



# OpenStack Administration Guide

FortiManager 7.4.0



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FortiManager 7.4.0 OpenStack Administration Guide

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# Change log

Date	Change description
2023-05-15	Initial release of FortiManager 7.4.0.
2025-10-24	Initial release of FortiManager OpenStack documentation.

# About FortiManager on OpenStack

This document provides information about deploying FortiManager-VM in an OpenStack environment. You can install FMG-VM64-KVM firmware into an OpenStack environment.

This includes how to configure the virtual appliance's virtual hardware settings. This guide presumes that the reader has a thorough understanding of virtualization servers.

This document does not cover configuring and operating the virtual appliance after successfully installing and starting it. For that information, see the *FortiManager Administration Guide*.

## OpenStack prerequisites

This guide assumes that before deploying the FortiManager-VM virtual appliance on the OpenStack virtual platform, you have addressed the following requirements:

- The OpenStack software is installed on a physical server with sufficient resources to support the FortiManager-VM and all other VMs that you deploy on the platform. See [Minimum system requirements on page 7](#).
- Ensure you have access to the OpenStack Horizon web interface from the computer you are uploading the image from. Alternatively, ensure you have a working environment for the OpenStack CLI.

See the following for OpenStack release series support: <https://releases.openstack.org/>

## Licensing

Fortinet offers the FortiManager-VM with a limited, free trial license. Stackable licenses can be purchased, letting you expand your VM solution as your environment expands. You can purchase perpetual or subscription-based licenses. Perpetual licenses never expire.

For information on purchasing a FortiManager-VM license, contact your Fortinet-authorized reseller, or visit [How To Buy](#).

When configuring your FortiManager-VM, ensure that you configure hardware settings according to the minimum system requirements and consider future expansion. Contact your Fortinet-authorized reseller for more information.

License	Devices/VDOMs	GB/day of logs with FortiAnalyzer enabled (not stackable)
Trial License	3	0

License	Devices/VDOMS	GB/day of logs with FortiAnalyzer enabled (not stackable)
		FortiAnalyzer features not supported
VM-10-UG	+10	2
VM-100-UG	+100	5
VM-1000-UG	+1000	10
VM-5000-UG	+5000	25
VM-10K-UG	+10000	50

See [Minimum system requirements on page 7](#).

See also the [FortiManager product datasheet](#).

## Trial license

With a FortiCare account, FortiManager-VM includes a free limited non-expiring trial license.

The free trial license includes support to add 3 devices/VDOMS and use 3 ADOMs.

The free trial license does not include services or support.

You can activate the trial license when you connect to the GUI for the FortiManager-VM. Full-feature products and services are available for purchase with an add-on license. See [Connecting to the GUI and enabling a trial license on page 14](#).

## Add-on license

You must activate a trial license before you can upgrade FortiManager-VM to a purchased add-on license.

See also the [FortiManager VM Trial License Guide](#) on the [Document Library](#).

## Licensing in an air-gap environment

Enabling the trial license requires internet access. This is used to connect to FortiCloud and your FortiCare account on the Technical Support Site. It is also used to receive the license agreement. If you are licensing in an air-gap environment, see [Licensing in an air-gap environment in the FortiManager Administration Guide](#).

# Preparing for deployment

You can prepare for deployment by reviewing the following information:

- [Minimum system requirements](#)
- [Registering your FortiManager-VM](#)
- [Downloading a deployment package](#)

## Minimum system requirements



FortiManager-VM has a minimum requirement of 4 CPU, 8 GB of RAM, and 500 GB of disk storage. In 7.2.5 and later and 7.4.1 and later, the minimum requirement for RAM is increased to 16 GB.

The following table includes example minimum system requirements for your VM hardware based on the number of devices/VDOMs that your VM will manage. This table is not inclusive of all scenarios and is based on the minimum requirements introduced in version 7.4.1.

Maximum devices/ VDOMs	VM hardware requirements	
	RAM (GB)	CPU cores
100	16	4
300	16	6
1200	32	6
4000	64	16
10000	128	24



This table does not take into account other hardware specifications, such as bus speed, CPU model, or storage type.



Enabling FortiAnalyzer features requires additional resources. See the minimum system requirements for FortiAnalyzer-VM as a guideline for how many additional resources your deployment may require.



Using Management Extension Applications (MEA) requires more resources. For details, see the [FortiManager Release Notes](#).

## Registering your FortiManager-VM

After placing an order for a FortiManager-VM, you receive a license registration code to the email address that you used in the order form. Use the license registration code provided to register the FortiManager-VM with [Customer Service & Support](#).

Upon registration, you can download the license file. You need this file to activate your FortiManager-VM. You can configure basic network settings from the CLI to complete the deployment. Once the license file is uploaded and validated, the CLI and GUI are fully functional.

For more information on registering assets in FortiCloud, see the [FortiCloud Asset Management Guide](#).

### To register your FortiManager:

1. Ensure that you have the following items needed to complete the procedure:
  - License registration code emailed to you after you placed an order for a FortiManager-VM
  - Support contract number
  - A static FortiManager IPv4 address
2. Log in to [FortiCloud](#) using a support account, or create an account.
3. In the main page, select *Register Now*.
4. Enter the registration code from the FortiManager license certificate emailed to you, select the *End User Type*, then click *Next*.
5. Enter an optional product description and the static IP address that will be used during license validation, then click *Next*.



As a part of the license validation process, the FortiManager-VM compares its configured IP addresses with the IP address information in the license file. The license must be associated with an IP address assigned to one of the interfaces on the FortiManager. If a new license has been imported or the FortiManager's associated IP address has changed, you must reboot the FortiManager for the system to validate the change and operate with a valid license.



The [FortiCloud](#) portal does not support IPv6 for FortiManager license validation. You must specify an IPv4 address in the support portal and the port management interface.

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6. Review your asset details and accept the terms of the contract, then click *Confirm*.
  7. From the *Registration Completed* page, you can download the FortiManager license file, select *Register More* to register another FortiManager, or select *Done* to complete the registration process.
  8. Select *License File Download* to save the license file (.lic) to your management computer.
    - In FortiCloud, you can also download your license file by selecting your FortiManager in *Products > Product List* and selecting the license file under *Product Information*.

## Downloading a deployment package

Firmware image FTP directories are organized by firmware version, major release, and patch release. The firmware images in the directories follow a specific naming convention. Each firmware image is specific to the device model.

To deploy a FortiManager into OpenStack, you must download the KVM image files: `FMG_VM64_KVM-vX.-buildxxxx-FORTINET.out.kvm.zip`.



You can download the *FortiManager Release Notes* and MIB file from this directory. The Fortinet Core MIB file is located in the *FortiManager > Download* tab.

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Download the `.out` file to upgrade your existing FortiManager installation.

---

### To download deployment packages:

1. Log in to the [FortiCloud portal](#) and select your account if applicable.
2. From the top menu bar, select *Support > Firmware Downloads*.
3. From the *Select Product* dropdown, select *FortiManager*. Then select the *Download* tab underneath the dropdown.
4. Browse to the appropriate directory for the version that you would like to download.
5. Download the appropriate firmware image and release notes to your management computer.  
To deploy a FortiManager into OpenStack, you must download the KVM image files (`.out.kvm.zip`).



You can use your browser's built-in find feature to quickly find the files you need. Use `Ctrl+F` or `Cmd+F` and search for `VM64_KVM`.

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6. Extract the contents of the package to a new folder on your management computer.

# Deployment

Prior to deploying the FortiManager, the VM platform must be installed and configured so that it is ready to create virtual machines. The installation instructions for FortiManager presume that you are familiar with the management software and terminology of your VM platform.

You might also need to refer to the documentation provided with your VM server. The deployment information in this guide is provided as an example because, for any particular VM server, there are multiple ways of creating a virtual machine - command line tools, APIs, alternative graphical user interface tools.

Before you start your FortiManager appliance for the first time, you might need to adjust virtual disk sizes and networking settings. The first time you start FortiManager, you will have access only through the console window of your VM server environment. After you configure one network interface with an IP address and administrative access, you can access the FortiManager GUI (see [Enabling GUI access on page 13](#)).

## Deploying FortiManager on OpenStack

After you download the `FMG_VM64_KVM-vX-buildxxxx-FORTINET.out.kvm.zip` file and extract the virtual hard drive image file, you can create the VM in your OpenStack environment.

## Upload the FortiManager image to OpenStack

You can upload the FortiManager image using the OpenStack dashboard (Horizon) or the OpenStack CLI.

### To upload the image using the OpenStack dashboard (Horizon):

1. In the OpenStack dashboard, go to *Project > Compute > Images*.
2. Click *Create Image*.
3. In the *Create An Image* dialog, configure the following:

<b>Image Name</b>	Enter a name for the image.
<b>Image Source</b>	Select <i>Image File</i> and upload the QCOW2 file that was downloaded and extracted as part of <a href="#">Downloading a deployment package on page 9</a> .
<b>Format</b>	Select QCOW2.

4. Configure the remaining options according to your needs.  
Note that the *Minimum Disk* and *Minimum RAM* should meet the minimum requirements for FortiManager VM outlined in [Minimum system requirements on page 7](#).
5. Click *Create Image*.

**To upload the image using the OpenStack CLI:**

1. Open the terminal in which you have access to the OpenStack CLI.
2. Go to the folder containing the image.

For example,

```
cd <folder containing the contents of the deployment package>
```

3. Use the following command to upload the image:

```
openstack image create --disk-format qcow2 --container-format bare --public --file ./<QCOW2
file in the deployment package> --min-disk <integer> --min-ram <integer> <image name> --
fit-width
```

Note that the `--min-disk` and `--min-ram` should meet the minimum requirements for FortiManager VM outlined in [Minimum system requirements on page 7](#).

An output will display once the upload is finished.

## Create a network for the FortiManager VM

You must create a network and subnet for the FortiManager VM in OpenStack. The following steps are completed in the OpenStack dashboard (Horizon), but the network and subnet can also be created using the OpenStack CLI.

**To create the network using the OpenStack dashboard (Horizon):**

1. In the OpenStack dashboard, go to *Project > Network > Networks*.  
The *Create Network* dialog displays.
2. In the *Network* tab, configure the following and then click *Next*.

<b>Network Name</b>	Enter a name for the FortiManager VM network.
<b>Enable Admin State</b>	Enabled.
<b>Create Subnet</b>	Enabled.

3. In the *Subnet* tab, configure the following and then click *Next*.

<b>Subnet Name</b>	Enter a name for the subnet.
<b>Network Address</b>	Enter the CIDR.
<b>IP Version</b>	Select IPv4.
<b>Gateway IP</b>	Enter a gateway IP or select <i>Disable Gateway</i> if you do not want to use a gateway.

4. In the *Subnet Details* tab, configure additional attributes as needed and then click *Create*.

## Configure security groups

Security groups in OpenStack are used to control inbound and outbound traffic to and from the FortiManager VM instance.

**To configure security groups in the OpenStack dashboard (Horizon):**

1. In the OpenStack dashboard, go to *Project > Network > Security Groups*.
2. Click *Create Security Group*.  
The *Create Security Group* dialog displays.
3. Enter a name and description for the security group.
4. Click *Create Security Group*.
5. Select the security group and click *Manage Rules*.
6. To add a new rule, click *Add Rule*.
7. Configure rules according to your needs for the FortiManager.

For example, you may need to configure rules to allow access for the following:

Direction	Ports/Protocols	Purpose
Ingress	TCP 22	SSH access
Ingress	TCP 80	HTTP
Ingress	TCP 443	HTTPS, which is required for GUI access FortiManager VM

For more information about FortiManager ports and protocols, see *FortiManager Ports and Protocols* on the [Fortinet Document Library](#).

## Launch the FortiManager VM instance

Once you have created the network and security groups, you can launch the FortiManager VM instance in OpenStack. Before launching the instance, you may also need to configure a flavor in OpenStack that meets your needs.

**To create a flavor in the OpenStack dashboard (Horizon):**

Flavors define the CPU, memory, and storage resources that can be assigned to instances. If default flavors are available in your OpenStack, you can skip this step and select an appropriate default flavor when launching the FortiManager VM instance.

1. Go to *Admin > Compute > Flavors*.
2. Click *Create Flavor*.
3. In the *Create Flavor* dialog, configure the following according to your needs.

The flavor must also meet the specifications defined in [Minimum system requirements on page 7](#).

<b>Name</b>	Enter a name for the flavor.
<b>VCPUs</b>	Enter the number of virtual CPUs.
<b>RAM</b>	Enter the amount of RAM in MB.
<b>Root Disk</b>	Enter the size of the root disk in GB.

4. Click *Create Flavor*.

Once the instance starts, you can proceed with the initial configuration. See [Configuring initial settings on page 13](#).

### To launch the FortiManager instance from the OpenStack dashboard (Horizon):

1. In the OpenStack dashboard, go to *Project > Compute > Instances*.
2. With no instance selected, click *Launch Instance*.  
The *Launch Instance* dialog displays.
3. Configure the following options:

<b>Instance Name</b>	Enter a name for the instance.
<b>Source</b>	Select <i>Image</i> and choose the FortiManager VM image. For more information about uploading the image, see <a href="#">Upload the FortiManager image to OpenStack on page 10</a> .
<b>Flavor</b>	Select a flavor that meets the requirements for your FortiManager VM. You can use a default flavor, if available, or you can create a new flavor according to your needs prior to launching the instance.
<b>Networks</b>	Select the network for the FortiManager VM. For more information about creating a network, see <a href="#">Create a network for the FortiManager VM on page 11</a> .
<b>Security Groups</b>	In the <i>Security Groups</i> tab, select the security group(s) you want to assign to the instance. For more information about creating security groups and rules, see <a href="#">Configure security groups on page 11</a> .

4. Click *Launch Instance*.

## Configuring initial settings

Before you can connect to the FortiManager-VM, you must configure basic network settings via the CLI console. Once configured, you can connect to the FortiManager GUI.

## Enabling GUI access

To enable GUI access to the FortiManager, you must configure the IP address and network mask of the appropriate port on the FortiManager. To enable access to the GUI from a browser, HTTP and HTTPS access must be enabled as well. In FortiManager 7.4.2 and later, you must also change the mode from dhcp to static.

The following instructions use port 1.



You can determine the appropriate port by matching the network adapter's MAC address and the HWaddr that the CLI command `diagnose fmnetwork interface list` provides.

In FortiManager 7.4.2 and later, the default configuration for port 1 is as follows:

```
config system interface
  edit port1
    set mode dhcp
    set allowaccess https ssh
    set type physical
  next
end
```

### To configure the port1 IP address and netmask:

1. In your hypervisor manager, start the FortiManager and access the console window. You might need to press *Enter* to see the login prompt.
2. At the FortiManager login prompt, enter the username *admin*, then press *Enter*. By default, there is no password.
3. Using CLI commands, configure port 1.

```
config system interface
  edit port1
    set mode static <--- this variable only needs to be configured in FortiManager v7.4.2
    and later
    set ip <IP address> <netmask>
    set allowaccess http https <--- other management access, such as SSH, can be included
    in the list as well
  next
end
```

For more information about CLI commands, see the FortiManager CLI Reference in the [Fortinet Document Library](#).



The port management interface should match the first network adapter and virtual switch that you have configured in the hypervisor VM settings.

---

4. To configure the default gateway, enter the following commands:

```
config system route
  edit 1
    set device port1
    set gateway <gateway_ipv4_address>
  end
```



The Customer Service & Support portal does not currently support IPv6 for FortiManager license validation. You must specify an IPv4 address in the support portal and the port management interface.

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## Connecting to the GUI and enabling a trial license

Once you have configured a port's IP address and network mask, you can connect to the GUI by using a web browser.

Enabling the trial license requires internet access. This is used to connect to FortiCloud and your FortiCare account on the Technical Support Site. It is also used to receive the license agreement. If you are licensing in an air-gap environment, see [Licensing in an air-gap environment in the FortiManager Administration Guide](#).

**To connect to the GUI and enable a trial license:**

1. Launch a web browser, and enter the IP address you configured for the port management interface.
2. At the login page, select *Free Trial*, and click *Login with FortiCloud* to start the process of activating your free trial license.

If you do not have a FortiCloud account, click *Register with FortiCloud* to create one.

See also the [FortiManager VM Trial License Guide](#) on the [Document Library](#).

## Upgrading to an add-on license

You must activate a trial license before you can upgrade FortiManager-VM to a purchased add-on license.

See also the [FortiManager VM Trial License Guide](#) on the [Document Library](#).

## Configuring your FortiManager

Once the FortiManager license has been validated, you can configure your device.



If the amount of memory or number of CPUs is too small for the VM, or if the allocated hard drive space is less than the licensed VM storage volume, warning messages show in the GUI in the *System Resources* widget on the dashboard and in the *Notification* list.

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For more information on configuring your FortiManager, see the [FortiManager Administration Guide](#).



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