loaded. Note that the NVIDIA Quadro 2000 is not supported, nor is the Quadro K420 card.

Check vendor specification and datasheets to confirm that your hardware meets these requirements. The **lspci -v** command can be used to print information for PCI devices already installed on a system.

1.2.6. vGPU Requirements

If you plan to configure a host to allow virtual machines on that host to install a vGPU, the following requirements must be met:

» vGPU-compatible GPU

» GPU-enabled host kernel

» Installed GPU with correct drivers

» Predefined **mdev_type** set to correspond with one of the mdev types supported by the device

» vGPU-capable drivers installed on each host in the cluster

» vGPU-supported virtual machine operating system with vGPU drivers installed

1.3. NETWORKING REQUIREMENTS

1.3.1. DNS Requirements

The Manager and all hosts must have a fully qualified domain name and full, perfectly aligned forward and reverse name resolution. Red Hat strongly recommends using DNS; using the **/etc/hosts** file for name resolution typically requires more work and has a greater chance for errors.

Due to the extensive use of DNS in a Red Hat Virtualization environment, running the environment's DNS service as a virtual machine hosted in the environment is not supported. All DNS services that the Red Hat Virtualization environment uses for name resolution must be hosted outside of the environment.

1.3.2. Red Hat Virtualization Manager Firewall Requirements

The Red Hat Virtualization Manager requires that a number of ports be opened to allow network traffic through the system's firewall.

The **engine-setup** script can configure the firewall automatically, but this overwrites any pre-existing firewall configuration if you are using **iptables**. If you want to keep the existing firewall configuration, you must manually insert the firewall rules required by the Manager. The **engine-setup** command saves a list of the **iptables** rules required in the **/etc/ovirt-engine/iptables.example** file. If you are using **firewalld**, **engine-setup** does not overwrite the existing configuration.

The firewall configuration documented here assumes a default configuration.

Table 1.4. Red Hat Virtualization Manager Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
-	ICMP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Manager	Optional. May help in diagnosis.
22	TCP	System(s) used for maintenance of the Manager including backend configuration, and software upgrades.	Red Hat Virtualization Manager	Secure Shell (SSH) access. Optional.
2222	TCP	Clients accessing virtual machine serial consoles.	Red Hat Virtualization Manager	Secure Shell (SSH) access to enable connection to virtual machine serial consoles.

Port(s)	Protocol	Source	Destination	Purpose
80, 443	TCP	Administration Portal clients VM Portal clients Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s) REST API clients	Red Hat Virtualization Manager	Provides HTTP and HTTPS access to the Manager.
6100	TCP	Administration Portal clients VM Portal clients	Red Hat Virtualization Manager	Provides websocket proxy access for a web-based console client, **noVNC**, when the websocket proxy is running on the Manager. If the websocket proxy is running on a different host, however, this port is not used.
7410	UDP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Manager	Must be open for the Manager to receive Kdump notifications, if Kdump is enabled.

Port(s)	Protocol	Source	Destination	Purpose
54323	TCP	Administration Portal clients	Red Hat Virtualization Manager (ImageIO Proxy server)	Required for communication with the ImageIO Proxy (**ovirt-imageio-proxy**)
6442	TCP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	OVN southbound database	Connect to OVN database
9696	TCP	Clients of the oVirt external network provider for OVN	oVirt external network provider for OVN	OpenStack Networking API
35357	TCP	Clients of the oVirt external network provider for OVN	oVirt external network provider for OVN	OpenStack Identity API

1.3.3. Host Firewall Requirements

Red Hat Enterprise Linux hosts and Red Hat Virtualization Hosts (RHVH) require a number of ports to be opened to allow network traffic through the system's firewall. The firewall rules are automatically configured by default when adding a new host to the Manager, overwriting any pre-existing firewall configuration.

To disable automatic firewall configuration when adding a new host, clear the **Automatically configure host firewall** check box under **Advanced Parameters**.

To customize the host firewall rules, see https://access.redhat.com/solutions/2772331.

Table 1.5. Virtualization Host Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
22	TCP	Red Hat Virtualization Manager	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Secure Shell (SSH) access. Optional.
2223	TCP	Red Hat Virtualization Manager	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Secure Shell (SSH) access to enable connection to virtual machine serial consoles.
161	UDP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Manager	Simple network management protocol (SNMP). Only required if you want Simple Network Management Protocol traps sent from the host to one or more external SNMP managers. Optional.
111	TCP	NFS storage server	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	NFS connections. Optional.

Port(s)	Protocol	Source	Destination	Purpose
5900 - 6923	TCP	Administration Portal clients VM Portal clients	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Remote guest console access via VNC and SPICE. These ports must be open to facilitate client access to virtual machines.
5989	TCP, UDP	Common Information Model Object Manager (CIMOM)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Used by Common Information Model Object Managers (CIMOM) to monitor virtual machines running on the host. Only required if you want to use a CIMOM to monitor the virtual machines in your virtualization environment. Optional.
9090	TCP	Red Hat Virtualization Manager Client machines	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Required to access the Cockpit user interface, if installed.
16514	TCP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Virtual machine migration using **libvirt**.

Port(s)	Protocol	Source	Destination	Purpose
49152 - 49216	TCP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Virtual machine migration and fencing using VDSM. These ports must be open to facilitate both automated and manual migration of virtual machines.
54321	TCP	Red Hat Virtualization Manager Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	VDSM communications with the Manager and other virtualization hosts.
54322	TCP	Red Hat Virtualization Manager (ImageIO Proxy server)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Required for communication with the ImageIO daemon (**ovirt-imageio-daemon**).
6081	UDP	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Red Hat Virtualization Host(s) Red Hat Enterprise Linux host(s)	Required, when Open Virtual Network (OVN) is used as a network provider, to allow OVN to create tunnels between hosts.

1.3.4. Database Server Firewall Requirements

Red Hat Virtualization supports the use of a remote database server for the Manager database (**engine**) and the Data Warehouse database (**ovirt-engine-history**). If you plan to use a remote database server, it must allow connections from the Manager and the Data Warehouse service (which can be separate from the Manager).

Similarly, if you plan to access a local or remote Data Warehouse database from an external system, such as Red Hat CloudForms, the database must allow connections from that system.

> **Important**
>
> Accessing the Manager database from external systems is not supported.

Table 1.6. Database Server Firewall Requirements

Port(s)	Protocol	Source	Destination	Purpose
5432	TCP, UDP	Red Hat Virtualization Manager Data Warehouse service	Manager (**engine**) database server Data Warehouse (**ovirt-engine-history**) database server	Default port for PostgreSQL database connections.
5432	TCP, UDP	External systems	Data Warehouse (**ovirt-engine-history**) database server	Default port for PostgreSQL database connections.

PART I. INSTALLING THE RED HAT VIRTUALIZATION MANAGER

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