# Oracle® Linux Virtualization Manager

## Installation Guide

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# About this document

This document is part of the documentation for Oracle Linux Virtualization Manager, which is available at: http://docs.oracle.com/cd/F15085_01

The documentation consists of the following items:

**Oracle Linux Virtualization Manager Release Notes**

This document provides a summary of the new features, changes, fixed bugs, and known issues in the Oracle Linux Virtualization Manager. It contains last-minute information, which may not be included in the main body of documentation, and information on Oracle Linux Virtualization Manager system requirements.
Read this document before you install your environment.

**Oracle Linux Virtualization Manager Installation Guide**

This document provides an overview of the Oracle Linux Virtualization Manager and explains how to install the Oracle Linux Virtualization Manager environment, including important information, such as system requirements, for planning your virtualization environment.

**Oracle Linux Virtualization Manager Getting Started Guide**

This document explains how to get started with the Oracle Linux Virtualization Manager. It provides an example scenario that covers some of the basic procedures for setting up the environment, such as, adding hosts, adding storage, creating virtual machines, and so on.

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# Chapter 1 Planning for Oracle Linux Virtualization Manager

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The following information helps you plan your installation of Oracle Linux Virtualization Manager, including the compute, storage and network components.

## Oracle Linux Virtualization Manager

Oracle Linux Virtualization Manager is the management center for the environment. It is used to manage all aspects of virtual machines as well as storage, networks, performance and security.

The Oracle Linux Virtualization Manager is accessed through the Administration Portal where users can be managed with built-in roles and permissions. Data warehousing and reporting depend on the history and reports databases which can be optionally installed during the setup.

The Oracle Linux Virtualization Manager incorporates the following functions:

- Network management creates logical networks and connects them to hosts and VMs
- Storage management manages storage domains and virtual disks
- Fault tolerance includes high availability, backup and restore, live migration
- Scheduling policies are for load balancing, enforcing policy rules for guests, hosts, etc.
- Image management manages virtual machine pools, snapshots, and block based device provisioning
- Monitoring manages workloads, events and notifications

## Users, Roles, and Permissions

User properties consist of the roles and permissions assigned to a user. The security roles for all actions and objects in the platform are granular, inheritable, and provide for multi-level administration.

Roles are sets of permissions defined in the Administration Portal and are used to specify permissions to resources in the environment. There are two types of roles:

- **Administrator Role**

  Conveys management permissions of physical and virtual resources through the Administration Portal. Examples of roles within this group are SuperUser, ClusterAdmin and DataCenterAdmin.

- **User Role**

  Conveys permissions for managing and accessing virtual machines and templates through the VM Portal by filtering what is visible to a user. Roles can be assigned to the users for individual resources, or levels of objects. Examples of roles within this group are UserRole, PowerUserRole and UserVmManager.

It is possible to create new roles with specific permissions applicable to a user's role within the environment. It is also possible to remove specific permissions to a resource from a role assigned to a specific user.

You can also use an external directory server to provide user account and authentication services. You can use Active Directory, OpenLDAP, and 389ds. Use the `ovirt-engine-extension-aaa-ldap-setup` command to configure the connection to these directories.

## Data Centers

A data center is a high-level logical entity for all physical and logical resources in the environment. You can have multiple data centers and all the data centers are controlled from a single Administration Portal.

A default data center is created during installation. Data centers have four associated objects:

- **Cluster**

  A cluster is an association of physical hosts sharing the same storage domains and having compatible processors. Every cluster belongs to a data center; every host belongs to a cluster. A cluster has to have a minimum of one host, and at least one active host is required to connect the system to a storage pool.

- **Host**

  Hosts, or hypervisors, are the physical servers that run virtual machines (VMs). You must have at least one host in a cluster.

- **Storage Domain**

  Data centers must have at least one data storage domain. Set up the data storage domain of the type required for the data center: NFS, iSCSI, FCP or Local.

- **Logical Network**

  Logical networks are required for Oracle Linux Virtualization Manager to communicate with all components for a data center. Logical networks are also used for the virtual machines to communicate with hosts and storage, for connecting clients to virtual machine resources, and for migrating virtual machines between the hosts in a cluster.

To initialize a data center, you must add a cluster, a host, and a storage domain.

## Metrics Store and Dashboards

The Metrics Store enables you to collect logs and metrics from Oracle Linux Virtualization Manager and to view the analysis through a set of predefined visualizations known as dashboards.

Dashboards enable you to quickly access a wide range of metrics and are changeable.

Log Analysis enables you to examine the data collected from Oracle Linux Virtualization Manager. Each set of results collected is called a **document**, which are collected from the following log files:

- `/var/log/ovirt-engine/engine.log` contains all Oracle Linux Virtualization Manager UI crashes, Active Directory lookups, database issues, and other events.
- `/var/log/vdsm/vdsm.log` is the log file for VDSM, the Manager's agent on the virtualization host(s), and contains host-related events.

## Log File Collection

The `ovirt-log-collector` tool enables you to collect relevant logs from across the environment. To use the tool, you must log into the Oracle Linux Virtualization Manager host as the root user and log into the Administration Portal with administration credentials.

The tool collects all logs from the Manager host, the Oracle Linux KVM hosts it manages, and the database.

## Backup and Restore

You use the `engine-backup` tool to take regular backups of the Oracle Linux Virtualization Manager. The tool backs up the `engine` database and configuration files into a single file and can be run without interrupting the `ovirt-engine` service.

You also use the `engine-backup` tool to restore a backup. However, the steps you need to take can be more involved depending on your restoration destination. For example, the `engine-backup` tool can be used to restore backups to fresh installations of Oracle Linux Virtualization Manager, on top of existing installations of Oracle Linux Virtualization Manager, and using local or remote databases.

If you restore a backup to a fresh installation of Oracle Linux Virtualization Manager, you do not run the `engine-setup` command to configure the Manager.

## Data Center Recovery

You use data center recovery if the data in your master data domain gets corrupted. This enables you to replace the master data domain of a data center with a new master data domain.

Reinitializing a data center enables you to restore all other resources associated with the data center, including clusters, hosts, and storage domains. You can import any backup or exported virtual machines or templates into the new master data domain.

# Compute

Oracle Linux KVM compute hosts are the hypervisors, that is, the physical servers that run virtual machines (VMs). Oracle Linux Virtualization Manager can manage a maximum of 64 KVM compute hosts.

KVM compute hosts can run multiple VMs concurrently and the VMs can run Windows or Linux operating systems. The VMs run as individual Linux processes and threads on the KVM compute host. Virtual machines are managed remotely either from the Administration Portal (administrator users) or from the VM Portal (non-administrator users).

The **Cockpit web interface** enables you to monitor a KVM compute host's resources and to perform administrative tasks. Cockpit must be installed and enabled separately. You can access a host's Cockpit web interface from the Administration Portal or by connecting directly to the host.

## Clusters

A cluster consists of one or more logical grouping of Oracle Linux KVM compute hosts on which a collection of virtual machines can run.

The KVM compute hosts in a cluster share the same storage domains and have the same type of CPU (either Intel or AMD).

Each cluster in the environment must belong to a data center and each KVM host must belong to a cluster.

At installation, a default cluster is created in the default data center.

Virtual machines are dynamically allocated to any KVM compute host in the cluster and can be migrated between them, according to policies defined on the cluster and settings on the virtual machines. The cluster is the highest level at which power and load-sharing policies can be defined. Since virtual machines are not bound to any specific host in the cluster, virtual machines always start even if one or more of the hosts are unavailable.

**Scheduling policies** enable you to specify the usage and distribution of virtual machines between available hosts. You can define the scheduling policy to enable automatic load balancing across the hosts in a cluster. Regardless of the scheduling policy, a virtual machine does not start on a host with an overloaded CPU. By default, a host’s CPU is considered overloaded if it has a load of more than 80% for 5 minutes, but these values can be changed using scheduling policies. For more information, see Scheduling, Load Balancing and Migration.

**Migration policies** enable you to define the conditions for live migrating virtual machines in the event of KVM compute host failure. These conditions include the downtime of the virtual machine during migration, network bandwidth, and how the virtual machines are prioritized.

**Resilience policies** enable you to define how the virtual machines are prioritized in migration.

You can set cluster optimization for the **Memory Overcommit Manager (MoM)** to start ballooning where and when possible, with a limitation of the guaranteed memory size of every virtual machine. To have a balloon running, a virtual machine needs to have a balloon device with relevant drivers. Each virtual machine includes a balloon device unless specifically removed. Each host in the cluster receives a balloon policy update when its status changes to **Up**. If necessary, you can manually update the balloon policy on a KVM compute host without having to change the status.

## Virtual Machines

Virtual machines can be created for either Linux or Windows. They can be created to a certain specification or cloned from an existing template in the virtual machine pools.

A **virtual machine pool** is a group of on-demand virtual machines that are all clones of the same template. They are available to any user in a given group.

When accessed from the VM Portal, virtual machines in a pool are stateless, meaning that data is not persistent across reboots. Each virtual machine in a pool uses the same backing read-only image, and

uses a temporary copy-on-write image to hold changed and newly generated data. Each time a virtual machine is assigned from a pool, it is allocated in its base state. Users who have been granted permission to access and use virtual machines from a pool receive an available virtual machine based on their position in a queue of requests.

When accessed from the Administration Portal, virtual machines in a pool are not stateless so that administrators can make changes to the disk if needed.

Additional functionality for virtual machines is provided by the **guest agents and drivers** such as the ability to monitor resource usage, shutdown and reboot the virtual machines from the Administration Portal.

A **snapshot** captures a virtual machine's operating system and applications on all available disks at a given point in time. Use a snapshot to restore a virtual machine to its previous state.

You can only access virtual machine consoles using the **Remote Viewer application** (`virt-viewer`) on Enterprise Linux and Microsoft Windows clients. Remote Viewer enables users to interact with a virtual machine in a similar way to a physical machine.

To download Remote Viewer, click **Console Client Resources** in the **Downloads** section on the Oracle Linux Virtualization Manager Welcome page. You must have Administrator privileges to install the Remote Viewer application.

## Guest Operating System Requirements

The following guest operating systems are tested with Oracle Linux Virtualization Manager.

### Linux Guest Operating Systems

- Oracle Linux 7 Update 6 64-bit
- Oracle Linux 6 Update 10 32-bit or 64-bit, `cloud-init` is not available for this OS
- Oracle Linux 5 Update 11 64-bit, `cloud-init` is not available for this OS
- CentOS 7.1804 64-bit
- CentOS 6.10 32-bit or 64-bit, `cloud-init` is not available for this operating system
- Red Hat Enterprise Linux 7 Update 6 64-bit
- Red Hat Enterprise Linux 6 Update 10 32-bit or 64-bit, `cloud-init` is not available for this OS
- Red Hat Enterprise Linux 5 Update 11 32-bit or 64-bit, `cloud-init` is not available for this OS

You can download Oracle Linux ISO images and disk images from Oracle Software Delivery Cloud: https://edelivery.oracle.com/linux.

### Microsoft Windows Guest Operating Systems

- Microsoft Windows Server 2016 64-bit
- Microsoft Windows Server 2012 R2 64-bit
- Microsoft Windows Server 2012 64-bit
- Microsoft Windows Server 2008 R2 SP1 64-bit
- Microsoft Windows Server 2008 SP1 32-bit or 64-bit

- Microsoft Windows 10 32-bit or 64-bit
- Microsoft Windows 8.1 32-bit or 64-bit
- Microsoft Windows 8 32-bit or 64-bit
- Microsoft Windows 7 SP1 32-bit or 64-bit

Oracle recommends that you install the Oracle VirtIO Drivers for Microsoft Windows in Windows guest OSes for improved performance for network and block (disk) devices and to resolve common issues. The drivers are paravirtualized drivers for Microsoft Windows guests running on Oracle Linux KVM hypervisors. For instructions on how to obtain and install the drivers, see Oracle VirtIO Drivers for Microsoft Windows in the *Oracle Linux 7 Administration Guide*.

## Scheduling, Load Balancing and Migration

A cluster is a group of Oracle Linux KVM compute hosts that share resources. Each KVM compute host in a cluster has limited resources. If a KVM compute host becomes overutilized, there is an adverse impact on the virtual machines that are running on the host. To avoid or mitigate overutlization, you use scheduling, load balancing, and migration policies to ensure the performance of virtual machines. If a KVM compute host becomes overutilized, VMs are migrated to another KVM compute host in the cluster.

**Scheduling policies** enable you to ensure the resources in a cluster meet your goals. A policy can contain filters, weightings, and load balancing policies, as follows:

- A filter is a set of conditions applied to the hosts for exclusion from a policy.
- Weighting prioritizes a number of factors to determine which hosts are capable of running a virtual machine.
- Load balancing policies used to determine on which host a VM is running are enforced by scheduling policies.

Regardless of the scheduling policy, a virtual machine does not start on a host with an overloaded CPU. By default, a host's CPU is considered overloaded if it has a load of more than 80% for 5 minutes, but these values can be changed using scheduling policies.

**Load balancing policies** enable you to distribute the workload by moving virtual machines from one host to another. Load balancing policies are set at the cluster level and determine the KVM compute host that runs a virtual machines.

**Affinity groups** enable you to specify whether certain virtual machines run together on the same host or run separately on different hosts. You can create workload scenarios for high availability needs.

You use migration policies to migrate VMs automatically when certain conditions are met, such as when you move a KVM compute host to **Maintenance** mode. You can also use migration policies to disable the automatic migration of virtual machines.

Live migration enables you to migrate virtual machines from one KVM compute host to another without a loss of service. The virtual machine being migrated remains powered on with all user applications continuing to execute. Live migration is only available if you use shared storage.

## High Availability

To make an Oracle Linux KVM compute host highly available, power management and fencing must be configured. This enables the Manager to keep the hosts in a cluster up and running by reacting to host

failures. If a KVM compute host becomes non-responsive, it is rebooted. If it remains non-responsive manual intervention needs to be taken.

Oracle Linux Virtualization Manager does not communicate directly with fence agents. Instead, it uses a proxy to send power management commands to a KVM compute host power management device. The Manager uses VDSM daemon to execute power management device actions, so another host in the environment is used as a fencing proxy.

You need at least two KVM compute hosts in a cluster or data center that are in Up or Maintenance status to ensure they are connected to the Manager.

You can select between:

- Any host in the same cluster as the host requiring fencing.
- Any host in the same data center as the host requiring fencing.

A viable fencing proxy host has a status of either Up or Maintenance.

If power management is not enabled, you can restart or stop a KVM compute host from the Administration Portal.

When a KVM compute host goes into Maintenance mode, all VMs are migrated to other servers in the cluster. This mean there is no downtime for virtual machines during planned maintenance windows.

If a virtual machine is unexpectedly terminated, it will be automatically restarted, either on the same KVM compute host or another host in the cluster. This is achieved through monitoring of the hosts and storage to detect any hardware failures. If a virtual machine has been configured as highly available and the host fails, it is automatically restarted on another KVM compute host in the cluster. If a storage error occurs, the virtual machine is paused. What happens to the virtual machines after the storage connection is re-established can be configured.

Load balancing, scheduling, and resiliency policies, enable critical VMs to be restarted on another KVM compute host in the event of hardware failure with three levels of priority. For more information, see Scheduling, Load Balancing and Migration.

# Storage

Oracle Linux Virtualization Manager uses a centralized storage system for virtual machine disk images, ISO files and snapshots. You can use Network File System (NFS), Internet Small Computer System Interface (iSCSI), or Fibre Channel Protocol (FCP) storage. You can also configure local storage attached directly to hosts.

A data center cannot be initialized unless a storage domain is attached to it and activated.

The storage must be located on the same subnet as the Oracle Linux KVM hosts that will use the storage, in order to avoid issues with routing.

Since you need to create, configure, attach and maintain storage, make sure you are familiar with the storage types and their use. Read your storage array manufacturer guides for more information.

## Storage Domains

A storage domain is a collection of images that have a common storage interface. A storage domain contains complete images of templates, VMs, VM snapshots, or ISO files. Oracle Linux Virtualization Manager supports storage domains that are block devices (SAN - iSCSI or FCP) or a file system (NAS - NFS).

On NFS, all virtual disks, templates, and snapshots are files. On SAN (iSCSI/FCP), each virtual disk, template or snapshot is a logical volume.

Virtual machines that share the same storage domain can be migrated between hosts that belong to the same cluster.

Storage, also referred to as a **data domain**, is used to store the virtual hard disks, snapshots, ISO files, and Open Virtualization Format (OVF) files for virtual machines and templates. Every data center must have at least one data domain. Data domains cannot be shared between data centers.

**Note**

The Administration Portal currently offers options for creating storage domains that are export domains or ISO domains. These options are deprecated.

Detaching a storage domain from a data center stops the association, but does not remove the storage domain from the environment. A detached storage domain can be attached to another data center. And, the data, such as VMs and templates, remains attached to the storage domain.

## Local Storage

Local storage is storage that is attached directly to an Oracle Linux KVM compute host, such as a local physical disk or a locally attached SAN.

When a KVM compute host is configured to use local storage, it is automatically added to a cluster where it is the only host. This is because clusters with multiple hosts must have shared storage domains accessible to all hosts.

When you use local storage, features such as live migration, scheduling, and fencing are not available.

## Storage Pool Manager

The Storage Pool Manager (SPM) is a management role assigned to one of the hosts in a data center enabling it to manage the storage domains of the data center. Any host in the data center can run the SPM entity, which is assigned by the Manager. SPM controls access to storage by coordinating the metadata across the storage domains. This includes creating, deleting, and manipulating virtual disks (images), snapshots, and templates, and allocating storage for sparse block devices (on SAN).

The host running as SPM can still host virtual resources. The SPM priority setting for hosts enables you to prioritize which host is assigned the SPM role. Since the SPM role uses some of the host's available resources, it is important to prioritize hosts that can afford the resources.

Because the SPM must always be available, the Manager assigns the SPM role to another host if the SPM host becomes unavailable. A host with higher SPM priority is assigned the SPM role before a host with lower SPM priority.

## Virtual Disks

The Storage Pool Manager (SPM) is responsible for creating and deleting virtual disks, as well as snapshots, and templates. In addition it allocates storage for sparse block devices.

If the storage type is NFS or local, the SPM creates a thin provisioned virtual disk by default.

If the storage type is iSCSI or other block-based devices, Logical Unit Numbers (LUNs) are provided to the SPM. Then, a volume group on top of the LUNs and logical volumes for use as virtual machine disks are created and the SPM preallocates the space by default.

If a virtual disk is thinly provisioned, a 1 GB logical volume is created with a QCOW2 format. Use thin provisioning for virtual machines with low I/O requirements.

The VM's host continuously monitors the logical volume used for its virtual disk. You can set a threshold so that when the disk usage nears the threshold the host notifies the SPM and extends the logical volume by 1 GB.

If the storage in a pool starts to become exhausted, a new LUN can be added to the volume group. The SPM automatically distributes the additional storage to logical volumes that need it.

If a virtual disk is preallocated, a logical volume of the specified size in GB and a virtual disk of RAW format is created. Use preallocated disks for virtual machines with high levels of I/O. Preallocated disks cannot be enlarged.

If an application requires storage to be shared between virtual machines, use **Shareable** virtual disks which can be attached to multiple virtual machines concurrently.

QCOW2 format virtual disks cannot be shareable. You cannot take a snapshot of a shared disk and virtual disks that have snapshots cannot be marked shareable. You cannot live migrate a shared disk.

If the VMs are not cluster-aware, mark shareable disks as read-only to avoid data corruption.

Use direct LUN to enable virtual machines to directly access RAW block-based storage devices on the host bus adapter (HBA). The mapping of the direct LUN to the host causes the storage to be emulated as file-based storage to virtual machines. This removes a layer of abstraction between virtual machines and their data as the virtual machine is being granted direct access to block-based storage LUNs.

# Network

The following are general, high-level networking recommendations.

- Use bond network interfaces, especially on production hosts
- Use VLANs to separate different traffic types
- Use 1 GbE networks for management traffic
- Use 10 GbE or 40 GbE for virtual machines and Ethernet-based storage
- When adding physical interfaces to a host for storage use, uncheck **VM network** so that the VLAN is assigned directly to the physical interface

The Oracle Linux Virtualization Manager host and all Oracle Linux KVM hosts must have a fully qualified domain name (FQDN) as well as forward and reverse name resolution. Oracle recommend using DNS. Alternatively, you can use the `/etc/hosts` file for name resolution, however, this requires more work and is error-prone.

All DNS services used for name resolution must be hosted outside of the environment.

## Logical Networks

In Oracle Linux Virtualization Manager, you configure logical networks to represent the resources required to ensure the network connectivity of the Oracle Linux KVM compute hosts for a specific purpose, for example to indicate that a network interface controller (NIC) is on a management network.

You define a logical network for a data center, apply the network to one or more clusters, and then configure the hosts by assigning the logical networks to the hosts physical interfaces. Once you implement

the network on all the hosts in a cluster, the network becomes operational. You perform all these operations from the Administration Portal.

At the cluster level, you can assign one or more network roles to a logical network to specify its purpose:

- A **management network** is used for communication between Oracle Linux Virtualization Manager and the hosts.
- A **VM network** is used for virtual machine communication, a virtual machine's virtual NIC is attached to a VM network.
- A **display network** is used to connect clients to virtual machine graphical consoles, using either the SPICE, VNC or RDP protocols.
- A **migration network** is used to migrate virtual machines between the hosts in a cluster.

By default a single logical network named **ovirtmgmt** is created and this is used for all network communication in a data center. You separate the network traffic according to your needs by defining and applying additional logical networks.

One logical network is configured as the default route for the hosts.

A logical network can be marked as a required network. If a required network ceases to function, any KVM compute hosts associated with the network become non-operational.

For logical networks that are **not** VM networks, you connect the host directly to the network using either a physical network interface, a VLAN interface, or a bond.

For VM networks, a bridge is created on the host for each logical network. Virtual machine VNICs are connected to the bridges as needed. The bridge is connected to the network using either a physical network interface, a VLAN interface, or a bond.

You can perform most network configuration operations on hosts from the Administration Portal, including:

- Assign a host NIC to logical networks.
- Configure a NIC's boot protocol, IP settings, and DNS settings.
- Create bonds and VLAN interfaces on KVM compute hosts.

When there are a large number of KVM compute hosts and logical networks, using network labels enables you to simplify administration. Labels can be applied to logical networks and host interfaces. When you set a label on a network, you to deploy the network on host NICs that have the same label. This requires that the host NICs are configured for DHCP.

## VLANs

A virtual local area network (VLAN) enables hosts and virtual machines to communicate regardless of their actual physical location on a LAN.

VLANs enable you improve security by segregating network traffic. Broadcasts between devices in the same VLAN are not visible to other devices with a different VLAN, even if they exist on the same switch.

VLANs can also help to compensate for the lack of physical NICs on hosts. A host or virtual machine can be connected to different VLANs using a single physical NIC or bond. This is implemented using VLAN interfaces.

A VLAN is identified by an ID. A VLAN interface attached to a host's NIC or bond is assigned a VLAN ID and handles the traffic for the VLAN. When traffic is routed through the VLAN interface, it is automatically tagged with the VLAN ID configured for that interface, and is then routed through the NIC or bond that the VLAN interface is attached to.

The switch uses the VLAN ID to segregate traffic among the different VLANs operating on the same physical link. In this way, a VLAN functions exactly like a separate physical connection.

You need to configure the VLANs needed to support your logical networks before you can use them. This is usually accomplished using switch trunking. Trunking involves configuring ports on the switch to enable multiple VLAN traffic on these ports, to ensure that packets are correctly transmitted to their final destination. The configuration required depends on the switches you use.

When you create a logical network, you can assign a VLAN ID to the network. When you assign a host NIC or bond to the network, the VLAN interface is automatically created on the host and attached to the selected device.

## Bonds

Bonds bind multiple NICs into a single interface. A bonded network interface combines the transmission capability of all the NICs included in the bond and acts as a single network interface, which can provide greater transmission speed. Because all network interface cards in the bond must fail for the bond itself to fail, bonding provides increased fault tolerance.

## Virtual NICs

A virtual machine uses a virtual network interface controller (VNIC) to connect to a logical network.

VNICs are always attached to a bridge on a KVM compute host. A bridge is a software network device that enables the VNICS to share a physical network connection and to appear as separate physical devices on a logical network.

Oracle Linux Virtualization Manager automatically assigns a MAC address to a VNIC. Each MAC address corresponds to a single VNIC. Because MAC addresses must be unique on a network, the MAC addresses are allocated from a predefined range of addresses, known as a MAC address pool. MAC address pools are defined for a cluster.

Virtual machines are connected to a logical network by their VNICs. The IP address of each VNIC can be set independently, by DHCP or statically, using the tools available in the operating system of the virtual machine. To use DHCP, you need to configure a DHCP server on the logical network.

Virtual machines can communicate with any other machine on the virtual network, and, depending on the configuration of the logical network, with public networks such as the Internet.

# Chapter 2 Installing the Manager

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To install Oracle Linux Virtualization Manager, you perform a fresh installation of Oracle Linux 7 Update 6 on the host, install the `ovirt-engine` package, and then run the `engine-setup` command to configure the Manager.

## Manager Host Requirements

The following are the minimum system requirements for Oracle Linux Virtualization Manager hosts:

- Oracle Linux 7 Update 6
  Select **Minimal Install** as the base environment for the installation.
- Unbreakable Enterprise Kernel Release 5 Update 1 or later
- 64-bit dual-core CPU
  **Recommended:** 64-bit quad core or greater CPU
- 4 GB RAM
  **Recommended:** 16 GB or greater
- 1 network interface card (NIC) with bandwidth of at least 1 Gbps
  **Recommended:** 2 or more NICs with bandwidth of at least 1 Gbps
- 25 GB local writable hard disk
  **Recommended:** 50 GB or greater

For information about x86-based servers that are certified for Oracle Linux with UEK, see the *Hardware Certification List for Oracle Linux and Oracle VM* at https://linux.oracle.com/hardware-certifications.

For more details about system requirements and known issues with installation, see:

- The *Oracle Linux 7 Release Notes* for your release at https://docs.oracle.com/en/operating-systems/oracle-linux/7/relnotes7.0/index.html.
- The *Unbreakable Enterprise Kernel Release 5 Release Notes* for your release at https://docs.oracle.com/en/operating-systems/uek/.
- The *Oracle Linux 7 Installation Guide* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/install/.

**Important**

Oracle does not support Oracle Linux Virtualization Manager on systems where the `ol7_preview`, `ol7_developer`, `ol7_developer_kvm_utils`, or `ol7_developer_EPEL` repositories are enabled, or where software from these repositories is currently installed on the systems where the Manager will run. Even if you follow the instructions in this document, you may render your platform unsupported if these repositories or channels are enabled or software from these channels or repositories is installed on your system.

# Installing the Manager

You must perform a fresh installation of Oracle Linux 7 Update 6 an Oracle Linux Virtualization Manager host before installing the Manager. You can download the installation ISO for the latest Oracle Linux 7 Update 6 from the Oracle Software Delivery Cloud at https://edelivery.oracle.com.

1. Install Oracle Linux 7 Update 6 on the host using the **Minimal Install** base environment.

   Follow the instructions in the *Oracle Linux 7 Installation Guide* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/install/

   **Important**

   Do not install any additional packages until after you have installed the Manager packages, because they may cause dependency issues.

2. **(Optional)** If you use a proxy server for Internet access, configure Yum with the proxy server settings. For more information, see *Configuring Use of a Proxy Server* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/admin/ol7-proxy-config.html.

3. Do one of the following.

   a. **For ULN registered hosts only**: If the host is registered on ULN, subscribe the system to the required channels.

      i. Log in to https://linux.oracle.com with your ULN user name and password.

      ii. On the Systems tab, click the link named for the host in the list of registered machines.

      iii. On the System Details page, click **Manage Subscriptions**.

      iv. On the System Summary page, select each required channel from the list of available channels and click the right arrow to move the channel to the list of subscribed channels. Subscribe the system to the following channels:

         - `ol7_x86_64_latest`
         - `ol7_x86_64_optional_latest`
         - `ol7_x86_64_kvm_utils`
         - `ol7_x86_64_ovirt42`
         - `ol7_x86_64_ovirt42_extras`
         - `ol7_x86_64_gluster312`
         - **(For VDSM)** `ol7_x86_64_UEKR5`

      v. Click **Save Subscriptions**.

   b. **For Oracle Linux yum server hosts only**: Install the Oracle Linux Virtualization Manager Release 4.2.8 package and enable the required repositories.

      i. **(Optional)** Make sure the host is using the modular yum repository configuration. For more information, see *Getting Started with Oracle Linux Yum Server* at http://yum.oracle.com/getting-started.html.

ii. Install the Oracle Linux Virtualization Manager Release 4.2.8 package.

```
# yum install https://yum.oracle.com/repo/OracleLinux/OL7/ovirt42/x86_64/ovirt-release42.rpm
```

iii. Use the `yum` command to verify that the required repositories are enabled.

A. Clear the yum cache.

```
# yum clean all
```

B. List the configured repositories and verify that the required repositories are enabled.

```
# yum repolist
```

The following repositories must be enabled:

- `ol7_latest`
- `olv_ol7_optional_latest`
- `olv_ol7_kvm-utils`
- `olv_ol7_gluster312`
- `ol7_UEKR5`
- `ovirt-4.2`
- `ovirt-4.2-extra`

C. If a required repository is not enabled, use the `yum-config-manager` to enable it.

```
# yum-config-manager enable repository
```

4. Install the Manager using the `ovirt-engine` command.

```
# yum install ovirt-engine
```

Proceed to Configuring the Manager.

# Configuring the Manager

After you install the Oracle Linux Virtualization Manager, you run the `engine-setup` command (the Setup program) to configure Manager. You are prompted to answer a series of questions whose values are used to configure Manager. Since many of these questions relate to features that are currently in technology preview, Oracle recommends that you accept the default values for these features. See Manager Configuration Options.

The Manager uses two PostgreSQL databases: one for the engine and one for the data warehouse. By default, Setup creates and configures the engine database locally on the Manager host. Alternatively, you can configure the Manager host to use a manually-configured local or remote database. If you choose to use a manually-configured local or remote database, you must set it up *before* running `engine-setup`.

Currently, running the engine or data warehouse database on a remote host is a technology preview feature. See Technology Preview

To configure the Manager:

1. Run the **`engine-setup`** command on the host where you installed the Manager.

   **Note**

   Run **`engine-setup --accept-defaults`** to automatically accept all questions that have default answers.

   The Setup program prompts you to configure the Manager.

2. Enter **`Yes`** to configure the Manager

   ```
   Configure Engine on this host (Yes, No) [Yes]:
   ```

   If you enter **`No`**, the configuration stops. To restart, rerun the `engine-setup` command.

3. For the remaining configuration questions, provide input or accept default values, which are in square brackets after each question. To accept the default value for a given question, press **Enter**.

   **Note**

   Setup asks you for the fully qualified DNS name (FQDN) of the Manager host. Although Setup tries to automatically detect the name, you must ensure the FQDN is correct.

   For detailed information on the configuration options, see Manager Configuration Options.

4. Once you have answered all the questions, Setup displays a list of the values you entered. Review the list carefully and then press **Enter** to configure the Manager.

   Your answers are saved to a file that can be used to reconfigure the Manager using the same values. Setup also displays the location of the log file for the configuration process.

5. When the configuration is complete, details about how to log in to the Administration Portal are displayed. To verify that the configuration was successful, log into the Administration Portal, as described in Logging in to the Administration Portal.

# Manager Configuration Options

The following information describes the options for configuring Oracle Linux Virtualization Manager when you run the `engine-setup` command:

- Image I/O Proxy
- WebSocket Proxy
- Data Warehouse
- VM Console Proxy
- OVN Provider
- Manager DNS Name
- Automatic Firewall Configuration
- Data Warehouse Database
- Engine Database

- Admin User Password
- Application Mode
- OVN Provider Credentials
- SAN Wipe After Delete
- Web Server Configuration
- Data Warehouse Sampling Scale

## Image I/O Proxy

```
Configure Image I/O Proxy on this host? (Yes, No) [Yes]:
```

The Image I/O Proxy (`ovirt-imageio-proxy`) enables you to upload virtual disks into storage domains.

## WebSocket Proxy

```
Configure WebSocket Proxy on this machine? (Yes, No) [Yes]:
```

The WebSocket Proxy enables you to connect to virtual machines using the noVNC or HTML 5 consoles.

For security and performance reasons, you can configure the WebSocket Proxy on a remote host.

## Data Warehouse

```
Please note: Data Warehouse is required for the engine.
If you choose to not configure it on this host, you have to configure
it on a remote host, and then configure the engine on this host so that it can
access the database of the remote Data Warehouse host.
Configure Data Warehouse on this host (Yes, No) [Yes]:
```

The Data Warehouse feature can run on the Manager host or on a remote host. Running Data Warehouse on a remote host reduces the load on the Manager host.

Running the Data Warehouse on a remote host is currently a technology preview feature, see Technology Preview.

## VM Console Proxy

```
Configure VM Console Proxy on this host (Yes, No) [Yes]:
```

The VM Console Proxy enables you to access virtual machine serial consoles from a command line. To use this feature, serial consoles must be enabled in the virtual machines.

## OVN Provider

```
Configure ovirt-provider-ovn (Yes, No) [Yes]:
```

Install the Open Virtual Network (OVN) provider on the Manager host and add it as an external network provider. The default cluster is automatically configured to use OVN as its network provider.

OVN is an OVS (Open vSwitch) extension which enables you to configure virtual networks.

Using external providers, including the OVN provider, is currently a technology preview feature, see Technology Preview.

## Manager DNS Name

```
Host fully qualified DNS name of this server [<autodetected-host-name>]:
```

The fully qualified DNS name of the Manager host. Check that the automatically detected DNS name is correct.

## Automatic Firewall Configuration

```
Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current settings.
NOTICE: iptables is deprecated and will be removed in future releases
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
```

Configure the firewall on the host to open the ports used for external communication between Oracle Linux Virtualization Manager and the components it manages.

If Setup configures the firewall, and no firewall managers are active, you are prompted to select a firewall manager from a list.

If you enter **No**, you must manually configure the firewall. When the Manager configuration is complete, Setup displays a list of ports that need to be opened, see Manager Host Firewall Requirements for details.

## Data Warehouse Database

```
Where is the DWH database located? (Local, Remote) [Local]:
```

The Data Warehouse database (the history database) can run on the Manager host or on a remote host. Running the database on a remote host reduces the load on the Manager host.

Running the database on a remote host is currently a technology preview feature, see Technology Preview.

**Caution**

In this step you configure the name of the database, and the user name and password for connecting to it. Make a note of these details.

Enter **Local** to connect to a local PostgreSQL server, or **Remote** to connect to an existing PostgreSQL server running on a remote host.

If you enter **Local**, you can choose whether to set up a local PostgreSQL server automatically, or to connect to an existing local PostgreSQL server.

```
Setup can configure the local postgresql server automatically for the DWH to run.
This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and create DWH database,
or prefer to perform that manually? (Automatic, Manual) [Automatic]:
```

Enter **Automatic** to have Setup configure a local database server, or **Manual** to connect to an existing local database server. If you enter **Manual**, you are prompted for the details for connecting to the database:

```
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password:
```

If you enter **Remote** to connect to an existing PostgreSQL server running on a remote host, you are prompted for the details for connecting to the database:

```
DWH database host [localhost]:
DWH database port [5432]:
DWH database secured connection (Yes, No) [No]:
DWH database name [ovirt_engine_history]:
DWH database user [ovirt_engine_history]:
DWH database password:
```

## Engine Database

```
Where is the Engine database located? (Local, Remote) [Local]:
```

The Oracle Linux Virtualization Manager database (the engine database) can run on the Manager host or on a remote host. Running the database on a remote host reduces the load on the Manager host.

Running the database on a remote host is currently a technology preview feature, see Technology Preview.

**Caution**

In this step you configure the name of the database, and the user name and password for connecting to it. Make a note of these details.

Enter **Local** to connect to a local PostgreSQL server, or **Remote** to connect to an existing PostgreSQL server running on a remote host.

If you enter **Local**, you can choose whether to set up a local PostgreSQL server automatically, or to connect to an existing local PostgreSQL server.

```
Setup can configure the local postgresql server automatically for the engine to run.
This may conflict with existing applications.
Would you like Setup to automatically configure postgresql and create Engine database,
or prefer to perform that manually? (Automatic, Manual) [Automatic]:
```

Enter **Automatic** to have Setup configure a local database server, or **Manual** to connect to an existing local database server. If you enter **Manual**, you are prompted for the details for connecting to the database:

```
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password:
```

If you enter **Remote** to connect to an existing PostgreSQL server running on a remote host, you are prompted for the details for connecting to the database:

```
Engine database host [localhost]:
Engine database port [5432]:
Engine database secured connection (Yes, No) [No]:
Engine database name [engine]:
Engine database user [engine]:
Engine database password:
```

## Admin User Password

```
Engine admin password:
Confirm engine admin password:
```

Enter a password for the default administrative user (admin@internal). Make a note of the password.

## Application Mode

```
Application mode (Both, Virt, Gluster) [Both]:
```

The Manager can be configured to manage virtual machines (**Virt**) or manage Gluster clusters (**Gluster**) , or **Both**.

## OVN Provider Credentials

```
Use default credentials (admin@internal) for ovirt-provider-ovn (Yes, No) [Yes]:
oVirt OVN provider user[admin@internal]:
oVirt OVN provider password:
```

If you installed the OVN provider, configure the credentials for connecting to the OVN (Open vSwitch) databases.

Using external providers, including the OVN provider, is currently a technology preview feature, see Technology Preview.

## SAN Wipe After Delete

```
Default SAN wipe after delete (Yes, No) [No]:
```

Enter **Yes** to set the default value for the `wipe_after_delete` flag to `true`, which wipes the blocks of a virtual disk when it is deleted.

Using the wipe after delete functionality is currently a technology preview feature, see Technology Preview.

## Web Server Configuration

```
Organization name for certificate [<autodetected-domain-based-name>]:
```

Provide the organization name to use for the automatically generated self-signed SSL certificate used by the Manager web server.

```
Setup can configure the default page of the web server to
present the application home page. This may conflict with existing applications.
Do you wish to set the application as the default web page of the server? (Yes, No) [Yes]:
```

Enter **Yes** to make the Oracle Linux Virtualization Manager landing page the default page presented by the web server.

```
Setup can configure apache to use SSL using a certificate issued
from the internal CA. Do you wish Setup to configure that, or prefer to
perform that manually? (Automatic, Manual) [Automatic]:
```

Enter **Automatic** to generate a self-signed SSL certificate for the web server. Only use self-signed certificates for testing purposes.

Enter **Manual** to provide the location of the SSL certificate and private key to use the web server.

## Data Warehouse Sampling Scale

```
Please choose Data Warehouse sampling scale:
(1) Basic
(2) Full
(1, 2)[1]:
```

Set the Data Warehouse sampling scale, either Basic or Full. This step is skipped the Data Warehouse is not configured to run on the Manager host.

Enter **1** for Basic, which reduces the values of `DWH_TABLES_KEEP_HOURLY` to `720` and `DWH_TABLES_KEEP_DAILY` to `0`. Enter **2** for Full.

If the Manager and the Data Warehouse run on the same host, Basic is the recommended sample scale because this reduces the load on the Manager host. Full is recommended only if the Data Warehouse runs on a remote host.

The Full sampling scale is currently a technology preview feature, see Technology Preview.

# Logging in to the Administration Portal

After you run the `engine-setup` command to configure Oracle Linux Virtualization Manager, you should log into the Administration Portal to verify that the configuration was successful.

## Preparing to Log in

It is recommended that you use the latest version one of the following browsers to access the Administration Portal

- Mozilla Firefox
- Google Chrome
- Apple Safari
- Microsoft Internet Explorer 11
- Microsoft Edge

If Oracle Linux Virtualization Manager was configured to use a self-signed SSL certificate, or an SSL certificate that is signed by a Certificate Authority (CA) that is not trusted by the browser (for example an Intermediate CA), you should install the CA certificate in the browser. Consult your browser's instructions for how to import a CA certificate. You can download the CA certificate from the Manager at:

`http://manager-fqdn/ovirt-engine/services/pki-resource?resource=ca-certificate&format=X509-PEM-CA`

Usually you access the Administration Portal using the fully qualified domain name of the Manager host that you provided during installation. However, you can access the Administration Portal using an alternate host name(s). To do this, you need to add a configuration file to the Manager as follows:

1. Log in to the Manager host as root.
2. Create the file `/etc/ovirt-engine/engine.conf.d/99-custom-sso-setup.conf` with the following content:

   ```
   SSO_ALTERNATE_ENGINE_FQDNS="alias1.example.com alias2.example.com"
   ```

   The list of alternate host names must be separated by spaces.
3. Restart Oracle Linux Virtualization Manager.

   ```
   # systemctl restart ovirt-engine
   ```

## Logging in

You log in to the Administration Portal using a web browser and the default admin@internal user.

1. Go to `https://manager-fqdn/ovirt-engine`. The **Welcome** page displays.
2. **(Optional)** Change the preferred language from the drop-down list on the **Welcome** page.

   You can view the **Administration Portal** in multiple languages. The default language is based on the locale of your web browser.
3. Click **Administration Portal**. The **Login** page displays.
4. Enter `admin` for the **Username** and the password you specified when you configured the Manager.
5. From the **Profile** list, select `internal` and click **Log In**.

## Next Steps

Now that you have configured and logged in to the Manager, the next step is to add Oracle Linux KVM compute hosts, as described in Chapter 3, *Installing KVM Compute Hosts*.

You also need to add storage and configure logical networks. See Adding Storage and Creating a Logical Network in the *Oracle Linux Virtualization Manager Getting Started Guide*

## Logging Out

To log out of the **Administration Portal**, click the person icon in the header bar and click **Sign Out**. You are returned to the **Login** page.

# Manager Host Firewall Requirements

When you run the `engine-setup` command to configure Oracle Linux Virtualization Manager, you can have the Setup program automatically configure the firewall ports on the host. Use the following information if you want to manually configure firewalls.

The following ports are the default ports. The Setup program enables you to choose different ports for some of the configuration options, see Manager Configuration Options.

**Table 2.1 Oracle Linux Virtualization Manager Host Firewall Requirements**

| Port | Protocol | Source | Destination | Purpose |
|---|---|---|---|---|
| Not applicable | ICMP | Oracle Linux KVM compute hosts | Manager host | (Optional) Diagnostics |
| 22 | TCP | External systems | Manager host | (Optional) SSH access to the Manager host for administration and maintenance |
| 80 | TCP | Administration Portal clients<br><br>VM Portal clients<br><br>Oracle Linux KVM compute hosts<br><br>REST API clients | Manager host | HTTP access to the Manager |
| 443 | TCP | Administration Portal clients<br><br>VM Portal clients | Manager host | HTTPS access to the Manager |

| Port | Protocol | Source | Destination | Purpose |
|---|---|---|---|---|
| | | Oracle Linux KVM compute hosts<br><br>REST API clients | | |
| 2222 | TCP | Clients | Manager host | SSH access to VM serial consoles |
| 5432 | TCP,UDP | Manager host<br><br>Data Warehouse Service<br><br>External systems | Manager host | (Optional) Connections to PostgreSQL database server<br><br>Only required if the Engine database or the Data Warehouse database run on the Manager host |
| 6100 | TCP | Administration Portal clients<br><br>VM Portal clients | Manager host | (Optional) WebSocket proxy access to the noVNC or HTML 5 VM consoles<br><br>Only required if the WebSocket proxy runs on the Manager host |
| 7410 | UDP | Oracle Linux KVM compute hosts | Manager host | (Optional) Kdump notifications<br><br>Only required if Kdump is enabled |
| 54323 | TCP | Administration Portal clients | Manager host | (Optional) Image I/O Proxy access to upload images<br><br>Only required if the Image I/O Proxy runs on the Manager host |

## Remote Component Firewall Requirements

Some Oracle Linux Virtualization Manager components can run on separate remote hosts. Use the following information to configure the firewall on these hosts.

**Table 2.2 Remote Component Firewall Requirements**

| Port | Protocol | Source | Destination | Purpose |
|---|---|---|---|---|
| 5432 | TCP,UDP | Manager host<br><br>Data Warehouse Service<br><br>External systems | PostgreSQL database server | Connections to PostgreSQL database server<br><br>Required if the Engine database or the Data Warehouse database run on a remote host |
| 6100 | TCP | Administration Portal clients<br><br>VM Portal clients | WebSocket proxy host | WebSocket proxy access to the noVNC or HTML 5 VM consoles<br><br>Required if the WebSocket proxy runs on a remote host |

# Chapter 3 Installing KVM Compute Hosts

## Table of Contents



To manage an Oracle Linux KVM compute host using Oracle Linux Virtualization Manager, you prepare the host by performing a fresh installation of Oracle Linux 7 and enabling the required repositories, and then you add the host to a data center using the Administration Portal.

## KVM Compute Host Requirements

The following are the minimum system requirements for Oracle Linux KVM compute hosts:

- Oracle Linux 7 Update 6 or later
  Select **Minimal Install** as the base environment for the installation.
- Unbreakable Enterprise Kernel Release 5 Update 1 or later
- 64-bit dual-core CPU
  **Recommended:** Multiple CPUs

  The CPUs must support either the Intel VT-x or the AMD AMD-V hardware virtualization extensions and the extensions must be enabled in the host's BIOS. The CPUs must also support the No eXecute flag (NX).
- 2 GB RAM
  **Maximum Tested:** 2 TB

  The amount of RAM required varies depending on guest operating system requirements, guest application requirements, and guest memory activity and usage.
- 1 network interface card (NIC) with bandwidth of at least 1 Gbps
  **Recommended:** 2 or more NICs with bandwidth of at least 1 Gbps

  Multiple NICs are recommended so that NICs can be dedicated for network intensive activities, such as virtual machine migration.
- 45 GB local writable hard disk allocated as follows:

| Allocation | Size |
|---|---|
| `/` (root) | 6 GB |
| `/home` | 1 GB |
| `/tmp` | 1 GB |
| `/boot` | 1 GB |
| `/var` | 15 GB |
| `/var/log` | 8 GB |
| `/var/log/audit` | 2 GB |
| swap | 1 GB |

Anaconda reserves 20% of the thin pool size within the volume group for future metadata expansion. This is to prevent an out-of-the-box configuration from running out of space under normal usage conditions. Oracle recommend using the default allocations which use more

For information about x86-based servers that are certified for Oracle Linux with UEK, see the *Hardware Certification List for Oracle Linux and Oracle VM* at https://linux.oracle.com/hardware-certifications.

Do not install any third-party watchdogs on your Oracle Linux KVM compute hosts, as they can interfere with the watchdog daemon provided by VDSM.

Do not install any other applications on the Oracle Linux KVM compute hosts as they may interfere with the operation of the KVM hypervisor.

For more details about system requirements and known issues with installation, see:

- The *Oracle Linux 7 Release Notes* for your release at https://docs.oracle.com/en/operating-systems/oracle-linux/7/relnotes7.0/index.html.
- The *Unbreakable Enterprise Kernel Release 5 Release Notes* for your release at https://docs.oracle.com/en/operating-systems/uek/.
- The *Oracle Linux 7 Installation Guide* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/install/.

# Configuring a KVM Compute Host

You must perform a fresh installation of Oracle Linux 7 Update 6 on an Oracle Linux KVM compute host before configuration.

You can download the installation ISO for the latest Oracle Linux 7 Update 6 update from the Oracle Software Delivery Cloud at https://edelivery.oracle.com.

1. Install Oracle Linux 7 Update 6 on the host.

   Follow the instructions in the *Oracle Linux 7 Installation Guide* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/install/

   Select **Minimal Install** as the base environment for the installation.

   Do not install any additional packages until after you have added the host to the Manager, because they may cause dependency issues.

2. **(Optional)** If you use a proxy server for Internet access, configure Yum with the proxy server settings. For more information, see *Configuring Use of a Proxy Server* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/admin/ol7-proxy-config.html.

3. Do one of the following.

   a. **For ULN registered hosts only**: If the host is registered on ULN, subscribe the system to the required channels.

      i. Log in to https://linux.oracle.com with your ULN user name and password.

      ii. On the Systems tab, click the link named for the host in the list of registered machines.

      iii. On the System Details page, click **Manage Subscriptions**.

iv. On the System Summary page, select each required channel from the list of available channels and click the right arrow to move the channel to the list of subscribed channels. Subscribe the system to the following channels:

- `ol7_x86_64_latest`
- `ol7_x86_64_optional_latest`
- `ol7_x86_64_kvm_utils`
- `ol7_x86_64_ovirt42`
- `ol7_x86_64_ovirt42_extras`
- `ol7_x86_64_gluster312`
- **(For VDSM)** `ol7_x86_64_UEKR5`

v. Click **Save Subscriptions**.

b. **For Oracle Linux yum server configured KVM compute hosts only**: Install the Oracle Linux Virtualization Manager Release 4.2.8 package and enable the required repositories.

> **Note**
>
> Installing the Oracle Linux Virtualization Manager Release 4.2.8 package configures an Oracle Linux KVM compute host; it does not install the Manager.

i. **(Optional)** Make sure the host is using the modular yum repository configuration. For more information, see *Getting Started with Oracle Linux Yum Server* at http://yum.oracle.com/getting-started.html.

ii. Install the Oracle Linux Virtualization Manager Release 4.2.8 package.

```
# yum install https://yum.oracle.com/repo/OracleLinux/OL7/ovirt42/x86_64/ovirt-release42.rpm
```

iii. Use the `yum` command to verify that the required repositories are enabled.

A. Clear the yum cache.

```
# yum clean all
```

B. List the configured repositories and verify that the required repositories are enabled.

```
# yum repolist
```

The following repositories must be enabled:

- `ol7_latest`
- `olv_ol7_optional_latest`
- `olv_ol7_kvm-utils`
- `olv_ol7_gluster312`

- `ol7_UEKR5`
- `ovirt-4.2`
- `ovirt-4.2-extra`

C. If a required repository is not enabled, use the `yum-config-manager` to enable it.

```
# yum-config-manager enable repository
```

4. **(Optional)** Open the Cockpit port.

```
# firewall-cmd --zone=public --add-port=9090/tcp
```

The Cockpit web interface can be used to monitor the host's resources and to perform administrative tasks. You can access the host's Cockpit web interface from the Administration Portal or by connecting directly to the host.

For more information about configuring `firewalld`, see *Controlling Access to Ports* at https://docs.oracle.com/en/operating-systems/oracle-linux/7/admin/section_r22_155_5n.html

The KVM compute host is now ready to be added to the Manager using the Administration Portal.

# Adding a KVM Compute Host to the Manager

Once you have configured an Oracle Linux KVM compute host (see Configuring a KVM Compute Host), you use the Administration Portal to add the host to a data center so that it can be used to run virtual machines.

When you install Oracle Linux Virtualization Manager, a data center and cluster named Default is created. You can rename and configure this data center and cluster, or you can add new data centers and clusters, to meet your needs. See Additional Administration Tasks in the *Oracle Linux Virtualization Manager Getting Started Guide* for details of how to do this.

1. Log in to the Administration Portal.

   See Logging in to the Administration Portal for details.

2. Go to **Compute** and then click **Hosts**.

3. On the **Hosts** pane, click **New**.

   The **New Host** dialog box opens with the **General** tab selected on the sidebar.

4. From the **Host Cluster** drop-down list, select the data center and host cluster for the host.

   By default, the **Default** data center is selected.

5. In the **Name** field, enter a name for the host.

6. In the **Hostname** field, enter the fully qualified DNS name for the host.

7. In the **SSH Port** field, change the standard SSH port 22 if the SSH server on the host uses a different port.

8. Under **Authentication**, select the authentication method to use.

   Oracle recommends that you select **SSH PublicKey** authentication. If you select this option, copy the key displayed in the **SSH PublicKey** field to the `/root/.ssh/authorized_keys` file on the host.

Otherwise, enter the root user's password to use password authentication.

9. **(Optional)** Configure other settings for the host from the other tabs on the **New Host** sidebar.

10. Click **OK** to add the host to the data center.

    The host is added to the list of hosts in the Manager. While the Manager is installing the host agent (VDSM) and other required packages on the host, the status of the host is shown as **Installing**. You can view the progress of the installation in the details pane. When the host is added to the Manager, the host status changes to **Up**.

# KVM Compute Host Firewall Requirements

When you add an Oracle Linux KVM compute host to Oracle Linux Virtualization Manager, the existing firewall configuration on the host is overwritten and the required firewall ports are configured automatically.

To disable automatic firewall configuration when adding a KVM compute host, clear the **Automatically configure host firewall** check box under **Advanced Parameters**. Then use the following information to manually configure the firewall.

**Table 3.1 Oracle Linux KVM Compute Host Firewall Requirements**

| Port | Protocol | Source | Destination | Purpose |
|---|---|---|---|---|
| 22 | TCP | Manager host | KVM compute hosts | (Optional) SSH access to KVM compute hosts |
| 111 | TCP | NFS storage server | KVM compute hosts | (Optional) NFS connections<br><br>Only required if you use NFS storage |
| 161 | UDP | KVM compute hosts | Manager host | (Optional) Simple network management protocol (SNMP)<br><br>Only required if you want to send SNMP traps to external SNMP managers |
| 2223 | TCP | Manager host | KVM compute hosts | SSH access to VM serial consoles |
| 5900 to 6923 | TCP | Administration Portal clients<br><br>VM Portal clients | KVM compute hosts | Access to VM consoles using VNC or SPICE protocols |
| 5989 | TCP,UDP | Common Information Model Object Manager (CIMOM) | KVM compute hosts | (Optional) CIMOM connections<br><br>Only required if you use CIMOM to monitor VMs running on the host |
| 6081 | UDP | KVM compute hosts | KVM compute hosts | (Optional) Open Virtual Network (OVN) connections<br><br>Only required if the OVN network provider is enabled |
| 9090 | TCP | Manager host<br><br>Client machines | KVM compute hosts | (Optional) Cockpit connections<br><br>Only required if Cockpit is installed |
| 16514 | TCP | KVM compute hosts | KVM compute hosts | VM migration using `libvirt` |

| Port | Protocol | Source | Destination | Purpose |
|---|---|---|---|---|
| 49152 to 49216 | TCP | KVM compute hosts | KVM compute hosts | Automated and manual VM migration and fencing using VDSM |
| 54321 | TCP | Manager host<br><br>KVM compute hosts | KVM compute hosts | VDSM communication with the Oracle Linux Virtualization Manager and other KVM compute hosts |
| 54322 | TCP | Manager host<br><br>Image I/O Proxy host | KVM compute hosts | (Optional) Communication with the Image I/O Proxy to upload images<br><br>Only required if the Image I/O Proxy runs on the Manager host or a separate host |