



Red Hat Virtualization 4.0

Self-Hosted Engine Guide

Installing and Maintaining the Red Hat Virtualization Self-Hosted Engine

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Abstract

A comprehensive guide to the self-hosted engine.

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CHAPTER 1. INTRODUCTION

A self-hosted engine is a virtualized environment in which the Red Hat Virtualization Manager, or engine, runs on a virtual machine on the hosts managed by that Manager. The virtual machine is created as part of the host configuration, and the Manager is installed and configured in parallel to the host configuration process. The primary benefit of the self-hosted engine is that it requires less hardware to deploy an instance of Red Hat Virtualization as the Manager runs as a virtual machine, not on physical hardware. Additionally, the Manager is configured to be highly available. If the host running the Manager virtual machine goes into maintenance mode, or fails unexpectedly, the virtual machine is migrated automatically to another host in the environment. Hosts that can run the Manager virtual machine are referred to as self-hosted engine nodes. At least two self-hosted engine nodes are required to support the high availability feature.

For the Manager virtual machine installation, a RHV-M Virtual Appliance is provided. Manually installing the Manager virtual machine is not supported. To customize the Manager virtual machine, you can use a custom cloud-init script with the appliance. Creating custom cloud-init scripts is currently outside the scope of this documentation. A default cloud-init script can be generated during the deployment.

Table 1.1. Supported OS versions to Deploy Self-Hosted Engine

System Type	Supported Versions
Red Hat Enterprise Linux host	7.2 or later
Red Hat Virtualization Host	7.2 or later
HostedEngine-VM (Manager)	7

For hardware requirements, see [Hypervisor Requirements](#) in the *Installation Guide*.



IMPORTANT

It is important to synchronize the system clocks of the hosts, Manager, and other servers in the environment to avoid potential timing or authentication issues. To do this, configure the Network Time Protocol (NTP) on each system to synchronize with the same NTP server.

The following diagram illustrates the self-hosted engine deployment workflow:

HOST

- 1 Launch `hosted-engine --deploy`
- 2 Answer questions to configure the host and the appliance
- 3 The script creates a virtual machine and configures it using cloud-init.
- 4 The script runs `engine-setup` and reboots the machine so the virtual machine is managed by the high availability agent.
- 5 Deployment complete

VIRTUAL MACHINE

No user interaction required.

RHEV_370168_0116

CHAPTER 2. DEPLOYING SELF-HOSTED ENGINE

2.1. DEPLOYING SELF-HOSTED ENGINE ON RED HAT ENTERPRISE LINUX HOSTS

2.1.1. Installing the Self-Hosted Engine Packages

Ensure the host is registered and subscribed to the required entitlements. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* for more information.

Procedure 2.1. Installing the Self-Hosted Engine

1. Install the self-hosted engine packages:

```
# yum install ovirt-hosted-engine-setup
```

2. Install the RHV-M Virtual Appliance package for the Manager virtual machine installation:

```
# yum install rhevm-appliance
```

Proceed to the next section to deploy and configure self-hosted engine on a Red Hat Enterprise Linux host.

2.1.2. Configuring a RHEL-Based Self-Hosted Engine

The **hosted-engine** script is provided to assist with configuring the host, and the Manager virtual machine. The script asks you a series of questions, and configures your environment based on your answers.



NOTE

If using the script, use the **hosted-engine --check-deployed** command to check whether a self-hosted engine has already been deployed. An error will only be displayed if no self-hosted engine has been deployed. If a self-hosted engine has already been deployed, subsequent deployments will fail. See [Chapter 3, Troubleshooting a Self-Hosted Engine Deployment](#) if you need to troubleshoot an existing deployment, or clean up a failed deployment in order to redeploy the self-hosted engine.

Ensure that you have completed the following prerequisites:

Prerequisites

- You must have a freshly installed Red Hat Enterprise Linux 7 system with the ovirt-hosted-engine-setup package installed.
- You must have prepared storage for your self-hosted engine environment. At least two storage domains are required:
 - A shared storage domain dedicated to the Manager virtual machine. This domain is created during the self-hosted engine deployment, and must be at least 60 GB.

- o A data storage domain for regular virtual machine data. This domain must be added to the self-hosted engine environment after completing the deployment.



WARNING

Red Hat strongly recommends that you have additional active data storage domains available in the same data center as the self-hosted engine environment.

If you deploy the self-hosted engine in a data center with only one active data storage domain, and if that data storage domain is corrupted, you will be unable to add new data storage domains or to remove the corrupted data storage domain. You will have to redeploy the self-hosted engine.

If you are using an ISO storage domain, Red Hat recommends that the ISO domain not be within the hosted engine virtual machine.

For more information on preparing storage for your deployment, see the [Storage](#) chapter of the *Administration Guide*.



IMPORTANT

If you are using iSCSI storage, do not use the same iSCSI target for the shared storage domain and data storage domain.

- You must have a fully qualified domain name prepared for your Manager and the host. Forward and reverse lookup records must both be set in the DNS.
- You must have the RHV-M Virtual Appliance for the Manager installation. If you have not manually installed the `rhev-m-appliance` package, it will be downloaded and installed automatically.
- To use the RHV-M Virtual Appliance for the Manager installation, one directory must be at least 5 GB. The `hosted-engine` script first checks if `/var/tmp` has enough space to extract the appliance files. If not, you can specify a different directory or mount external storage. The VDSM user and KVM group must have read, write, and execute permissions on the directory.

Procedure 2.2. Configuring a RHEL-based Self-Hosted Engine

1. Initiating Hosted Engine Deployment

Run the `hosted-engine` script. To escape the script at any time, use the **CTRL+D** keyboard combination to abort deployment. It is recommended to use the `screen` window manager to run the script to avoid losing the session in case of network or terminal disruption. If not already installed, install the `screen` package, which is available in the standard Red Hat Enterprise Linux repository.

```
# yum install screen
```

```
# screen
```

```
# hosted-engine --deploy
```



NOTE

In the event of session timeout or connection disruption, run **screen -d -r** to recover the **hosted-engine** deployment session.

2. Configuring Storage

Select the type of storage to use.

During customization use CTRL-D to abort.
Please specify the storage you would like to use (glusterfs, iscsi, fc, nfs3, nfs4)[nfs3]:

- o For NFS storage types, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

Please specify the full shared storage connection path to use (example: host:/path): *storage.example.com:/hosted_engine/nfs*

- o For iSCSI, specify the iSCSI portal IP address, port, user name and password, and select a target name from the auto-detected list. You can only select one iSCSI target during the deployment.

Please specify the iSCSI portal IP address:
Please specify the iSCSI portal port [3260]:
Please specify the iSCSI portal user:
Please specify the iSCSI portal password:
Please specify the target name (*auto-detected values*) [*default*]:

- o For Gluster storage, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.



IMPORTANT

Only replica 3 Gluster storage is supported. Ensure the following configuration has been made:

- In the `/etc/glusterfs/glusterd.vol` file on all three Gluster servers, set `rpc-auth-allow-insecure` to `on`.

```
option rpc-auth-allow-insecure on
```

- Configure the volume as follows:

```
gluster volume set volume cluster.quorum-type auto
gluster volume set volume network.ping-timeout 10
gluster volume set volume auth.allow \*
gluster volume set volume group virt
gluster volume set volume storage.owner-uid 36
gluster volume set volume storage.owner-gid 36
gluster volume set volume server.allow-insecure on
```

Please specify the full shared storage connection path to use (example: `host:/path`):
`storage.example.com:/hosted_engine/gluster_volume`

- For Fibre Channel, the host bus adapters must be configured and connected, and the **hosted-engine** script will auto-detect the LUNs available. The LUNs must not contain any existing data.

```
The following luns have been found on the requested target:
[1]      3514f0c5447600351      30GiB  XtremIO XtremApp
          status: used, paths: 2 active

[2]      3514f0c5447600352      30GiB  XtremIO XtremApp
          status: used, paths: 2 active
```

Please select the destination LUN (1, 2) [1]:

3. Configuring the Network

The script detects possible network interface controllers (NICs) to use as a management bridge for the environment. It then checks your firewall configuration and offers to modify it for console (SPICE or VNC) access.

```
Please indicate a nic to set rhvm bridge on: (eth1, eth0) [eth1]:
iptables was detected on your computer, do you wish setup to
configure it? (Yes, No)[Yes]: Yes
Please indicate a pingable gateway IP address [X.X.X.X]:
```

4. Configuring the Virtual Machine

Select **disk** for the boot device type, and the script will automatically detect the RHV-M Virtual Appliances available. Specify the memory size.

Please specify the device to boot the VM from (choose disk

```

for the oVirt engine appliance)
    (cdrom, disk, pxe) [disk]:
    Please specify the console type you would like to use to
connect to the VM (vnc, spice) [vnc]: vnc
[ INFO ] Detecting available oVirt engine appliances
    The following appliance have been found on your system:
        [1] - The oVirt Engine Appliance image (OVA)
        [2] - Directly select an OVA file
    Please select an appliance (1, 2) [1]:
[ INFO ] Checking OVF archive content (could take a few minutes
depending on archive size)

```

Specify **Yes** if you want cloud-init to take care of the initial configuration of the Manager virtual machine. Specify **Generate** for cloud-init to take care of tasks like setting the root password, configuring networking, configuring the host name, injecting an answers file for **engine-setup** to use, and running **engine-setup** on boot. Optionally, select **Existing** if you have an existing cloud-init script to take care of more sophisticated functions of cloud-init. Specify the FQDN for the Manager virtual machine. Specify a MAC address for the HostedEngine-VM, or accept a randomly generated one. The MAC address can be used to update your DHCP and DNS server prior to installing the operating system on the virtual machine.



NOTE

For more information on cloud-init, see <https://cloudinit.readthedocs.org/en/latest/>.

```

Would you like to use cloud-init to customize the appliance on the
first boot (Yes, No)[Yes]? Yes
Would you like to generate on-fly a cloud-init ISO image (of no-cloud
type)
or do you have an existing one (Generate, Existing)[Generate]?
Generate
Please provide the FQDN you would like to use for the engine
appliance.
Note: This will be the FQDN of the engine VM you are now going to
launch.
It should not point to the base host or to any other existing
machine.
Engine VM FQDN: (leave it empty to skip): manager.example.com
Automatically execute engine-setup on the engine appliance on first
boot (Yes, No)[Yes]? Yes
Automatically restart the engine VM as a monitored service after
engine-setup (Yes, No)[Yes]? Yes
Enter root password that will be used for the engine appliance
(leave it empty to skip): p@ssw0rd
Confirm appliance root password: p@ssw0rd
The following CPU types are supported by this host:
- model_Penryn: Intel Penryn Family
- model_Conroe: Intel Conroe Family
Please specify the CPU type to be used by the VM [model_Penryn]:
Please specify the number of virtual CPUs for the VM [Defaults to
appliance OVF value: 4]:
You may specify a MAC address for the VM or accept a randomly
generated default [00:16:3e:77:b2:a4]:
How should the engine VM network be configured (DHCP, Static)[DHCP]?
Static

```

Please enter the IP address to be used for the engine VM:

`192.168.x.x`

Please provide a comma-separated list (max3) of IP addresses of domain name servers for the engine VM

Engine VM DNS (leave it empty to skip):

Add lines for the appliance itself and for this host to `/etc/hosts` on the engine VM?

Note: ensuring that this host could resolve the engine VM hostname is still up to you (Yes, No)[No] Yes

5. Configuring the Hosted Engine

Specify a name for the host to be identified in the Administration Portal, and the password for the **admin@internal** user to access the Administration Portal. Provide the name and TCP port number of the SMTP server, the email address used to send email notifications, and a comma-separated list of email addresses to receive these notifications.

Enter engine admin password: `p@ssw0rd`

Confirm engine admin password: `p@ssw0rd`

Enter the name which will be used to identify this host inside the Administrator Portal [`hosted_engine_1`]:

Please provide the FQDN for the engine you would like to use.

This needs to match the FQDN that you will use for the engine installation within the VM.

Note: This will be the FQDN of the VM you are now going to create,

it should not point to the base host or to any other existing machine.

Engine FQDN: `[: manager.example.com`

Please provide the name of the SMTP server through which we will send notifications [`localhost`]:

Please provide the TCP port number of the SMTP server [`25`]:

Please provide the email address from which notifications will be sent [`root@localhost`]:

Please provide a comma-separated list of email addresses which will get notifications [`root@localhost`]:

6. Configuration Preview

Before proceeding, the **hosted-engine** script displays the configuration values you have entered, and prompts for confirmation to proceed with these values.

7. Creating the Manager Virtual Machine

The script creates the Manager virtual machine, starts the **ovirt-engine** and high availability services, and connects the host and shared storage domain to the Manager virtual machine.

You can now connect to the VM with the following command:

```
/usr/bin/remote-viewer vnc://localhost:5900
```

Use temporary password "3042QHpx" to connect to vnc console.

Please note that in order to use remote-viewer you need to be able to run graphical applications.

This means that if you are using ssh you have to supply the `-Y` flag (enables trusted X11 forwarding).

Otherwise you can run the command from a terminal in your preferred desktop environment.

If you cannot run graphical applications you can connect to the graphic console from another host or connect to the serial console

using the following command:

```
socat UNIX-CONNECT:/var/run/ovirt-vmconsole-console/fabbea5a-1989-411f-8ed7-7abe0917fc66.sock,user=ovirt-vmconsole
STDIO,raw,echo=0,escape=1
```

If you need to reboot the VM you will need to start it manually using the command:

```
hosted-engine --vm-start
```

You can then set a temporary password using the command:

```
hosted-engine --add-console-password
```

```
[ INFO ] Running engine-setup on the appliance
```

```
...
```

```
[ INFO ] Engine-setup successfully completed
```

```
[ INFO ] Engine is still unreachable
```

```
[ INFO ] Engine is still unreachable, waiting...
```

```
[ INFO ] Engine replied: DB Up!Welcome to Health Status!
```

```
[ INFO ] Connecting to the Engine
```

```
Enter the name of the cluster to which you want to add the
host (Default) [Default]:
```

```
[ INFO ] Waiting for the host to become operational in the engine.
This may take several minutes... [ INFO ] Still waiting for VDSM
host to become operational...
```

```
[ INFO ] The VDSM Host is now operational
```

```
[ INFO ] Shutting down the engine VM
```

```
[ INFO ] Enabling and starting HA services
```

```
[ INFO ] Saving hosted-engine configuration on the shared storage
domain
```

```
Hosted Engine successfully set up
```

```
[ INFO ] Stage: Clean up
```

```
[ INFO ] Generating answer file '/var/lib/ovirt-hosted-engine-
setup/answers/answers-2015xx.conf'
```

```
[ INFO ] Generating answer file '/etc/ovirt-hosted-
engine/answers.conf'
```

```
[ INFO ] Stage: Pre-termination
```

```
[ INFO ] Stage: Termination
```

When the **hosted-engine** deployment script completes successfully, the Red Hat Virtualization Manager is configured and running on your host. The Manager has already configured the data center, cluster, host, the Manager virtual machine, and a shared storage domain dedicated to the Manager virtual machine.



IMPORTANT

Log in as the **admin@internal** user to continue configuring the Manager and add further resources. You must create another data domain for the data center to be initialized to host regular virtual machine data, and for the Manager virtual machine to be visible. See [Storage](#) in the *Administration Guide* for different storage options and on how to add a data storage domain.

Link your Red Hat Virtualization Manager to a directory server so you can add additional users to the environment. Red Hat Virtualization supports many directory server types; for example, Red Hat Directory Server (RHDS), Red Hat Identity Management (IdM), Active Directory, and many other types. Add a directory server to your environment using the **ovirt-engine-extension-aaa-ldap-setup** interactive setup script. For more information, see [Configuring an External LDAP Provider](#) in the *Administration Guide*.

The **ovirt-hosted-engine-setup** script also saves the answers you gave during configuration to a file, to help with disaster recovery. If a destination is not specified using the **--generate-answer=<file>** argument, the answer file is generated at **/etc/ovirt-hosted-engine/answers.conf**.



NOTE

SSH password authentication is not enabled by default on the RHV-M Virtual Appliance. You can enable SSH password authentication by accessing the Red Hat Virtualization Manager virtual machine through the SPICE or VNC console. Verify that the **sshd** service is running. Edit **/etc/ssh/sshd_config** and change the following two options to **yes**:

- **PasswordAuthentication**
- **PermitRootLogin**

Restart the **sshd** service for the changes to take effect.

8. Subscribing to the Required Entitlements

Subscribe the Manager virtual machine to the required entitlements. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* for more information.

2.2. DEPLOYING SELF-HOSTED ENGINE ON RED HAT VIRTUALIZATION HOST

On Red Hat Virtualization Host (RHVH), self-hosted engine deployment is performed through the Cockpit user interface. A UI version of the **hosted-engine** script assists with configuring the host and Manager virtual machine. The script asks you a series of questions, and configures your environment based on your answers.

Prerequisites

- You must have a freshly installed Red Hat Virtualization Host system. The **Performance Profile** in the **System** sub-tab of the Cockpit user interface must be set to **virtual-host**.
- You must have prepared storage for your self-hosted engine environment. At least two storage domains are required:
 - A shared storage domain dedicated to the Manager virtual machine. This domain is created during the self-hosted engine deployment, and must be at least 60 GB.
 - A data storage domain for regular virtual machine data. This domain must be added to the self-hosted engine environment after completing the deployment.

**WARNING**

Red Hat strongly recommends that you have additional active data storage domains available in the same data center as the self-hosted engine environment.

If you deploy the self-hosted engine in a data center with only one active data storage domain, and if that data storage domain is corrupted, you will be unable to add new data storage domains or to remove the corrupted data storage domain. You will have to redeploy the self-hosted engine.

If you are using an ISO storage domain, Red Hat recommends that the ISO domain not be within the hosted engine virtual machine.

For more information on preparing storage for your deployment, see the [Storage](#) chapter of the *Administration Guide*.

**IMPORTANT**

If you are using iSCSI storage, do not use the same iSCSI target for the shared storage domain and data storage domain.

- You must have a fully qualified domain name prepared for your Manager and the host. Forward and reverse lookup records must both be set in the DNS.
- To use the RHV-M Virtual Appliance for the Manager installation, one directory must be at least 5 GB. The **hosted-engine** script first checks if **/var/tmp** has enough space to extract the appliance files. If not, you can specify a different directory or mount external storage. The VDSM user and KVM group must have read, write, and execute permissions on the directory.

Procedure 2.3. Configuring a RHVH-based Self-Hosted Engine**1. Obtaining the RHV-M Virtual Appliance**

Download the RHV-M Virtual Appliance from the Customer Portal:

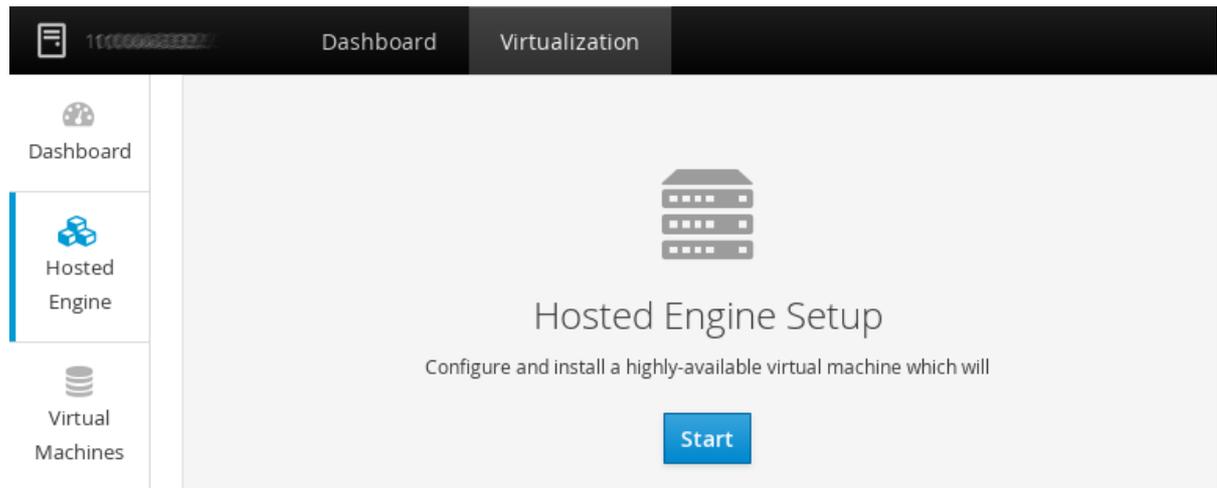
- Log in to the Customer Portal at <https://access.redhat.com>.
- Click **Downloads** in the menu bar.
- Click **Red Hat Virtualization > Download Latest** to access the product download page.
- Choose the appliance for the correct Red Hat Virtualization version and click **Download Now**.

Secure copy the OVA file to the Red Hat Virtualization Host:

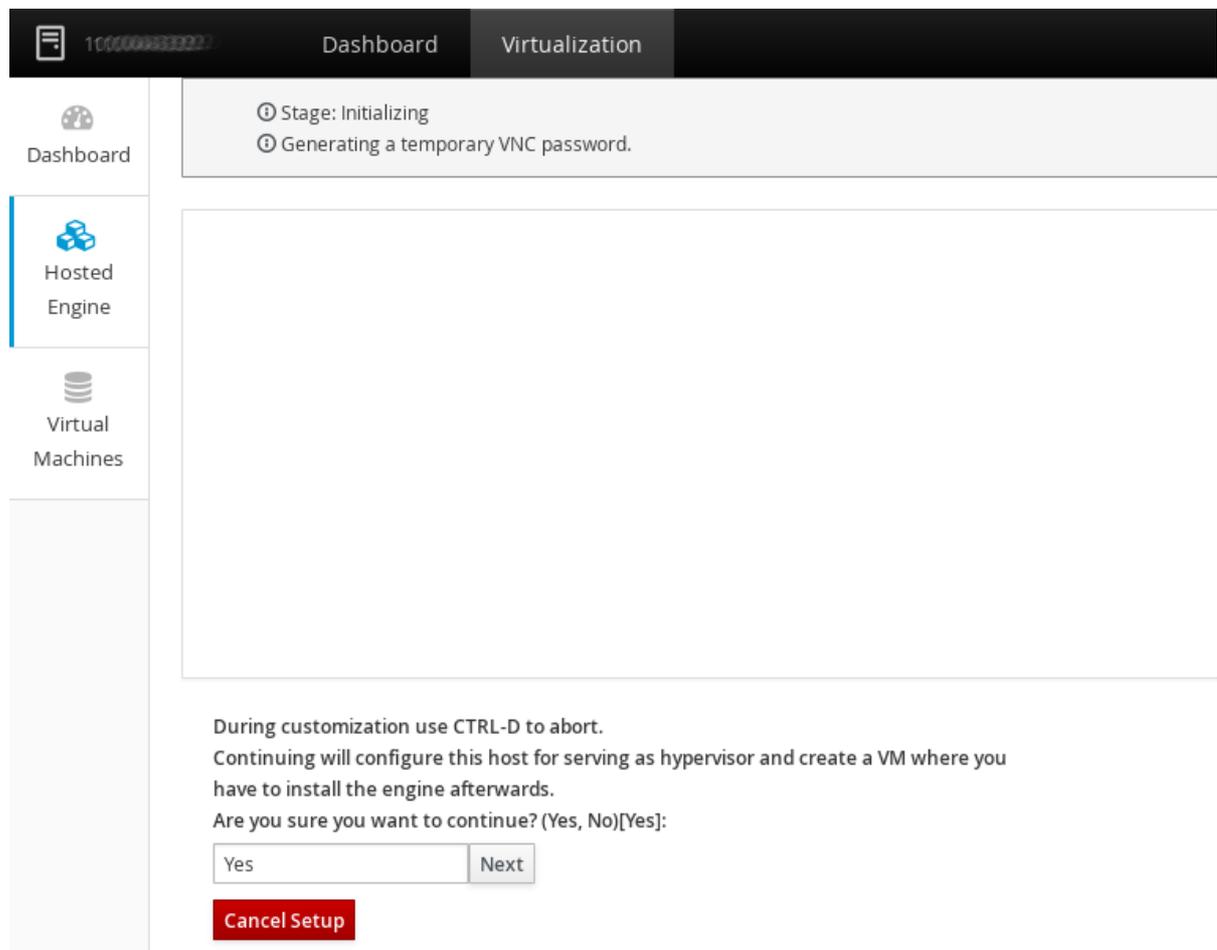
```
scp rhvm-appliance.ova root@host.example.com:/usr/share
```

2. Initiating Self-Hosted Engine Deployment

Log in to the Cockpit user interface at `https://HostIPorFQDN:9090` and navigate to **Virtualization > Hosted Engine**. Click **Start**.



The text fields in the deployment script are pre-populated with a default answer if one is available; change or enter your answers as necessary.



NOTE

In this procedure, the deployment questions are presented in text form. In the UI, click **Next** when prompted.

```

During customization use CTRL-D to abort.
Continuing will configure this host for serving as hypervisor and
create a VM where you have to install the engine afterwards.
Are you sure you want to continue? (Yes, No)[Yes]:

```

3. Configuring Storage

Select the type of storage to use.

```

Please specify the storage you would like to use (glusterfs, iscsi,
fc, nfs3, nfs4)[nfs3]:

```

- o For NFS storage types, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

```

Please specify the full shared storage connection path to use
(example: host:/path): storage.example.com:/hosted_engine/nfs

```

- o For iSCSI, specify the iSCSI portal IP address, port, user name and password, and select a target name from the auto-detected list. You can only select one iSCSI target during the deployment.

```

Please specify the iSCSI portal IP address:

```

```

Please specify the iSCSI portal port [3260]:

```

```

Please specify the iSCSI portal user:

```

```

Please specify the iSCSI portal password:

```

```

Please specify the target name (auto-detected values) [default]:

```

- o For Gluster storage, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

IMPORTANT

Only replica 3 Gluster storage is supported. Ensure the following configuration has been made:

- In the `/etc/glusterfs/glusterd.vol` file on all three Gluster servers, set `rpc-auth-allow-insecure` to `on`.

```
option rpc-auth-allow-insecure on
```

- Configure the volume as follows:

```
gluster volume set volume cluster.quorum-type auto
gluster volume set volume network.ping-timeout 10
gluster volume set volume auth.allow \*
gluster volume set volume group virt
gluster volume set volume storage.owner-uid 36
gluster volume set volume storage.owner-gid 36
gluster volume set volume server.allow-insecure on
```

Please specify the full shared storage connection path to use (example: `host:/path`):
`storage.example.com:/hosted_engine/gluster_volume`

- For Fibre Channel, the host bus adapters must be configured and connected, and the **hosted-engine** script will auto-detect the LUNs available. The LUNs must not contain any existing data.

```
The following luns have been found on the requested target:
[1]      3514f0c5447600351      30GiB  XtremIO XtremApp
          status: used, paths: 2 active

[2]      3514f0c5447600352      30GiB  XtremIO XtremApp
          status: used, paths: 2 active
```

Please select the destination LUN (1, 2) [1]:

4. Configuring the Network

The script checks your firewall configuration and offers to modify it for console (SPICE or VNC) access. It then detects possible network interface controllers (NICs) to use as a management bridge for the environment.

```
iptables was detected on your computer, do you wish setup to
configure it? (Yes, No)[Yes]: Yes
```

```
Please indicate a pingable gateway IP address [X.X.X.X]:
```

```
Please indicate a nic to set ovirtmgmt bridge on: (eth1, eth0)
[eth1]:
```

5. Configuring the Virtual Machine

Select **disk** for the boot device type, and then specify the path to the RHV-M Virtual Appliance. If the `/var/tmp` directory does not have enough space, specify a different directory. The VDSM user and KVM group must have read, write, and execute permissions on the directory.

```
Please specify the device to boot the VM from (choose disk for the
oVirt engine appliance) (cdrom, disk, pxe) [disk]: disk
```

```
Please specify the console type you would like to use to connect to
the VM (vnc, spice) [vnc]: vnc
```

```
Using an oVirt engine appliance could greatly speed-up ovirt hosted-
engine deploy.
```

```
You could get oVirt engine appliance installing ovirt-engine-
appliance rpm.
```

```
Please specify path to OVF archive you would like to use [None]:
/path/to/rhvm-appliance.ova
```

Specify **Yes** if you want cloud-init to take care of the initial configuration of the Manager virtual machine. Specify **Generate** for cloud-init to take care of tasks like setting the root password, configuring networking, configuring the host name, injecting an answers file for **engine-setup** to use, and running **engine-setup** on boot. Optionally, select **Existing** if you have an existing cloud-init script to take care of more sophisticated functions of cloud-init.



NOTE

For more information on cloud-init, see <https://cloudinit.readthedocs.org/en/latest/>.

```
Would you like to use cloud-init to customize the appliance on the
first boot (Yes, No)[Yes]? Yes
```

```
Would you like to generate on-fly a cloud-init ISO image (of no-cloud
type) or do you have an existing one (Generate, Existing)[Generate]?
Generate
```

```
Please provide the FQDN you would like to use for the engine
appliance.
```

```
Note: This will be the FQDN of the engine VM you are now going to
launch.
```

```
It should not point to the base host or to any other existing
machine.
```

```
Engine VM FQDN: (leave it empty to skip): manager.example.com
```

```
Automatically execute engine-setup on the engine appliance on first
boot (Yes, No)[Yes]? Yes
```

```
Automatically restart the engine VM as a monitored service after
engine-setup (Yes, No)[Yes]? Yes
```

```
Please provide the domain name you would like to use for the engine
appliance.
```

```
Engine VM domain: [localdomain] example.com
```

-

Enter root password that will be used for the engine appliance
(leave it empty to skip): *p@ssw0rd*

Confirm appliance root password: *p@ssw0rd*

The following CPU types are supported by this host:

- model_SandyBridge: Intel SandyBridge Family
- model_Westmere: Intel Westmere Family
- model_Nehalem: Intel Nehalem Family
- model_Penryn: Intel Penryn Family
- model_Conroe: Intel Conroe Family

Please specify the CPU type to be used by the VM

[model_SandyBridge]:

Please specify the number of virtual CPUs for the VM [Defaults to
appliance OVF value: [2]:

You may specify a unicast MAC address for the VM or accept a
randomly generated default [00:16:3e:77:b2:a4]:

Please specify the memory size of the VM in MB (Defaults to maximum
available): [12722]:

How should the engine VM network be configured (DHCP, Static)[DHCP]?
Static

Please enter the IP address to be used for the engine VM:
192.168.x.x

Please provide a comma-separated list (max 3) of IP addresses of
domain name servers for the engine VM
Engine VM DNS (leave it empty to skip):

Specify **Yes** to copy the **/etc/hosts** file from the host to the Manager virtual machine for host
name resolution.

Add lines for the appliance itself and for this host to **/etc/hosts**
on the engine VM?

Note: ensuring that this host could resolve the engine VM hostname
is still up to you (Yes, No)[No] *Yes*

6. Configuring the Self-Hosted Engine

Specify a name for the host to be identified in the Administration Portal, and the password for the
admin@internal user to access the Administration Portal. Provide the name and TCP port
number of the SMTP server, the email address used to send email notifications, and a comma-
separated list of email addresses to receive these notifications.

Enter engine admin password: *p@ssw0rd*

```
Confirm engine admin password: p@ssw0rd
```

```
Enter the name which will be used to identify this host inside the
Administrator Portal [hosted_engine_1]:
```

```
Please provide the name of the SMTP server through which we will
send notifications [localhost]:
```

```
Please provide the TCP port number of the SMTP server [25]:
```

```
Please provide the email address from which notifications will be
sent [root@localhost]:
```

```
Please provide a comma-separated list of email addresses which will
get notifications [root@localhost]:
```

7. Configuration Preview

Before proceeding, the **hosted-engine** script displays the configuration values you have entered, and prompts for confirmation to proceed with these values.

```
Please confirm installation settings (Yes, No)[Yes]: Yes
```

The script creates the Manager virtual machine, starts the **ovirt-engine** and high availability services, and connects the host and shared storage domain to the Manager virtual machine.

When the **hosted-engine** deployment script completes successfully, the Red Hat Virtualization Manager is configured and running on your host. The Manager has already configured the data center, cluster, host, the Manager virtual machine, and a shared storage domain dedicated to the Manager virtual machine.



IMPORTANT

Log in to the Administration Portal as the **admin@internal** user to continue configuring the Manager and add further resources. You must create another data domain for the data center to be initialized to host regular virtual machine data, and for the Manager virtual machine to be visible. See [Storage](#) in the *Administration Guide* for different storage options and on how to add a data storage domain.

Link your Red Hat Virtualization Manager to a directory server so you can add additional users to the environment. Red Hat Virtualization supports many directory server types; for example, Red Hat Directory Server (RHDS), Red Hat Identity Management (IdM), Active Directory, and many other types. Add a directory server to your environment using the **ovirt-engine-extension-aaa-ldap-setup** interactive setup script. For more information, see [Configuring an External LDAP Provider](#) in the *Administration Guide*.

The script also saves the answers you gave during configuration to a file, to help with disaster recovery. If a destination is not specified using the **--generate-answer=<file>** argument, the answer file is generated at **/etc/ovirt-hosted-engine/answers.conf**.

**NOTE**

SSH password authentication is not enabled by default on the RHV-M Virtual Appliance. You can enable SSH password authentication by accessing the Red Hat Virtualization Manager virtual machine through the SPICE or VNC console. Verify that the **sshd** service is running. Edit `/etc/ssh/sshd_config` and change the following two options to **yes**:

- **PasswordAuthentication**
- **PermitRootLogin**

Restart the **sshd** service for the changes to take effect.

8. Subscribing to the Required Entitlements

Subscribe the Manager virtual machine to the required entitlements. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* for more information.

2.3. ADMINISTERING THE MANAGER VIRTUAL MACHINE

The **hosted-engine** utility is provided to assist with administering the Manager virtual machine. It can be run on any self-hosted engine nodes in the environment. For all the options, run **hosted-engine - -help**. For additional information on a specific command, run **hosted-engine --command - -help**.

See [Section 3.1, “Troubleshooting the Manager Virtual Machine”](#) for more information.

CHAPTER 3. TROUBLESHOOTING A SELF-HOSTED ENGINE DEPLOYMENT

To confirm whether the self-hosted engine has already been deployed run `hosted-engine --check-deployed`. An error will only be displayed if the self-hosted engine has not been deployed.

3.1. TROUBLESHOOTING THE MANAGER VIRTUAL MACHINE

Procedure 3.1. Troubleshooting the Manager Virtual Machine

1. Check the status of the Manager virtual machine by running `hosted-engine --vm-status`.



NOTE

Any changes made to the Manager virtual machine will take about 20 seconds before they are reflected in the status command output.

If the Manager virtual machine is up and running as normal, you will see the following output:

```
--== Host 1 status ==--
Status up-to-date           : True
Hostname                    : hypervisor.example.com
Host ID                     : 1
Engine status               : {"health": "good",
"vm": "up", "detail": "up"}
Score                       : 3400
stopped                     : False
Local maintenance         : False
crc32                      : 99e57eba
Host timestamp              : 248542
```

2. If the **health** is bad or the **vm** is down, enable the global maintenance mode so that the hosts are no longer managed by the HA services.
 - o In the Administration Portal, right-click the Manager virtual machine, and select **Enable Global HA Maintenance**.
 - o You can also set the maintenance mode from the command line:

```
# hosted-engine --set-maintenance --mode=global
```

3. If the Manager virtual machine is down, start the Manager virtual machine. If the virtual machine is up, skip this step.

```
# hosted-engine ---vm-start
```

4. Set the console password:

```
# hosted-engine --add-console-password
```

5. Connect to the console. When prompted, enter the password set in the previous step. For more console options, see <https://access.redhat.com/solutions/2221461>.

```
# hosted-engine --console
```

6. Determine why the Manager virtual machine is down or in a bad health state. Check `/var/log/messages` and `/var/log/ovirt-engine/engine.log`. After fixing the issue, reboot the Manager virtual machine.
7. Log in to the Manager virtual machine as root and verify that the **ovirt-engine** service is up and running:

```
# systemctl status ovirt-engine.service
```

8. After ensuring the Manager virtual machine is up and running, close the console session and disable the maintenance mode to enable the HA services again:

```
# hosted-engine --set-maintenance --mode=none
```

Additional Troubleshooting Commands:



IMPORTANT

Contact the Red Hat Support Team if you feel you need to run any of these commands to troubleshoot your self-hosted engine environment.

- **hosted-engine --reinitialize-lockspace**: This command is used when the sanlock lockspace is broken. Ensure that the global maintenance mode is enabled and that the Manager virtual machine is stopped before reinitializing the sanlock lockspaces.
- **hosted-engine --clean-metadata**: Remove the metadata for a host's agent from the global status database. This makes all other hosts forget about this host. Ensure that the target host is down and that the global maintenance mode is enabled.
- **hosted-engine --check-liveliness**: This command checks the liveliness page of the ovirt-engine service. You can also check by connecting to `https://engine-fqdn/ovirt-engine/services/health/` in a web browser.
- **hosted-engine --connect-storage**: This command instructs VDSM to prepare all storage connections needed for the host and the Manager virtual machine. This is normally run in the back-end during the self-hosted engine deployment. Ensure that the global maintenance mode is enabled if you need to run this command to troubleshoot storage issues.

3.2. CLEANING UP A FAILED SELF-HOSTED ENGINE DEPLOYMENT

If a self-hosted engine deployment was interrupted, subsequent deployments will fail with the following error:

```
Failed to connect to broker, the number of errors has exceeded the limit.
```

See <https://access.redhat.com/solutions/2121581> for more information on how to clean up a failed deployment.

CHAPTER 4. MIGRATING FROM BARE METAL TO A RHEL-BASED SELF-HOSTED ENVIRONMENT

4.1. MIGRATING TO A SELF-HOSTED ENVIRONMENT

To migrate an existing instance of a standard Red Hat Virtualization to a self-hosted engine environment, use the **hosted-engine** script to assist with the task. The script asks you a series of questions, and configures your environment based on your answers. The Manager from the standard Red Hat Virtualization environment is referred to as the BareMetal-Manager in the following procedure.

The RHV-M Virtual Appliance shortens the process by reducing the required user interaction with the Manager virtual machine. However, although the appliance can automate **engine-setup** in a standard installation, in the migration process **engine-setup** must be run manually so that you can restore the BareMetal-Manager backup file on the new Manager virtual machine beforehand.

The migration involves the following key actions:

- Run the **hosted-engine** script to configure the host to be used as a self-hosted engine node and to create a new Red Hat Virtualization virtual machine.
- Back up the the engine database and configuration files using the **engine-backup** tool, copy the backup to the new Manager virtual machine, and restore the backup using the `--mode=restore` parameter of **engine-backup**. Run **engine-setup** to complete the Manager virtual machine configuration.
- Follow the **hosted-engine** script to complete the setup.

Prerequisites

- Prepare a new host with the `ovirt-hosted-engine-setup` package installed. See [Section 2.1, “Deploying Self-Hosted Engine on Red Hat Enterprise Linux Hosts”](#) for more information on subscriptions and package installation. The host must be a supported version of the current Red Hat Virtualization environment.



NOTE

If you intend to use an existing host, place the host in maintenance and remove it from the existing environment. See [Removing a Host](#) in the *Administration Guide* for more information.

- Prepare storage for your self-hosted engine environment. The self-hosted engine requires a shared storage domain dedicated to the Manager virtual machine. This domain is created during deployment, and must be at least 60 GB. For more information on preparing storage for your deployment, see the [Storage chapter](#) of the *Administration Guide*.



IMPORTANT

If you are using iSCSI storage, do not use the same iSCSI target for the shared storage domain and data storage domain.

- Obtain the RHV-M Virtual Appliance by installing the `rhev-m-appliance` package. The RHV-M Virtual Appliance is always based on the latest supported Manager version. Ensure the Manager

version in your current environment is updated to the latest supported Y-stream version as the Manager version needs to be the same for the migration.

- To use the RHV-M Virtual Appliance for the Manager installation, ensure one directory is at least 5 GB. The **hosted-engine** script first checks if `/var/tmp` has enough space to extract the appliance files. If not, you can specify a different directory or mount external storage. The VDSM user and KVM group must have read, write, and execute permissions on the directory.
- The fully qualified domain name of the new Manager must be the same fully qualified domain name as that of the BareMetal-Manager. Forward and reverse lookup records must both be set in DNS.
- You must have access and can make changes to the BareMetal-Manager.
- The virtual machine to which the BareMetal-Manager is being migrated must have the same amount of RAM as the physical machine from which the BareMetal-Manager is being migrated. If you must migrate to a virtual machine that has less RAM than the physical machine from which the BareMetal-Manager is migrated, see the following Red Hat Knowledgebase article: <https://access.redhat.com/articles/2705841>.

Procedure 4.1. Migrating to a Self-Hosted Environment

1. Initiating a Self-Hosted Engine Deployment



NOTE

If you are updating from version 3.5 or earlier, you must run the command **hosted-engine --deploy --config-append=/etc/ovirt-hosted-engine/answers.conf**. The file **answers.conf** must contain the parameter **OVEHOSTED_NETWORK/bridgeName=str:rhev**. Upgrading from version 3.5 to version 3.6 or later causes the default management network to be non-operational unless this parameter is set.

Run the **hosted-engine** script. To escape the script at any time, use the **CTRL+D** keyboard combination to abort deployment. It is recommended to use the **screen** window manager to run the script to avoid losing the session in case of network or terminal disruption. If not already installed, install the **screen** package, which is available in the standard Red Hat Enterprise Linux repository.

```
# yum install screen

# screen

# hosted-engine --deploy
```



NOTE

In the event of session timeout or connection disruption, run **screen -d -r** to recover the **hosted-engine** deployment session.

2. Configuring Storage

Select the type of storage to use.

During customization use CTRL-D to abort.

Please specify the storage you would like to use (glusterfs, iscsi, fc, nfs3, nfs4)[nfs3]:

- o For NFS storage types, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

Please specify the full shared storage connection path to use (example: host:/path): *storage.example.com:/hosted_engine/nfs*

- o For iSCSI, specify the iSCSI portal IP address, port, user name and password, and select a target name from the auto-detected list. You can only select one iSCSI target during the deployment.

Please specify the iSCSI portal IP address:

Please specify the iSCSI portal port [3260]:

Please specify the iSCSI portal user:

Please specify the iSCSI portal password:

Please specify the target name (*auto-detected values*) [*default*]:

- o For Gluster storage, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

IMPORTANT

Only replica 3 Gluster storage is supported. Ensure the following configuration has been made:

- In the `/etc/glusterfs/glusterd.vol` file on all three Gluster servers, set `rpc-auth-allow-insecure` to `on`.

```
option rpc-auth-allow-insecure on
```

- Configure the volume as follows:

```
gluster volume set volume cluster.quorum-type auto
gluster volume set volume network.ping-timeout 10
gluster volume set volume auth.allow \*
gluster volume set volume group virt
gluster volume set volume storage.owner-uid 36
gluster volume set volume storage.owner-gid 36
gluster volume set volume server.allow-insecure on
```

Please specify the full shared storage connection path to use (example: host:/path):

storage.example.com:/hosted_engine/gluster_volume

- o For Fibre Channel, the host bus adapters must be configured and connected, and the **hosted-engine** script will auto-detect the LUNs available. The LUNs must not contain any existing data.

The following luns have been found on the requested target:

```
[1]      3514f0c5447600351      30GiB  XtremIO XtremApp
        status: used, paths: 2 active

[2]      3514f0c5447600352      30GiB  XtremIO XtremApp
        status: used, paths: 2 active

Please select the destination LUN (1, 2) [1]:
```

3. Configuring the Network

The script detects possible network interface controllers (NICs) to use as a management bridge for the environment. It then checks your firewall configuration and offers to modify it for console (SPICE or VNC) access HostedEngine-VM. Provide a pingable gateway IP address, to be used by the **ovirt-ha-agent** to help determine a host's suitability for running HostedEngine-VM.

```
Please indicate a nic to set rhvm bridge on: (eth1, eth0) [eth1]:
iptables was detected on your computer, do you wish setup to
configure it? (Yes, No)[Yes]:
Please indicate a pingable gateway IP address [X.X.X.X]:
```

4. Configuring the Virtual Machine

The script creates a virtual machine to be configured as the Red Hat Virtualization Manager, referred to in this procedure as HostedEngine-VM. Select **disk** for the boot device type, and the script will automatically detect the RHV-M Appliances available. Select an appliance.

```
Please specify the device to boot the VM from (choose disk
for the oVirt engine appliance)
(cdrom, disk, pxe) [disk]:
Please specify the console type you would like to use to
connect to the VM (vnc, spice) [vnc]: vnc
[ INFO ] Detecting available oVirt engine appliances
The following appliance have been found on your system:
    [1] - The oVirt Engine Appliance image (OVA)
    [2] - Directly select an OVA file
Please select an appliance (1, 2) [1]:
[ INFO ] Checking OVF archive content (could take a few minutes
depending on archive size)
```

Specify **Yes** if you want cloud-init to take care of the initial configuration of the Manager virtual machine. Specify **Generate** for cloud-init to take care of tasks like setting the root password, configuring networking, and configuring the host name. Optionally, select **Existing** if you have an existing cloud-init script to take care of more sophisticated functions of cloud-init. Specify the FQDN for the Manager virtual machine. This must be the same FQDN provided for the BareMetal-Manager.



NOTE

For more information on cloud-init, see <https://cloudinit.readthedocs.org/en/latest/>.

```
Would you like to use cloud-init to customize the appliance on the
first boot (Yes, No)[Yes]? Yes
Would you like to generate on-fly a cloud-init no-cloud ISO image or
do you have an existing one(Generate, Existing)[Generate]? Generate
Please provide the FQDN you would like to use for the engine
```

appliance.

Note: This will be the FQDN of the engine VM you are now going to launch.

It should not point to the base host or to any other existing machine.

Engine VM FQDN: (leave it empty to skip): *manager.example.com*

You must answer **No** to the following question so that you can restore the BareMetal-Manager backup file on HostedEngine-VM before running **engine-setup**.

Automatically execute engine-setup on the engine appliance on first boot (Yes, No)[Yes]? *No*

Configure the Manager domain name, root password, networking, hardware, and console access details.

Enter root password that will be used for the engine appliance (leave it empty to skip): *p@ssw0rd*

Confirm appliance root password: *p@ssw0rd*

The following CPU types are supported by this host:

- model_Penryn: Intel Penryn Family
- model_Conroe: Intel Conroe Family

Please specify the CPU type to be used by the VM [model_Penryn]:

Please specify the number of virtual CPUs for the VM [Defaults to appliance OVF value: 4]:

You may specify a MAC address for the VM or accept a randomly generated default [00:16:3e:77:b2:a4]:

How should the engine VM network be configured (DHCP, Static)[DHCP]? *Static*

Please enter the IP address to be used for the engine VM:

192.168.x.x

Please provide a comma-separated list (max3) of IP addresses of domain name servers for the engine VM

Engine VM DNS (leave it empty to skip):

Add lines for the appliance itself and for this host to /etc/hosts on the engine VM?

Note: ensuring that this host could resolve the engine VM hostname is still up to you (Yes, No)[No] *Yes*

5. Configuring the Self-Hosted Engine

Specify the name for Host-HE1 to be identified in the Red Hat Virtualization environment, and the password for the **admin@internal** user to access the Administration Portal. Finally, provide the name and TCP port number of the SMTP server, the email address used to send email notifications, and a comma-separated list of email addresses to receive these notifications.

Enter engine admin password: *p@ssw0rd*

Confirm engine admin password: *p@ssw0rd*

Enter the name which will be used to identify this host inside the Administrator Portal [hosted_engine_1]:

Please provide the FQDN for the engine you would like to use.

This needs to match the FQDN that you will use for the engine installation within the VM.

Note: This will be the FQDN of the VM you are now going to create,

it should not point to the base host or to any other

existing machine.

Engine FQDN: []: *manager.example.com*

Please provide the name of the SMTP server through which we will send notifications [localhost]:

Please provide the TCP port number of the SMTP server [25]:

Please provide the email address from which notifications will be sent [root@localhost]:

Please provide a comma-separated list of email addresses which will get notifications [root@localhost]:

6. Configuration Preview

Before proceeding, the **hosted-engine** script displays the configuration values you have entered, and prompts for confirmation to proceed with these values.

```

Bridge interface           : eth1
Engine FQDN                : manager.example.com
Bridge name                : ovirtmgmt
Host address               : host.example.com
SSH daemon port           : 22
Firewall manager           : iptables
Gateway address            : X.X.X.X
Host name for web application : Host-HE1
Host ID                    : 1
Image size GB              : 50
Storage connection         :
storage.example.com:/hosted_engine/nfs
Console type               : vnc
Memory size MB             : 4096
MAC address                 : 00:16:3e:77:b2:a4
Boot type                   : pxe
Number of CPUs              : 2
CPU Type                    : model_Penryn

```

Please confirm installation settings (Yes, No)[Yes]:

7. Creating HostedEngine-VM

The script creates the virtual machine to be configured as HostedEngine-VM and provides connection details. You must manually run **engine-setup** after restoring the backup file on HostedEngine-VM before the **hosted-engine** script can proceed on Host-HE1.

```

[ INFO ] Stage: Transaction setup
...
[ INFO ] Creating VM
        You can now connect to the VM with the following command:
                /bin/remote-viewer vnc://localhost:5900
        Use temporary password "3463VnKn" to connect to vnc
console.
        Please note that in order to use remote-viewer you need to
be able to run graphical applications.
        This means that if you are using ssh you have to supply
the -Y flag (enables trusted X11 forwarding).
        Otherwise you can run the command from a terminal in your
preferred desktop environment.
        If you cannot run graphical applications you can connect
to the graphic console from another host or connect to the serial

```

console using the following command:

```
socat UNIX-CONNECT:/var/run/ovirt-vmconsole-
console/8f74b589-8c6f-4a32-9adf-6e615b69de07.sock,user=ovirt-
vmconsole STDIO,raw,echo=0,escape=1
```

Please ensure that your Guest OS is properly configured to support serial console according to your distro documentation.

Follow

http://www.ovirt.org/Serial_Console_Setup#I_need_to_access_the_console_the_old_way for more info.

If you need to reboot the VM you will need to start it manually using the command:

```
hosted-engine --vm-start
```

You can then set a temporary password using the command:

```
hosted-engine --add-console-password
```

Please install and setup the engine in the VM.

You may also be interested in subscribing to "agent" RHN/Satellite channel and installing `rhev-guest-agent-common` package in the VM.

The VM has been rebooted.

To continue please install `oVirt-Engine` in the VM

(Follow http://www.ovirt.org/Quick_Start_Guide for more info).

Make a selection from the options below:

(1) Continue setup - `oVirt-Engine` installation is ready and `ovirt-engine` service is up

(2) Abort setup

(3) Power off and restart the VM

(4) Destroy VM and abort setup

(1, 2, 3, 4)[1]:

Connect to the virtual machine using the VNC protocol with the following command. Replace `FQDN` with the fully qualified domain name or the IP address of the self-hosted engine node.

```
# /bin/remote-viewer vnc://FQDN:5900
```

8. Enabling SSH on HostedEngine-VM

SSH password authentication is not enabled by default on the RHV-M Virtual Appliance.

Connect to `HostedEngine-VM` via VNC and enable SSH password authentication so that you can access the virtual machine via SSH later to restore the `BareMetal-Manager` backup file and configure the new Manager. Verify that the `sshd` service is running. Edit `/etc/ssh/sshd_config` and change the following two options to **yes**:

```
[...]
PermitRootLogin yes
[...]
PasswordAuthentication yes
```

Restart the `sshd` service for the changes to take effect.

```
# systemctl restart sshd.service
```

9. Disabling BareMetal-Manager

Connect to BareMetal-Manager, the Manager of your established Red Hat Virtualization environment, and stop the **ovirt-engine** service and prevent it from running.

```
# systemctl stop ovirt-engine.service
# systemctl disable ovirt-engine.service
```



NOTE

Though stopping BareMetal-Manager from running is not obligatory, it is recommended as it ensures no changes are made to the environment after the backup is created. Additionally, it prevents BareMetal-Manager and HostedEngine-VM from simultaneously managing existing resources.

10. Updating DNS

Update your DNS so that the FQDN of the Red Hat Virtualization environment correlates to the IP address of HostedEngine-VM and the FQDN previously provided when configuring the **hosted-engine** deployment script on Host-HE1. In this procedure, FQDN was set as *manager.example.com* because in a migrated hosted-engine setup, the FQDN provided for the engine must be identical to that given in the engine setup of the original engine.

11. Creating a Backup of BareMetal-Manager

Connect to BareMetal-Manager and run the **engine-backup** command with the **--mode=backup**, **--file=FILE**, and **--log=LogFILE** parameters to specify the backup mode, the name of the backup file created and used for the backup, and the name of the log file to be created to store the backup log.

```
# engine-backup --mode=backup --file=FILE --log=LogFILE
```

12. Copying the Backup File to HostedEngine-VM

On BareMetal-Manager, secure copy the backup file to HostedEngine-VM. In the following example, *manager.example.com* is the FQDN for HostedEngine-VM, and */backup/* is any designated folder or path. If the designated folder or path does not exist, you must connect to HostedEngine-VM and create it before secure copying the backup from BareMetal-Manager.

```
# scp -p FILE LogFILE manager.example.com:/backup/
```

13. Registering HostedEngine-VM

Register HostedEngine-VM with Red Hat Subscription Management and enable the required repositories. See [Subscribing to the Required Entitlements](#) in the *Installation Guide*.

14. Restoring the Backup File on HostedEngine-VM

Use the **engine-backup** tool to restore a complete backup. If you configured the BareMetal-Manager database(s) manually during **engine-setup**, follow the instructions at [Section 6.2.3, “Restoring the Self-Hosted Engine Manager Manually”](#) to restore the backup environment manually.

- o If you are only restoring the Manager, run:

```
# engine-backup --mode=restore --file=file_name --
log=log_file_name --provision-db --restore-permissions
```

- o If you are restoring the Manager and Data Warehouse, run:

```
# engine-backup --mode=restore --file=file_name --
log=log_file_name --provision-db --provision-dwh-db --restore-
permissions
```

If successful, the following output displays:

```
You should now run engine-setup.
Done.
```

15. Configuring HostedEngine-VM

Configure the restored Manager virtual machine. This process identifies the existing configuration settings and database content. Confirm the settings. Upon completion, the setup provides an SSH fingerprint and an internal Certificate Authority hash.

```
# engine-setup
```

```
[ INFO ] Stage: Initializing
[ INFO ] Stage: Environment setup
Configuration files: ['/etc/ovirt-engine-setup.conf.d/10-
packaging.conf', '/etc/ovirt-engine-setup.conf.d/20-setup-ovirt-
post.conf']
Log file: /var/log/ovirt-engine/setup/ovirt-engine-setup-
20140304075238.log
Version: otopi-1.1.2 (otopi-1.1.2-1.el6ev)
[ INFO ] Stage: Environment packages setup
[ INFO ] Yum Downloading: rhel-65-zstream/primary_db 2.8 M(70%)
[ INFO ] Stage: Programs detection
[ INFO ] Stage: Environment setup
[ INFO ] Stage: Environment customization
```

```
--== PACKAGES ==--
```

```
[ INFO ] Checking for product updates...
[ INFO ] No product updates found
```

```
--== NETWORK CONFIGURATION ==--
```

Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current settings.

Do you want Setup to configure the firewall? (Yes, No) [Yes]:

```
[ INFO ] iptables will be configured as firewall manager.
```

```
--== DATABASE CONFIGURATION ==--
```

```
--== OVIRT ENGINE CONFIGURATION ==--
```

```
--== PKI CONFIGURATION ==--
```

```

--== APACHE CONFIGURATION ==--

--== SYSTEM CONFIGURATION ==--

--== END OF CONFIGURATION ==--

[ INFO ] Stage: Setup validation
[ INFO ] Cleaning stale zombie tasks

--== CONFIGURATION PREVIEW ==--

Default SAN wipe after delete      : False
Firewall manager                    : iptables
Update Firewall                     : True
Host FQDN                           :
manager.example.com
Engine database secured connection  : False
Engine database host                 : X.X.X.X
Engine database user name            : engine
Engine database name                  : engine
Engine database port                  : 5432
Engine database host name validation : False
Engine installation                  : True
PKI organization                     : example.com
NFS mount point                      :
/var/lib/exports/iso
Configure VMConsole Proxy            : True
Engine Host FQDN                     :
manager.example.com
Configure WebSocket Proxy             : True

Please confirm installation settings (OK, Cancel) [OK]:

```

16. Synchronizing the Host and the Manager

Return to Host-HE1 and continue the **hosted-engine** deployment script by selecting option 1:

```
(1) Continue setup - oVirt-Engine installation is ready and oVirt-
engine service is up
```

The script displays the internal Certificate Authority hash, and prompts you to select the cluster to which to add Host-HE1.

```

[ INFO ] Engine replied: DB Up!Welcome to Health Status!
[ INFO ] Acquiring internal CA cert from the engine
[ INFO ] The following CA certificate is going to be used, please
immediately interrupt if not correct:
[ INFO ] Issuer: C=US, O=example.com, CN=manager.example.com.23240,
Subject: C=US, O=example.com, CN=manager.example.com.23240,
Fingerprint (SHA-1): XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
[ INFO ] Connecting to the Engine
Enter the name of the cluster to which you want to add the
host (DB1, DB2, Default) [Default]:
[ INFO ] Waiting for the host to become operational in the engine.

```

```
This may take several minutes...
```

```
[ INFO ] The VDSM Host is now operational
```

```
[ INFO ] Saving hosted-engine configuration on the shared storage domain
```

```
        Please shutdown the VM allowing the system to launch it as a monitored service.
```

```
        The system will wait until the VM is down.
```

17. Shutting Down HostedEngine-VM

Shut down HostedEngine-VM.

```
# shutdown -h now
```

18. Setup Confirmation

Return to Host-HE1 to confirm it has detected that HostedEngine-VM is down.

```
[ INFO ] Enabling and starting HA services
```

```
[ INFO ] Stage: Clean up
```

```
[ INFO ] Generating answer file '/var/lib/ovirt-hosted-engine-setup/answers/answers-20160509162843.conf'
```

```
[ INFO ] Generating answer file '/etc/ovirt-hosted-engine/answers.conf'
```

```
[ INFO ] Stage: Pre-termination
```

```
[ INFO ] Stage: Termination
```

```
[ INFO ] Hosted Engine successfully set up
```

Your Red Hat Virtualization engine has been migrated to a self-hosted engine setup. The Manager is now operating on a virtual machine on Host-HE1, called HostedEngine-VM in the environment. As HostedEngine-VM is highly available, it is migrated to other self-hosted engine nodes in the environment when applicable.

CHAPTER 5. MAINTENANCE AND UPGRADING RESOURCES

5.1. MAINTAINING THE SELF-HOSTED ENGINE

The maintenance modes enable you to start, stop, and modify the Manager virtual machine without interference from the high-availability agents, and to restart and modify the self-hosted engine nodes in the environment without interfering with the Manager.

There are three maintenance modes that can be enforced:

- **global** - All high-availability agents in the cluster are disabled from monitoring the state of the Manager virtual machine. The global maintenance mode must be applied for any setup or upgrade operations that require the **ovirt-engine** service to be stopped, such as upgrading to a later version of Red Hat Virtualization.
- **local** - The high-availability agent on the node issuing the command is disabled from monitoring the state of the Manager virtual machine. The node is exempt from hosting the Manager virtual machine while in local maintenance mode; if hosting the Manager virtual machine when placed into this mode, the Manager will migrate to another node, provided there is one available. The local maintenance mode is recommended when applying system changes or updates to a self-hosted engine node.
- **none** - Disables maintenance mode, ensuring that the high-availability agents are operating.

Procedure 5.1. Maintaining a RHEL-Based Self-Hosted Engine (Local Maintenance)

1. Place a self-hosted engine node into the local maintenance mode:
 - In the Administration Portal, select a self-hosted engine node and click **Maintenance**. The local maintenance mode is automatically triggered for that node.
 - You can also set the maintenance mode from the command line:

```
# hosted-engine --set-maintenance --mode=local
```

2. After you have completed any maintenance tasks, disable the maintenance mode:

```
# hosted-engine --set-maintenance --mode=none
```

Procedure 5.2. Maintaining a RHEL-Based Self-Hosted Engine (Global Maintenance)

1. Place a self-hosted engine node into the global maintenance mode:
 - In the Administration Portal, right-click the Manager virtual machine, and select **Enable Global HA Maintenance**.
 - You can also set the maintenance mode from the command line:

```
# hosted-engine --set-maintenance --mode=global
```

2. After you have completed any maintenance tasks, disable the maintenance mode:

```
# hosted-engine --set-maintenance --mode=none
```

5.2. REMOVING A HOST FROM A SELF-HOSTED ENGINE ENVIRONMENT

To remove a self-hosted engine node from your environment, place the node into maintenance mode, undeploy the node, and optionally remove it. The node can be managed as a regular host after the HA services have been stopped, and the self-hosted engine configuration files have been removed.

Procedure 5.3. Removing a Host from a Self-Hosted Engine Environment

1. In the Administration Portal, click the **Hosts** tab. Select the self-hosted engine node and click **Maintenance** to set it to the local maintenance mode.
2. Click **Edit**.
3. Click the **Hosted Engine** sub-tab and select the **Undeploy** radio button. This action stops the `ovirt-ha-agent` and `ovirt-ha-broker` services and removes the self-hosted engine configuration file.



NOTE

The host will be visible, but shown as unavailable when running `hosted-engine --vm-status`. This is because the metadata is not removed when a host is undeployed. The removed host will disappear in approximately a week when the metadata is not refreshed. To force the removal of the host's metadata follow the procedure in [How to clean the metadata of redeployed Hosts in a Hosted Engine setup](#).

4. Optionally, click **Remove** to open the **Remove Host(s)** confirmation window, and click **OK**.

5.3. UPGRADING A RHEL-BASED SELF-HOSTED ENGINE ENVIRONMENT

A Red Hat Enterprise Virtualization 3.6 self-hosted engine environment can be upgraded to Red Hat Virtualization 4.0. An upgrade utility that is provided with Red Hat Virtualization 4.0 will install Red Hat Enterprise Linux 7 on the Manager virtual machine and restore a backup of the 3.6 Manager database on the new Manager. After the Manager is upgraded to 4.0 you can update the self-hosted engine nodes, and any standard hosts, to 4.0.



IMPORTANT

The upgrade utility builds a new Manager based on a template. Manual changes or custom configuration to the original Manager such as custom users, SSH keys, and monitoring will need to be reapplied manually on the new Manager.



NOTE

An in-place upgrade of the Manager virtual machine to Red Hat Enterprise Linux 7 is not supported.



IMPORTANT

The following procedure is only for upgrading a Red Hat Enterprise Virtualization 3.6 self-hosted engine environment running on Red Hat Enterprise Linux 7 hosts. All data centers and clusters in the environment must have the cluster compatibility level set to version 3.6 before attempting the procedure.



NOTE

The upgrade must occur on the host that is currently running the Manager virtual machine and is set as the SPM server. The upgrade utility will check for this.

The upgrade process involves the following key steps:

- Place the high-availability agents that manage the Manager virtual machine into the global maintenance mode.
- Enable the required repositories on the host and update the `ovirt-hosted-engine-setup` and `rhev-appliance` packages.
- Run `hosted-engine --upgrade-appliance` to upgrade the Manager virtual machine. During the upgrade you will be asked to create a backup of the 3.6 Manager and copy it to the host machine where the upgrade is being performed.
- Update the hosts.
- After the Manager virtual machine and all hosts in the cluster have been updated, change the cluster compatibility version to 4.0.

The backup created during the upgrade procedure is not automatically deleted. You need to manually delete it after confirming the upgrade has been successful. The backup disks are labeled with **hosted-engine-backup-***.

Prerequisites

- The `/var/tmp` directory must have at least 5 GB of free space to extract the appliance files. If it does not, you can specify a different directory or mount alternate storage that does have the required space. The VDSM user and KVM group must have read, write, and execute permissions on the directory.
- The self-hosted engine storage domain must have additional free space for the new appliance being deployed (50 GB by default). To increase the storage on iSCSI or Fibre Channel storage, you must manually extend the LUN size on the storage and then extend the storage domain using the Manager. See [Increasing iSCSI or FCP Storage](#) in the *Administration Guide* for more information about resizing a LUN.

Procedure 5.4. Upgrading the Self-Hosted Engine

1. Disable the high-availability agents on all the self-hosted engine nodes. To do this run the following command on any host in the cluster.

```
# hosted-engine --set-maintenance --mode=global
```

**NOTE**

Run **hosted-engine --vm-status** to confirm that the environment is in maintenance mode.

2. On the host that is currently set as SPM and contains the Manager virtual machine, enable the required repository.

```
# subscription-manager repos --enable=rhel-7-server-rhv-4-mgmt-agent-rpms
```

3. Migrate all virtual machines except the Manager virtual machine to alternate hosts.
4. On the host, update the Manager virtual machine packages.

```
# yum update ovirt-hosted-engine-setup rhevm-appliance
```

If the `rhevm-appliance` package is missing, install it manually before updating `ovirt-hosted-engine-setup`.

```
# yum install rhevm-appliance
```

```
# yum update ovirt-hosted-engine-setup
```

5. Run the upgrade utility to upgrade the Manager virtual machine. If not already installed, install the `screen` package, which is available in the standard Red Hat Enterprise Linux repository.

```
# yum install screen
```

```
# screen
```

```
# hosted-engine --upgrade-appliance
```

**NOTE**

You will be prompted to select the appliance if more than one is detected, and to create a backup of the Manager database and provide its full location.

6. After the upgrade is complete, disable global maintenance:

```
# hosted-engine --set-maintenance --mode=none
```

If anything went wrong during the upgrade, power off the Manager by using the **hosted-engine --vm-poweroff** command, then rollback the upgrade by running **hosted-engine --rollback-upgrade**.

To upgrade the hosts in the self-hosted engine environment, see [Section 5.5, “Upgrading Hosts in a Self-Hosted Engine Environment”](#).

5.4. UPGRADING A RHEV-H-BASED SELF-HOSTED ENGINE ENVIRONMENT

Upgrading a RHEV-H-based self-hosted engine environment from RHEV 3.6 to RHV 4.0 requires that you install the latest Red Hat Virtualization Host (RHVH) 4.0 and upgrade to Red Hat Virtualization Manager (RHV-M) 4.0. An upgrade utility that is provided with Red Hat Virtualization 4.0 will install Red Hat Enterprise Linux 7 on the Manager virtual machine and restore a backup of the 3.6 Manager database on the new Manager.



IMPORTANT

The upgrade utility builds a new Manager based on a template. Manual changes or custom configuration to the original Manager such as custom users, SSH keys, and monitoring will need to be reapplied manually on the new Manager.



IMPORTANT

All data centers and clusters in the environment must have the cluster compatibility level set to version 3.6 before attempting the procedure.

The upgrade process involves the following key steps:

- Place the high-availability agents that manage the Manager virtual machine into the global maintenance mode.
- Add a new RHVH 4.0 host to your environment.
- Migrate the Manager virtual machine to the new host and set as SPM.
- Run the upgrade utility to upgrade the Manager. During the upgrade procedure you will be asked to create a backup of the 3.6 Manager and copy it to the host machine where the upgrade is being performed.
- Update the hosts.
- After the Manager virtual machine and all hosts in the cluster have been updated, change the cluster compatibility version to 4.0.

The backup created during the upgrade procedure is not automatically deleted. You need to manually delete it after confirming the upgrade has been successful. The backup disks are labeled with **hosted-engine-backup-***.

Prerequisites

- The `/var/tmp` directory must have at least 5 GB of free space to extract the appliance files. If it does not, you can specify a different directory or mount alternate storage that has the required space. The VDSM user and KVM group must have read, write, and execute permissions on the directory.
- The self-hosted engine storage domain must have additional free space for the new appliance being deployed (50 GB by default). To increase the storage on iSCSI or Fibre Channel storage, you must manually extend the LUN size on the storage and then extend the storage domain using the Manager. See [Increasing iSCSI or FCP Storage](#) in the *Administration Guide* for more information about resizing a LUN.

Procedure 5.5. Upgrading the Self-Hosted Engine

1. Install a new RHVH 4.0 host. See the [Installation Guide](#) for instructions to install RHVH.
2. Add the new host to your environment. Run the deployment script on the new host:

```
# hosted-engine --deploy
```

Specify the existing shared storage domain when prompted; the script then detects that this is an additional host setup. See [Installing Additional Hosts to a Self-Hosted Environment](#) in the *Red Hat Enterprise Virtualization 3.6 Self-Hosted Engine Guide* for more details about the questions asked by the script during an additional host deployment.

3. Disable the high-availability agents on all the self-hosted engine nodes. To do this run the following command on any host in the cluster.

```
# hosted-engine --set-maintenance --mode=global
```

**NOTE**

Run **hosted-engine --vm-status** to confirm that the environment is in maintenance mode.

4. Download the RHV-M Virtual Appliance from the Customer Portal and copy it to the new host:
 - a. Log in to the Customer Portal at <https://access.redhat.com>.
 - b. Click **Downloads** in the menu bar.
 - c. Click **Red Hat Virtualization > Download Latest** to access the product download page.
 - d. Choose the appliance for Red Hat Virtualization 4.0 and click **Download Now**.

Secure copy the OVA file to the Red Hat Virtualization Host:

```
scp rhvm-appliance.ova root@host.example.com:/usr/share
```

5. Migrate the Manager virtual machine to the RHVH 4.0 host and set the host as the Storage Pool Manager (SPM).
6. Run the upgrade script to upgrade the Manager virtual machine. If not already installed, install the screen package.

```
# yum install screen
```

```
# screen
```

```
# hosted-engine --upgrade-appliance
```

**NOTE**

The script will ask for the location of the RHV-M Virtual Appliance you copied to the host. It will also prompt you to create a backup of the Manager database and provide its full location.

7. After the upgrade is complete, disable global maintenance:

```
# hosted-engine --set-maintenance --mode=none
```

If anything went wrong during the upgrade, power off the Manager by using the **hosted-engine --vm-poweroff** command, then rollback the upgrade by running **hosted-engine --rollback-upgrade**.

To upgrade the hosts in the self-hosted engine environment, see [Section 5.5, “Upgrading Hosts in a Self-Hosted Engine Environment”](#).

5.5. UPGRADING HOSTS IN A SELF-HOSTED ENGINE ENVIRONMENT

Before updating the Red Hat Enterprise Linux hosts in the environment, disable the version 3.6 repository and enable the required 4.0 repository by running the following commands on the host you wish to update.

```
# subscription-manager repos --disable=rhel-7-server-rhev-mgmt-agent-rpms
```

```
# subscription-manager repos --enable=rhel-7-server-rhv-4-mgmt-agent-rpms
```

You may now update the Red Hat Enterprise Linux hosts in the environment. See [Updating Hosts in the Upgrade Guide](#) for more information.

RHEV-H hosts must be reinstalled with RHVH 4.0. See [Red Hat Virtualization Hosts](#) in the *Installation Guide*.

After the hosts have been updated, update the data center and cluster compatibility level to 4.0. See [Post-Upgrade Tasks](#) in the *Upgrade Guide* for more information.

5.6. UPDATING THE SELF-HOSTED ENGINE MANAGER BETWEEN MINOR RELEASES

Updating a self-hosted engine to a minor release requires placing the machine in global maintenance mode and then following the standard procedures for updating between minor versions.

1. Ensure you have subscribed the Manager virtual machine to the required entitlements. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* for more information.
2. Place the system in global maintenance mode. See [Section 5.1, “Maintaining the Self-Hosted Engine”](#) for details.
3. Follow the procedures for updating between minor versions using **engine-setup**. See [Updates Between Minor Releases](#) in the *Installation Guide* for details.
4. Disable global maintenance mode. See [Section 5.1, “Maintaining the Self-Hosted Engine”](#) for details.

CHAPTER 6. BACKING UP AND RESTORING A RHEL-BASED SELF-HOSTED ENVIRONMENT

The nature of the self-hosted engine, and the relationship between the self-hosted engine nodes and the Manager virtual machine, means that backing up and restoring a self-hosted engine environment requires additional considerations to that of a standard Red Hat Virtualization environment. In particular, the self-hosted engine nodes remain in the environment at the time of backup, which can result in a failure to synchronize the new node and Manager virtual machine after the environment has been restored.

To address this, Red Hat recommends that one of the nodes be placed into maintenance mode prior to backup, thereby freeing it from a virtual load. This failover host can then be used to deploy the new self-hosted engine.

If a self-hosted engine node is carrying a virtual load at the time of backup, then a host with any of the matching identifiers - IP address, FQDN, or name - cannot be used to deploy a restored self-hosted engine. Conflicts in the database will prevent the host from synchronizing with the restored Manager virtual machine. The failover host, however, can be removed from the restored Manager virtual machine prior to synchronization.



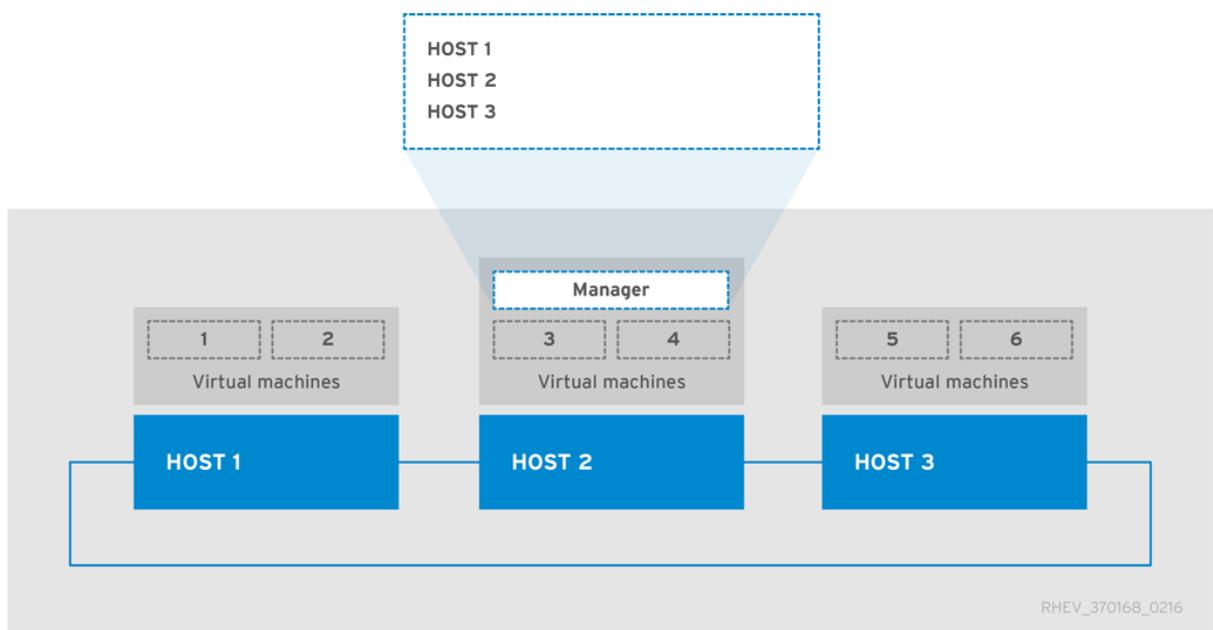
NOTE

A failover host at the time of backup is not strictly necessary if a new host is used to deploy the self-hosted engine. The new host must have a unique IP address, FQDN, and name so that it does not conflict with any of the hosts present in the database backup.

Procedure 6.1. Workflow for Backing Up the Self-Hosted Engine Environment

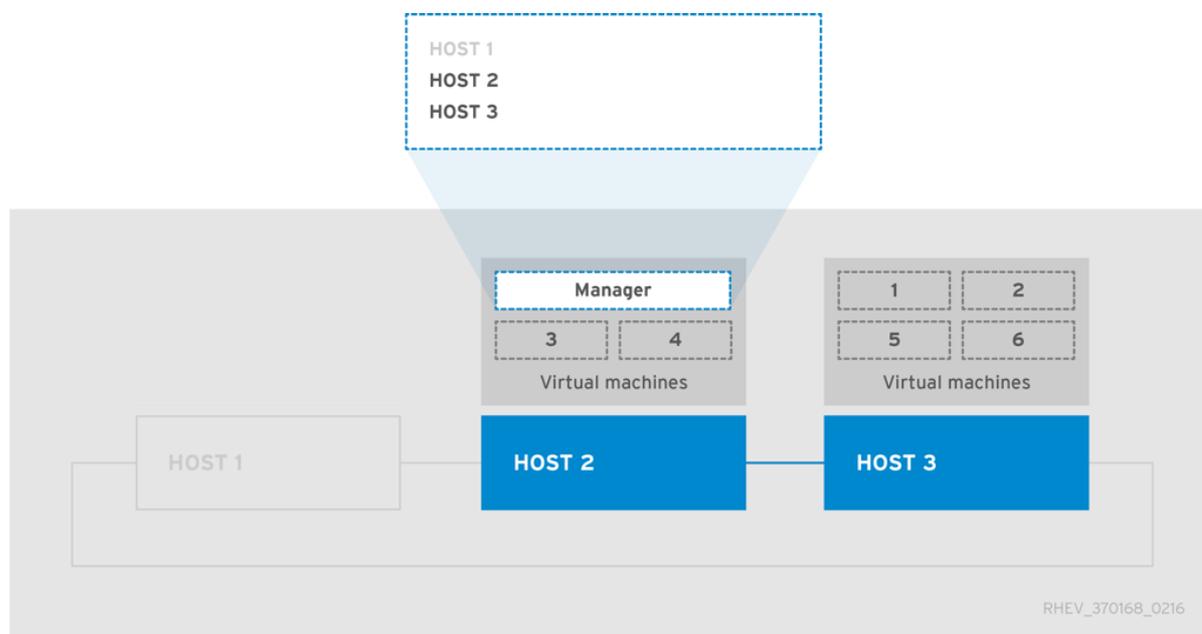
This procedure provides an example of the workflow for backing up a self-hosted engine using a failover host. This host can then be used later to deploy the restored self-hosted engine environment. For more information on backing up the self-hosted engine, see [Section 6.1, “Backing up the Self-Hosted Engine Manager Virtual Machine”](#).

1. The Manager virtual machine is running on **Host 2** and the six regular virtual machines in the environment are balanced across the three hosts.



Place **Host 1** into maintenance mode. This will migrate the virtual machines on **Host 1** to the other hosts, freeing it of any virtual load and enabling it to be used as a failover host for the backup.

2. **Host 1** is in maintenance mode. The two virtual machines it previously hosted have been migrated to Host 3.

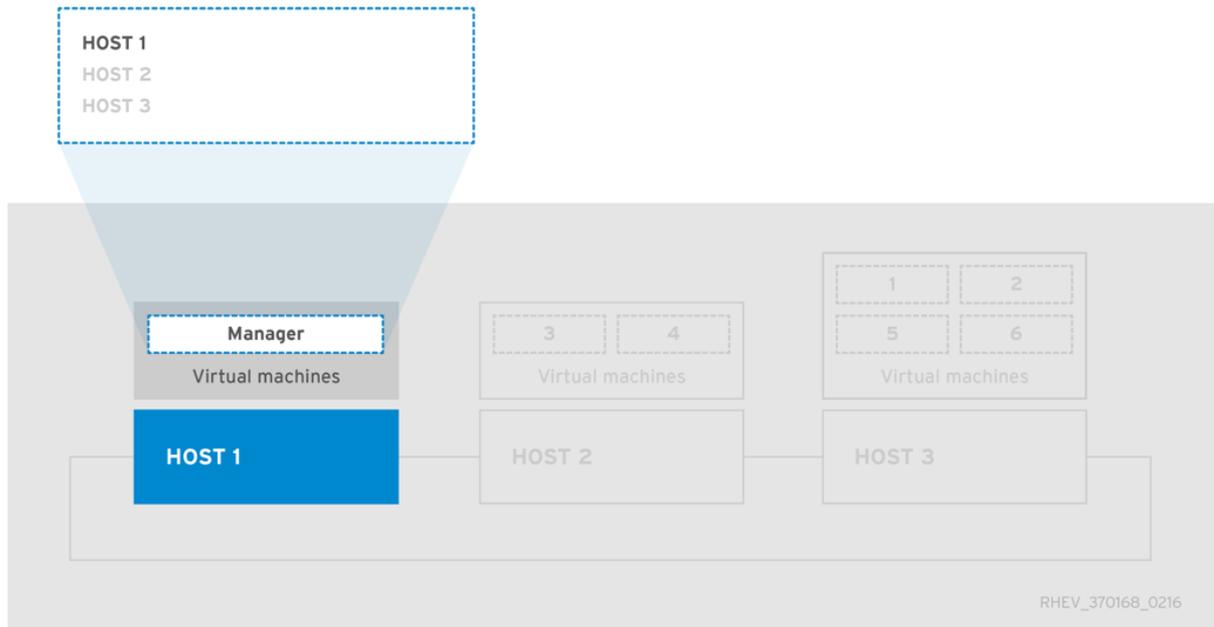


Use **engine-backup** to create backups of the environment. After the backup has been taken, **Host 1** can be activated again to host virtual machines, including the Manager virtual machine.

Procedure 6.2. Workflow for Restoring the Self-Hosted Engine Environment

This procedure provides an example of the workflow for restoring the self-hosted engine environment from a backup. The failover host deploys the new Manager virtual machine, which then restores the backup. Directly after the backup has been restored, the failover host is still present in the Red Hat Virtualization Manager because it was in the environment when the backup was created. Removing the old failover host from the Manager enables the new host to synchronize with the Manager virtual machine and finalize deployment. For more information on restoring the self-hosted engine, see [Section 6.2, “Restoring the Self-Hosted Engine Environment”](#).

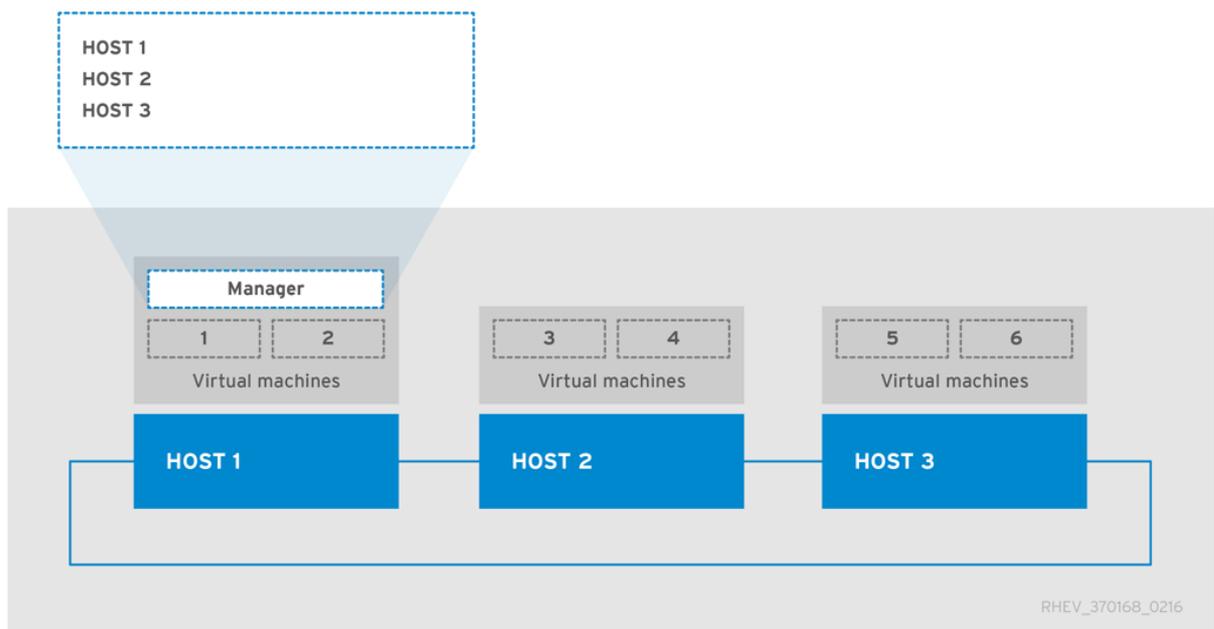
1. **Host 1** has been used to deploy a new self-hosted engine and has restored the backup taken in the previous example procedure. Deploying the restored environment involves additional steps to that of a regular self-hosted engine deployment:
 - o After Red Hat Virtualization Manager has been installed on the Manager virtual machine, but before **engine-setup** is first run, restore the backup using the **engine-backup** tool.
 - o After **engine-setup** has configured and restored the Manager, log in to the Administration Portal and remove **Host 1**, which will be present from the backup. If old **Host 1** is not removed, and is still present in the Manager when finalizing deployment on new **Host 1**, the Manager virtual machine will not be able to synchronize with new **Host 1** and the deployment will fail.



After **Host 1** and the Manager virtual machine have synchronized and the deployment has been finalized, the environment can be considered operational on a basic level. With only one self-hosted engine node, the Manager virtual machine is not highly available. However, if necessary, high-priority virtual machines can be started on **Host 1**.

Any standard RHEL-based hosts - hosts that are present in the environment but are not self-hosted engine nodes - that are operational will become active, and the virtual machines that were active at the time of backup will now be running on these hosts and available in the Manager.

2. **Host 2** and **Host 3** are not recoverable in their current state. These hosts need to be removed from the environment, and then added again to the environment using the **hosted-engine** deployment script. For more information on these actions, see [Section 6.2.4, “Removing Non-Operational Hosts from a Restored Self-Hosted Engine Environment”](#) and [Chapter 7, *Installing Additional Hosts to a Self-Hosted Environment*](#).



Host 2 and **Host 3** have been re-deployed into the restored environment. The environment is now as it was in the first image, before the backup was taken, with the exception that the Manager virtual machine is hosted on **Host 1**.

6.1. BACKING UP THE SELF-HOSTED ENGINE MANAGER VIRTUAL MACHINE

Red Hat recommends backing up your self-hosted engine environment regularly. The supported backup method uses the **engine-backup** tool and can be performed without interrupting the **ovirt-engine** service. The **engine-backup** tool only allows you to back up the Red Hat Virtualization Manager virtual machine, but not the self-hosted engine node that runs the Manager virtual machine or other virtual machines hosted in the environment.

Procedure 6.3. Backing up the Original Red Hat Virtualization Manager

1. Preparing the Failover Host

A failover host, one of the self-hosted engine nodes in the environment, must be placed into maintenance mode so that it has no virtual load at the time of the backup. This host can then later be used to deploy the restored self-hosted engine environment. Any of the self-hosted engine nodes can be used as the failover host for this backup scenario, however the restore process is more straightforward if **Host 1** is used. The default name for the **Host 1** host is **hosted_engine_1**; this was set when the **hosted-engine** deployment script was initially run.

- a. Log in to one of the self-hosted engine nodes.
- b. Confirm that the **hosted_engine_1** host is **Host 1**:

```
# hosted-engine --vm-status
```

- c. Log in to the Administration Portal.
- d. Click the **Hosts** tab.
- e. Select the **hosted_engine_1** host in the results list, and click **Maintenance**.
- f. Click **Ok**.

Depending on the virtual load of the host, it may take some time for all the virtual machines to be migrated. Proceed to the next step after the host status has changed to **Maintenance**.

2. Creating a Backup of the Manager

On the Manager virtual machine, back up the configuration settings and database content, replacing *[EngineBackupFile]* with the file name for the backup file, and *[LogFile]* with the file name for the backup log.

```
# engine-backup --mode=backup --file=[EngineBackupFile] --log=[LogFile]
```

3. Backing up the Files to an External Server

Back up the files to an external server. In the following example, *[Storage.example.com]* is the fully qualified domain name of a network storage server that will store the backup until it is needed, and */backup/* is any designated folder or path. The backup files must be accessible to restore the configuration settings and database content.

```
# scp -p [EngineBackupFiles] [Storage.example.com:/backup/EngineBackupFiles]
```

4. Activating the Failover Host

Bring the `hosted_engine_1` host out of maintenance mode.

- a. Log in to the Administration Portal.
- b. Click the **Hosts** tab.
- c. Select `hosted_engine_1` from the results list.
- d. Click **Activate**.

You have backed up the configuration settings and database content of the Red Hat Virtualization Manager virtual machine.

6.2. RESTORING THE SELF-HOSTED ENGINE ENVIRONMENT

This section explains how to restore a self-hosted engine environment from a backup on a newly installed host. The supported restore method uses the `engine-backup` tool.

Restoring a self-hosted engine environment involves the following key actions:

1. Create a newly installed Red Hat Enterprise Linux host and run the `hosted-engine` deployment script.
2. Restore the Red Hat Virtualization Manager configuration settings and database content in the new Manager virtual machine.
3. Remove self-hosted engine nodes in a **Non Operational** state and re-install them into the restored self-hosted engine environment.

Prerequisites

- To restore a self-hosted engine environment, you must prepare a newly installed Red Hat Enterprise Linux system on a physical host.
- The operating system version of the new host and Manager must be the same as that of the original host and Manager.
- You must have Red Hat Subscription Manager entitlements for your new environment. For a list of the required repositories, see [Subscribing to the Required Entitlements](#) in the *Installation Guide*.
- The fully qualified domain name of the new Manager must be the same fully qualified domain name as that of the original Manager. Forward and reverse lookup records must both be set in DNS.
- You must prepare storage for the new self-hosted engine environment to use as the Manager virtual machine's shared storage domain. This domain must be at least 60 GB. For more information on preparing storage for your deployment, see the [Storage](#) chapter of the *Administration Guide*.

6.2.1. Creating a New Self-Hosted Engine Environment to be Used as the Restored Environment

You can restore a self-hosted engine on hardware that was used in the backed-up environment.

However, you must use the failover host for the restored deployment. The failover host, **Host 1**, used in [Section 6.1, “Backing up the Self-Hosted Engine Manager Virtual Machine”](#) uses the default hostname of **hosted_engine_1** which is also used in this procedure. Due to the nature of the restore process for the self-hosted engine, before the final synchronization of the restored engine can take place, this failover host will need to be removed, and this can only be achieved if the host had no virtual load when the backup was taken. You can also restore the backup on a separate hardware which was not used in the backed up environment and this is not a concern.



IMPORTANT

This procedure assumes that you have a freshly installed Red Hat Enterprise Linux system on a physical host, have subscribed the host to the required entitlements, and installed the `ovirt-hosted-engine-setup` package. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* and [Section 2.1.1, “Installing the Self-Hosted Engine Packages”](#) for more information.

Procedure 6.4. Creating a New Self-Hosted Environment to be Used as the Restored Environment

1. Updating DNS

Update your DNS so that the fully qualified domain name of the Red Hat Virtualization environment correlates to the IP address of the new Manager. In this procedure, fully qualified domain name was set as *Manager.example.com*. The fully qualified domain name provided for the engine must be identical to that given in the engine setup of the original engine that was backed up.

2. Initiating Hosted Engine Deployment

On the newly installed Red Hat Enterprise Linux host, run the **hosted-engine** deployment script. To escape the script at any time, use the **CTRL+D** keyboard combination to abort deployment. If running the **hosted-engine** deployment script over a network, it is recommended to use the **screen** window manager to avoid losing the session in case of network or terminal disruption. Install the `screen` package first if not installed.

```
# screen
```

```
# hosted-engine --deploy
```

3. Preparing for Initialization

The script begins by requesting confirmation to use the host as a hypervisor for use in a self-hosted engine environment.

```
Continuing will configure this host for serving as hypervisor and
create a VM where you have to install oVirt Engine afterwards.
Are you sure you want to continue? (Yes, No)[Yes]:
```

4. Configuring Storage

Select the type of storage to use.

```
During customization use CTRL-D to abort.
Please specify the storage you would like to use (glusterfs, iscsi,
fc, nfs3, nfs4)[nfs3]:
```

- For NFS storage types, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

```
Please specify the full shared storage connection path to use
(example: host:/path): storage.example.com:/hosted_engine/nfs
```

- o For iSCSI, specify the iSCSI portal IP address, port, user name and password, and select a target name from the auto-detected list. You can only select one iSCSI target during the deployment.

```
Please specify the iSCSI portal IP address:
Please specify the iSCSI portal port [3260]:
Please specify the iSCSI portal user:
Please specify the iSCSI portal password:
Please specify the target name (auto-detected values) [default]:
```

- o For Gluster storage, specify the full address, using either the FQDN or IP address, and path name of the shared storage domain.

IMPORTANT

Only replica 3 Gluster storage is supported. Ensure the following configuration has been made:

- In the `/etc/glusterfs/glusterd.vol` file on all three Gluster servers, set `rpc-auth-allow-insecure` to `on`.

```
option rpc-auth-allow-insecure on
```

- Configure the volume as follows:

```
gluster volume set volume cluster.quorum-type auto
gluster volume set volume network.ping-timeout 10
gluster volume set volume auth.allow \*
gluster volume set volume group virt
gluster volume set volume storage.owner-uid 36
gluster volume set volume storage.owner-gid 36
gluster volume set volume server.allow-insecure on
```

```
Please specify the full shared storage connection path to use
(example: host:/path):
storage.example.com:/hosted_engine/gluster_volume
```

- o For Fibre Channel, the host bus adapters must be configured and connected, and the **hosted-engine** script will auto-detect the LUNs available. The LUNs must not contain any existing data.

```
The following luns have been found on the requested target:
[1]      3514f0c5447600351      30GiB   XtremIO XtremApp
          status: used, paths: 2 active

[2]      3514f0c5447600352      30GiB   XtremIO XtremApp
          status: used, paths: 2 active
```

```
Please select the destination LUN (1, 2) [1]:
```

5. Configuring the Network

The script detects possible network interface controllers (NICs) to use as a management bridge for the environment. It then checks your firewall configuration and offers to modify it for console (SPICE or VNC) access the Manager virtual machine. Provide a pingable gateway IP address, to be used by the **ovirt-ha-agent**, to help determine a host's suitability for running a Manager virtual machine.

```
Please indicate a nic to set ovirtmgmt bridge on: (eth1, eth0)
[eth1]:
iptables was detected on your computer, do you wish setup to
configure it? (Yes, No)[Yes]:
Please indicate a pingable gateway IP address [X.X.X.X]:
```

6. Configuring the New Manager Virtual Machine

The script creates a virtual machine to be configured as the new Manager virtual machine. Specify the boot device and, if applicable, the path name of the installation media, the image alias, the CPU type, the number of virtual CPUs, and the disk size. Specify a MAC address for the Manager virtual machine, or accept a randomly generated one. The MAC address can be used to update your DHCP server prior to installing the operating system on the Manager virtual machine. Specify memory size and console connection type for the creation of Manager virtual machine.

```
Please specify the device to boot the VM from (cdrom, disk, pxe)
[cdrom]:
Please specify an alias for the Hosted Engine image [hosted_engine]:
The following CPU types are supported by this host:
    - model_Penryn: Intel Penryn Family
    - model_Conroe: Intel Conroe Family
Please specify the CPU type to be used by the VM [model_Penryn]:
Please specify the number of virtual CPUs for the VM [Defaults to
minimum requirement: 2]:
Please specify the disk size of the VM in GB [Defaults to minimum
requirement: 25]:
You may specify a MAC address for the VM or accept a randomly
generated default [00:16:3e:77:b2:a4]:
Please specify the memory size of the VM in MB [Defaults to minimum
requirement: 4096]:
Please specify the console type you want to use to connect to the VM
(vnc, spice) [vnc]:
```

7. Identifying the Name of the Host

Specify the password for the **admin@internal** user to access the Administration Portal.

A unique name must be provided for the name of the host, to ensure that it does not conflict with other resources that will be present when the engine has been restored from the backup. The name **hosted_engine_1** can be used in this procedure because this host was placed into maintenance mode before the environment was backed up, enabling removal of this host between the restoring of the engine and the final synchronization of the host and the engine.

```
Enter engine admin password:
Confirm engine admin password:
Enter the name which will be used to identify this host inside the
Administration Portal [hosted_engine_1]:
```

8. Configuring the Hosted Engine

Provide the fully qualified domain name for the new Manager virtual machine. This procedure uses the fully qualified domain name *Manager.example.com*. Provide the name and TCP port number of the SMTP server, the email address used to send email notifications, and a comma-separated list of email addresses to receive these notifications.



IMPORTANT

The fully qualified domain name provided for the engine (*Manager.example.com*) must be the same fully qualified domain name provided when original Manager was initially set up.

```
Please provide the FQDN for the engine you would like to use.
This needs to match the FQDN that you will use for the engine
installation within the VM.
```

```
Note: This will be the FQDN of the VM you are now going to create,
it should not point to the base host or to any other existing
machine.
```

```
Engine FQDN: Manager.example.com
```

```
Please provide the name of the SMTP server through which we will
send notifications [localhost]:
```

```
Please provide the TCP port number of the SMTP server [25]:
```

```
Please provide the email address from which notifications will be
sent [root@localhost]:
```

```
Please provide a comma-separated list of email addresses which will
get notifications [root@localhost]:
```

9. Configuration Preview

Before proceeding, the **hosted-engine** deployment script displays the configuration values you have entered, and prompts for confirmation to proceed with these values.

```
Bridge interface           : eth1
Engine FQDN                : Manager.example.com
Bridge name                : ovirtmgmt
SSH daemon port           : 22
Firewall manager           : iptables
Gateway address            : X.X.X.X
Host name for web application : hosted_engine_1
Host ID                    : 1
Image alias                : hosted_engine
Image size GB              : 25
Storage connection         :
storage.example.com:/hosted_engine/nfs
Console type               : vnc
Memory size MB             : 4096
MAC address                 : 00:16:3e:77:b2:a4
Boot type                  : pxe
Number of CPUs             : 2
CPU Type                   : model_Penryn
```

```
Please confirm installation settings (Yes, No)[Yes]:
```

10. Creating the New Manager Virtual Machine

The script creates the virtual machine to be configured as the Manager virtual machine and provides connection details. You must install an operating system on it before the **hosted-engine** deployment script can proceed on Hosted Engine configuration.

```
[ INFO ] Stage: Transaction setup
[ INFO ] Stage: Misc configuration
[ INFO ] Stage: Package installation
[ INFO ] Stage: Misc configuration
[ INFO ] Configuring libvirt
[ INFO ] Configuring VDSM
[ INFO ] Starting vdsmd
[ INFO ] Waiting for VDSM hardware info
[ INFO ] Waiting for VDSM hardware info
[ INFO ] Configuring the management bridge
[ INFO ] Creating Storage Domain
[ INFO ] Creating Storage Pool
[ INFO ] Connecting Storage Pool
[ INFO ] Verifying sanlock lockspace initialization
[ INFO ] Creating VM Image
[ INFO ] Disconnecting Storage Pool
[ INFO ] Start monitoring domain
[ INFO ] Configuring VM
[ INFO ] Updating hosted-engine configuration
[ INFO ] Stage: Transaction commit
[ INFO ] Stage: Closing up
[ INFO ] Creating VM
```

You can now connect to the VM with the following command:

```
/usr/bin/remote-viewer vnc://localhost:5900
```

Use temporary password "3477XXAM" to connect to vnc console.

Please note that in order to use remote-viewer you need to be able to run graphical applications.

This means that if you are using ssh you have to supply the -Y flag (enables trusted X11 forwarding).

Otherwise you can run the command from a terminal in your preferred desktop environment.

If you cannot run graphical applications you can connect to the graphic console from another host or connect to the console using the following command:

```
virsh -c qemu+tls://Test/system console HostedEngine
```

If you need to reboot the VM you will need to start it manually using the command:

```
hosted-engine --vm-start
```

You can then set a temporary password using the command:

```
hosted-engine --add-console-password
```

The VM has been started. Install the OS and shut down or reboot it. To continue please make a selection:

- (1) Continue setup - VM installation is complete
- (2) Reboot the VM and restart installation
- (3) Abort setup
- (4) Destroy VM and abort setup

(1, 2, 3, 4)[1]:

Using the naming convention of this procedure, connect to the virtual machine using VNC with the following command:

```
/usr/bin/remote-viewer vnc://hosted_engine_1.example.com:5900
```

11. Installing the Virtual Machine Operating System

Connect to Manager virtual machine and install a Red Hat Enterprise Linux 7 operating system.

12. Synchronizing the Host and the Manager

Return to the host and continue the **hosted-engine** deployment script by selecting option 1:

```
(1) Continue setup - VM installation is complete
```

```
Waiting for VM to shut down...
[ INFO ] Creating VM
You can now connect to the VM with the following command:
    /usr/bin/remote-viewer vnc://localhost:5900
Use temporary password "3477XXAM" to connect to vnc console.
Please note that in order to use remote-viewer you need to be able
to run graphical applications.
This means that if you are using ssh you have to supply the -Y flag
(enables trusted X11 forwarding).
Otherwise you can run the command from a terminal in your preferred
desktop environment.
If you cannot run graphical applications you can connect to the
graphic console from another host or connect to the console using
the following command:
virsh -c qemu+tls://Test/system console HostedEngine
If you need to reboot the VM you will need to start it manually
using the command:
hosted-engine --vm-start
You can then set a temporary password using the command:
hosted-engine --add-console-password
Please install and setup the engine in the VM.
You may also be interested in subscribing to "agent" RHN/Satellite
channel and installing rhvm-guest-agent-common package in the VM.
To continue make a selection from the options below:
  (1) Continue setup - engine installation is complete
  (2) Power off and restart the VM
  (3) Abort setup
  (4) Destroy VM and abort setup

(1, 2, 3, 4)[1]:
```

13. Installing the Manager

Connect to the new Manager virtual machine, register it with Red Hat Subscription Management, and enable the required repositories. See [Subscribing to the Required Entitlements](#) in the *Installation Guide*.

Ensure the latest versions of all installed packages are in use, and install the rhvm packages.

```
# yum update
```



NOTE

Reboot the machine if any kernel related packages have been updated.

```
# yum install rhevm
```

After the packages have completed installation, you will be able to continue with restoring the self-hosted engine Manager.

6.2.2. Restoring the Self-Hosted Engine Manager

The following procedure outlines how to use the **engine-backup** tool to automate the restore of the configuration settings and database content for a backed-up self-hosted engine Manager virtual machine and Data Warehouse. The procedure only applies to components that were configured automatically during the initial **engine-setup**. If you configured the database(s) manually during **engine-setup**, follow the instructions at [Section 6.2.3, “Restoring the Self-Hosted Engine Manager Manually”](#) to restore the back-up environment manually.

Procedure 6.5. Restoring the Self-Hosted Engine Manager

1. Secure copy the backup files to the new Manager virtual machine. This example copies the files from a network storage server to which the files were copied in [Section 6.1, “Backing up the Self-Hosted Engine Manager Virtual Machine”](#). In this example, *Storage.example.com* is the fully qualified domain name of the storage server, */backup/EngineBackupFiles* is the designated file path for the backup files on the storage server, and */backup/* is the path to which the files will be copied on the new Manager.

```
# scp -p Storage.example.com:/backup/EngineBackupFiles /backup/
```

2. Use the **engine-backup** tool to restore a complete backup.
 - o If you are only restoring the Manager, run:

```
# engine-backup --mode=restore --file=file_name --
log=log_file_name --provision-db --restore-permissions
```

- o If you are restoring the Manager and Data Warehouse, run:

```
# engine-backup --mode=restore --file=file_name --
log=log_file_name --provision-db --provision-dwh-db --restore-
permissions
```

If successful, the following output displays:

```
You should now run engine-setup.
Done.
```

3. Configure the restored Manager virtual machine. This process identifies the existing configuration settings and database content. Confirm the settings. Upon completion, the setup provides an SSH fingerprint and an internal Certificate Authority hash.

```
# engine-setup
```

```
[ INFO ] Stage: Initializing
[ INFO ] Stage: Environment setup
Configuration files: ['/etc/ovirt-engine-setup.conf.d/10-
```

```
packaging.conf', '/etc/ovirt-engine-setup.conf.d/20-setup-ovirt-
post.conf']
```

```
Log file: /var/log/ovirt-engine/setup/ovirt-engine-setup-
20140304075238.log
```

```
Version: otopi-1.1.2 (otopi-1.1.2-1.el6ev)
```

```
[ INFO ] Stage: Environment packages setup
```

```
[ INFO ] Yum Downloading: rhel-65-zstream/primary_db 2.8 M(70%)
```

```
[ INFO ] Stage: Programs detection
```

```
[ INFO ] Stage: Environment setup
```

```
[ INFO ] Stage: Environment customization
```

```
--== PACKAGES ==--
```

```
[ INFO ] Checking for product updates...
```

```
[ INFO ] No product updates found
```

```
--== NETWORK CONFIGURATION ==--
```

Setup can automatically configure the firewall on this system.

Note: automatic configuration of the firewall may overwrite current settings.

Do you want Setup to configure the firewall? (Yes, No) [Yes]:

```
[ INFO ] iptables will be configured as firewall manager.
```

```
--== DATABASE CONFIGURATION ==--
```

```
--== OVIRT ENGINE CONFIGURATION ==--
```

Skipping storing options as database already prepared

```
--== PKI CONFIGURATION ==--
```

PKI is already configured

```
--== APACHE CONFIGURATION ==--
```

```
--== SYSTEM CONFIGURATION ==--
```

```
--== END OF CONFIGURATION ==--
```

```
[ INFO ] Stage: Setup validation
```

```
[ INFO ] Cleaning stale zombie tasks
```

```
--== CONFIGURATION PREVIEW ==--
```

```
Database name           : engine
Database secured connection : False
Database host           : X.X.X.X
Database user name      : engine
Database host name validation : False
Database port           : 5432
NFS setup               : True
Firewall manager        : iptables
```

```

Update Firewall                : True
Configure WebSocket Proxy     : True
Host FQDN                     : Manager.example.com
NFS mount point              : /var/lib/exports/iso
Set application as default page : True
Configure Apache SSL          : True

```

Please confirm installation settings (OK, Cancel) [OK]:

4. Removing the Host from the Restored Environment

If the deployment of the restored self-hosted engine is on new hardware that has a unique name not present in the backed-up engine, skip this step. This step is only applicable to deployments occurring on the failover host, **hosted_engine_1**. Because this host was present in the environment at time the backup was created, it maintains a presence in the restored engine and must first be removed from the environment before final synchronization can take place.

- a. Log in to the Administration Portal.
- b. Click the **Hosts** tab. The failover host, **hosted_engine_1**, will be in maintenance mode and without a virtual load, as this was how it was prepared for the backup.
- c. Click **Remove**.
- d. Click **Ok**.



NOTE

If the host you are trying to remove becomes non-operational, see [Section 6.2.4, “Removing Non-Operational Hosts from a Restored Self-Hosted Engine Environment”](#) for instructions on how to force the removal of a host.

5. Synchronizing the Host and the Manager

Return to the host and continue the **hosted-engine** deployment script by selecting option 1:

```
(1) Continue setup - engine installation is complete
```

```

[ INFO ] Engine replied: DB Up!Welcome to Health Status!
[ INFO ] Waiting for the host to become operational in the engine.
This may take several minutes...
[ INFO ] Still waiting for VDSM host to become operational...

```

At this point, **hosted_engine_1** will become visible in the Administration Portal with **Installing** and **Initializing** states before entering a **Non Operational** state. The host will continue to wait for the VDSM host to become operational until it eventually times out. This happens because another host in the environment maintains the Storage Pool Manager (SPM) role and **hosted_engine_1** cannot interact with the storage domain because the SPM host is in a **Non Responsive** state. When this process times out, you are prompted to shut down the virtual machine to complete the deployment. When deployment is complete, the host can be manually placed into maintenance mode and activated through the Administration Portal.

```

[ INFO ] Still waiting for VDSM host to become operational...
[ ERROR ] Timed out while waiting for host to start. Please check
the logs.

```

```
[ ERROR ] Unable to add hosted_engine_2 to the manager
          Please shutdown the VM allowing the system to launch it as
          a monitored service.
          The system will wait until the VM is down.
```

6. Shut down the new Manager virtual machine.

```
# shutdown -h now
```

7. Return to the host to confirm it has detected that the Manager virtual machine is down.

```
[ INFO ] Enabling and starting HA services
          Hosted Engine successfully set up
[ INFO ] Stage: Clean up
[ INFO ] Stage: Pre-termination
[ INFO ] Stage: Termination
```

8. Activate the host.

- a. Log in to the Administration Portal.
- b. Click the **Hosts** tab.
- c. Select **hosted_engine_1** and click the **Maintenance** button. The host may take several minutes before it enters maintenance mode.
- d. Click the **Activate** button.

Once active, **hosted_engine_1** immediately contends for SPM, and the storage domain and data center become active.

9. Migrate virtual machines to the active host by manually fencing the **Non Responsive** hosts. In the Administration Portal, right-click the hosts and select **Confirm 'Host has been Rebooted'**.

Any virtual machines that were running on that host at the time of the backup will now be removed from that host, and move from an **Unknown** state to a **Down** state. These virtual machines can now be run on **hosted_engine_1**. The host that was fenced can now be forcefully removed using the REST API.

The environment has now been restored to a point where **hosted_engine_1** is active and is able to run virtual machines in the restored environment. The remaining self-hosted engine nodes in **Non Operational** state can now be removed by following the steps in [Section 6.2.4, “Removing Non-Operational Hosts from a Restored Self-Hosted Engine Environment”](#) and then re-installed into the environment by following the steps in [Chapter 7, Installing Additional Hosts to a Self-Hosted Environment](#).



NOTE

If the Manager database is restored successfully, but the Manager virtual machine appears to be **Down** and cannot be migrated to another self-hosted engine node, you can enable a new Manager virtual machine and remove the dead Manager virtual machine from the environment by following the steps provided in <https://access.redhat.com/solutions/1517683>.

6.2.3. Restoring the Self-Hosted Engine Manager Manually

The following procedure outlines how to manually restore the configuration settings and database content for a backed-up self-hosted engine Manager virtual machine.

Procedure 6.6. Restoring the Self-Hosted Engine Manager

1. Manually create an empty database to which the database content in the backup can be restored. The following steps must be performed on the machine where the database is to be hosted.
 1. If the database is to be hosted on a machine other than the Manager virtual machine, install the `postgresql-server` package. This step is not required if the database is to be hosted on the Manager virtual machine because this package is included with the `rhvm` package.

```
# yum install postgresql-server
```

2. Initialize the `postgresql` database, start the `postgresql` service, and ensure this service starts on boot:

```
# postgresql-setup initdb
# systemctl start postgresql.service
# systemctl enable postgresql.service
```

3. Enter the `postgresql` command line:

```
# su postgres
$ psql
```

4. Create the `engine` user:

```
postgres=# create role engine with login encrypted password
'password';
```

If you are also restoring Data Warehouse, create the `ovirt_engine_history` user on the relevant host:

```
postgres=# create role ovirt_engine_history with login encrypted
password 'password';
```

5. Create the new database:

```
postgres=# create database database_name owner engine template
template0 encoding 'UTF8' lc_collate 'en_US.UTF-8' lc_ctype
'en_US.UTF-8';
```

If you are also restoring the Data Warehouse, create the database on the relevant host:

```
postgres=# create database database_name owner
ovirt_engine_history template template0 encoding 'UTF8'
lc_collate 'en_US.UTF-8' lc_ctype 'en_US.UTF-8';
```

- Exit the postgresql command line and log out of the postgres user:

```
postgres=# \q
$ exit
```

- Edit the `/var/lib/pgsql/data/pg_hba.conf` file as follows:

- For each local database, replace the existing directives in the section starting with **local** at the bottom of the file with the following directives:

```
host    database_name    user_name    0.0.0.0/0    md5
host    database_name    user_name    ::0/0        md5
```

- For each remote database:
 - Add the following line immediately underneath the line starting with **Local** at the bottom of the file, replacing `X.X.X.X` with the IP address of the Manager:

```
host    database_name    user_name    X.X.X.X/32    md5
```

- Allow TCP/IP connections to the database. Edit the `/var/lib/pgsql/data/postgresql.conf` file and add the following line:

```
listen_addresses='*'
```

This example configures the **postgresql** service to listen for connections on all interfaces. You can specify an interface by giving its IP address.

- Open the default port used for PostgreSQL database connections, and save the updated firewall rules:

```
# iptables -I INPUT 5 -p tcp -s Manager_IP_Address --dport
5432 -j ACCEPT
# service iptables save
```

- Restart the **postgresql** service:

```
# systemctl restart postgresql.service
```

- Securely copy the backup files to the new Manager virtual machine. This example copies the files from a network storage server to which the files were copied in [Section 6.1, “Backing up the Self-Hosted Engine Manager Virtual Machine”](#). In this example, `Storage.example.com` is the fully qualified domain name of the storage server, `/backup/EngineBackupFiles` is the designated file path for the backup files on the storage server, and `/backup/` is the path to which the files will be copied on the new Manager.

```
# scp -p Storage.example.com:/backup/EngineBackupFiles /backup/
```

- Restore a complete backup or a database-only backup with the `--change-db-credentials` parameter to pass the credentials of the new database. The `database_location` for a database local to the Manager is **localhost**.



NOTE

The following examples use a `--*password` option for each database without specifying a password, which will prompt for a password for each database. Passwords can be supplied for these options in the command itself, however this is not recommended as the password will then be stored in the shell history. Alternatively, `--*passfile=password_file` options can be used for each database to securely pass the passwords to the **engine-backup** tool without the need for interactive prompts.

- o Restore a complete backup:

```
# engine-backup --mode=restore --file=file_name --
log=log_file_name --change-db-credentials --db-
host=database_location --db-name=database_name --db-user=engine -
-db-password
```

If Data Warehouse is also being restored as part of the complete backup, include the revised credentials for the additional database:

```
engine-backup --mode=restore --file=file_name --log=log_file_name
--change-db-credentials --db-host=database_location --db-
name=database_name --db-user=engine --db-password --change-dwh-
db-credentials --dwh-db-host=database_location --dwh-db-
name=database_name --dwh-db-user=ovirt_engine_history --dwh-db-
password
```

- o Restore a database-only backup restoring the configuration files and the database backup:

```
# engine-backup --mode=restore --scope=files --scope=db --
file=file_name --log=file_name --change-db-credentials --db-
host=database_location --db-name=database_name --db-user=engine -
-db-password
```

The example above restores a backup of the Manager database.

```
# engine-backup --mode=restore --scope=files --scope=dwhdb --
file=file_name --log=file_name --change-dwh-db-credentials --dwh-
db-host=database_location --dwh-db-name=database_name --dwh-db-
user=ovirt_engine_history --dwh-db-password
```

The example above restores a backup of the Data Warehouse database.

If successful, the following output displays:

```
You should now run engine-setup.
Done.
```

4. Configure the restored Manager virtual machine. This process identifies the existing configuration settings and database content. Confirm the settings. Upon completion, the setup provides an SSH fingerprint and an internal Certificate Authority hash.

```
# engine-setup
```

```

[ INFO ] Stage: Initializing
[ INFO ] Stage: Environment setup
Configuration files: ['/etc/ovirt-engine-setup.conf.d/10-
packaging.conf', '/etc/ovirt-engine-setup.conf.d/20-setup-ovirt-
post.conf']
Log file: /var/log/ovirt-engine/setup/ovirt-engine-setup-
20140304075238.log
Version: otopi-1.1.2 (otopi-1.1.2-1.el6ev)
[ INFO ] Stage: Environment packages setup
[ INFO ] Yum Downloading: rhel-65-zstream/primary_db 2.8 M(70%)
[ INFO ] Stage: Programs detection
[ INFO ] Stage: Environment setup
[ INFO ] Stage: Environment customization

      --== PACKAGES ==--

[ INFO ] Checking for product updates...
[ INFO ] No product updates found

      --== NETWORK CONFIGURATION ==--

Setup can automatically configure the firewall on this system.
Note: automatic configuration of the firewall may overwrite current
settings.
Do you want Setup to configure the firewall? (Yes, No) [Yes]:
[ INFO ] iptables will be configured as firewall manager.

      --== DATABASE CONFIGURATION ==--

      --== OVIRT ENGINE CONFIGURATION ==--

Skipping storing options as database already prepared

      --== PKI CONFIGURATION ==--

PKI is already configured

      --== APACHE CONFIGURATION ==--

      --== SYSTEM CONFIGURATION ==--

      --== END OF CONFIGURATION ==--

[ INFO ] Stage: Setup validation
[ INFO ] Cleaning stale zombie tasks

      --== CONFIGURATION PREVIEW ==--

Database name                : engine
Database secured connection  : False
Database host                 : X.X.X.X
Database user name           : engine
Database host name validation : False

```

```

Database port                : 5432
NFS setup                    : True
Firewall manager             : iptables
Update Firewall              : True
Configure WebSocket Proxy    : True
Host FQDN                    : Manager.example.com
NFS mount point              : /var/lib/exports/iso
Set application as default page : True
Configure Apache SSL         : True

```

```
Please confirm installation settings (OK, Cancel) [OK]:
```

5. Removing the Host from the Restored Environment

If the deployment of the restored self-hosted engine is on new hardware that has a unique name not present in the backed-up engine, skip this step. This step is only applicable to deployments occurring on the failover host, **hosted_engine_1**. Because this host was present in the environment at time the backup was created, it maintains a presence in the restored engine and must first be removed from the environment before final synchronization can take place.

- a. Log in to the Administration Portal.
- b. Click the **Hosts** tab. The failover host, **hosted_engine_1**, will be in maintenance mode and without a virtual load, as this was how it was prepared for the backup.
- c. Click **Remove**.
- d. Click **Ok**.

6. Synchronizing the Host and the Manager

Return to the host and continue the **hosted-engine** deployment script by selecting option 1:

```
(1) Continue setup - engine installation is complete
```

```

[ INFO ] Engine replied: DB Up!Welcome to Health Status!
[ INFO ] Waiting for the host to become operational in the engine.
This may take several minutes...
[ INFO ] Still waiting for VDSM host to become operational...

```

At this point, **hosted_engine_1** will become visible in the Administration Portal with **Installing** and **Initializing** states before entering a **Non Operational** state. The host will continue to wait for the VDSM host to become operational until it eventually times out. This happens because another host in the environment maintains the Storage Pool Manager (SPM) role and **hosted_engine_1** cannot interact with the storage domain because the SPM host is in a **Non Responsive** state. When this process times out, you are prompted to shut down the virtual machine to complete the deployment. When deployment is complete, the host can be manually placed into maintenance mode and activated through the Administration Portal.

```

[ INFO ] Still waiting for VDSM host to become operational...
[ ERROR ] Timed out while waiting for host to start. Please check
the logs.
[ ERROR ] Unable to add hosted_engine_2 to the manager
Please shutdown the VM allowing the system to launch it as
a monitored service.
The system will wait until the VM is down.

```

7. Shut down the new Manager virtual machine.

```
# shutdown -h now
```

8. Return to the host to confirm it has detected that the Manager virtual machine is down.

```
[ INFO ] Enabling and starting HA services
        Hosted Engine successfully set up
[ INFO ] Stage: Clean up
[ INFO ] Stage: Pre-termination
[ INFO ] Stage: Termination
```

9. Activate the host.

- a. Log in to the Administration Portal.
- b. Click the **Hosts** tab.
- c. Select **hosted_engine_1** and click the **Maintenance** button. The host may take several minutes before it enters maintenance mode.
- d. Click the **Activate** button.

Once active, **hosted_engine_1** immediately contends for SPM, and the storage domain and data center become active.

10. Migrate virtual machines to the active host by manually fencing the **Non Responsive** hosts. In the Administration Portal, right-click the hosts and select **Confirm 'Host has been Rebooted'**.

Any virtual machines that were running on that host at the time of the backup will now be removed from that host, and move from an **Unknown** state to a **Down** state. These virtual machines can now be run on **hosted_engine_1**. The host that was fenced can now be forcefully removed using the REST API.

The environment has now been restored to a point where **hosted_engine_1** is active and is able to run virtual machines in the restored environment. The remaining self-hosted engine nodes in **Non Operational** state can now be removed by following the steps in [Section 6.2.4, “Removing Non-Operational Hosts from a Restored Self-Hosted Engine Environment”](#) and then re-installed into the environment by following the steps in [Chapter 7, Installing Additional Hosts to a Self-Hosted Environment](#).



NOTE

If the Manager database is restored successfully, but the Manager virtual machine appears to be **Down** and cannot be migrated to another self-hosted engine node, you can enable a new Manager virtual machine and remove the dead Manager virtual machine from the environment by following the steps provided in <https://access.redhat.com/solutions/1517683>.

6.2.4. Removing Non-Operational Hosts from a Restored Self-Hosted Engine Environment

Once a host has been fenced in the Administration Portal, it can be forcefully removed with a REST API request. This procedure will use **cURL**, a command line interface for sending requests to HTTP servers. Most Linux distributions include **cURL**. This procedure will connect to the Manager virtual machine to perform the relevant requests.

1. Fencing the Non-Operational Host

In the Administration Portal, right-click the hosts and select **Confirm 'Host has been Rebooted'**.

Any virtual machines that were running on that host at the time of the backup will now be removed from that host, and move from an **Unknown** state to a **Down** state. The host that was fenced can now be forcefully removed using the REST API.

2. Retrieving the Manager Certificate Authority

Connect to the Manager virtual machine and use the command line to perform the following requests with **cURL**.

Use a **GET** request to retrieve the Manager Certificate Authority (CA) certificate for use in all future API requests. In the following example, the **--output** option is used to designate the file *hosted-engine.ca* as the output for the Manager CA certificate. The **--insecure** option means that this initial request will be without a certificate.

```
# curl --output hosted-engine.ca --insecure  
https://[Manager.example.com]/ca.crt
```

3. Retrieving the GUID of the Host to be Removed

Use a **GET** request on the hosts collection to retrieve the Global Unique Identifier (GUID) for the host to be removed. The following example includes the Manager CA certificate file, and uses the **admin@internal** user for authentication, the password for which will be prompted once the command is executed.

```
# curl --request GET --cacert hosted-engine.ca --user admin@internal  
https://[Manager.example.com]/api/hosts
```

This request returns the details of all of the hosts in the environment. The host GUID is a hexadecimal string associated with the host name. For more information on the Red Hat Virtualization REST API, see the *Red Hat Virtualization REST API Guide*.

4. Removing the Fenced Host

Use a **DELETE** request using the GUID of the fenced host to remove the host from the environment. In addition to the previously used options this example specifies headers to specify that the request is to be sent and returned using eXtensible Markup Language (XML), and the body in XML that sets the **force** action to be **true**.

```
curl --request DELETE --cacert hosted-engine.ca --user  
admin@internal --header "Content-Type: application/xml" --header  
"Accept: application/xml" --data "<action><force>true</force>  
</action>" https://[Manager.example.com]/api/hosts/ecde42b0-de2f-  
48fe-aa23-1ebd5196b4a5
```

This **DELETE** request can be used to remove every fenced host in the self-hosted engine environment, as long as the appropriate GUID is specified.

5. Removing the Self-Hosted Engine Configuration from the Host

Remove the host's self-hosted engine configuration so it can be reconfigured when the host is re-installed to a self-hosted engine environment.

Log in to the host and remove the configuration file:

```
█ # rm /etc/ovirt-hosted-engine/hosted-engine.conf
```

The host can now be re-installed to the self-hosted engine environment.

CHAPTER 7. INSTALLING ADDITIONAL HOSTS TO A SELF-HOSTED ENVIRONMENT

Additional self-hosted engine nodes are added in the same way as a regular host, with an additional step to deploy the host as a self-hosted engine node. The shared storage domain is automatically detected and the node can be used as a failover host to host the Manager virtual machine when required. You can also attach regular hosts to a self-hosted engine environment, but they cannot host the Manager virtual machine. Red Hat highly recommends having at least two self-hosted engine nodes to ensure the Manager virtual machine is highly available. Additional hosts can also be added using the REST API. See [Hosts](#) in the *REST API Guide*.

Prerequisites

- For a RHEL-based self-hosted engine environment, you must have prepared a freshly installed Red Hat Enterprise Linux system on a physical host, and subscribed the host to the required entitlements. See [Subscribing to the Required Entitlements](#) in the *Installation Guide* for more information on subscriptions.
- For a RHVH-based self-hosted engine environment, you must have prepared a freshly installed Red Hat Virtualization Host system on a physical host. See [Red Hat Virtualization Hosts](#) in the *Installation Guide*.
- If you are reusing a self-hosted engine node, remove its existing self-hosted engine configuration. See [Section 5.2, “Removing a Host from a Self-Hosted Engine Environment”](#).

Procedure 7.1. Adding an Additional Self-Hosted Engine Node

1. In the Administration Portal, click the **Hosts** resource tab.
2. Click **New**.

For information on additional host settings, see [Explanation of Settings and Controls in the New Host and Edit Host Windows](#) in the *Administration Guide*.

3. Use the drop-down list to select the **Data Center** and **Host Cluster** for the new host.
4. Enter the **Name** and the **Address** of the new host. The standard SSH port, port 22, is auto-filled in the **SSH Port** field.
5. Select an authentication method to use for the Manager to access the host.
 - Enter the root user's password to use password authentication.
 - Alternatively, copy the key displayed in the **SSH PublicKey** field to `/root/.ssh/authorized_keys` on the host to use public key authentication.
6. Optionally, configure power management, where the host has a supported power management card. For information on power management configuration, see [Host Power Management Settings Explained](#) in the *Administration Guide*.
7. Click the **Hosted Engine** sub-tab.
8. Select the **Deploy** radio button.
9. Click **OK**.

CHAPTER 8. MIGRATING THE SELF-HOSTED ENGINE DATABASE TO A REMOTE SERVER DATABASE

You can migrate the **engine** database of a self-hosted engine to a remote database server after the Red Hat Virtualization Manager has been initially configured. Use **engine-backup** to create a database backup and restore it on the new database server. This procedure assumes that the new database server has Red Hat Enterprise Linux 7 installed and the appropriate subscriptions configured. See [Subscribing to the Required Entitlements](#) in the *Installation Guide*.

To migrate Data Warehouse to a separate machine, see [Migrating Data Warehouse to a Separate Machine](#) in the *Data Warehouse Guide*.

Procedure 8.1. Migrating the Database

1. Log in to a self-hosted engine node and place the environment into **global** maintenance mode. This disables the High Availability agents and prevents the Manager virtual machine from being migrated during the procedure:

```
# hosted-engine --set-maintenance --mode=global
```

2. Log in to the Red Hat Virtualization Manager machine and stop the **ovirt-engine** service so that it does not interfere with the engine backup:

```
# systemctl stop ovirt-engine.service
```

3. Create the **engine** database backup:

```
# engine-backup --scope=files --scope=db --mode=backup --  
file=file_name --log=backup_log_name
```

4. Copy the backup file to the new database server:

```
# scp /tmp/engine.dump root@new.database.server.com:/tmp
```

5. Log in to the new database server and install **engine-backup**:

```
# yum install ovirt-engine-tools-backup
```

6. Restore the database on the new database server. *file_name* is the backup file copied from the Manager.

```
# engine-backup --mode=restore --scope=files --scope=db --  
file=file_name --log=restore_log_name --provision-db --no-restore-  
permissions
```

7. Now that the database has been migrated, start the **ovirt-engine** service:

```
# systemctl start ovirt-engine.service
```

8. Log in to a self-hosted engine node and turn off maintenance mode, enabling the High Availability agents:

```
| # hosted-engine --set-maintenance --mode=none
```