synchronizing | The configuration scripts are either being sent to FortiManager or are being installed to the device. |
| Synchronized to FortiManager | The configuration scripts have been sent to FortiManager, but the configuration is not yet installed to the device. See also Synchronizing with FortiManager on page 45. |
| Synchronized | The configuration is successfully installed to the device. |

When a configuration is synchronizing, status information also displays in the SD-WAN Orchestrator MEA banner.

### To view configuration status:

1. Go to *Configuration* > *Device*.
   The list of regions is displayed as well as the synchronization status.
2. Expand each region to view the devices in each region.
   The *Config Status* column displays the status for each device.

## Overriding device settings

When you add a device to SD-WAN Orchestrator MEA, you assign a profile to the device. After the device is added to SD-WAN Orchestrator MEA, you can override profile settings for each device.

This topic describes how to override the NTP setting. You can also override network settings.

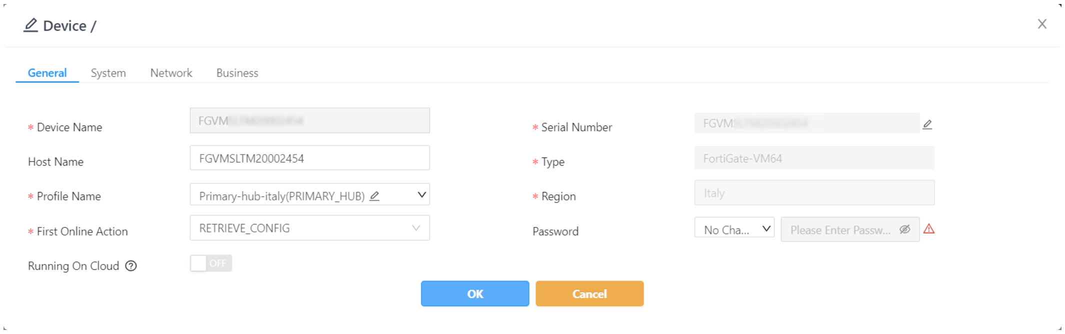
Any changes you make apply only to the device.

See also:

- Adding static routes on page 49
- Creating BGP neighbors on page 50
- Creating business rules on page 80

### To override device settings:

1. Go to *Configuration* > *Device*.
2. Expand the region.
   The devices in the region are displayed.
3. Double-click the device to open it for editing.
   The *Device / <name>* dialog box is displayed.

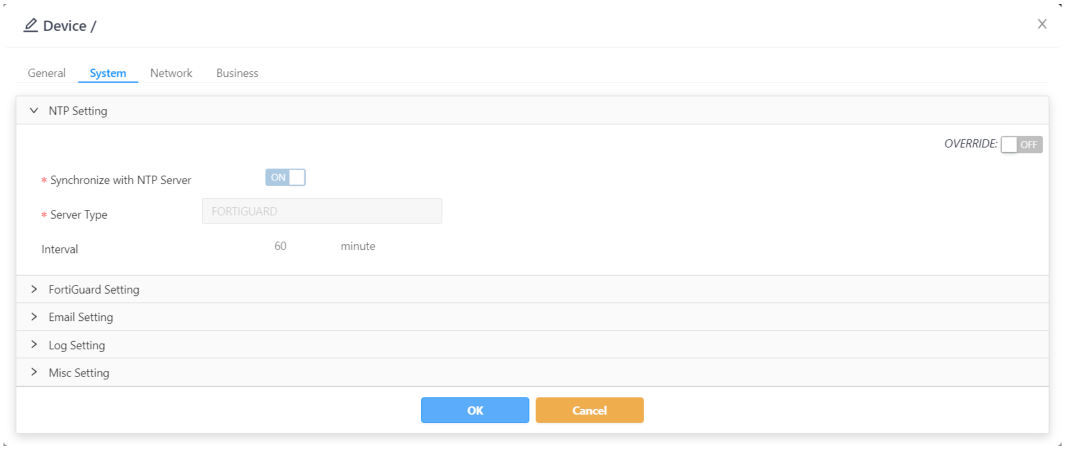


Device /

General | System | Network | Business

|  |  |  |  |
|---|---|---|---|
| * Device Name | FGVM[redacted] | * Serial Number | FGVM[redacted] |
| Host Name | FGVMSLTM20002454 | * Type | FortiGate-VM64 |
| * Profile Name | Primary-hub-italy(PRIMARY_HUB) | * Region | Italy |
| * First Online Action | RETRIEVE_CONFIG | Password | No Cha... / Please Enter Passw... |
| Running On Cloud | OFF |  |  |

4. Click the *System* tab.
   The *System* settings are displayed.



OVERRIDE: OFF

* Synchronize with NTP Server: ON

* Server Type: FORTIGUARD

Interval: 60 minute

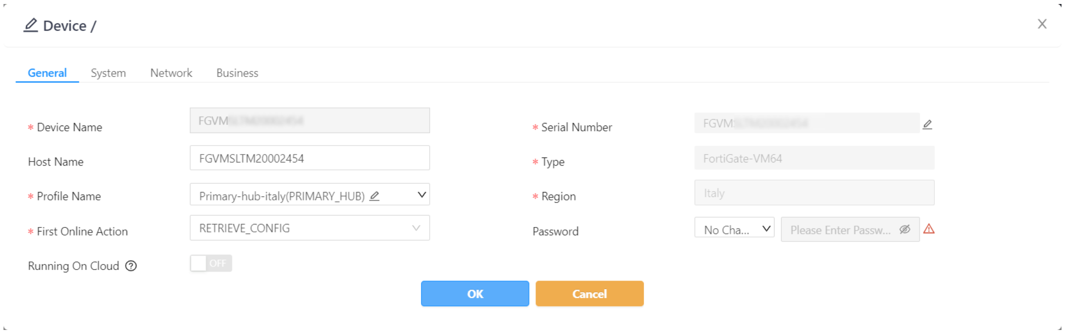
5. Expand the setting that you want to override, such as *NTP Setting*, and toggle on the *Override* button.
   A confirmation dialog box displays.
6. Click *OK* to confirm the desire to enable an override, and select the settings you want to override.
7. Click *OK* to save the changes.
8. Install the configuration changes. See Installing configuration changes on page 46.

## Adding static routes

After the device is added to SD-WAN Orchestrator MEA, you can override profile settings for each device. For example, you can add a static route. The static route applies only to the device.

### To add static routes:

1. Go to *Configuration > Device*.
2. Expand the region.
   The devices in the region are displayed.
3. Double-click the device to open it for editing.
   The *Device / <name>* dialog box is displayed.



* Device Name: FGVM[redacted]

Host Name: FGVMSLTM20002454

* Profile Name: Primary-hub-italy(PRIMARY_HUB)

* First Online Action: RETRIEVE_CONFIG

Running On Cloud: OFF

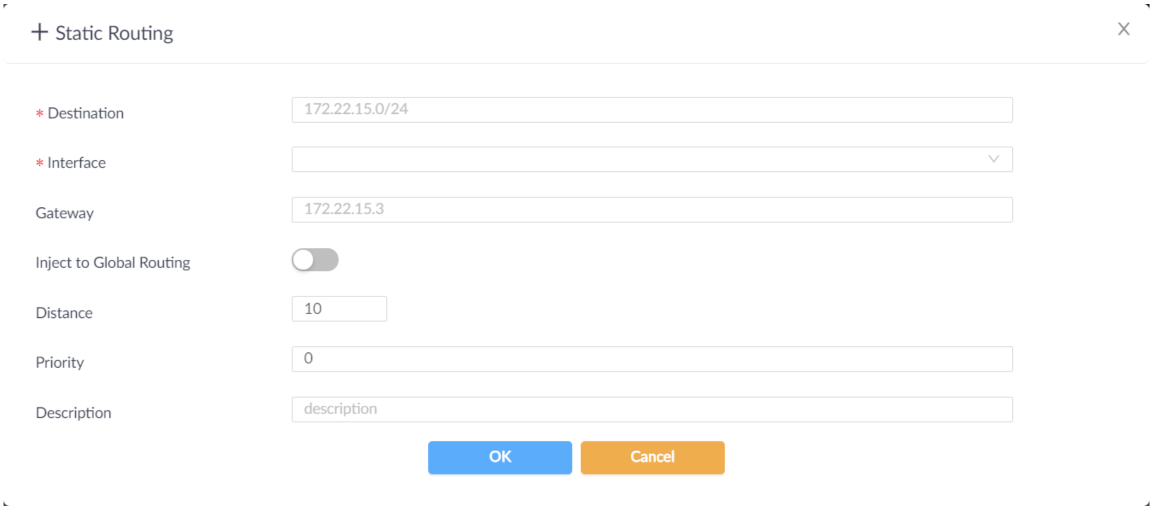
* Serial Number: FGVM[redacted]

* Type: FortiGate-VM64

* Region: Italy

Password: No Cha... Please Enter Passw...

4. Click the *Network* tab, and expand the *Static Routing* section.
5. Click *Create New*.
   A *+ Static Routing* dialog box displays.



+ Static Routing

| | |
|---|---|
| * Destination | 172.22.15.0/24 |
| * Interface | |
| Gateway | 172.22.15.3 |
| Inject to Global Routing | |
| Distance | 10 |
| Priority | 0 |
| Description | description |

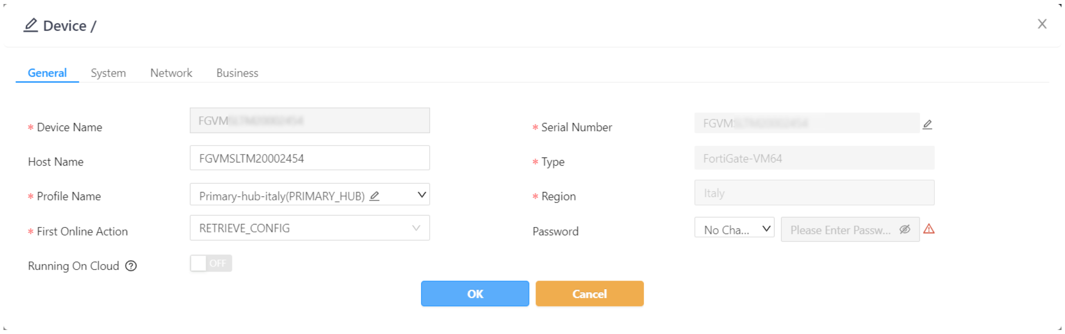
6. Configure the options, and click *OK*.
   The static route is created.
7. Click *OK* to save the changes.
8. Install the configuration changes. See Installing configuration changes on page 46.

## Creating BGP neighbors

After the device is added to SD-WAN Orchestrator MEA, you can override profile settings for each device. For example, you can add a BGP neighbor. The BGP neighbor applies only to the device.

### To create BGP neighbors:

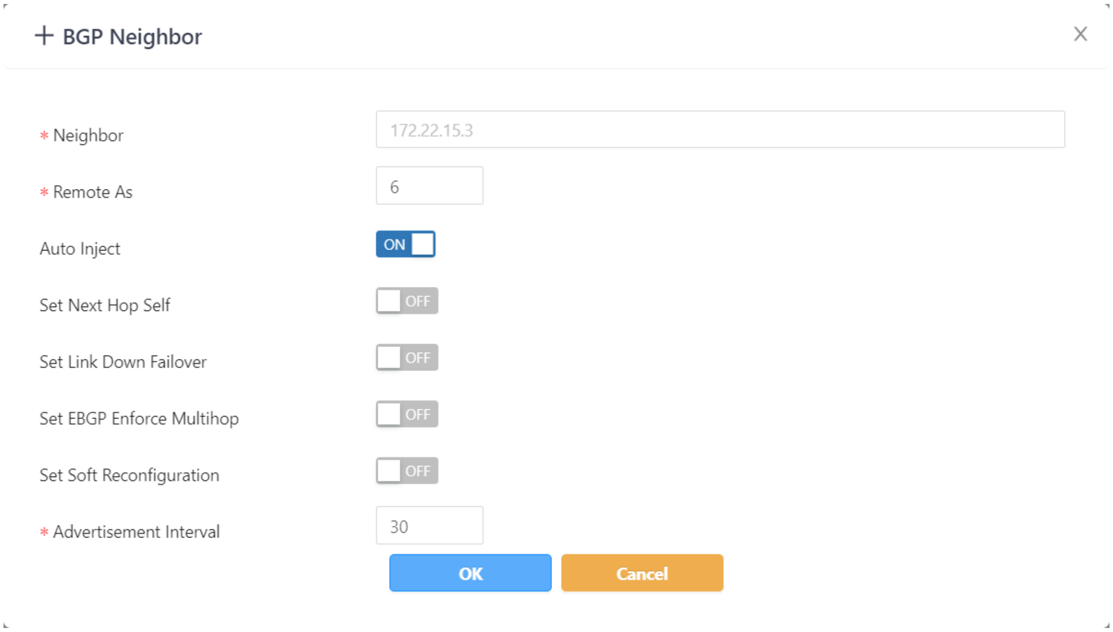
1. Go to *Configuration > Device*.
2. Expand the region.
   The devices in the region are displayed.
3. Double-click the device to open it for editing.
   The *Device / <name>* dialog box is displayed.



Device /

| | | | |
|---|---|---|---|
| * Device Name | FGVM[redacted] | * Serial Number | FGVM[redacted] |
| Host Name | FGVMSLTM20002454 | * Type | FortiGate-VM64 |
| * Profile Name | Primary-hub-italy(PRIMARY_HUB) | * Region | Italy |
| * First Online Action | RETRIEVE_CONFIG | Password | No Cha... / Please Enter Passw... |
| Running On Cloud | OFF | | |

4. Click the *Network* tab, and expand the *BGP* section.
5. Under Neighbors, click *Create New*.
   A *+ BGP Neighbor* dialog box displays.



+ BGP Neighbor

| | |
|---|---|
| * Neighbor | 172.22.15.3 |
| * Remote As | 6 |
| Auto Inject | ON |
| Set Next Hop Self | OFF |
| Set Link Down Failover | OFF |
| Set EBGP Enforce Multihop | OFF |
| Set Soft Reconfiguration | OFF |
| * Advertisement Interval | 30 |

6. Configure the options, and click *OK*.
   The BGP neighbor is added.
7. Click *OK* to save the changes.
8. Install the configuration changes. See Installing configuration changes on page 46.

## Updating regions

After you create regions, you can delete devices from the region, change profile assignments, and specify whether to synchronize profile settings when the device comes online for the first time.

**To update a region:**

1. Go to *Configuration* > *Device*.
2. Beside the region name, click the *Update* button.
3. Select a device, and click *Delete* to remove the device from the region.
4. Select a device, and click *Assign Profile* to change the profile.
5. Select a device, and click *Sync First Time Online* to change the setting.
6. Click *OK*.
   The configuration changes are saved to the region.
7. Install the configuration changes. See Installing configuration changes on page 46.

## Deleting regions

You can delete a region and all its devices from SD-WAN Orchestrator MEA.

**To delete a region:**

1. Go to *Configuration* > *Device*.
2. Beside the region name, click *Delete*.

## Monitoring devices

You can access the device monitoring panes from the *Device* tree.

**To monitor a device:**

1. Go to *Configuration* > *Device*.
2. Expand the region to view details about each device.
   When the device is part of an HA cluster, an HA icon displays in the *Status* column. You can hover over the icon to view details about the HA cluster.
3. Click the *monitor* button beside the device you want to monitor.
   The *Devices* > *Overview* tab is displayed. For more information, see Viewing device overviews on page 28.

## Replacing FortiGate serial numbers

You can use this procedure to replace one FortiGate with another FortiGate by updating the serial number in SD-WAN Orchestrator MEA.

It is recommended to use the same WAN IP for the new and old FortiGates, regardless of whether a static IP or DHCP is used.

**To replace FortiGate serial numbers:**

1. In SD-WAN Orchestrator MEA, go to *Configuration* > *Device*, and ensure that the *Config Status* for the device is *Synched*.
2. Turn off the FortiGate device that you want to replace.
3. Edit the serial number in SD-WAN Orchestrator MEA
   a. Go to *Configuration* > *Device*, and double-click the device to open it for editing.
   b. Beside the *Serial Number* box, click the *Pencil* icon.
      The *Serial Number* box becomes editable.
   c. In the *Serial Number* box, type the new serial number, and click *Confirm*.
   d. Click *OK*.
      The serial number is updated.
4. In FortiManager, download a configuration revision for the FortiGate device you are replacing.
   a. Go to *Device Manager* > *Device & Groups*, and select the device in the lower tree menu.
      The *System: Dashboard* is displayed in the content pane.
   b. In the *Configuration and Installation* widget, click the *Revision History* button.
      The *Configuration Revision History* dialog box is displayed.
   c. Select the revision, and select *Download Revision* from the *More* menu.
   d. Select the *Regular Download*, and click *OK*.
      The configuration is downloaded to your computer.

5. Open the downloaded configuration file in a text editor, and remove the FortiManager IP address from the `central-management` configuration section.
   The change ensures that the new FortiGate device isn't registered as a new device.
6. Turn on the new FortiGate.
7. Go to FortiOS, and restore the configuration.
8. Go to FortiManager, and replace the serial number by using the following CLI.
   ```
   #diag dvm device list
   #exec device replace sn <device name> <serial number>
   ```

<serial number> is case-sensitive. Letters used in Fortinet product serial numbers are capitalized.

# Profile

You can create and edit profiles by using the *Profile* tree menu. Profiles are templates that define general, system, network, and business policies for devices in SD-WAN networks. You can create one profile and assign it to multiple devices.

This section contains the following topics:

## Creating profiles for hub devices

Before you create a profile, you should create all of the needed shared resources, so you can select them in the profile. See Shared resources on page 91.

Each region can have one primary hub and one secondary hub. The secondary hub is for redundancy and is optional.

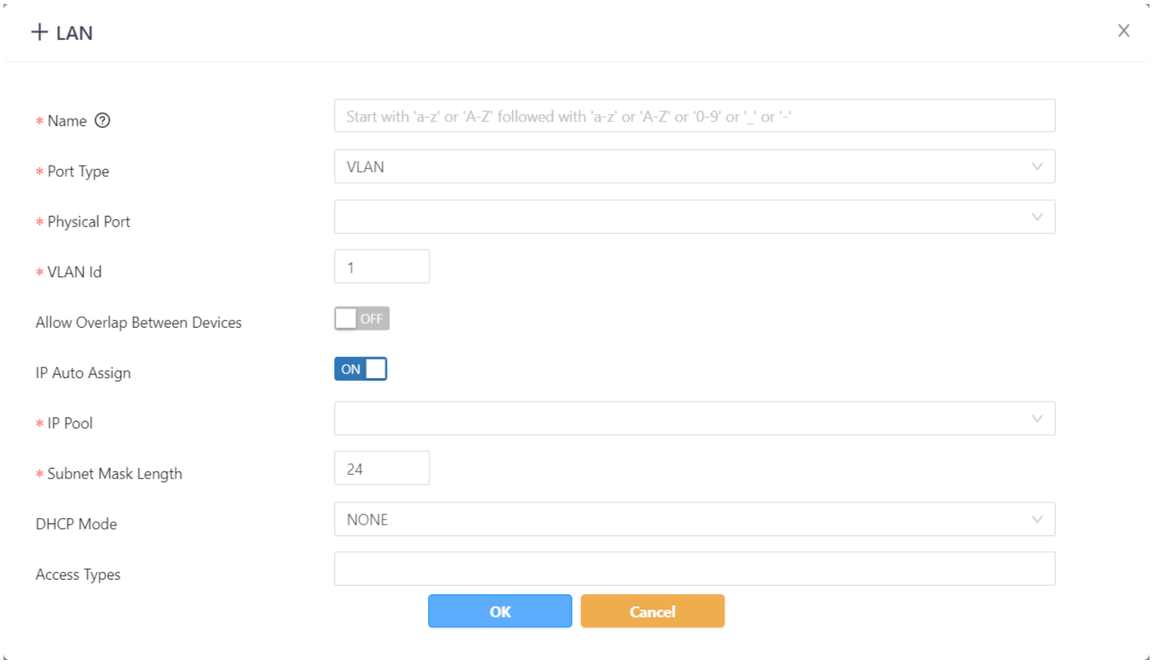
You should create a profile for each device type in the SD-WAN network. If you plan to use primary and secondary hubs, you should create a profile for primary hubs and a profile for secondary hubs.

**To create profiles for hub devices:**

1. Go to *Configuration* > *Profile*.
2. In the toolbar, click +*Create New*.
3. Configure the profile settings.
   The following table identifies settings that are specific to configuring a hub device. You can set the remaining settings as desired.

| Option | Description |
|---|---|
| **Device Role** | Select *PRIMARY_HUB* to create a profile for primary hubs.<br>Select *SECONDARY_HUB* to create a profile for secondary hubs. |
| **VPN Mode with Edge** | Select one of the following options to connect the hub device with edge devices:<br>• Select *DIAL_UP* to create one-to-one overlay links between the hub device and its edge devices. When you select *DIAL_UP*, you can enable ADVPN on the *Network* tab in the *WAN* settings.<br>• Select *DIAL_UP_FULL_MESH* to create full-mesh overlay links on WAN ports between hub devices and edge devices in the same region.<br>• Select *SITE_TO_SITE* to create full-mesh overlay links between the hub device and its edge devices in the same region. |
| **VDOM Mode** | Toggle on to create a profile for a FortiGate VDOM.<br>Toggle off to disable this feature. |
| **Max Edge Count** | Available when *VPN Mode with Edge* is set to *DIAL_UP*.<br>Specify the maximum number of edge devices allowed to connect with the hub device. |
| **Port Number** | Specify the number of ports on the FortiGate. The number of ports in the FGT VM should be the same number as defined here. Otherwise conflict will occur. |

4. Click *OK*. The profile is created, and the *System* tab opens.
5. Configure the *System* settings.
   For a description of the options on the *System* tab, see Profile options described on page 82.
6. Click the *Network* tab to configure the network settings.
   If you're using primary and secondary hubs in a region, you can optionally configure LAN port communication between the hubs. The LAN port communication is used in addition to the default full-mesh overlay link communication between the hubs.
   a. On the *Network* tab, expand the *LAN* section.
   b. Either click *Create New*, or double-click an interface to open it for updating.
      The LAN options are displayed.



+ LAN

| | |
|---|---|
| * Name | Start with 'a-z' or 'A-Z' followed with 'a-z' or 'A-Z' or '0-9' or '_' or '-' |
| * Port Type | VLAN |
| * Physical Port | |
| * VLAN Id | 1 |
| Allow Overlap Between Devices | OFF |
| IP Auto Assign | ON |
| * IP Pool | |
| * Subnet Mask Length | 24 |
| DHCP Mode | NONE |
| Access Types | |

- **c.** Toggle *Connect to Peer Hub* to *ON*.
  You must enable this option in the profile for the primary hub and the profile for the secondary hub.
- **d.** For primary hub devices, toggle *Allow Overlap Between Devices* to *ON*.
  In the *IP Address* box, type the IP address for the primary hub, and in the *Peer Hub's IP Address* box, type the IP address for the secondary hub.

  This option is not available for secondary hubs.
- **e.** Set the remaining options as desired, and click *OK* to save the WAN configuration.
  For a description of the options on the *Network* tab, see Profile options described on page 82.

7. Click the *Business* tab to create business rules.
   For a description of the options on the *Business* tab, see Profile options described on page 82.
8. Click *OK*.

## Creating profiles for edge devices

Before you create a profile, you should create all of the needed shared resources, so you can select them in the profile. See Shared resources on page 91.

**To create profiles:**

1. Go to *Configuration* > *Profile*.
2. In the toolbar, click +*Create New*.
3. Configure the profile settings.
   The following table identifies settings that are specific to configuring an edge device. You can set the remaining settings as desired.

| Option | Description |
|---|---|
| **Device Role** | Select *Edge* to designate the device as an edge. |
| **VPN Mode with Hub** | Select one of the following options to connect the edge devices to the hub in the region:<br>• Select *DIAL_UP* to create one-to-one overlay links between the hub device and its edge devices. When you select *DIAL_UP*, you can enable ADVPN on the *Network* tab in the *WAN* settings.<br>• Select *DIAL_UP_FULL_MESH* to create full-mesh overlay links on WAN ports between hub devices and edge devices in the same region.<br>• Select *SITE_TO_SITE* to create full-mesh overlay links between the hub device and its edge devices in the same region. |
| **Port Number** | Specify the number of ports on the FortiGate. The number of ports in the FGT VM should be the same number as defined here. Otherwise conflict will occur. |

4. Click *OK*.
   The profile is created, and the *System* tab opens.
5. Configure the *System* settings.
   For a description of the options on the *System*, *Network*, and *Business* tabs, see Profile options described on page 82.
6. Click the *Network* tab to configure the network settings.
7. Click the *Business* tab to create business rules.
8. Click *OK*.

## Creating profiles for VDOMs

Before you create a profile, you should create all of the needed shared resources, so you can select them in the profile. See Shared resources on page 91.

You can configure a VDOM as a primary or secondary hub device as well as an edge device.

### To create profiles for VDOMs:

1. Go to *Configuration* > *Profile*.
2. In the toolbar, click *+Create New*.
3. Configure the profile settings.
   The following table identifies settings that are specific to configuring a FortiGate VDOM. You can set the remaining settings as desired.

| Option | Description |
|---|---|
| **VDOM Mode** | Toggle on to create a profile for a FortiGate VDOM. |
| **Running on Cloud** | Toggle off to disable this feature. |

4. Click *OK*. The profile is created, and the *System* tab opens.
5. Configure the *System* settings.
   For a description of the options on the *System* tab, see Profile options described on page 82.
6. Configure the *Network* settings.
   You can add physical interfaces for the VDOM to the profile. See Adding physical interfaces for VDOMs on page 59.

Alternately, you can retrieve the VDOM interfaces when you add the VDOM to SD-WAN Orchestrator MEA. It is recommended to retrieve VDOM interfaces. See Adding VDOMs on page 35.

For a description of the options on the *Network* tab, see Profile options described on page 82.

7. Click the *Business* tab to create business rules.
   For a description of the options on the *Business* tab, see Profile options described on page 82.
8. Click *OK*.

## Creating profiles with FortiExtender WAN ports

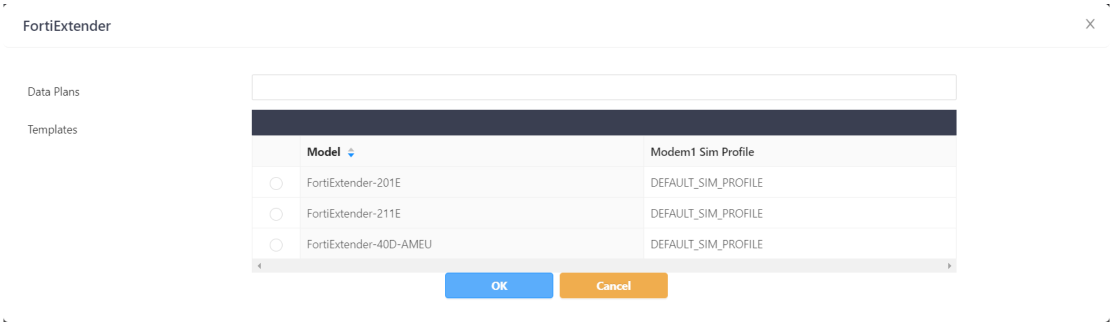
You can use a FortiExtender as a WAN port for FortiGates.

Before configuring the WAN port, configure shared resources for FortiExtender for selection in the profile. For example, you can configure a profile for the data plan. For SIM cards, you can use the default profiles for SIM cards, or you can create a custom SIM card profile. For information about creating the shared resources, see Creating extender resources on page 97.

When creating profiles for managed devices with authorized FortiExtenders, ensure that you use the same settings for FortiExtender in the SD-WAN Orchestrator MEA profile that you used in FortiOS because the profile will be applied to all authorized FortiExtenders.

**To create profiles with FortiExtender WAN ports:**

1. Go to *Configuration > Profile*.
2. In the toolbar, click *+Create New*.
   The settings on the *General* tab are displayed.
3. Complete the settings on the *General* tab, and click *OK*:
   a. In the *Platform* box, select a device that supports FortiExtender, such as *FortiWiFi-40F-3G4G*.
   b. Set the remaining options as desired.
      The profile is created, and the *System* tab opens.
4. Click the *Network* tab, and add a WAN interface for FortiExtender:
   a. Under WAN, click *Create New*.
      The *WAN* dialog box is displayed.
   b. In the *Name* box, type a name for the interface.
   c. In the *Port Type* box, select *EXTENDER*.
   d. In the *ISP Link* box, select the default *FEXT_ISP_Link_1*.
   e. Set the remaining options as desired, and click *OK*.
   FortiExtender is added as a WAN port.
5. Define the FortiExtender data plan and SIM card settings:
   a. In the *WAN* section, and click *Extender*.
      The *FortiExtender <profile name>* dialog box is displayed.

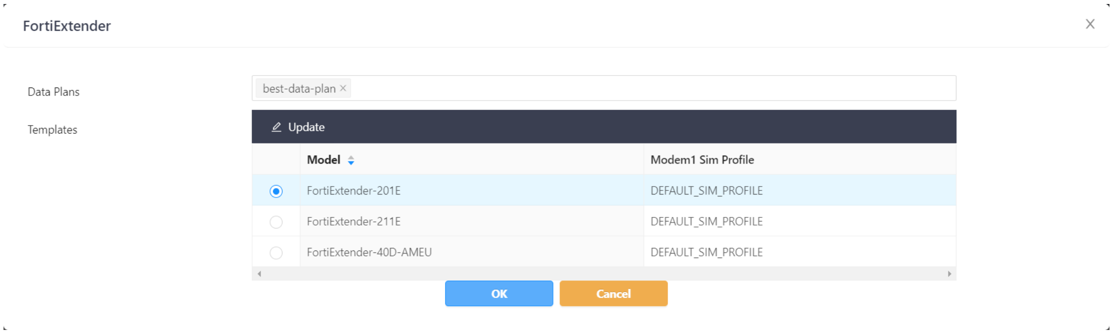


Data Plans

Templates

| | Model | Modem1 Sim Profile |
|---|---|---|
| ○ | FortiExtender-201E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-211E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-AMEU | DEFAULT_SIM_PROFILE |

- **b.** In the *Data Plans* box, select a data plan.
- **c.** Beside *Templates*, select the FortiExtender model.
  The *Update* button is displayed.



Data Plans: best-data-plan ×

Templates

| | Model | Modem1 Sim Profile |
|---|---|---|
| ● | FortiExtender-201E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-211E | DEFAULT_SIM_PROFILE |
| ○ | FortiExtender-40D-AMEU | DEFAULT_SIM_PROFILE |

- **d.** Click the *Update* button to select a different SIM profile for the selected FortiExtender model, and click *OK*.
  The SIM profile is updated.
- **e.** Click *OK*.
  A data plan profile and SIM card profile are defined for the FortiExtender model.

6. Set options on the other tabs as needed.
   For a description of the options on each tab, see Profile options described on page 82.
7. Click *OK*.
   The profile is updated with the specified configuration.
8. Add FortiExtender to SD-WAN Orchestrator MEA by using one of the following methods:
   - Adding FortiExtenders to online devices on page 41
   - Adding devices with authorized FortiExtenders on page 43

## Creating profiles for HA devices

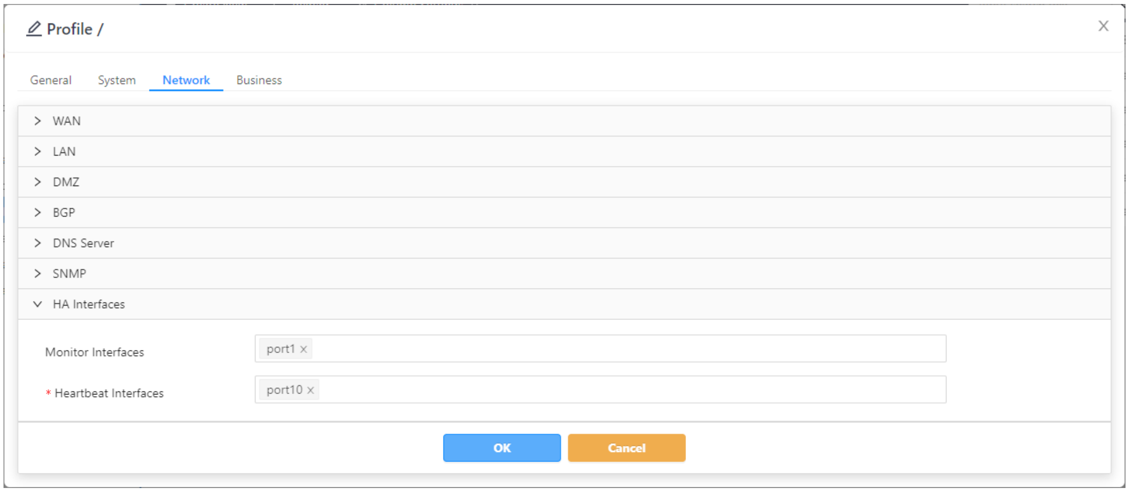
Before you create a profile, you should create all of the needed shared resources, so you can select them in the profile. See Shared resources on page 91.

Among other settings, use the profile to define high availability (HA) interfaces for devices. Once a profile refers to one or more devices, you cannot change HA interfaces in the profile.

### To create profiles for HA devices:

1. Go to *Configuration > Profile*.
2. In the toolbar, click *+Create New*.
   The settings on the *General* tab are displayed.

3. Complete the settings on the *General* tab, and click *OK*.
   The profile is created, and the *System* tab opens.
4. Click the *Network* tab.
   The *Network* settings are displayed.
5. Configure options as needed.
6. Expand the *HA Interfaces* section at the bottom, and set the options.



Monitor Interfaces: port1

* Heartbeat Interfaces: port10

   For a description of the options on the *Network* tab, see HA Interfaces on page 89.
7. Configure the options on the *System* and *Business* tabs as desired.
   For a description of the options on the *System* and *Business* tabs, see Profile options described on page 82.
8. Click *OK*.

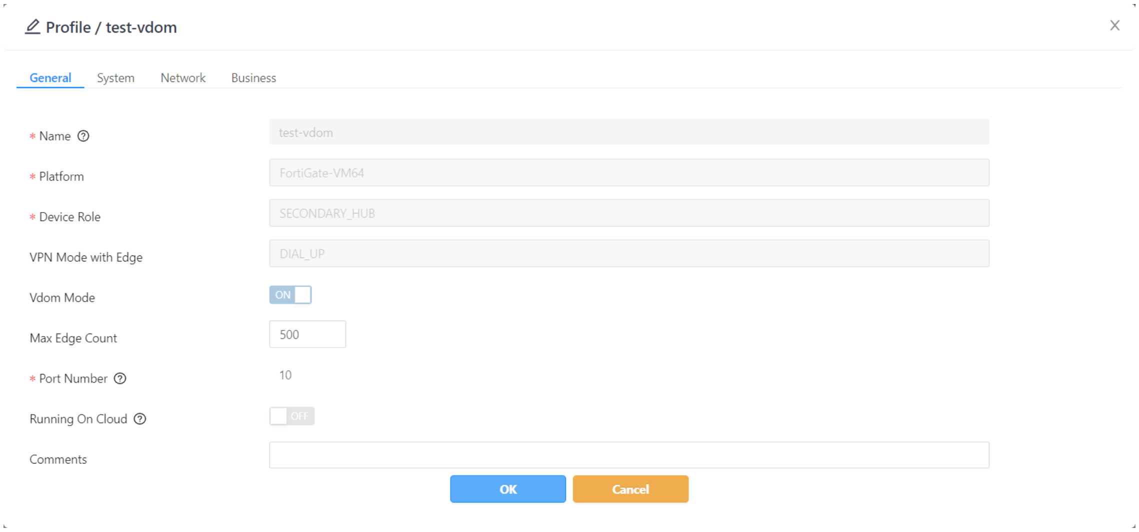
## Adding physical interfaces for VDOMs

When creating a profile for VDOMs, you can add physical interfaces to the profile and configure them. The settings in the profile can be used for all VDOMs.

Instead of adding physical interfaces to the profile for all VDOMs, you can retrieve interfaces for the VDOM when you add it to SD-WAN Orchestrator MEA. See Adding VDOMs on page 35.

### To add physical interfaces:

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.



Profile / test-vdom

General | System | Network | Business

* Name: test-vdom

* Platform: FortiGate-VM64

* Device Role: SECONDARY_HUB

VPN Mode with Edge: DIAL_UP

Vdom Mode: ON

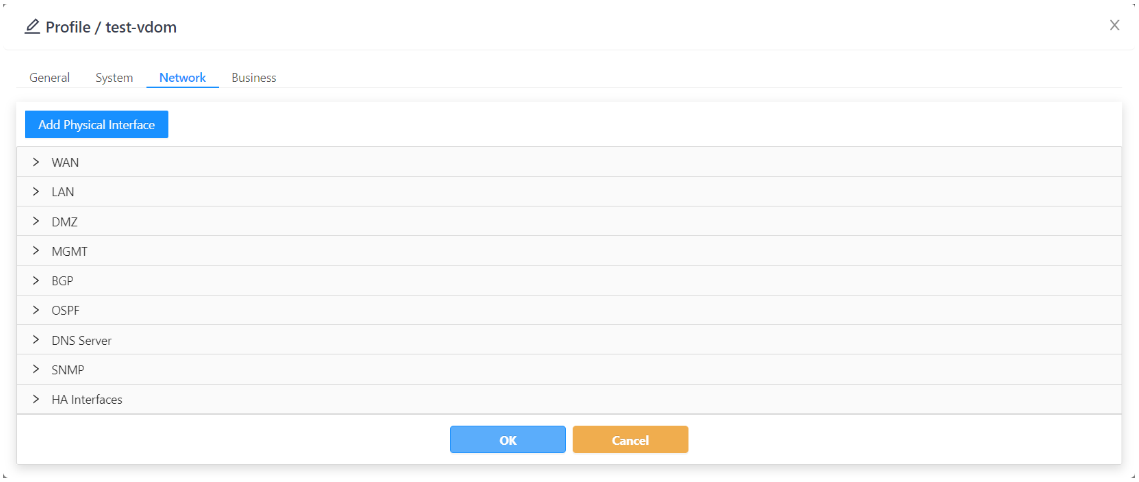
Max Edge Count: 500

* Port Number: 10

Running On Cloud: OFF

Comments:

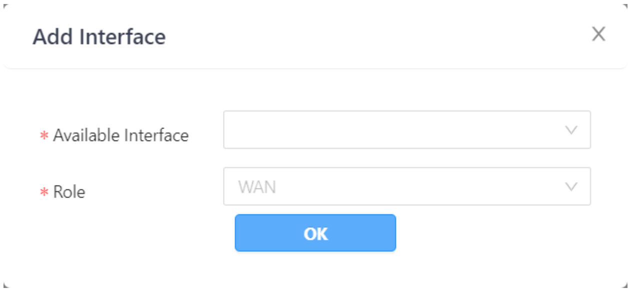
3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.



Profile / test-vdom

General | System | Network | Business

4. Add physical interfaces to the profile:
   a. Click *Add Physical Interface*.
      The *Add Interface* dialog box is displayed.



Add Interface

* Available Interface:

* Role: WAN

**b.** Complete the options, and click *OK*.

| Option | Description |
|---|---|
| Available Interface | Select an interface. |
| Role | Specify a role for the interface. Choose from the following:<br>• WAN<br>• LAN<br>• DMZ |

**c.** When you are finished adding physical interfaces, close the dialog box.
The added interfaces display in the section for the role. For example, if you added a physical interface for a role of WAN, the interface displays in the WAN table.

**5.** Click *OK*.
The profile is saved.

## Creating new WAN settings

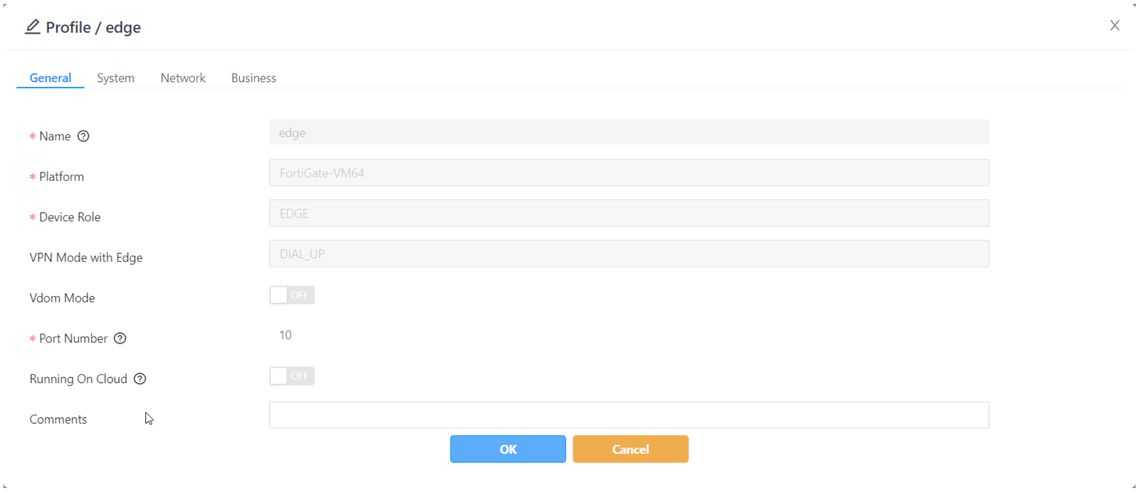
When creating a profile, you can also create new WAN settings.

FortiGate 40F-3G4G model supports a special WAN interface for Wireless Wide Area Networks (WWAN). When you insert a 3G or 4G SIM card into the WWAN interface slot of the device, you can connect to the Internet by using telecommunication operators. If you add this type of FortiGate with WWAN enabled to SD-WAN Orchestrator MEA, a WWAN port is available for configuration.

### To create new WAN settings:

**1.** Go to *Configuration > Profile*.
The list of profiles is displayed.

**2.** Create a new profile, or open a profile for updating.
The *Profile <name>* dialog box is displayed.

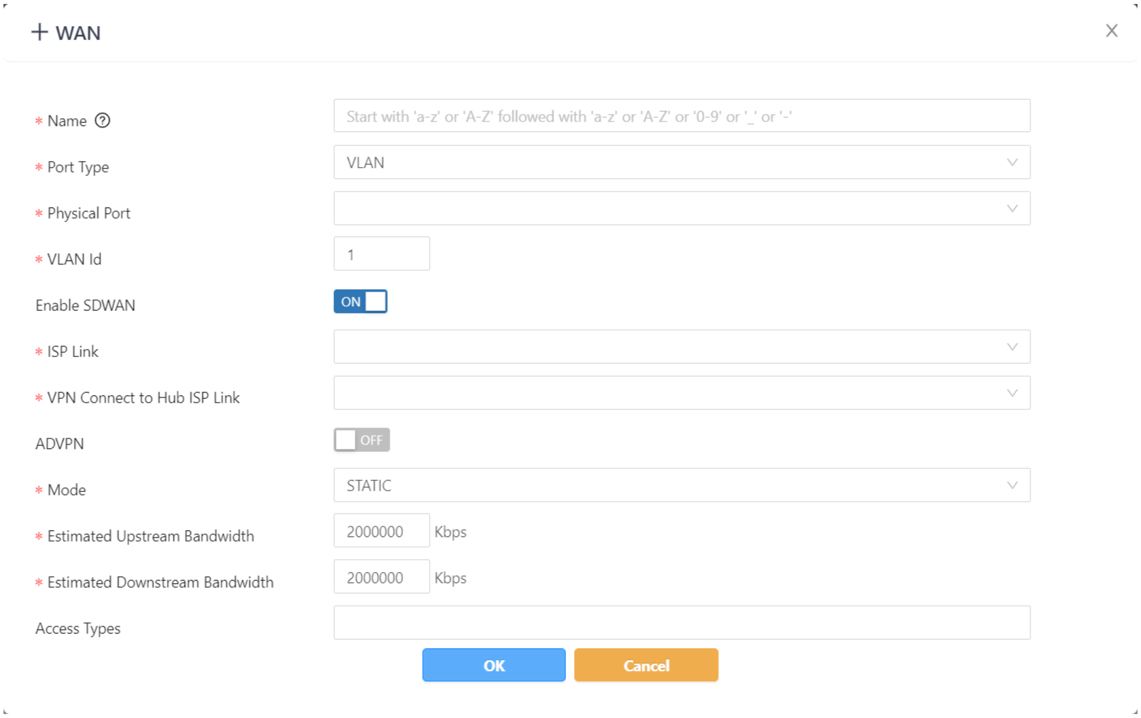


Profile / edge

* Name: edge
* Platform: FortiGate-VM64
* Device Role: EDGE
VPN Mode with Edge: DIAL_UP
Vdom Mode: OFF
* Port Number: 10
Running On Cloud: OFF
Comments:

**3.** Click the *Network* tab.
The *Network* pane is displayed. For a description of the options, see Network tab on page 85.

4. Expand the *WAN* section, and click *+Create New*.
   The WAN dialog box is displayed.



+ WAN

* Name: Start with 'a-z' or 'A-Z' followed with 'a-z' or 'A-Z' or '0-9' or '_' or '-'

* Port Type: VLAN

* Physical Port:

* VLAN Id: 1

Enable SDWAN: ON

* ISP Link:

* VPN Connect to Hub ISP Link:

ADVPN: OFF

* Mode: STATIC

* Estimated Upstream Bandwidth: 2000000 Kbps

* Estimated Downstream Bandwidth: 2000000 Kbps

Access Types:

5. In the *Name* box, type a name for the WAN settings.
6. In the *Port Type* box, select the port, and complete the options.

| Port Type | Description |
|---|---|
| VLAN | Select to configure a virtual interface. |
| Aggregate | Select to configure an aggregate virtual interface. |
| Hard_Switch | Select to configure a hardware switch. A hardware switch is a virtual switch interface that groups different ports together. FortiGate uses the group of ports as a single interface.<br>Supported FortiGate models have a default hardware switch called either *internal* or *lan*. The hardware switch is supported by the chipset at the hardware level. For example, the FortiGate 60E/61E series supports hardware switches. |
| Soft_Switch | Select to configure a software switch. A software switch is a virtual switch interface that is implemented at the software or firmware level and not at the hardware level. FortiGate uses the group of ports as a single interface. |
| Extender | Select to configure FortiExtender as a WAN port. See also Creating profiles with FortiExtender WAN ports on page 57. |

7. Complete the remaining options, and click *OK*.

| Option | Description |
|---|---|
| Physical Port | Available when *Port Type* set to *VLAN*. |

| Option | Description |
|---|---|
| | Select the port number.<br>Displays *wwan* for FortiGate 40F-3G4G models with enabled WWAN ports. |
| VLAN ID | Available when *Port Type* is set to *VLAN*.<br>Type an ID for the VLAN. |
| Enable SDWAN | Toggle on to enable the interface. Toggle off to disable the interface. |
| Interface Status | Available when *Enable SDWAN* is toggled *OFF*.<br>Overlay links are not initiated on a WAN port with the following settings:<br>• *Enable SDWAN* is toggled *OFF*.<br>• *Interface Status* is set to *UP*.<br>• *Mode* is set to *STATIC*.<br>However, overlay links can be established on VLAN ports that are based on the physical WAN port. |
| ISP Link | Available for edge devices when *VPN Mode with Hub* is set to *SITE_TO_SITE* on the *General* tab. |
| VPN Connect to Hub ISP Link | Available for edge devices when *VPN Mode with Hub* is set to *SITE_TO_SITE* on the *General* tab.<br>When configuring WWAN interfaces, select an LTE type of ISP link, such as *DEFAULT_ISP_LTE_1*. Any other setting will disable the wwan feature. |
| ADVPN | Available for edge devices when *VPN Mode with Hub* is set to *DIAL_UP* on the *General* tab.<br>On hub devices, select one of the following options:<br>• *NONE* - ADVPN is disabled. Edge devices from the same region will communicate with each other by forwarding packets through their region's hub.<br>• *INSIDE_REGION* - Shortcut tunnels are triggered by traffic and established only inside a region.<br>On edge devices, toggle *ADVPN* on to enable ADVPN. Toggle off to disable ADVPN. |
| Mode | Select a mode. |
| Use VIP for VPN Connection | Toggle on to enable VIP mapping for the WAN port.<br>This feature allows overlay tunnels to be established when FortiGate devices are deployed on Cloud platforms, such as AWS, Azure, and on. It also helps establish overlay links between devices when both devices are behind a NAT gateway. |
| VIP Address | Available when *Use VIP for VPN Connection* is on.<br>Type the VIP address for the device. When enabled, tunnels are established with the VIP address instead of the intranet IP address.<br>If the FortiGate is deployed on a Cloud platform, contact the Cloud operator to obtain the public IP address . |
| Estimated Upstream Bandwidth | Leave the default value, or specify an estimated value. |

| Option | Description |
|---|---|
| Estimated Downstream Bandwidth | Leave the default value, or specify an estimated value. |
| Access Types | Select one or more types of access. |

The WAN settings are created.

8. If you set *Port Type* to *Aggregate*, open the WAN settings for editing, select interface members, and click *OK*.
   Interface members are added to the WAN settings.

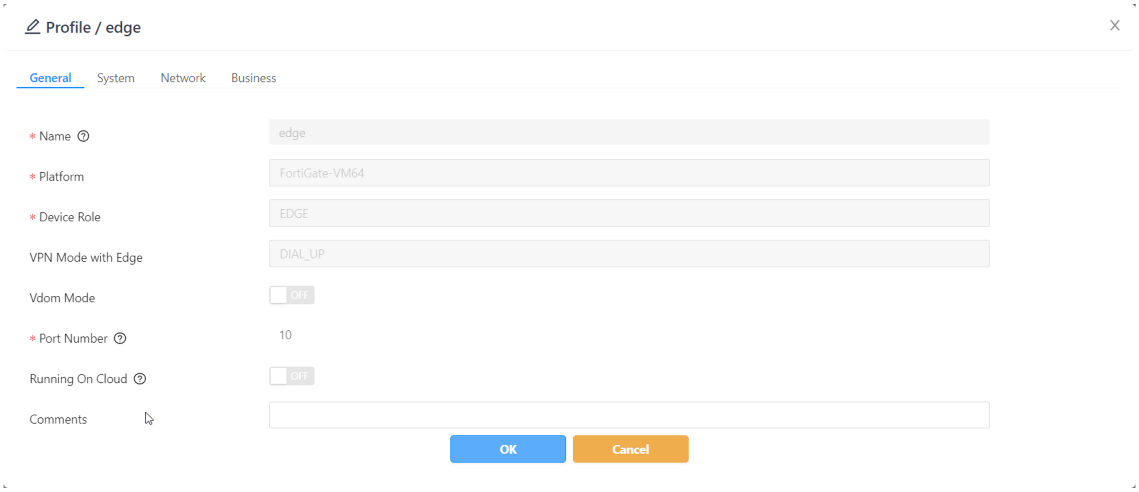
## Creating new LAN settings

When creating a profile, you can also create new LAN settings.

When creating profiles for primary hubs and secondary hubs in a region, you can optionally configure LAN ports for each hub to define communication between them by using the *Connect to Peer Hub* option. When LAN ports are configured for both hubs in a region, they are connected by site-to-site VPN and LAN, and the LAN port has higher priority than the VPN tunnels in business rules.

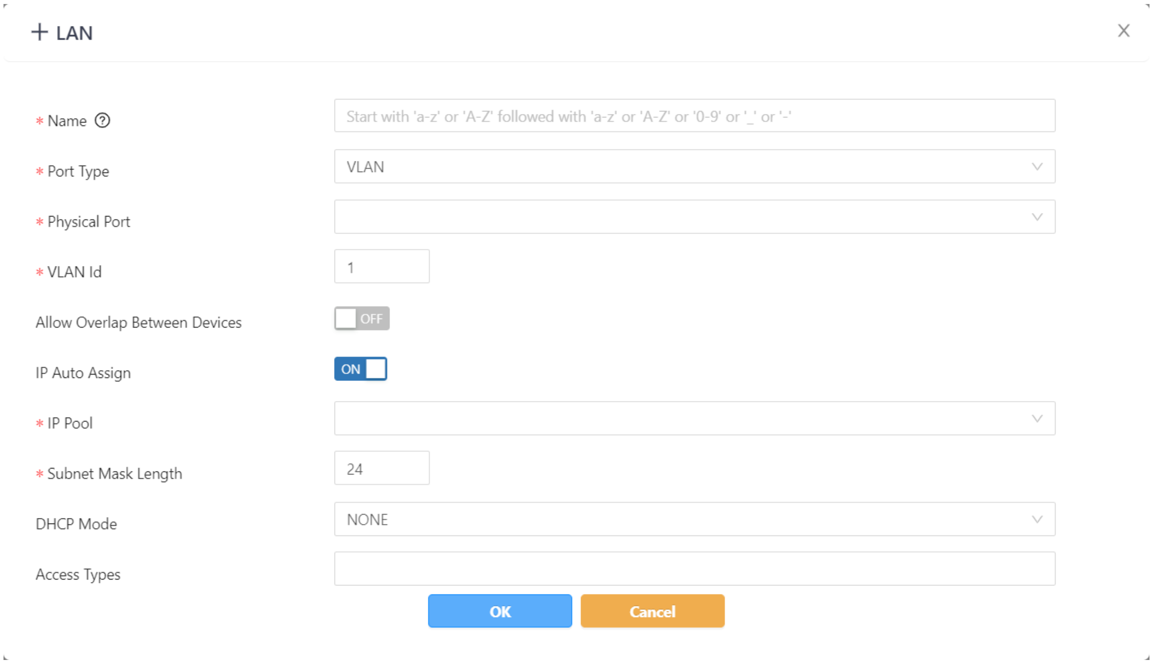
### To create new LAN settings:

1. Go to *Configuration > Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.



| | |
|---|---|
| * Name | edge |
| * Platform | FortiGate-VM64 |
| * Device Role | EDGE |
| VPN Mode with Edge | DIAL_UP |
| Vdom Mode | OFF |
| * Port Number | 10 |
| Running On Cloud | OFF |
| Comments | |

3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
4. Expand the *LAN* section, and click *+Create New*.
   The *LAN* dialog box is displayed.



+ LAN

| | |
|---|---|
| * Name | Start with 'a-z' or 'A-Z' followed with 'a-z' or 'A-Z' or '0-9' or '_' or '-' |
| * Port Type | VLAN |
| * Physical Port | |
| * VLAN Id | 1 |
| Allow Overlap Between Devices | OFF |
| IP Auto Assign | ON |
| * IP Pool | |
| * Subnet Mask Length | 24 |
| DHCP Mode | NONE |
| Access Types | |

5. In the *Name* box, type a name for the LAN settings.
6. In the *Port Type* box, select the port, and complete the options.

| Port Type | Description |
|---|---|
| VLAN | Select to configure a virtual interface. |
| WiFi_SSID | Select to configure a wireless network interface (SSID). |
| Aggregate | Select to configure an aggregate virtual interface. |
| Hard_Switch | Select to configure a hardware switch. A hardware switch is a virtual switch interface that groups different ports together. FortiGate uses the group of ports as a single interface.<br>Supported FortiGate models have a default hardware switch called either *internal* or *lan*. The hardware switch is supported by the chipset at the hardware level. For example, the FortiGate 60E/61E series supports hardware switches. |
| Soft_Switch | Select to configure a software switch. A software switch is a virtual switch interface that is implemented at the software or firmware level and not at the hardware level. FortiGate uses the group of ports as a single interface. |

7. Complete the remaining options, and click *OK*.

| Option | Description |
|---|---|
| Connect to Peer Hub | Available when configuring profiles for primary or secondary hubs.<br>Toggle on to configure LAN communication between a primary hub and a secondary hub in a region. You must enable this option in the profile for the primary hub and the profile for the secondary hub to enable communication for the interface. |

| Option | Description |
|---|---|
| Allow Overlap Between Devices | For edge devices, toggle on to allow overlap between devices. Toggle off to disable this feature.<br>For primary hub devices, toggle on to configure the local address and peer hub address for the LAN port to communicate between the primary and secondary hubs.<br>For secondary hubs, this feature is disabled and cannot be enabled. |
| IP Address | Available when *Allow Overlap Between Devices* is enabled. |
| Peer Hub's IP Address | Available when *Allow Overlap Between Devices* is enabled. |
| IP Auto Assign | Available when *Allow Overlap Between Devices* is disabled.<br>Toggle on to automatically assign IP addresses. Toggle off to disable this feature. |
| IP Pool | Available when *IP Auto Assign* is enabled.<br>Specify a pool of IP addresses to be used for SD-WAN Orchestrator MEA to automatically assign. |
| Subnet Mask Length | Available when *IP Auto Assign* is enabled.<br>Specify the length of the subnet mask. |
| DHCP Mode | Specify whether to use DHCP for automatic IP assignment. Select one of the following options:<br>• *None* - DHCP is not used.<br>• *Server* - Enable DHCP server.<br>• *Relay* - Enable DHCP relay agent. |
| Access Types | Select the types of access to allow on the interface. |
| Interface Members | Available when *Port Type* is set to *Hard_Switch* or *Soft_Switch*.<br>Select the ports to include in the interface group. |

The LAN settings are saved.

8. If you set *Port Type* to *AGGREGATE*, open the LAN settings for editing, select interface members, and click *OK*. Interface members are added to the LAN settings.

## Attaching a FortiSwitch model to FortiGate

When creating a profile, you can attach a model switch to a port on a FortiGate. This is called attaching FortiLink. When the switch comes online, it is managed by FortiGate and receives the configuration.

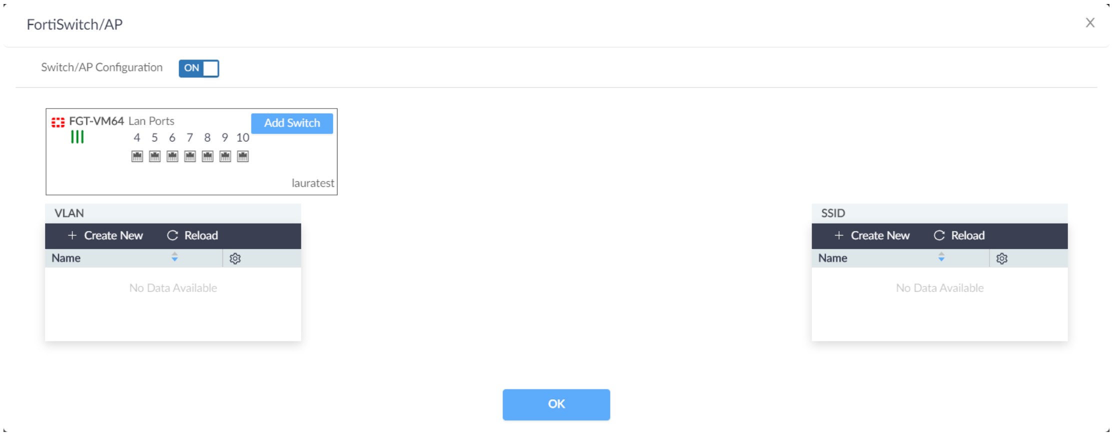
Do not connect FortiSwitch to the physical FortiGate port until the FortiSwitch profile is installed. See Install a profile on a device.

If FortiSwitch is already connected to FortiGate:

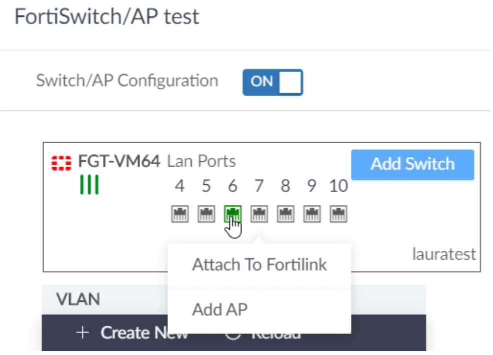
Configure and install the profile without FortiLink and FortiSwitch first. After the profile has successfully synchronized with FortiGate, add the FortiLink and FortSwitch configuration, and then install the profile again.

### To attach a FortiGate port to a FortiSwitch:

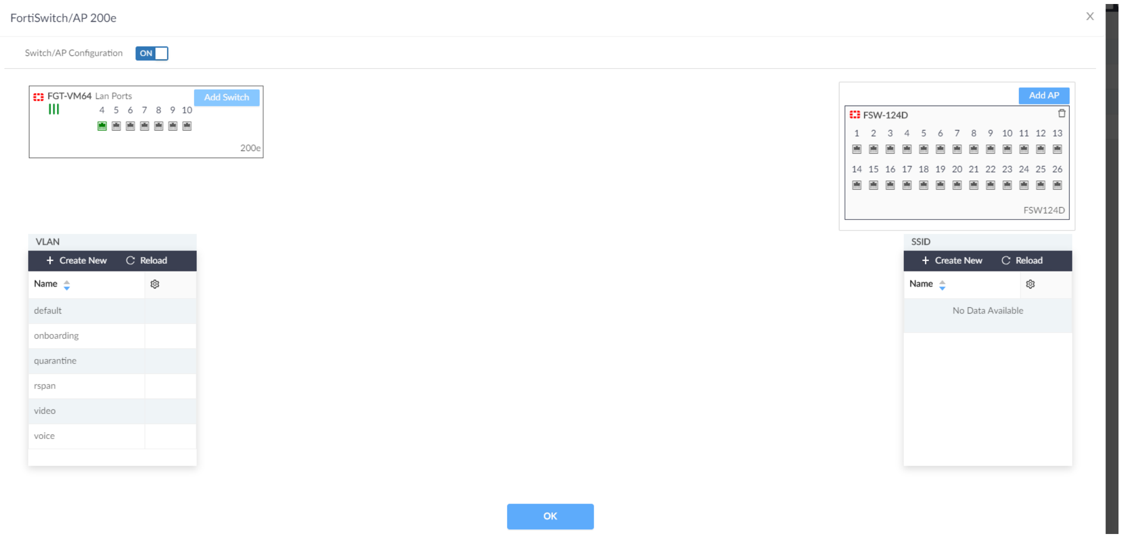
1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile / <Name>* dialog box is displayed.
3. Display the Switch/AP settings.
   a. Click the *Network* tab.
      The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
   b. Expand the *LAN* section, and toggle *Switch/AP Configuration* to *ON*.
      The *Switch/AP* button is displayed.
   c. Click *Switch/AP*.
      The *FortiSwitch/AP<Name>* dialog box is displayed.



4. Select the FortiGate port you want to connect to FortiSwitch, and click *Attach to FortiLink*.



   The port is attached, and the VLAN settings are created.
5. Add a platform model.
   a. Click *Add Switch*.
   b. In the *Name* field, enter a name for the FortiSwitch.
   c. From the *Platform* dropdown, select a FortiSwitch model.
   d. Click *OK*.
      The switch is added to the profile.

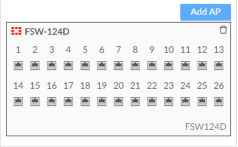


**To assign a VLAN to ports in a switch template:**

1. In the *VLAN* table, create a new VLAN or open a VLAN for updating.
   The *VLAN / <Name>* dialog box is displayed.
2. Configure the VLAN settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Type a name for the interface. |
| **Allow Overlap Between Devices** | Toggle on to allow overlap between devices. Toggle off to disable this feature. |
| **VLAN Id** | Enter a unique VLAN ID. |
| **IP Auto Assign** | Available when *Allow Overlap Between Devices* is disabled.<br>Toggle on to automatically assign IP addresses. Toggle off to disable this feature. |
| **IP Pool** | Available when *IP Auto Assign* is enabled.<br>Specify a pool of IP addresses to be used for SD-WAN Orchestrator to automatically assign. |
| **Subnet Mask Length** | Available when *IP Auto Assign* is enabled. |
| **DHCP Mode** | Specify whether to use DHCP for automatic IP assignment. Select one of the following options:<br>• *None* - DHCP is not used.<br>• *Server* - Enable DHCP server.<br>• *Relay* - Enable DHCP relay agent. |
| **Access Types** | Select the types of access to allow on the interface. |

3. Assign the VLAN to a switch template.
   a. Select a FortiSwitch port.



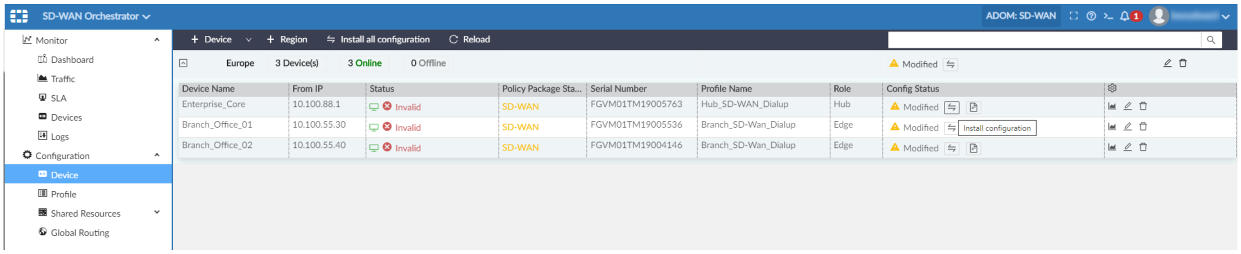
   The *More Configuration/ <port>* dialog box is displayed.

   b. Configure the port settings and click *OK*.

| Option | Description |
|---|---|
| **Native Vlan** | Select the native VLAN from the available VLAN objects |
| **Allowed Vlans** | Select the allowed VLAN from the available VLAN objects. |
| **Allowed Vlans-all** | Select the allowed VLAN from the available VLAN objects. |
| **Description** | Enter a description of the VLAN. |
| **DHCP Snooping** | Choose TRUSTED or UNTRUSTED. |
| **Lldp Profile** | Choose *default* or *default-auto-isl*. |
| **Loop Guard** | Toggle on to enable Loop Guard for the port.<br>Loop Guard cannot be applied to ports that are in trunks. |
| **Port Security-policy** | Select a port security policy from the dropdown. |
| **Stp State** | Toggle on to enable this feature. |
| **stp Root-gaurd** | Toggle on to enable STP Root Guard for the port. |
| **Edge Port** | Right-click to enable or disable Edge Port for the port. |
| **stp bpdu-guard** | Toggle on to enable STP BPDU Guard for the port. |

### To install a profile on a device:

1. Go to *Configuration > Device*.
   The device list is displayed.
2. Click *+Device* to add a device, or select a device to update.
   The *Device <Name>* dialog box is displayed.
3. From the *Profile Name* dropdown, select a profile and click *OK*.
4. In the *Config Status* column, click *Install Configuration*.



[redacted]

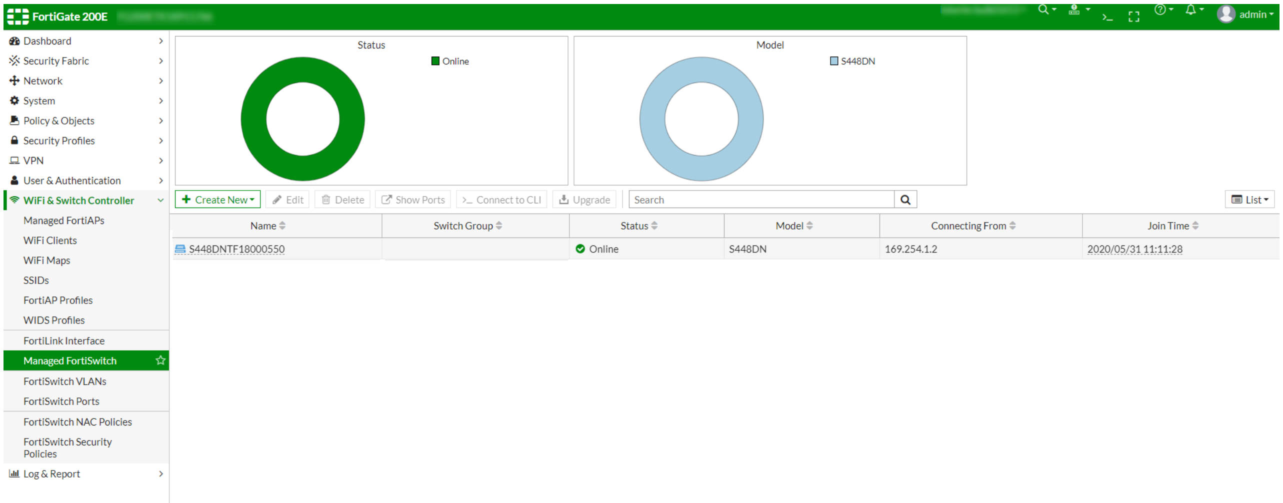
| Device Name | From IP | Status | Policy Package Sta... | Serial Number | Profile Name | Role | Config Status |
|---|---|---|---|---|---|---|---|
| Enterprise_Core | 10.100.88.1 | Invalid | SD-WAN | FGVM01TM19005763 | Hub_SD-WAN_Dialup | Hub | Modified |
| Branch_Office_01 | 10.100.55.30 | Invalid | SD-WAN | FGVM01TM19005536 | Branch_SD-Wan_Dialup | Edge | Modified |
| Branch_Office_02 | 10.100.55.40 | Invalid | SD-WAN | FGVM01TM19004146 | Branch_SD-Wan_Dialup | Edge | Modified |

   Wait for the status to change to *Synchronized*.

5. Connect the physical port on the FortiSwitch to the target port on FortiGate.
   Wait 10-15 minutes to allow the device to come online.

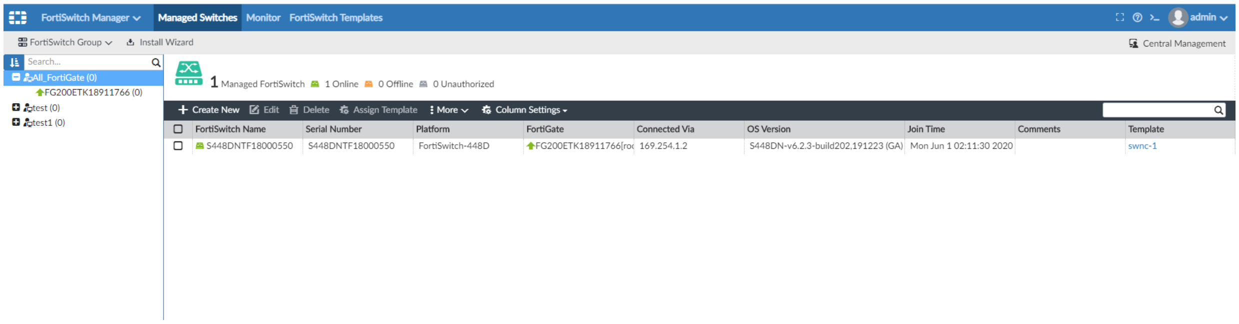
### To verify the connection:

1. On FortiGate, go to *WiFi & Switch Control > Managed FortiSwitch*.
   Check the *Status* column to verify the device status is *Online*.



| Name | Switch Group | Status | Model | Connecting From | Join Time |
|---|---|---|---|---|---|
| S448DNTF18000550 | | ✓ Online | S448DN | 169.254.1.2 | 2020/05/31 11:11:28 |

2. On FortiManager, go to *FortiSwitch Manager > Managed Switches > All_FortiGate* and select a device in the tree menu.
   Check the *FortiSwitch Name* column to verify the device is online.

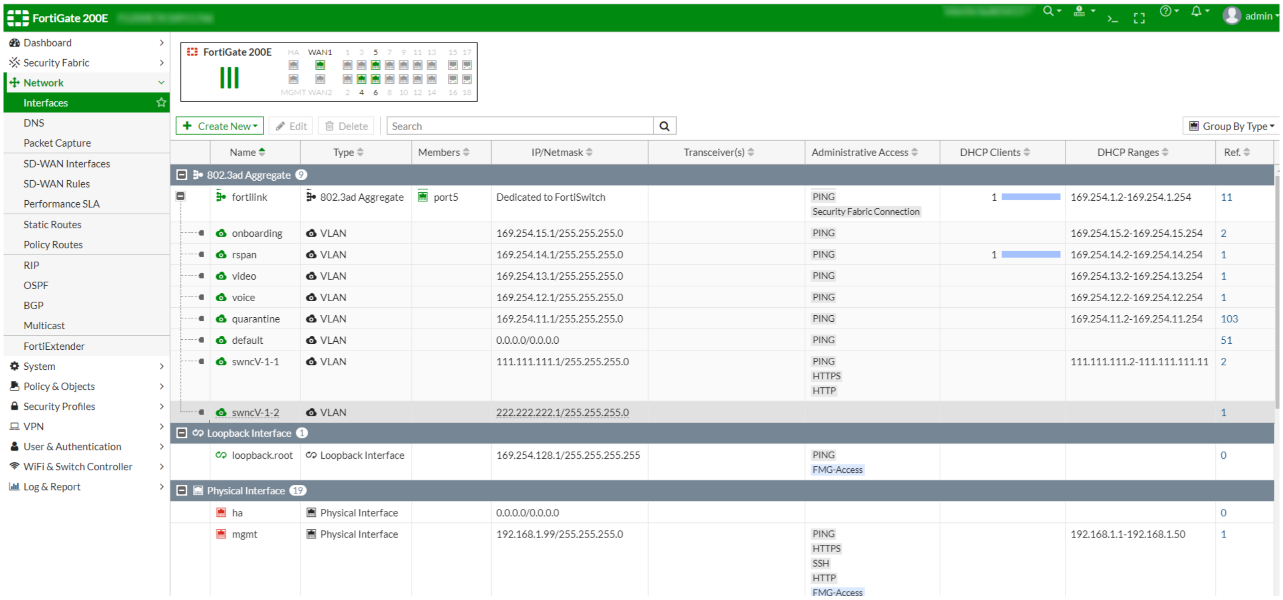


| □ | FortiSwitch Name | Serial Number | Platform | FortiGate | Connected Via | OS Version | Join Time | Comments | Template |
|---|---|---|---|---|---|---|---|---|---|
| □ | S448DNTF18000550 | S448DNTF18000550 | FortiSwitch-448D | FG200ETK18911766[roo | 169.254.1.2 | S448DN-v6.2.3-build202,191223 (GA) | Mon Jun 1 02:11:30 2020 | | swnc-1 |

### To verify the device received the configuration:

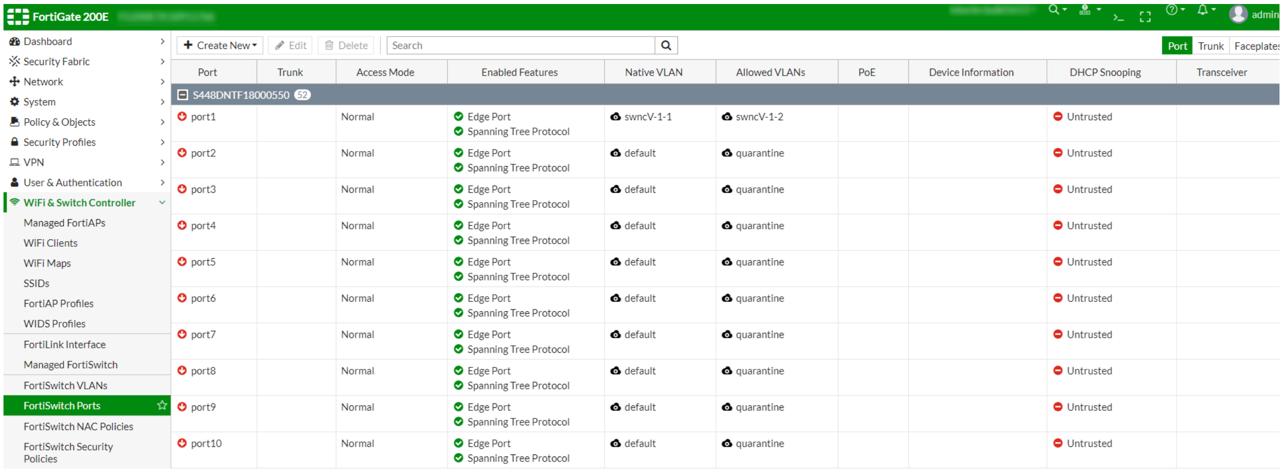
1. On FortiGate go to *Network > Interfaces*, and expand the interface in the table.
   In the *Name* column check that the target interface is set as *fortilink* member.

   In the *Type* column check that then VLANs in the controller profile are displayed.



| Name | Type | Members | IP/Netmask | Transceiver(s) | Administrative Access | DHCP Clients | DHCP Ranges | Ref. |
|---|---|---|---|---|---|---|---|---|
| 802.3ad Aggregate 9 | | | | | | | | |
| fortilink | 802.3ad Aggregate | port5 | Dedicated to FortiSwitch | | PING<br>Security Fabric Connection | 1 | 169.254.1.2-169.254.1.254 | 11 |
| onboarding | VLAN | | 169.254.15.1/255.255.255.0 | | PING | | 169.254.15.2-169.254.15.254 | 2 |
| rspan | VLAN | | 169.254.14.1/255.255.255.0 | | PING | 1 | 169.254.14.2-169.254.14.254 | 1 |
| video | VLAN | | 169.254.13.1/255.255.255.0 | | PING | | 169.254.13.2-169.254.13.254 | 1 |
| voice | VLAN | | 169.254.12.1/255.255.255.0 | | PING | | 169.254.12.2-169.254.12.254 | 1 |
| quarantine | VLAN | | 169.254.11.1/255.255.255.0 | | PING | | 169.254.11.2-169.254.11.254 | 103 |
| default | VLAN | | 0.0.0.0/0.0.0.0 | | PING | | | 51 |
| swncV-1-1 | VLAN | | 111.111.111.1/255.255.255.0 | | PING<br>HTTPS<br>HTTP | | 111.111.111.2-111.111.111.11 | 2 |
| swncV-1-2 | VLAN | | 222.222.222.1/255.255.255.0 | | | | | 1 |
| Loopback Interface 1 | | | | | | | | |
| loopback.root | Loopback Interface | | 169.254.128.1/255.255.255.255 | | PING<br>FMG-Access | | | 0 |
| Physical Interface 19 | | | | | | | | |
| ha | Physical Interface | | 0.0.0.0/0.0.0.0 | | | | | 0 |
| mgmt | Physical Interface | | 192.168.1.99/255.255.255.0 | | PING<br>HTTPS<br>SSH<br>HTTP<br>FMG-Access | | 192.168.1.1-192.168.1.50 | 1 |

2. Go to *WiFi & Switch Control* > *Managed FortiSwitch*.
   In the *Native VLAN* or *Allowed VLANs* columns, check that the VLANs are assigned to the FortiSwitch port.



| Port | Trunk | Access Mode | Enabled Features | Native VLAN | Allowed VLANs | PoE | Device Information | DHCP Snooping | Transceiver |
|---|---|---|---|---|---|---|---|---|---|
| S448DNTF18000550 52 | | | | | | | | | |
| port1 | | Normal | Edge Port<br>Spanning Tree Protocol | swncV-1-1 | swncV-1-2 | | | Untrusted | |
| port2 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port3 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port4 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port5 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port6 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port7 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port8 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port9 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |
| port10 | | Normal | Edge Port<br>Spanning Tree Protocol | default | quarantine | | | Untrusted | |

# Adding a FortiAP model device

When creating a profile, you can add a model FortiAP device to a FortiGate. When the access point comes online, it is managed by FortiGate and receives the configuration.

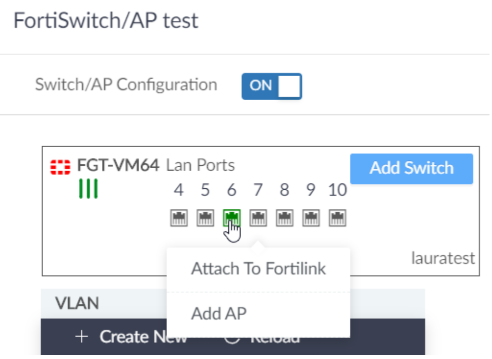
### Requirements:

Connect the FortiAP LAN port to the target FortiGate port.

### To add a model FortiAP to a FortiGate:

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or select a profile to update.

3. Display the FortiSwitch/AP settings.
   a. Click the *Network* tab.
   b. Expand the *LAN* section, and toggle *Switch/AP Configuration* to *ON*.
      The *Switch/AP* button is displayed.
   c. Click *Switch/AP*.
      The *FortiSwitch/AP <Name>* dialog box is displayed.
4. Select a FortiGate port, and click *Add AP*.

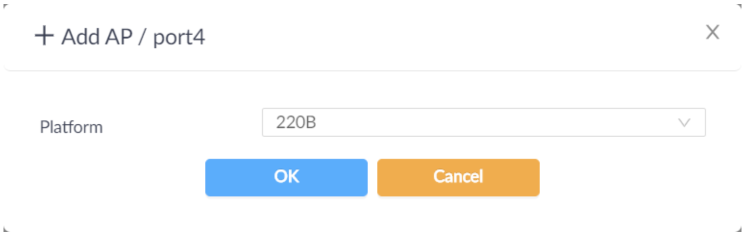


FortiSwitch/AP test

Switch/AP Configuration ON

The *+Add AP <Name>* dialog box is displayed.

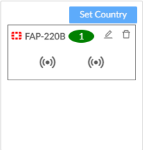
5. From the *Platform* dropdown, select a FortiAP model you want to manage .



+ Add AP / port4

Platform 220B

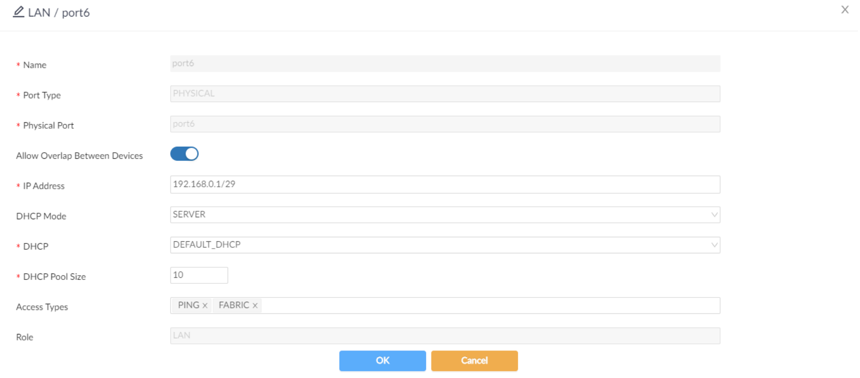
6. Click *OK*.
   The AP model is added to the profile.



### To install a profile on the target device:

1. Enable DHCP on the port so the connected AP will receive the IP address from the DHCP server.
   a. Go to *Configuration* > *Device*.
      The device list is displayed.
   b. Select a device to update.
      The *Device / <Name>* dialog box is displayed.
   c. Click the *Network* tab.
   d. Expand the *LAN* section, and select a port to update.
      The *LAN<port>* dialog box is displayed.

**e.** Configure the DHCP settings, and click *OK*

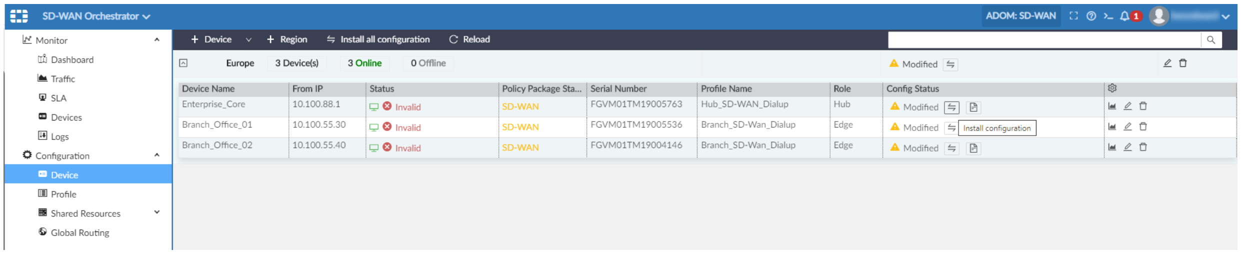


LAN / port6

| | |
|---|---|
| * Name | port6 |
| * Port Type | PHYSICAL |
| * Physical Port | port6 |
| Allow Overlap Between Devices | ● |
| * IP Address | 192.168.0.1/29 |
| DHCP Mode | SERVER |
| * DHCP | DEFAULT_DHCP |
| * DHCP Pool Size | 10 |
| Access Types | PING × FABRIC × |
| Role | LAN |

**f.** Click OK again.

2. In the *Device* pane, click *Install Configuration*.

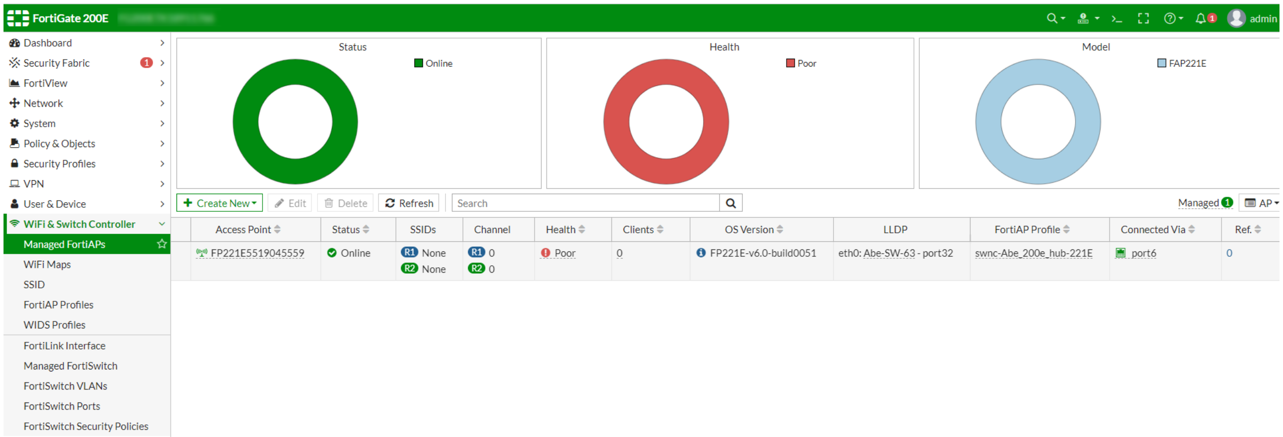


Europe 3 Device(s) 3 Online 0 Offline ⚠ Modified

| Device Name | From IP | Status | Policy Package Sta... | Serial Number | Profile Name | Role | Config Status |
|---|---|---|---|---|---|---|---|
| Enterprise_Core | 10.100.88.1 | Invalid | SD-WAN | FGVM01TM19005763 | Hub_SD-WAN_Dialup | Hub | ⚠ Modified |
| Branch_Office_01 | 10.100.55.30 | Invalid | SD-WAN | FGVM01TM19005536 | Branch_SD-Wan_Dialup | Edge | ⚠ Modified Install configuration |
| Branch_Office_02 | 10.100.55.40 | Invalid | SD-WAN | FGVM01TM19004146 | Branch_SD-Wan_Dialup | Edge | ⚠ Modified |

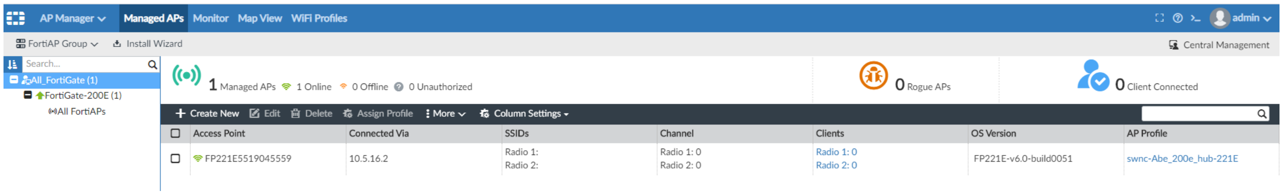
The configuration is synchronized with FortiGate. Wait 10-15 minutes for the device to come online.

3. To verify the connection in FortiGate, go to *WiFi & Switch Controller > Manager FortiAPs*.
Check the *Status* column to verify the device is *Online*.
Check the *FortiAP Profile* column to ensure the correct profile was deployed.



| Access Point | Status | SSIDs | Channel | Health | Clients | OS Version | LLDP | FortiAP Profile | Connected Via | Ref. |
|---|---|---|---|---|---|---|---|---|---|---|
| FP221E5519045559 | Online | R1 None<br>R2 None | R1 0<br>R2 0 | Poor | 0 | FP221E-v6.0-build0051 | eth0: Abe-SW-63 - port32 | swnc-Abe_200e_hub-221E | port6 | 0 |

4. To verify the connection in FortiManager, go to *AP Manager > Managed APs*.
Check the *Access Point* column to verify the device is online.
Check the *AP Profile* column to verify the correct profile was deployed.



1 Managed APs 1 Online 0 Offline 0 Unauthorized 0 Rogue APs 0 Client Connected

| Access Point | Connected Via | SSIDs | Channel | Clients | OS Version | AP Profile |
|---|---|---|---|---|---|---|
| FP221E5519045559 | 10.5.16.2 | Radio 1:<br>Radio 2: | Radio 1: 0<br>Radio 2: 0 | Radio 1: 0<br>Radio 2: 0 | FP221E-v6.0-build0051 | swnc-Abe_200e_hub-221E |

### To add an SSID profile to a ports AP profile:

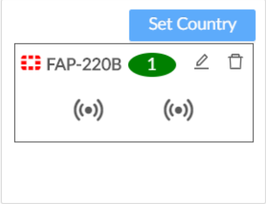
1. In the SSID table, create a new profile or select a profile to update.
   The *+SSID* dialog box is displayed.
2. Configure the SSID settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the SSID profile. |
| **SSID** | Type the wireless service set identifier (SSID), or network name, for this wireless interface. Users who want to use the wireless network must configure their computers with this network name. |
| **Security Mode** | Select a security mode:<br>• *Open*<br>• *WPA2_PERSONAL*<br>• *WPA3_SAE*<br>• *WPA3_SAE_TRANSITION* |
| **Pre-shared Key** | Enter the pre-shared key for the SSID.<br>This option is only available when the security mode includes *WPA2 _PERSONAL* and *WPA3_SAE_TRANSITION*. |
| **SAE Password** | Enter the password for the SSID.<br>This option is only available when the security mode includes *WPA3_SAE* and *WPA3_SAE_TRANSITION*. |
| **Client Limit** | The maximum number of clients that can simultaneously connect to the AP (0 - 4294967295, default = 0, meaning no limitation). |
| **Broadcast SSID** | Enable/disable broadcasting the SSID (default = enable).<br>Broadcasting enables clients to connect to the wireless network without first knowing the SSID. For better security, do not broadcast the SSID. |
| **Block Intra-SSID Traffic** | Enable/disable blocking communication between clients of the same AP (default = disable). |
| **Quarantine Host** | Enable/disable station quarantine (default = enable). |
| **Allow Overlap between Device** | Toggle on to allow overlap between devices. Toggle off to disable this feature. |
| **IP Auto Assign** | Available when *Allow Overlap Between Devices* is disabled.<br>Toggle on to automatically assign IP addresses.<br>Toggle off to disable this feature. |
| **IP Pool** | Available when *IP Auto Assign* is enabled.<br>Specify a pool of IP addresses to be used for SD-WAN Orchestrator to automatically assign. |
| **Subnet Mask Length** | Available when *IP Auto Assign* is enabled.<br>Specify the length of the subnet mask. |

| Option | Description |
|---|---|
| **DHCP Mode** | Specify whether to use DHCP for automatic IP assignment. Select one of the following options:<br>• *None* - DHCP is not used.<br>• *Server* - Enable DHCP server.<br>• *Relay* - Enable DHCP relay agent. |
| **DHCP** | Choose the DHCP server. |
| **DHCP Pool Size** | Enter the DHCP pool size. |
| **Access Types** | Select the types of access to allow on the interface. |

**To configure an AP profile:**

1. In the AP profile table, click *Edit*.



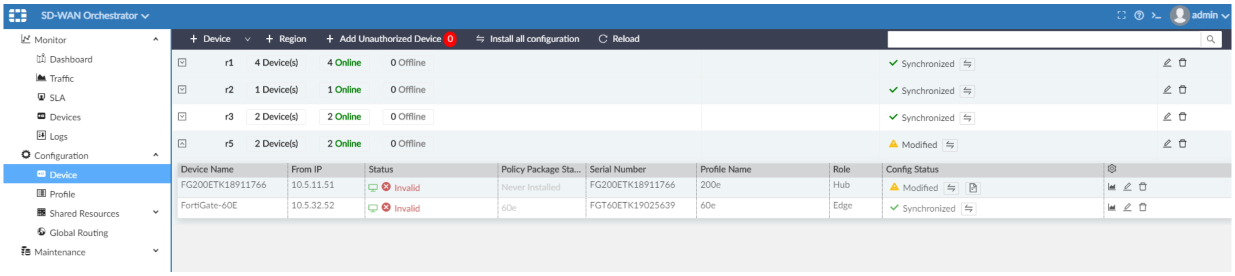
The *AP<Name>* dialog box is displayed.

2. Configure the settings and click *OK*.

| Option | Description |
|---|---|
| **AllowAccess** | Choose from:<br>• *HTTPS*<br>• *SSH*<br>• *SNMP* |
| **Login Password Change** | Choose from:<br>• *LEAVE_UNCHANGED*<br>• *SET*<br>• *SET_EMPTY* |
| **Mode** | Choose from:<br>• *DISABLED*<br>• *AP*<br>• *MONITOR* |
| **Wids Profile** | Choose from:<br>• *default*<br>• *default-wids-apscan-enabled* |
| **Radio Resource Provision** | Select to enable radio resource provisioning.<br>This feature measures utilization and interference on the available channels and selects the clearest channel at each access point. |

| Option | Description |
|---|---|
| **Band** | Select the wireless protocol from the dropdown list. The available bands depend on the selected platform.<br>In two radio devices, both radios cannot use the same band. |
| **Short Guard-interval** | Select to enable the short guard interval. |
| **Auto TX Power Control** | Enable automatic adjustment of transmit power. |
| **TX Power (%)** | If *Auto TX Power Control* is disabled, enter the TX power in the form of the percentage of the total available power.<br>If *Auto TX Power Control* is enabled, enter the *TX Power Low (dBm)* and *TX Power High (dBm)* power levels. |
| **SSIDs Auto Assign** | Disable to manually assign the SSIDs that APs using this profile will carry, or let them be selected automatically. |
| **Monitor Channel Utilization** | Enable/disable monitoring channel utilization. |

3. To verify the profile was updated, go to *Configuration* > *Device*.
   Check the *Config Status* column to verify the profile is *Modified*.



| | | | | |
|---|---|---|---|---|
| r1 | 4 Device(s) | 4 Online | 0 Offline | ✓ Synchronized |
| r2 | 1 Device(s) | 1 Online | 0 Offline | ✓ Synchronized |
| r3 | 2 Device(s) | 2 Online | 0 Offline | ✓ Synchronized |
| r5 | 2 Device(s) | 2 Online | 0 Offline | ⚠ Modified |

| Device Name | From IP | Status | Policy Package Sta... | Serial Number | Profile Name | Role | Config Status |
|---|---|---|---|---|---|---|---|
| FG200ETK18911766 | 10.5.11.51 | Invalid | Never Installed | FG200ETK18911766 | 200e | Hub | ⚠ Modified |
| FortiGate-60E | 10.5.32.52 | Invalid | 60e | FGT60ETK19025639 | 60e | Edge | ✓ Synchronized |

4. Click *Install Configuration* to synchronize the profile on the device.

## Creating new DMZ settings

When creating a profile, you can also create new DMZ settings.

### To create new DMZ settings:

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.
3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
4. Expand the *DMZ* section, and click *+Create New*.
   The *DMZ* dialog box is displayed.

| Option | Description |
|---|---|
| Name | Type a name for the interface. |
| Port Type | Select the type of port. Choose from *VLAN* or *AGGREGATE*. |
| Physical Port | Available when *Port Type* is set to *VLAN*.<br>Select the port number. |
| VLAN ID | Available when *Port Type* is set to *VLAN*.<br>Type an ID for the VLAN. |
| Allow Overlap Between Devices | Toggle on to allow overlap between devices and specify the IP address of the other device. |
| IP Address | Available when *Allow Overlap Between Devices* is toggled on.<br>Type the IP address of the device that can be overlapped. |
| IP Auto Assign | Available when *Allow Overlap Between Devices* is toggled off.<br>Toggle on to allow automatic IP assignment from a pool of IP addresses. |
| IP Pool | Available when *IP Auto Assign* is toggled on.<br>Select the pool of IP addresses to use for automatic assignment.<br>If you have not yet created a pool of IP addresses, you can create one. In the dropdown list, click *Create*. See also Creating intranet IP pools on page 94. |
| Subnet Mask Length | Type the prefix of the IP address or subnet mask. |
| DHCP Mode | Specify whether to use DHCP for automatic IP assignment. Select one of the following options:<br>• *None* - DHCP is not used.<br>• *Server* - Enable DHCP server.<br>• *Relay* - Enable DHCP relay agent. |
| DHCP | When *DHCP Mode* is set to *Server*, select a server from shared resources. See Creating DHCP servers on page 93.<br>When *DHCP Mode* is set to *Relay*, select a relay agent from shared resources. See Creating DHCP relay agents on page 94. |
| DHCP Pool Auto Assign | Available when *DHCP Mode* is set to *Server*.<br>Toggle on to enable and specify the pool size. |
| Access Types | Select the types of access to allow on the interface. |

5. Complete the options, and click *OK*.
   The DMZ setting is created.
6. If you set *Port Type* to *AGGREGATE*, open the DMZ settings for editing, select interface members, and click *OK*.
   Interface members are added to the DMZ settings.

## Creating virtual wire pairs

When creating a profile, you can also create a virtual wire pair. A virtual wire pair consists of two interfaces that do not have IP addressing and are treated like a transparent-mode VDOM.

You can create a virtual wire pair for FortiGate VMs and hardware.

**To create a virtual wire pair:**

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.
3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
4. Expand the *Virtual Wire Pair* section, and click *+Create New*.
   The *Virtual Wire Pair* dialog box is displayed.

| Option | Description |
|---|---|
| Name | Type a name for the virtual wire pair. |
| Interface Members | Select two interface members for the virtual wire pair. A virtual wire pair must have exactly two interface members. |
| Wilcard VLAN | Toggle *ON* to enable wildcard VLAN.<br>Toggle *OFF* to disable this feature. |
| VLAN Filter | Available when *Wildcard VLAN* is toggled *ON*.<br>Click *Add* to create a VLAN filter. |

5. Complete the options, and click *OK*.
   The virtual wire pair is created.
6. Go to FortiManager, and configure a virtual wire pair policy.

## Creating new BGP network

When creating a profile, you can also create a new port subnet for BGP.

**To create new BPG network settings:**

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.
3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
4. Expand the *BGP* section, and click *+Create New*.
   The *BGP Network* dialog box is displayed.

| Option | Description |
|---|---|
| Type | Displays *Port Subnet*. |
| Physical Port | Select the port for the subnet. |

5. Complete the options, and click *OK*.
   The port subnet for BGP is created.

## Creating new OSPF area

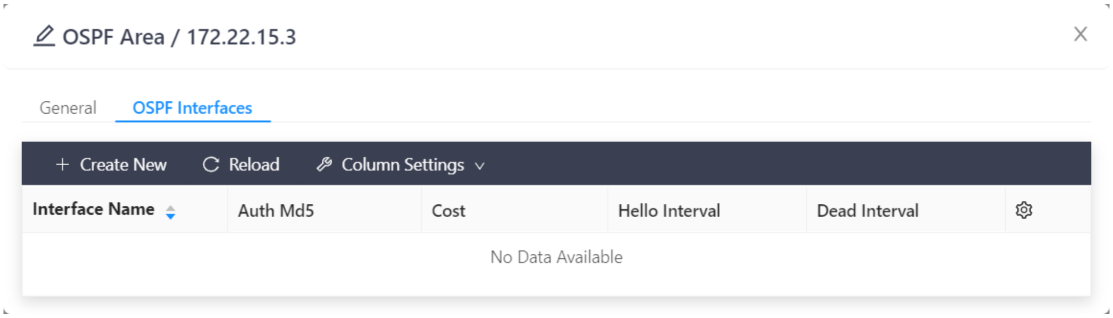
When creating a profile, you can also create a new OSPF area and add interface members.

**To create new OSPF area:**

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.
3. Click the *Network* tab.
   The *Network* pane is displayed. For a description of the options, see Network tab on page 85.
4. Expand the *OSPF* section, and click *+Create New*.
   The *OSPF Area* dialog box is displayed.
5. Complete the options, and click *OK*.

| Option | Description |
|---|---|
| Area | Type the IP address for the OSPF area. |
| Type | Select the type of area. Choose from the following:<br>• Regular<br>• Stub<br>• NSSA |
| Authentication | Choose whether to enable authentication. Choose from the following:<br>• None<br>• MD5<br>• Text |

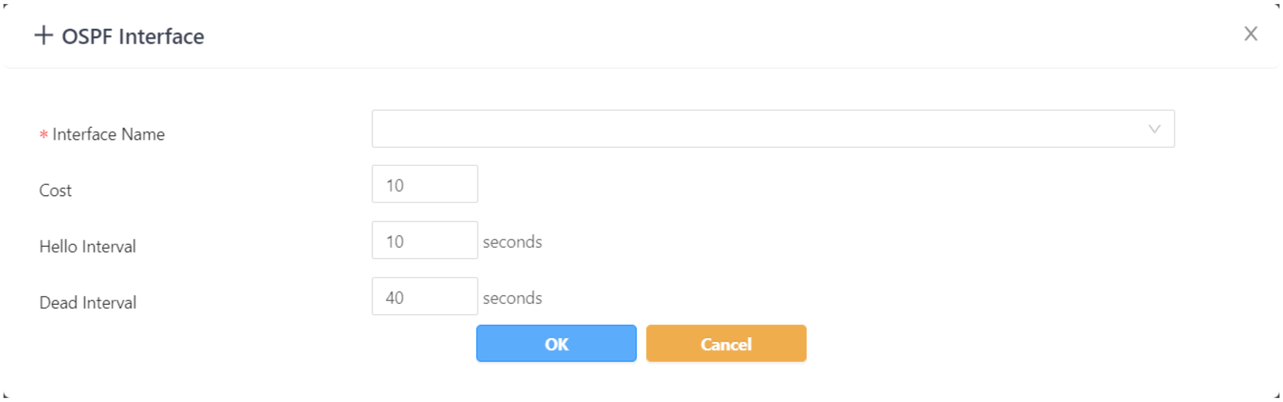
The OSPF area is created, and *OSPF Interfaces* tab is displayed.



| Interface Name | Auth Md5 | Cost | Hello Interval | Dead Interval |
|---|---|---|---|---|

No Data Available

6. Click *Create New*.
   The *OSPF Interface* dialog box is displayed.



| | |
|---|---|
| * Interface Name | |
| Cost | 10 |
| Hello Interval | 10 seconds |
| Dead Interval | 40 seconds |

7. Configure the options, and click *OK*.
   The interface is defined for OSPF.
8. Close the dialog box.
   The OSPF area is displayed with the defined interfaces.

## Creating business rules

You can create or update a business rule in a profile from the *Business* tab.

### To create a business rule:

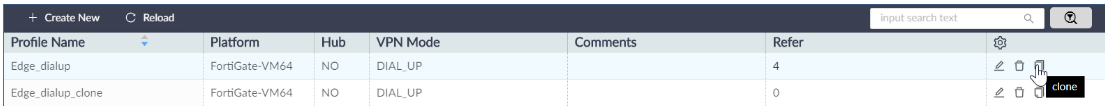
1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Create a new profile, or open a profile for updating.
   The *Profile <name>* dialog box is displayed.
3. Click the *Business* tab.
   The *Business* pane is displayed.
4. Click +*Create New*.
   The *Business Rule* dialog box is displayed.
5. Complete the options, and click *OK*.
   The business rule is created.

## Cloning profiles

You can clone profiles, and then edit the settings to save time.

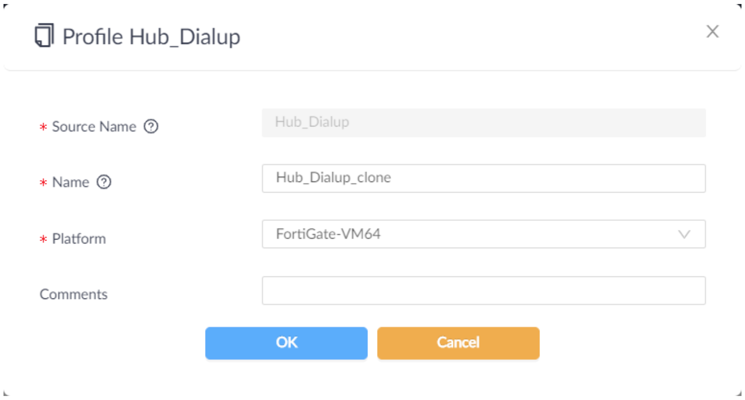
### To clone profiles:

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Click the *Clone* icon for the profile.



| Profile Name | Platform | Hub | VPN Mode | Comments | Refer | ⚙ |
|---|---|---|---|---|---|---|
| Edge_dialup | FortiGate-VM64 | NO | DIAL_UP | | 4 | |
| Edge_dialup_clone | FortiGate-VM64 | NO | DIAL_UP | | 0 | |

The *Profile <name>* dialog box is displayed.



Profile Hub_Dialup

* Source Name: Hub_Dialup

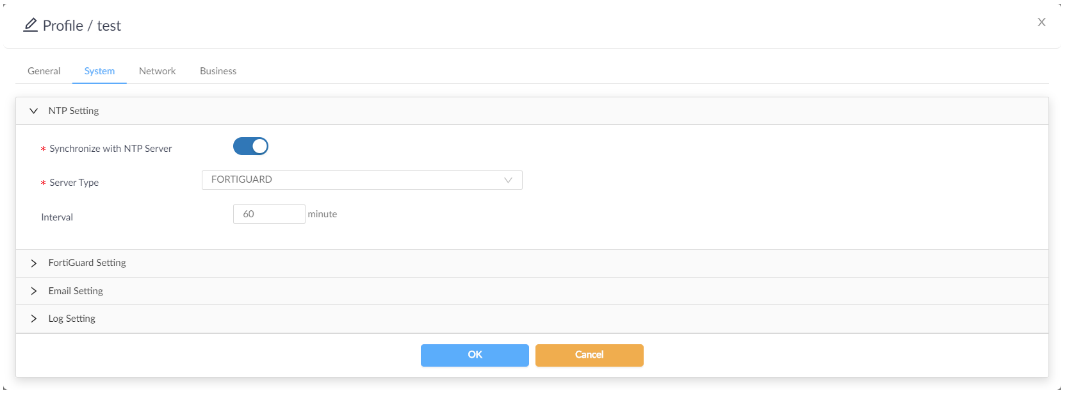
* Name: Hub_Dialup_clone

* Platform: FortiGate-VM64

Comments:

3. Set the following options, and click *OK*.
   - **a.** In the *Name* box, type a unique name.
   - **b.** In the *Platform* list, select the platform.

   The cloned profile opens for editing.



Profile / test

* Synchronize with NTP Server: ●

* Server Type: FORTIGUARD

Interval: 60 minute

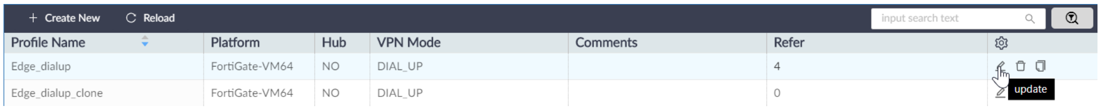
4. Set the options on the *System*, *Network*, and *Business* tabs, and click *OK*.

## Updating profiles

You can update profiles after you create them. Updated profile settings are synchronized to associated devices.

### To update profiles:

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Click the *Update* icon for the profile.
   Alternately, you can double-click the profile to open it for updating.



| Profile Name | Platform | Hub | VPN Mode | Comments | Refer |
|---|---|---|---|---|---|
| Edge_dialup | FortiGate-VM64 | NO | DIAL_UP | | 4 |
| Edge_dialup_clone | FortiGate-VM64 | NO | DIAL_UP | | 0 |

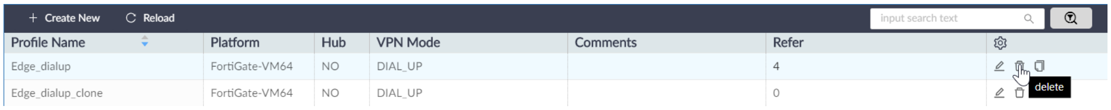
   The *Profile <name>* dialog box opens.
3. Edit the settings, and click *OK*.
4. Install profile changes. See Installing configuration changes on page 46.

## Deleting profiles

You can delete profiles when they are no longer used by devices or regions.

**To delete profiles:**

1. Go to *Configuration* > *Profile*.
   The list of profiles is displayed.
2. Click the *Delete* icon for the profile.

   | Profile Name | Platform | Hub | VPN Mode | Comments | Refer |
   |---|---|---|---|---|---|
   | Edge_dialup | FortiGate-VM64 | NO | DIAL_UP | | 4 |
   | Edge_dialup_clone | FortiGate-VM64 | NO | DIAL_UP | | 0 |

   A confirmation dialog box is displayed.
3. Click *OK*.
   The profile is deleted.

## Profile options described

This section describes the options available when you configure a profile. The options are organized into the following tabs:

- General tab on page 82
- System tab on page 83
- Network tab on page 85
- Business tab on page 90

### General tab

The *General* tab contains the following sections:

| Option | Description |
|---|---|
| Name | Type a name for the profile. You can use lowercase and uppercase letters, numbers 0 to 9, underscores, and dashes. |
| Platform | Select a platform for the profile settings. |
| Device Role | Select *PRIMARY_HUB* to create a profile for primary hubs.<br>Select *SECONDARY_HUB* to create a profile for secondary hubs. |
| VPN Mode with Edge | Select one of the following options to connect the hub device with edge devices:<br>• Select *DIAL_UP* to create one-to-one overlay links between the hub device and its edge devices. When you select *DIAL_UP*, you can enable ADVPN on the *Network* tab in the *WAN* settings.<br>• Select *DIAL_UP_FULL_MESH* to create full-mesh overlay links on WAN ports between hub devices and edge devices in the same region.<br>• Select *SITE_TO_SITE* to create full-mesh overlay links between the hub device and its edge devices in the same region. |

| Option | Description |
|---|---|
| VDOM Mode | Toggle on to create a profile for a FortiGate VDOM.<br>Toggle off to disable this feature. |
| Max Edge Count | Available with *Hub* is toggled on and *VPN Mode with Edge* is set to *DIAL_UP*.<br>Specify the maximum number of edge devices allowed to connect with the hub device. |
| Port Number | Specify the number of ports on the FortiGate. The number of ports in the FGT VM should be the same number as defined here. Otherwise conflict will occur. |
| Running on Cloud | Toggle on to support FortiGate Cloud.<br>Toggle off to disable this feature. |
| Comments | (Optional) Type a comment about the profile. |

## System tab

The *System* tab contains the following sections:

- NTP on page 83
- FortiGuard on page 83
- Email on page 84
- Log on page 84
- Misc Setting on page 85

### NTP

Expand *NTP Setting* to view the following options:

| Option | Description |
|---|---|
| Synchronize with NTP Server | Toggle on to enable synchronization with an NTP server, and then specify the server. Toggle off to disable this feature. |
| Server Type | Choose between the following options:<br>• *FortiGuard*<br>• *Specify*<br>When you select *Specify*, you must also select an NTP server. |
| NTP Servers | Available when *Server Type* is set to *Specify*. Select an NTP server that you added to SD-WAN Orchestrator MEA. |
| Interval | Specify how often in minutes to synchronize time with the NTP server. |

### FortiGuard

Expand *FortiGuard Setting* to view the following options:

| Option | Description |
|---|---|
| FortiGuard Security Updates | Toggle on to enable security updates from FortiGuard. Toggle off to disable this feature. |
| Servers | Select a FortiGuard server that you added to SD-WAN Orchestrator MEA. |
| Include Worldwide FortiGuard servers | Toggle on to include FortiGuard servers from around the world. Toggle off to disable this feature. |

## Email

Expand *Email Setting* to view the following options:

| Option | Description |
|---|---|
| Server name | Select the server to use for email notifications. You must add a server to SD-WAN Orchestrator MEA before you can select it. |

## Log

Expand *Log Setting* to view the following logging options:

- Send Logs to FortiAnalyzer / FortiManager
- Send logs to Syslog

You can configure devices to send logs to FortiAnalyzer/FortiManager or a syslog server.

| Option | Description |
|---|---|
| Send logs to FortiAnalyzer / FortiManager | Toggle on to enable logging to FortiAnalyzer or FortiManager. Toggle off to disable this feature. |
| Server Type | Select one of the following options:<br>• *This FortiManager or managed FortiAnalyzer*: Sets the IP of the FortiAnalyzer to be the same as the FortiManager to which the FortiGate is connected. Use this option when FortiAnalyzer features are enabled on FortiManager.<br>• *Specify IP Address*: Specify an IP address for FortiAnalyzer when the IP address for FortiAnalyzer is different from the FortiManager to which the FortiGate is connected. |
| Upload option | Specify how often to upload logs from devices to FortiManager or FortiAnalyzer. |
| Encrypt Log Transmission | Specify the level of encryption for log transmission. |
| Reliable logging to FortiAnalyzer | Toggle on to enable reliable logging to FortiAnalyzer. Toggle off to disable this feature. |
| Send Logs to Syslog | Toggle on to enable logging to a syslog server. Toggle off to disable this feature. |
| Server IP/Name | Type the IP address or FQDN of the syslog server that you added to SD-WAN Orchestrator MEA. |
| Mode | Select a mode for transmitting logs. Choose from: |

| Option | Description |
|---|---|
| | • UDP<br>• Legacy reliable<br>• Reliable |
| Port | Specify which port to use. See the SD-WAN Orchestrator MEA GUI tooltip (?) for port suggestions. |
| Minimum Log Level | Specify the minimum level of logs to include. |
| Format | Specify the log format. |

### Misc Setting

Expand *Misc Setting* to view the following options:

| Option | Description |
|---|---|
| Admin HTTPS Port | Specify the HTTPS port to use for admin access. |

## Network tab

The *Network* tab contains the following sections:

- Physical Interface on page 85
- WAN on page 86
- LAN on page 86
- DMZ on page 87
- Virtual Wire Pair on page 87
- BGP on page 88
- OSPF on page 88
- DNS Server on page 89
- SNMP on page 89
- HA Interfaces on page 89

### Physical Interface

On the *General* tab when *VDOM mode* is toggled on, the *Add Physical Interface* button is available on the *Network* tab. In other words, it is available when configuring a profile for VDOM mode.

Click *Add Physical Interface* to add one or more physical interfaces for the role of WAN, LAN, or DMZ. See Adding physical interfaces for VDOMs on page 59.

Instead of adding physical interfaces for use by VDOMs, you can retrieve interfaces when you add a VDOM to SD-WAN Orchestrator MEA. See Adding VDOMs on page 35.

## WAN

Expand *WAN* to view the following options:

| Option | Description |
|---|---|
| Create New | Click *Create New* to define a new WAN interface.<br>You can define the port type as *VLAN*, *Aggregate*, *Hard_Switch*, *Soft_Switch*, and *Extender*.<br>When the port type is *AGGREGATE*, you must save the WAN configuration, and then open it for editing to add interface members.<br>See also Creating new WAN settings on page 61. |
| Extender | Available when *Running on Cloud* is toggled off on the *General* tab of the profile.<br>Click *Extender* to configure FortiExtender as a WAN port for FortiGate.<br>See also Creating profiles with FortiExtender WAN ports on page 57. |
| Interface | Displays the interface name. |
| Vlan | Displays whether VLAN is used. |
| Interface Members | Displays the interface members for an aggregate interface. |
| ISP Link | Displays the name of the ISP link. |
| WAN Type | Displays the type of WAN used. |
| Private Wire | Displays whether a private wire is used. |
| Mode | Displays the mode used by the interface. |
| Enable | Indicates whether the interface is enabled. |
| Access | Displays the types of access to allowed for the interface. |
| Update | Click the *Update* icon to edit the settings. |

## LAN

Expand *LAN* to view the following options:

| Option | Description |
|---|---|
| Create New | Click *Create New* to define a new LAN interface.<br>You can define the port type as *VLAN*, *WiFi_SSID*, *Aggregate*, *Hard_Switch*, and *Soft_Switch*.<br>When the port type is *AGGREGATE*, you must save the LAN configuration, and then open it for editing to add interface members.<br>See also Creating new LAN settings on page 64. |
| Switch/AP Configuration | Toggle on to enable configuration of managed FortiSwitch and FortiAP devices, and display the *Switch/AP* button. |

| Option | Description |
|---|---|
| | Toggle off to disable configuration of managed FortiSwitch and FortiAP devices. If you toggle this feature off after configuring switch and AP devices, the configuration is reset for all managed switch and AP devices. |
| Switch/AP | Available when *Switch/AP Configuration* is toggled on.<br>Click *Switch/AP* to define settings for FortiSwitch and FortiAP devices.<br>See also Attaching a FortiSwitch model to FortiGate on page 66 and Adding a FortiAP model device on page 71. |
| Interface | Displays the interface name. |
| Vlan | Displays whether VLAN is used. |
| Interface Members | Displays the interface members for an aggregate interface. |
| Subnet Type | Displays the type of subnet. |
| IP Address | Displays the IP address. |
| DHCP Server/Relay | Displays the DHCP mode |
| DHCP Pool Size | Displays the DHCP pool size. |
| Access | Displays the types of access to allowed for the interface. |
| Update | Click the *Update* icon to edit the settings. |

## DMZ

Expand *DMZ* to view the following options:

| Option | Description |
|---|---|
| Create New | Click *Create New* to define a new DMZ interface.<br>You can define the port type as *VLAN* or *AGGREGATE*.<br>When the port type is *AGGREGATE*, you must save the DMZ configuration, and then open it for editing to add interface members.<br>See also Creating new DMZ settings on page 76. |
| Interface | Displays the interface name. |
| Vlan | Displays whether VLAN is used. |
| Interface Members | Displays the interface members for an aggregate interface. |
| Enable | Indicates whether the interface is enabled. |
| Access | Displays the types of access to allowed for the interface. |
| Update | Click the *Update* icon to edit the settings. |

## Virtual Wire Pair

Expand *Virtual Wire Pair* to view the following options:

| Option | Description |
|---|---|
| Create New | Click *Create New* to define a virtual wire pair.<br>See also Creating virtual wire pairs on page 77. |
| Interface Members | Select two interface members for the virtual wire pair. A virtual wire pair must have exactly two interface members. |
| Wildcard VLAN | Toggle *ON* to enable wildcard VLAN.<br>Toggle *OFF* to disable this feature. |
| VLAN Filter | Available when *Wildcard VLAN* is toggled *ON*.<br>Click *Add* to create a VLAN filter. |

## MGMT

Expand *MGMT* to view the following options:

| Option | Description |
|---|---|
| Interface | Displays the management interface. |

## BGP

Expand *BGP* to view the following options:

| Option | Description |
|---|---|
| Router ID | Displays *Auto Assign* to indicate that the router ID will be automatically assigned. |
| Redistribute OSPF | Toggle on to enable redistribution of routing table learned by OSPF to other devices controlled by SD-WAN Orchestrator MEA through BGP, or to devices not controlled by SD-WAN Orchestrator MEA, such as Cisco routers.<br>Toggle off to disable. |
| Create New | Click *Create New* to define a new BGP network.<br>See also Creating new BGP network on page 78. |
| Type | Displays *Port Subnet*. |
| Subnet | Displays the physical port name. |

## OSPF

Expand *OSPF* to view the following options:

| Option | Description |
|---|---|
| Settings | The *Settings* section displays the OSPF settings. |
| Router ID | Displays *Auto Assign*. |
| Inject Default Route | Select from the following options: |

| Option | Description |
|---|---|
| | - Always<br>- Enable<br>- Disable |
| Redistribute | The *Settings > Redistribute* section lets you enable redistribution of routes between devices managed by SD-WAN Orchestrator MEA and devices that are not managed by SD-WAN Orchestrator MEA. |
| Redistribute Connected | Toggle on to enable redistribution of connected routes. |
| Redistribute Static | Toggle on to enable redistribution of static routes. |
| Redistribute BGP | Toggle on to enable redistribution of routing table learned by BGP to other devices controlled by SD-WAN Orchestrator MEA through OSPF, or to devices not controlled by SD-WAN Orchestrator MEA, such as Cisco routers. |
| Areas | The *Areas* section lets you define OSPF areas. |
| Create New | Click *Create New* to define a new OSPF area.<br>See Creating new OSPF area on page 79. |

### DNS Server

Expand *DNS Server* to view the following options:

| Option | Description |
|---|---|
| Server Name | Select a DNS server that you added to SD-WAN Orchestrator MEA. |

### SNMP

Expand *SNMP* to view the following options:

| Option | Description |
|---|---|
| SNMP Agent | Toggle on to enable an SNMP agent. Toggle off to disable this feature. |

### HA Interfaces

Expand *HA Interfaces* to view the following options:

| Option | Description |
|---|---|
| Monitor Interfaces | Select a port for monitoring interfaces. You can use the same port as the FortiManager heartbeat interface. |
| Heartbeat Interfaces | Select a port to use for the heartbeat. You can use the same port as the FortiManager monitor interface. |

When a profile without HA interface definitions is assigned to a device in an HA cluster, default ports are used. For *Monitor Interfaces*, WAN1 is used, and for *Heartbeat Interfaces*, the last LAN port is used.

## Business tab

The *Business* tab contains the following options:

| Option | Description |
|---|---|
| Create New | Click *Create New* to create a new business rule. |
| Name | Type a name for the business rule. |
| Criteria | |
| Valid | Displays whether the rule is valid. A checkmark indicates a valid rule. |
| Source Address | Select the source address or address group. |
| Users | Select or create users. |
| User Groups | Select or create user groups |
| Destination Type | Select the type of destination for the traffic. |
| Dest Address | Select or create the destination address or address group. |
| Service | Select or create the Internet service. |
| Enable | Toggle *ON* to enable the rule, and Toggle *OFF* to disable the rule. |
| Link Policy | |
| Group Type | For hub devices, choose from *UNDERLAY* or *OVERLAY*.<br>For edge devices, choose from *UNDERLAY*, *OVERLAY*, or *ALL*. |
| Path | When *Group Type* is set to *OVERLAY*, displays the path.<br>When *Group Type* is set to *UNDERLAY*, choose from *SINGLE_PATH*, *MULTIPLE_PATH*, or *ALL_PUBLIC_LINE*. |
| Load Policy | When *Group Type* is set to *Overlay*, choose from *LOW_COST*, *HIGH_QUALITY*, or *HIGH_THROUGHPUT*.<br>When *Group Type* is set to *Underlay* for hub devices, choose from *LOW_COST*, *HIGH_QUALITY*, *HIGH_THROUGHPUT*, or *MANUAL*. |
| SLA Quality Level | Displays the minimum quality level. |
| Dual Hub Load Mode | Available for dual hubs when *Group Type* is set to *OVERLAY*. Choose from *ACTIVE_PASSIVE* or *ACTIVE_ACTIVE*.<br>When you choose *ACTIVE_PASSIVE*, the business rule is split and deployed to FortiGate as two rules:<br>• One rule is for the primary hub, and includes all overlay links to the primary hub as priority members.<br>• The other rule is for secondary hub, and includes all overlay links to the secondary hub as priority members.<br>When you choose *ACTIVE_ACTIVE*, a business rule is deployed to FortiGate as one rule. The priority members include all overlay links between the edge and both hubs. |

| Option | Description |
|---|---|
| SLA Server Type | When *Group Type* is set to *Overlay*, select the type of SLA server. |
| SLA Server | Select the SLA server. |
| Backhaul to Group | When *Group Type* is set to *Overlay* for hub devices, choose the backhaul route to the group. |

# Shared resources

You can define resources once, and then select them in multiple profiles by using the *Shared Resources* tree menu. You can create the following shared resources:

- Intranet addresses
- Network resources, such as DHCP servers
- SLA quality levels and servers
- Servers used by SD-WAN Orchestrator MEA, such as NTP servers, FortiGuard servers, and email servers
- Health thresholds

## Intranet IP pool addresses

You can view the internal addresses and address groups that SD-WAN Orchestrator MEA automatically generates for your network.

You can use these auto-generated addresses and address groups to implement business rules to manage the traffic between different devices and groups.

If you wan to create your own addresses and add them to an address group, you must add them by using the *Policy & Objects* module in FortiManager.

Starting with SD-WAN Orchestrator MEA 6.4.1.r6, all user specified, custom IP addresses in the LAN/DMZ interface must also be in an intranet IP pool. See Address group change on page 91.

**To view intranet IP pool addresses:**

1. Go to *Configuration > Shared Resources > Intranet Address*.
2. Click *IPv4 Address* or *IPv4 Address Group*.
3. In the toolbar click *Reload*.

## Address group change

Starting with SD-WAN Orchestrator MEA 6.4.1.r6, all user specified, custom IP addresses in the LAN/DMZ interface must also be in an intranet IP pool. As a result, the *GROUP.CUSTOM_groupname* address group is no longer needed.

All subnets of LAN/DMZ must be included in a blackhole static route, and the subnet of the blackhole must not equal any subnet of LAN/DMZ. If the subnet of the blackhole equals any subnet of LAN/DMZ, the route of that interface becomes invalid. All user specified, custom IP addresses must be included in an intranet IP pool. See Creating intranet IP pools on page 94.

## Address groups in SD-WAN Orchestrator MEA 6.4.1.r5 and earlier

In SD-WAN Orchestrator MEA 6.4.1.r5 and earlier, you could create an address group named *GROUP.CUSTOM_groupname* for each region to contain user specified, custom IP addresses. A custom IP address is an address specified by the user in the LAN/DMZ interface. The IP address is not allocated by SD-WAN Orchestrator MEA. The custom IP address must NOT be in an intranet IP pool, or a conflict occurs.

*GROUP_ALL* contains all regions' *GROUP.CUSTOM_groupname* address group and all address groups for intranet IP pools, because all addresses allocated from intranet IP pool are included in IP pool address group. As a result, *GROUP_ALL* contains all addresses.

It is not recommended to use *GROUP.CUSTOM_groupname* address group in business rules and in FortiManager policy packages, because it only contains part of the addresses of the corresponding region. It contains only user specified custom addresses of that region, and doesn't contain the addresses allocated from intranet IP pools.

## Example

For example, we have a region named Seattle, and an intranet IP pool named *pool1* with a subnet 192.168.0.0/16, a user specified custom address 172.1.1.0/24 for port4 in device with ID 1, and an address 192.168.1.0/24 for port5.

SD-WAN Orchestrator MEA 6.4.1.r5 and earlier handles the scenario as follows:

- *GROUP_ALL* includes address group *GROUP.CUSTOM_Seattle*, *POOL_pool1* two address groups.
- *GROUP.CUSTOM_Seattle* contains *DEVICE_1_port4* (with address 172.1.1.0/24).
- *POOL_pool1* contains *POOL_192.168.0.0_16* (with address 192.168.0.0/16).
- The address *port5* doesn't need to merge in *GROUP_ALL* as an item, because it is included in *POOL_192.168.0.0_16*.

*GROUP_Seattle* for region Seattle is also created, and this group contains address group *DEVICE_1*, which includes *DEVICE_1_port4* (with address 172.1.1.0/24) and *DEVICE_1_port5* (with address 192.168.1.0/24).

*GROUP.CUSTOM_Seattle* is not recommended for use in business rules and in FortiManager policy packages; *GROUP_Seattle* is recommended instead.

SD-WAN Orchestrator MEA 6.4.1.r6 and later handles the scenario as follows:

- User must create an intranet IP pool for port4, for example, an intranet IP pool named *pool2* with a subnet 172.1.0.0/23.

As a result, *GROUP_ALL* contains *POOL_pool1* and *POOL_pool2*.

*POOL_pool1* contains *POOL_192.168.0.0_16* (with address 192.168.0.0/16).

*POOL_pool2* contains *POOL_172.1.0.0_23* (with address 172.1.0.0/23).

The *GROUP.CUSTOM_Seattle* is not need any more, because 172.1.1.0/24 is included in *GROUP_ALL* already.

The old *GROUP_Seattle* and its members are not changed, and you can use the group in business rules and FortiManager policy packages as before.

# Network

From the *Network* tree menu, you can create and manage servers, relays, hosts, and IP Pools.

This section contains the following topics:

- Creating DHCP servers on page 93
- Creating DHCP relay agents on page 94
- Creating DNS servers on page 94
- Creating intranet IP pools on page 94
- Creating SNMP hosts on page 95
- Changing network settings on page 95
- Creating ISP links on page 96
- Creating extender resources on page 97
- Creating MD5 keys for OSPF on page 97

## Creating DHCP servers

**To create DHCP servers:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *DHCP*.
2. In the toolbar, click +*Create New*.
   The *DHCP Server* dialog box is displayed.
3. Configure the settings:

| Option | Description |
|---|---|
| **Name** | Enter a name for the DHCP server. |
| **Lease Time (in Seconds)** | Toggle on to specify how long in seconds the DHCP lease time should remain active before it expires.<br>Toggle off to disable lease time. |
| **TFTP Server** | Specify the IP address for the Trivial File Transfer Protocol (TFTP) server if used. |
| **DNS Server Res Type** | Specify the DNS service to use. Choose from:<br>• Default - IP address of the interface that the DHCP server is added to becomes the client's DNS server IP address.<br>• Local - Clients are assigned to FortiGate's configured DNS servers.<br>• Specify - Specify up to three DNS servers. |
| **DNS Server1** | Available when *DNS Server Res Type* is set to *Specify*.<br>Type the IP address for the DNS server. |

4. Beside *Additional DHCP* options, click *Create*.
   The *DHCP Option* dialog box is displayed.
5. In the *Code* box, select the code for the type of DHCP server.
   For example, code *6* is for a *Domain server*.
6. In the *Type* box, select one of the following options:
7. In the *Value* box, type a value for the type.

8. Click *OK*.
   The DHCP option is created and displayed.
9. Click *OK*.
   The DHCP server is created.

## Creating DHCP relay agents

**To create DHCP relay agents:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *DHCP Relay*.
2. In the toolbar, click *Create New*.
   The *DHCP Relay* dialog box is displayed.
3. Configure the settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the DHCP relay agent configuration. |
| **Primary Relay IP** | Enter IP address for the primary relay agent. |
| **Secondary Relay IP** | Enter IP address for the secondary relay agent. |

## Creating DNS servers

**To create DNS servers:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *DNS*.
2. In the toolbar, click +*Create New*.
   The *DNS Server* dialog box is displayed.
3. Configure the settings:

| Option | Description |
|---|---|
| **Name** | Enter a name for the DHCP server. |
| **Primary Server** | Type the IP address for the primary DHCP server. |
| **Secondary Server** | Type the IP address for the secondary DHCP server. |

4. Click *OK*.
   The DNS server is created.

## Creating intranet IP pools

A blackhole static route is added to FortiGates for all intranet IP pools to avoid intranet prefixes being resolved in underlay WAN ports in BGP. All LAN port IP subnets should be contained in one IP pool, and the LAN port subnet must be smaller than IP Pool subnet.

If a LAN port is configured with a custom subnet that is not automatically assigned, ensure that you create or modify an IP pool to include the LAN custom subnet.

See also Address group change on page 91.

**To create intranet IP pools:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *Intranet IP Pool*.
2. In the toolbar, click +*Create New*.
   The *IP Pool* dialog box is displayed.
3. Configure the settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the Intranet IP pool. |
| **Pool** | Enter the IP address for the pool. |

## Creating SNMP hosts

You must create an SNMP host before you can add it to SD-WAN Orchestrator MEA.

**To create SNMP hosts:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *SNMP Host*.
2. In the toolbar, click +*Create New*.
   The SNMP dialog box is displayed.
3. Configure the settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the SNMP Host. |
| **Version** | Select the version from the dropdown. |
| **Host Type** | Select the host type from the dropdown. |
| **IP** | Enter the IP address for the SNMP host. |
| **Query Port** | Enter the query port number. |
| **Trap Remote Port** | Enter the trap remote port number. |
| **Community Name** | Enter a name for SNMP community. |

## Changing network settings

In the network settings, you can change VPN address pool, loopback address pool, and enable anti-theft protection.

**To change network settings:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *Network Settings*.
2. Configure the settings, and click *OK*.

| Option | Description |
|---|---|
| **VPN Addr Pool** | Enter the IP address for the VPN address pool. |
| **Loopback Address Pool** | Enter the IP address for the loopback address pool. |
| **Auth After Location Change** | Toggle *On* to enable anti-theft protection. When a device is disconnected from the SD-WAN network and reappears in a different geographic location or in a different network topology, access to the overlay is blocked, and information is displayed about the device location change. Administrators can choose whether manually approve access to the network.<br>Toggle *Off* to disable anti-theft protection. |
| **BGP Community Prefix (First 8 bits)** | Displays the prefix number for BGP communities. |

## Creating ISP links

**To create ISP links:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *ISP Link*.
2. In the toolbar, click *+Create New*.
   A dialog box is displayed.
3. Configure the settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the ISP link. |
| **Type** | From the dropdown, select one of the following options:<br>• *Internet*: An Internet ISP link with a public IP can both initiate or respond IPsec negotiation with peer devices.<br>• *MPLS*: If a WAN port is set as *MPLS* link type with *Private Wire* on, it can only establish IPsec tunnels with other devices' WAN ports that are also configured as MPLS.<br>• *LTE*: Usually used when local WAN port is behind NAT or without a public IP address. If a WAN port is set as *LTE*, it can only be IPSec initiator but not responder. |
| **Cost** | From the dropdown, select *Low*, *Medium*, or *High*.<br>• *High* sets cost to 3.<br>• *Medium* sets cost to 2.<br>• *Low* sets cost to 1. |

| Option | Description |
|---|---|
| | For example, if the Load Policy is LOW_COST, FortiGates usually choose links with lower cost first. As a result, the interface with the lowest assigned cost of 1 is selected. |
| **Public IP** | Toggle *On* if the IP is public. |

## Creating extender resources

When you create a profile to configure FortiExtender as a WAN port for FortiGates, you can select a SIM card profile and a data plan profile from the pool of shared resources.

This section describes how to create the following shared resources to select in profiles:

- Creating SIM card profiles on page 97
- Creating data plan profiles on page 97

## Creating SIM card profiles

This section describes how to create profiles for extender SIM cards that you can select when you create profiles that configure FortiExtender as a WAN port for FortiGates.

**To create SIM card profiles:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *Extender Resources* > *SIM profile*.
2. In the toolbar, click *+Create New*.
   The *SIM Profile* dialog box is displayed.
3. Configure the settings, and click *OK*.

## Creating data plan profiles

This section describes how to create profiles for extender data plans that you can select when you create profiles that configure FortiExtender as a WAN port for FortiGates.

**To create data plan profiles:**

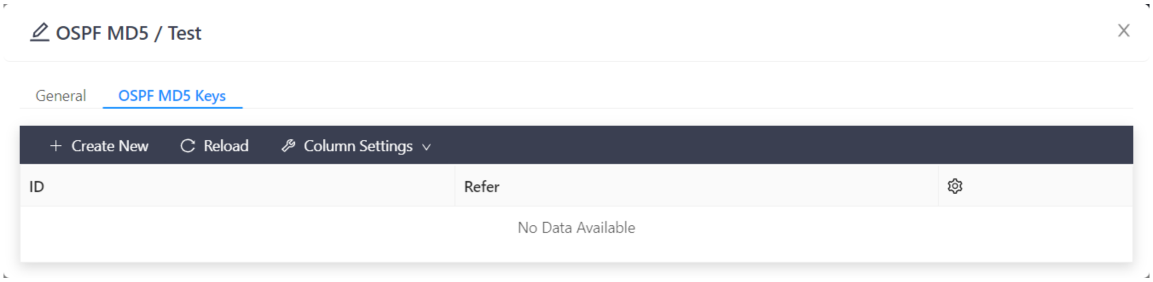
1. Go to *Configuration* > *Shared Resources* > *Network* > *Extender Resources* > *Data Plan*.
2. In the toolbar, click *+Create New*.
   The *Data Plan* dialog box is displayed.
3. Configure the settings, and click *OK*.

## Creating MD5 keys for OSPF

You can create profiles of MD5 authentication keys to use for the Open Shortest Path First (OSPF) protocol.

**To create profiles of MD5 keys for OSPF:**

1. Go to *Configuration* > *Shared Resources* > *Network* > *OSPF MD5*.
2. Create a profile:
   a. In the toolbar, click +*Create New*.
   The *OSPF MD5* dialog box is displayed.
   b. In the *Name* box, type a name, and click *OK*.
   The profile is created, and the *OSPF MDF Keys* tab is displayed.



OSPF MD5 / Test

| ID | Refer |
|---|---|
| No Data Available | |

3. Create MD5 keys for the profile:
   a. Click *Create New*.
   The *OSPF MD5 Key* dialog box is displayed.
   b. In the *ID* box, type an ID number for the key.
   c. In the *Key* box, type the MD5 key.
   d. Click *OK*.
   The key is created.
   e. (Optional) Click *Create New* to create additional keys for the profile, or close the dialog box.

# SLA

The service level agreements in SD-WAN Orchestrator MEA help you monitor SD-WAN performance.

This section contains the following topics:

- Adding SLA quality levels on page 98
- Adding SLA servers on page 99

## Adding SLA quality levels

**To add SLA quality levels:**

1. Go to *Configuration* > *Shared Resources* > *SLA* > *SLA Quality*.
2. In the toolbar, click +*Create New*.
   The *SLA Quality Level* dialog box is displayed.
3. Configure the following settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the quality level. |

| Option | Description |
|---|---|
| **Latency** | Enter the latency threshold (in milliseconds). |
| **Jitter** | Enter the jitter threshold (in milliseconds). |
| **Packet Loss** | Enter the packet loss threshold (in percent). |

### Adding SLA servers

You must create an SLA server before you can add it to SD-WAN Orchestrator MEA.

**To add SLA servers:**

1. Go to *Configuration* > *Shared Resources* > *SLA* > *SLA Server*.
2. In the toolbar, click *Create New*.
3. Configure the SLA server settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the SLA server. |
| **Protocol** | From the dropdown select the detection method (*Ping* or *HTTP*). |
| **Servers** | Type the IP address or FQDN of the SLA server to probe. |

## System

The *System Settings* tree menu lets you add servers for SD-WAN Orchestrator MEA to use. SD-WAN Orchestrator MEA supports the following servers: NTP, FortiGuard, and email. See:

- Adding NTP servers on page 99
- Adding FortiGuard servers on page 100
- Adding email servers on page 100

### Adding NTP servers

You can add an NTP server to SD-WAN Orchestrator MEA, and then select the server in profiles and devices.

**To add NTP servers:**

1. Go to *Configuration* > *Shared Resources* > *System* > *NTP Server*.
2. In the toolbar, click *Create New*.
3. Configure the NTP server settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the NTP server. |
| **Address Type** | From the dropdown, select *IP* or *FQDN*. |

| Option | Description |
|---|---|
| **Address** | Enter the server's IP address or host name. |
| **NTP v3** | Toggle *On* to enable NTP v3. |
| **Authentication** | Toggle *On* to enable authentication. |
| **Key** | Available when *Authentication* is enabled. |
| **Key ID** | Available when *Authentication* is enabled. |

## Adding FortiGuard servers

You can add a FortiGuard server to SD-WAN Orchestrator MEA, and then select the server in profiles and devices.

### To add FortiGuard servers:

1. Go to *Configuration* > *Shared Resources* > *System* > *FortiGuard Server*.
2. In the toolbar, click *Create New*.
3. Configure the FortiGaurd server settings, and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the NTP server. |
| **Server Type** | From the dropdown, select *Update* or *Rating*. |
| **Address Type** | From the dropdown, select *IP4*, *IP6*, or *FQDN*. |
| **Address** | Enter the device's IP address or host name. |

## Adding email servers

You can add an email server to SD-WAN Orchestrator MEA, and then select the server in profiles and devices.

### To add email servers:

1. Go to *Configuration* > *Shared Resources* > *System* > *Email Server*.
2. In the toolbar, click *Create New*.
3. Configure the email server settings and click *OK*.

| Option | Description |
|---|---|
| **Name** | Enter a name for the email server. |
| **Address Type** | From the dropdown, select *IPv4* or *FQDN*. |
| **Address** | Enter the email server's IP address or host name. |
| **Authentication** | Toggle *On* to enable authentication, then enter the *Username* and *Password*. |
| **Username** | Available when *Authentication* is enabled. |

| Option | Description |
|---|---|
| **Password** | Available when *Authentication* is enabled. |
| **Port** | Enter the port number. |
| **Reply To** | Enter the email address users can reply to. |
| **Security** | From the dropdown, select *None*, *STARTTLS*, or *SMTPS* . |
| **SSL Version** | From the dropdown, select the SSL version. |
| **Validate Server** | Toggle *On* to enable validation. |

## Health Threshold

Quality of devices (indicated by color in *Monitor* > *Dashboard and Monitor* > *Devices*) in the SD-WAN network are valued according to the defined health threshold.

**To update health thresholds:**

1. Go to *Configuration* > *Shared Resources* > *Health Threshold*.
2. In the *Tools* column, click the *Update* icon for the health threshold.
   The *Health Threshold* dialog box is displayed.
3. Update the settings, and click *OK*.

# Global routing

You can view the subnet, next hop, and type information for global routing.

**To view global routing:**

1. Go to *Configuration* > *Global Routing*.
   The subnet, next hop, and type information is displayed for global routing.

# Maintenance

The *Maintenance* tree menu is available only in the root ADOM, and the root ADOM must be version 6.4.

You can maintain SD-WAN Orchestrator MEA by using the *Maintenance* tree menu. You can perform the following tasks:

- Upgrade firmware for SD-WAN Orchestrator MEA. See Upgrade on page 102.
- Back up and restore configurations for SD-WAN Orchestrator MEA. See Configuration on page 102.
- Export a zip file of debug information for SD-WAN Orchestrator MEA. See Debug on page 103.

## Upgrade

You can upgrade firmware for SD-WAN Orchestrator MEA when updates are available.

**To upgrade firmware:**

1. Go to *Maintenance* > *Upgrade*.
2. Click *Check for updates*.

## Configuration

You can back up all configurations from SD-WAN Orchestrator MEA, and then store them for safe keeping. You can also restore the configurations by uploading a backup file.

If devices managed by SD-WAN Orchestrator MEA are changed or removed from FortiManager after you back up an SD-WAN Orchestrator MEA configuration, restoring the SD-WAN Orchestrator MEA backup file does not work well. Instead it’s recommend to back up and restore in FortiManager. When you restore a FortiManager backup file, SD-WAN Orchestrator MEA is restored as well.

**To back up configurations:**

1. Go to *Maintenance* > *Configuration*.
2. Click *Backup*.
   A `controller-store.config` file is downloaded to your computer.
3. Store the backup file in a safe location.

**To restore configurations:**

1. Go to *Maintenance* > *Configuration*.
2. Click *Restore*.
   The *Upload* window opens.
3. Click *Select File*.
4. Select your backup file, and click *Open*.

# Debug

You can export debug information about SD-WAN Orchestrator MEA. The export process produces a zip file that contains the following folders of information that you can use:

- etc
- logs
- stat

**To export debug information:**

1. Go to *Maintenance* > *Debug*.
2. Click *Export Debug Info Zip File*.
   A `debug-info.zip` file is downloaded to your computer.

# More information

SD-WAN Orchestrator MEA is available as a management extension application with FortiManager. For information about SD-WAN Orchestrator MEA, see the FortiManager page on the Document Library.

# Appendix A - managed FortiGate CLI objects and attributes

SD-WAN Orchestrator MEA can create and manage some, but not all FortiGate CLI objects and attributes. SD-WAN Orchestrator MEA uses two methods to manage objects. Some objects are managed by the first method, and some objects are managed by the second method. SD-WAN Orchestrator MEA uses the following methods to manage FortiOS CLI objects:

1. Manage partial objects for a FortiOS command and use an ID, name, or description to indicate when an object is managed by SD-WAN Orchestrator MEA
   For example, with the *config router static* command, SD-WAN Orchestrator MEA only manages ID range 1,000,000 to 1,100,000. If you create a static route with ID = 100 on FortiGate or FortiManager, SD-WAN Orchestrator MEA does not touch the static route.
2. Manage all objects for a FortiOS command
   When this method is used, it affects some objects created by FortiOS or FortiManager. When you create a FortiGate object by using FortiOS or FortiManager, the object is removed by SD-WAN Orchestrator MEA when the *Install configuration* option is executed.

   For example, if you use FortiOS or FortiManager to create an SD-WAN health-check server with name XXX by using the `config system sdwan -> config health-check` command, SD-WAN Orchestrator MEA removes the health-check server with name XXX when you execute the *Install configuration* option.

SD-WAN Orchestrator MEA uses the following methods to manage different attributes of FortiOS CLI objects:

1. For attributes managed by SD-WAN Orchestrator MEA, you can use FortiOS or FortiManager to change the attribute, but SD-WAN Orchestrator MEA overwrites the change.
   For example, SD-WAN Orchestrator MEA was used to configure a static route:
   ```
   Config router static
      edit 1000001
         set dst 10.248.0.0 255.252.0.0
         set comment "SDWAN.Orchestrator.created.automatically."
         set blackhole enable
      next
   end
   ```
   SD-WAN Orchestrator MEA manages following static route attributes: `device, distance, priority, gateway, dst, virtual-wan-link, sdwan, comment, blackhole, status`

   If you change the static route by using FortiOS to:
   ```
   Config router static
      edit 1000001
         set dst 10.248.0.0 255.252.0.0
         set comment "SDWAN.Orchestrator.created.automatically."
         set blackhole disable
      next
   end
   ```
   SD-WAN Orchestrator MEA overwrites the change made by FortiOS and sets `blackhole` back to `enable`.
2. For attributes not managed by SD-WAN Orchestrator MEA, you can change the attributes using any method you like, and SD-WAN Orchestrator MEA does not change the attribute.
3. Some attributes are initiated by SD-WAN Orchestrator MEA, but not managed by SD-WAN Orchestrator MEA. In this case, SD-WAN Orchestrator MEA sets the attribute when it creates the object, but you can change the attribute using any method you like, and SD-WAN Orchestrator MEA will not overwrite your changes.

SD-WAN Orchestrator MEA manages the following FortiGate CLI objects and attributes:

For information about all FortiOS configuration commands, see the FortiOS 6.4 CLI Reference.

# extender-controller

This section includes information about the following commands:

## config extender-controller dataplan

FortiExtender dataplan configuration.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ modem-id, type, carrier, slot, iccid, auth-type, username, password, PDN, preferred-
      subnet, APN,private-network, capacity, monthly-fee, billing-date, overage, signal-
      threshold, signal-period ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config extender-controller extender

Extender controller configuration.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ id, authorized ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config modem

Configuration options for modem <number>.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ ifname, default-sim, gps, sim1-pin, sim2-pin, sim1-pin-code, sim2-pin-code, preferred-
     carrier ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config auto-switch

FortiExtender auto switch configuration.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ disconnect, disconnect-threshold, disconnect-period, signal, dataplan, switch-back,
     switch-back-time, switch-back-timer ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

# firewall

This section includes information about the following commands:

- config firewall address on page 107
- config firewall addrgrp on page 108

## config firewall address

Configure IPv4 addresses.

### ID generated by SD-WAN Orchestrator MEA:

Prefix: `DEVICE_`

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ subnet, fqdn, wildcard-fqdn, start-ip, end-ip, country, type, comment, interface ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config firewall addrgrp

Configure IPv4 address groups.

### ID generated by SD-WAN Orchestrator MEA:

Prefix: `DEVICE_` or `GROUP_`

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ member, comment ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

# log

This section includes information about the following commands:

- config log fortianalyzer setting on page 108
- config log syslogd filter on page 109
- config log syslogd setting on page 109

## config log fortianalyzer setting

Global FortiAnalyzer settings.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, server, upload-option, enc-algorithm, reliable, certificate-verification ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config log syslogd filter

Filters for remote system server.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ severity ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config log syslogd setting

Global settings for remote syslog server.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, server, mode, port, facility, format, enc-algorithm, ssl-min-proto-version,
     certificate ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

# router

This section includes information about the following commands:

- config router bgp on page 110
- config router community-list on page 111
- config router ospf on page 112
- config router policy on page 114
- config router prefix-list on page 114

- config router route-map on page 115
- config router static on page 115

## config router bgp

Configure BGP.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ as, router-id, ibgp-multipath, ebgp-multipath, additional-path, additional-path-select,
     recursive-next-hop ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

### config network

BGP network table.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ prefix, route-map ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

### config neighbor

BGP neighbor table.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ remote-as, advertisement-interval, link-down-failover, additional-path, adv-additional-
     path, attribute-unchanged, ebgp-enforce-multihop, route-map-in, route-map-out, next-
     hop-self, route-reflector-client, soft-reconfiguration, description ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

### config neighbor-group

BGP neighbor range table.

#### ID generated by SD-WAN Orchestrator MEA:

Prefix: `SWNC-`

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ remote-as, link-down-failover, additional-path, adv-additional-path, route-reflector-
     client, route-map-in, route-map-out, next-hop-self, description ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

### config redistribute ospf

BGP neighbor range table.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, route-map ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config router community-list

Configure community lists.

#### ID generated by SD-WAN Orchestrator MEA:

Prefix: `SWNC-`

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ rule ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config router ospf

Configure OSPF.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ router-id, default-information-originate ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config area

Configure OSPF area.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ type, authentication ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config ospf-interface

OSPF interface configuration.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ interface, cost, hello-Interval, dead-Interval, authentication, authentication-key, md5-
    keys ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config network

OSPF network configuration.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ prefix, area ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config redistribute bgp

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, metric ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config redistribute connected

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, metric ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config redistribute static

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, metric ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config router policy

Configure IPv4 routing policies.

#### ID generated by SD-WAN Orchestrator MEA:

SD-WAN Orchestrator MEA managed ID range 60000 to 61000.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ action, output-device, input-device, gateway, dstaddr, dst, comment ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config router prefix-list

Configure community lists.

#### ID generated by SD-WAN Orchestrator MEA:

Prefix: `SWNC-`

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ rule ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config router route-map

Configure route maps.

### ID generated by SD-WAN Orchestrator MEA:

Prefix: `SWNC-`

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ rule ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config router static

Configure IPv4 static routing tables.

### ID generated by SD-WAN Orchestrator MEA:

SD-WAN Orchestrator MEA managed ID range 1,000,000 to 1,100,000.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ device, distance, priority, gateway, dst, virtual-wan-link, sdwan, comment, blackhole,
      status ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

# system

This section includes information about the following commands:

- config system admin on page 116
- config system central-management on page 116
- config system dhcp server on page 117
- config system dns on page 118
- config system email-server on page 118
- config system fortiguard on page 118
- config system global on page 119
- config system ha on page 119
- config system interface on page 119
- config system ntp on page 120

- config system sdwan on page 121
- config system settings on page 124
- config system snmp community on page 123
- config system snmp sysinfo on page 123
- config system snmp user on page 124
- config system switch-interface on page 124
- config system virtual-switch on page 125

## config system admin

Configure admin users.

**ID generated by SD-WAN Orchestrator MEA:**

No ID generated. SD-WAN Orchestrator MEA manages all objects.

**Attributes managed by SD-WAN Orchestrator MEA:**

```
[ password ]
```

**Attributes initialized but not managed by SD-WAN Orchestrator MEA:**

N/A

## config system central-management

Configure central management.

**ID generated by SD-WAN Orchestrator MEA:**

No ID generated. SD-WAN Orchestrator MEA manages all objects.

**Attributes managed by SD-WAN Orchestrator MEA:**

```
[ include-default-servers ]
```

**Attributes initialized but not managed by SD-WAN Orchestrator MEA:**

```
[ N/A ]
```

### config server-list

Additional severs that the FortiGate can use for updates (for AV, IPS, updates) and ratings (for web filter and antispam ratings) servers.

**ID generated by SD-WAN Orchestrator MEA:**

SD-WAN Orchestrator MEA managed ID range 1,000,000 to 1,100,000.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ server-type, addr-type, server-address, server-address6, fqdn ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system dhcp server

Configure DHCP servers.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ interface, domain, tftp-server, netmask, default-gateway, dns-service, timezone-option,
     ntp-service, vci-match, vci-string, lease-time, dns-server1, dns-server2, dns-server3,
     dns-server4 ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config ip-range

DHCP IP range configuration.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ start-ip, end-ip ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config options

DHCP options.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ code, type, value, ip ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system dns

Configure DNS.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ primary, secondary ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system email-server

Configure the email server used by the FortiGate various things. For example, for sending email messages to users to support user authentication features.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ server, authenticate, username, password, port, reply-to, security, ssl-min-proto-version,
      validate-server ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system fortiguard

Configure FortiGuard services.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ antispam-force-off, webfilter-force-off ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system global

Configure global attributes.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ hostname, switch-controller, fortiextender, admin-https-redirect, admin-sport ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config system ha

Configure HA.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ group-name, mode, hbdev, override, monitor ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system interface

Configure interfaces.

### ID generated by SD-WAN Orchestrator MEA:

No IDs generated, except for VLANs and SSIDs:

- For managed VLANs, add a comment `SDWAN.Orchestrator.created.` to interface.
- All SSIDs are managed by SD-WAN Orchestrator MEA.

**Attributes managed by SD-WAN Orchestrator MEA:**

```
[ interface, dhcp-relay-service, vlanid, type, mode, dhcp-relay-ip, username, password,
     disc-retry-timeout, dns-server-override, ip, vdom, fortilink, member, allowaccess,
     status, role, estimated-downstream-bandwidth, estimated-upstream-bandwidth, preserve-
     session-route, auto-auth-extension-device, security-mode, device-identification,
     switch-controller-access-vlan, switch-controller-feature, description ]
```

**Attributes initialized but not managed by SD-WAN Orchestrator MEA:**

```
[ N/A ]
```

### tunnel interface: config system interface

Configure tunnel interface type.

**ID generated by SD-WAN Orchestrator MEA:**

SD-WAN Orchestrator MEA managed ID range 1 to 10,000,000.

**Attributes managed by SD-WAN Orchestrator MEA:**

```
[ remote-ip, description, alias ]
```

**Attributes initialized but not managed by SD-WAN Orchestrator MEA:**

```
[ N/A ]
```

## config system ntp

Configure system NTP information.

**ID generated by SD-WAN Orchestrator MEA:**

No ID generated. SD-WAN Orchestrator MEA manages all objects.

**Attributes managed by SD-WAN Orchestrator MEA:**

```
[ ntpsync, type, syncinterval ]
```

**Attributes initialized but not managed by SD-WAN Orchestrator MEA:**

```
[ N/A ]
```

### config ntpserver

Configure the FortiGate to connect to any available third-party NTP server.

#### ID generated by SD-WAN Orchestrator MEA:

SD-WAN Orchestrator MEA managed ID range 1,000,000 to 1,100,000.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ server, ntpv3, authentication, key, key-id ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system sdwan

Configure redundant Internet connections with multiple outbound links and health-check profiles.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, load-balance-mode, fail-detect ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config health-check

SD-WAN status checking or health checking. Identify a server on the Internet and determine how SD-WAN verifies that the FortiGate can communicate with it.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ addr-mode, server, protocol, interval, failtime, recoverytime, update-static-route,
     members, sla, sla-fail-log-period, sla-pass-log-period, port ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

### config members

FortiGate interfaces added to the SD-WAN.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ interface, gateway, priority, status, comment, cost ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config service

Create SD-WAN rules (also called services) to control how sessions are distributed to interfaces in the SD-WAN.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ name, addr-mode, mode, protocol, dst, src, internet-service, internet-service-id,
     internet-service-name, sla, health-check, priority-members, start-port, end-port,
     status, users, groups, internet-service-group, internet-service-custom, internet-
     service-custom-group, internet-service-app-ctrl, internet-service-app-ctrl-group,
     link-cost-factor, packet-loss-weight, latency-weight, jitter-weightroute-tag ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config zone

Configure SD-WAN zones.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system snmp community

SNMP community configuration.

#### ID generated by SD-WAN Orchestrator MEA:

SD-WAN Orchestrator MEA managed ID range 1,000,000 to 1,100,000.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ name, status, query-v1-status, query-v1-port, query-v2c-status, query-v2c-port, trap-v1-
      status, trap-v1-lport, trap-v1-rport, trap-v2c-status, trap-v2c-lport, trap-v2c-rport
      ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ events ]
```

### config hosts

Configure IPv4 SNMP managers (hosts).

#### ID generated by SD-WAN Orchestrator MEA:

SD-WAN Orchestrator MEA managed ID range 1,000,000 to 1,100,000.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ host-type, ip ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ N/A ]
```

## config system snmp sysinfo

SNMP system info configuration.

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, trap-high-cpu-threshold, trap-low-memory-threshold, trap-log-full-threshold ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ description, contact-info, location ]
```

## config system snmp user

SNMP user configuration.

### ID generated by SD-WAN Orchestrator MEA:

Prefix: `SWNC-`

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ status, queries, query-port, trap-status, trap-lport, trap-rport, notify-hosts, security-
      level, auth-proto, auth-pwd, priv-proto, priv-pwd ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ events ]
```

## config system settings

Configure VDOM settings.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ ecmp-max-paths ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config system switch-interface

Configure software switch interfaces by grouping physical and WiFi interfaces.

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ vdom, member ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

## config system virtual-switch

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ physical-switch ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

### config port

#### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

#### Attributes managed by SD-WAN Orchestrator MEA:

```
[ speed, status ]
```

#### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A

# vpn

This section includes information about the following commands:

- config vpn ipsec phase1-interface on page 125
- config vpn ipsec phase2-interface on page 126

## config vpn ipsec phase1-interface

Configure VPN remote gateway.

#### ID generated by SD-WAN Orchestrator MEA:

- Change the IPsec tunnel name on edge devices.
- The general rule is <port_name> + <hub_role_indicator> + <peer_port_name>
- For keeping the length of the tunnel name within 15 characters, the components of the general rule are simplified as follows:
  - If the port is a physical interface, we will compose the `port_name` with the first letter and the number of interface name. For example, if the interface is port1, `port_name` should be `p1`.

  - If the port is a VLAN interface, we will compose the `port_name` with the abbreviated physical port name and VLAN ID. For example, if the VLAN interface is configured on port2, and the VLAN ID is 1500, the `port_name` is `p2v1500`.
  - If the port is an aggregate interface, we will compose the `port_name` with the prefix `a_` and the last three letters of interface name. For example, if the interface is `agg_test`, the port_name is `a_est`.
  - If the hub is a primary hub, `hub_role_indicator` is `H1`. If the hub is secondary hub, `hub_rule_indicator` is `H2`.
  - If the length of new tunnel name exceeds 15 characters, the previous numerical tunnel name is used, which is the method used in SD-WAN Orchestrator MEA 7.0.0.r1 and earlier.
- The previous numerical tunnel name will be recorded in the comment of the phase1/phase2 configuration.
- If the IPsec tunnel name is numerical, it starts from 1,000,000.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ type, interface, psksecret, remote-gw, peertype, localid, peerid, comments, auto-
      discovery-sender, auto-discovery-forwarder, auto-discovery-receiver, net-device, add-
      route, tunnel-search, exchange-interface-ip, ike-version, network-overlay, network-id
      ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ dhgrp, dpd, keylife, proposal, idle-timeout ]
```

## config vpn ipsec phase2-interface

Configure VPN remote gateway.

### ID generated by SD-WAN Orchestrator MEA:

The ID for IPsec phase2 is the same as IPsec phase1. See config vpn ipsec phase1-interface on page 125.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ phase1name, auto-negotiate, comments ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

```
[ proposal, dhgrp ]
```

# wireless-controller

This section includes information about the following commands:

- config wireless-controller vap on page 126

## config wireless-controller vap

Configure Virtual Access Points (VAPs).

### ID generated by SD-WAN Orchestrator MEA:

No ID generated. SD-WAN Orchestrator MEA manages all objects.

### Attributes managed by SD-WAN Orchestrator MEA:

```
[ ssid ]
```

### Attributes initialized but not managed by SD-WAN Orchestrator MEA:

N/A