Red Hat CloudForms 4.0

Installing CloudForms on Red Hat OpenStack Platform

How to Install and Configure the CloudForms Management Engine Appliance on a Red Hat OpenStack Platform environment

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Abstract

This guide provides installation and configuration instructions for the CloudForms Management Engine Appliance. Information and procedures in this book are relevant to CloudForms Managemen Engine administrators. If you have a suggestion for improving this guide or have found an error, please submit a Bugzilla report at http://bugzilla.redhat.com against Red Hat CloudForms Management Engine for the Documentation component. Please provide specific details, such as the section number, guide name, and CloudForms version so we can easily locate the content.

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CHAPTER 1. INSTALLING CLOUDFORMS

CloudForms Management Engine is able to be installed and ready to configure in a few quick steps. After downloading CloudForms Management Engine as a virtual machine image template from the Red Hat Customer Portal, the installation process takes you through the steps of uploading the appliance to a supported virtualization or cloud provider.

IMPORTANT

After installing the CloudForms Management Engine Appliance, you must configure the database for Red Hat CloudForms. See Section 2.3, “Configuring a Database for CloudForms Management Engine”.

1.1. OBTAINING THE CLOUDFORMS MANAGEMENT ENGINE APPLIANCE

1. Go to access.redhat.com and log in to the Red Hat Customer Portal using your customer account details.

2. Click **Downloads** in the menu bar.

3. Click **A-Z** to sort the product downloads alphabetically.

4. Click **Red Hat CloudForms** to access the product download page. The latest version of each download displays by default.

5. From the list of installers and images under **Product Software**, select **CFME OpenStack Virtual Appliance** and click **Download Now**.

1.2. UPLOADING THE APPLIANCE ON OPENSTACK

Log in to your OpenStack dashboard to upload your CloudForms Management Engine Appliance.

1. Log in to the OpenStack dashboard.

2. In the **Project** tab, navigate to **Compute** → **Images**.

3. Click **Create Image**.

4. In **Name**, enter a name for the image.

5. From **Image Source** list, select **Image Location**. Note that currently only images available via an HTTP URL are supported.

6. In **Image Location**, add an external (HTTP) URL to load the image from. For example, **http://example.com/image.iso**.

7. From the **Format** list, select the image format. For example, **`ISO - Optical Disk Image`**.

8. Specify the **Architecture**. For example, **`i386`** for a 32-bit architecture or **`x86-64`** for a 64-bit architecture.

9. Leave the **Minimum Disk (GB)** and **Minimum RAM (MB)** fields empty.

10. Check the **Public** box to make the appliance available to all users.

11. Check the **Protected** box to protect the image from being accidentally deleted.

12. Click **Create Image**.

You have successfully uploaded the CloudForms Management Engine Appliance.

NOTE

As a result of this procedure, the appliance image is placed in a queue to be uploaded. It may take some time before the Status of the image changes from Queued to Active.

1.3. ADDING A RULE TO A SECURITY GROUP

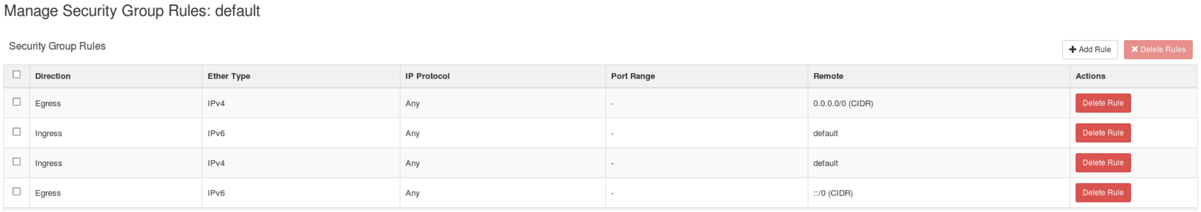
Security groups specify what IP traffic is allowed to reach an instance on its public IP address. Security group rules are processed before network traffic reaches firewall rules defined within the guest itself.

NOTE

In the default configuration, the default security group accepts all connections from the default source; all instances within the default group can talk to each other on any port.

1. From the OpenStack dashboard, navigate to **Project** → **Compute** → **Access & Security**.

2. Navigate to **Security Groups** → **Manage Rules** on the row for the default security group.

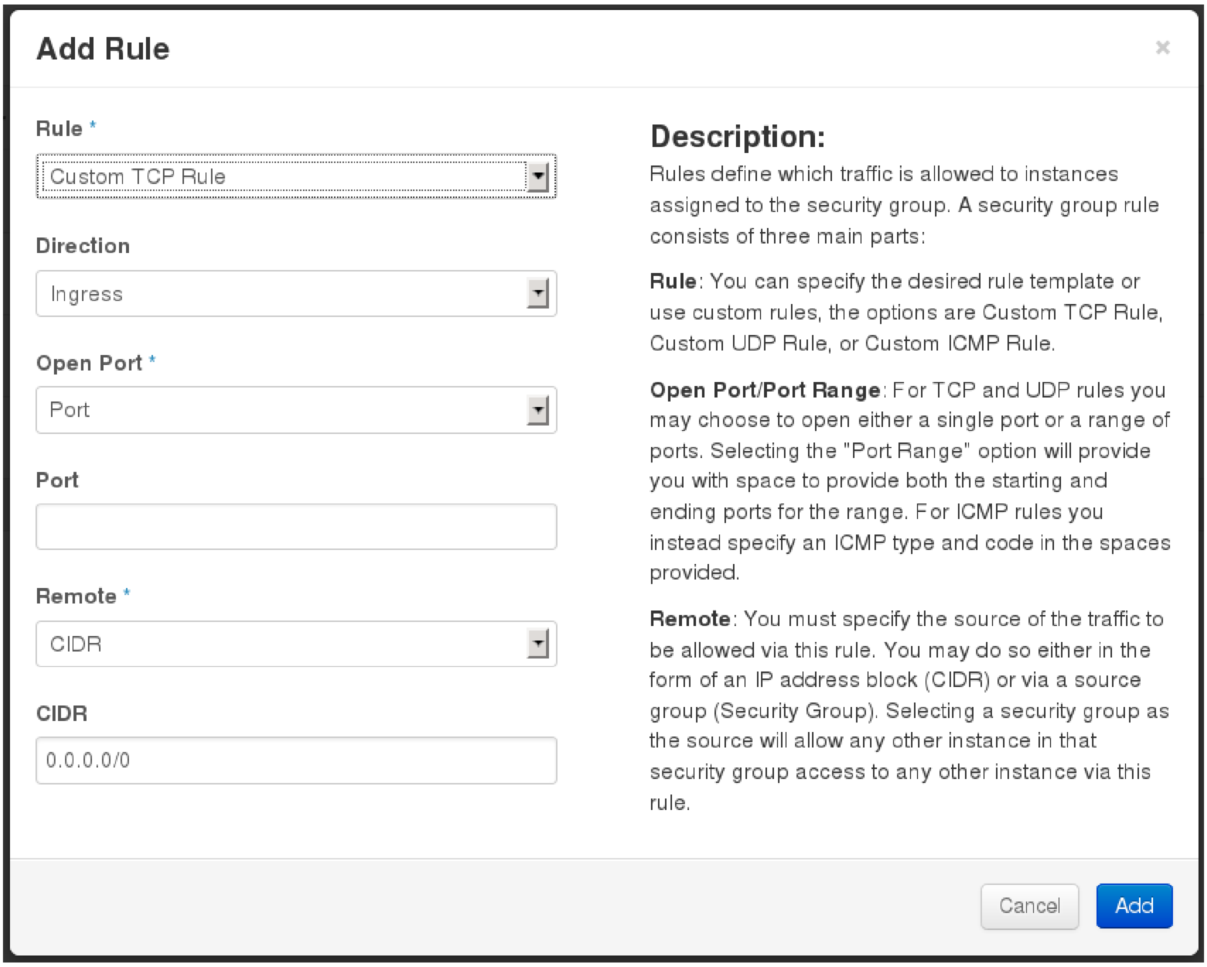


Manage Security Group Rules: default

Security Group Rules

□	Direction	Ether Type	IP Protocol	Port Range	Remote	Actions
□	Egress	IPv4	Any	-	0.0.0.0/0 (CIDR)	Delete Rule
□	Ingress	IPv6	Any	-	default	Delete Rule
□	Ingress	IPv4	Any	-	default	Delete Rule
□	Egress	IPv6	Any	-	::/0 (CIDR)	Delete Rule

3. Click **Add Rule**.



Description:

Rules define which traffic is allowed to instances assigned to the security group. A security group rule consists of three main parts:

Rule: You can specify the desired rule template or use custom rules, the options are Custom TCP Rule, Custom UDP Rule, or Custom ICMP Rule.

Open Port/Port Range: For TCP and UDP rules you may choose to open either a single port or a range of ports. Selecting the "Port Range" option will provide you with space to provide both the starting and ending ports for the range. For ICMP rules you instead specify an ICMP type and code in the spaces provided.

Remote: You must specify the source of the traffic to be allowed via this rule. You may do so either in the form of an IP address block (CIDR) or via a source group (Security Group). Selecting a security group as the source will allow any other instance in that security group access to any other instance via this rule.

4. Configure the rule.

   a. Select **Rule** → **Custom TCP Rule**.

   b. Select **Direction** → **Ingress**.

   c. Select **Port** from the **Open Port** list.

   d. Specify **443** in the **Port** field.

   e. Select **CIDR** from the **Remote** list.

   f. Specify `0.0.0.0/0` in the **CIDR** field.

   g. Click **Add**.

1.4. CREATING A CUSTOM FLAVOR FOR CLOUDFORMS MANAGEMENT ENGINE

A flavor is a resource allocation profile that specifies, for example, how many virtual CPUs and how much RAM can be allocated to an instance. You can, for example, run CloudForms Management Engine on a Red Hat OpenStack m1.large flavor, which specifies a virtual machine with 4 cores, 8GB RAM, and 80GB disk space. Creating a flavor to run CloudForms Management Engine is optional.

The following procedure demonstrates creating a flavor with the minimum requirements (4 cores, 6GB RAM, 40GB disk space) for CloudForms Management Engine. For more information about flavors, see the Red Hat OpenStack Platform Administration User Guide.

1. Log in to the OpenStack dashboard as admin.
2. In the **Admin** tab, navigate to **System** → **Flavors**.
3. Click **Create Flavor** to display the **Create Flavor** dialog.
4. Configure the settings to define a flavor that meets CloudForms Management Engine system requirements.
   a. Enter a name for the flavor.
   b. Enter the following settings:
      - **VCPUs**: 4
      - **RAM MB**: 6144
      - **Root Disk GB**: 45
      - **Ephemeral Disk GB**: 0
      - **Swap Disk MB**: 0
5. Click **Create Flavor**.

A new flavor specific to CloudForms Management Engine is created.

1.5. LAUNCHING THE CLOUDFORMS MANAGEMENT ENGINE INSTANCE

1. From the OpenStack dashboard, navigate to **Project** → **Compute** → **Instances**.
2. Click **Launch Instance**.
3. Enter a name for the instance.
4. Select the custom flavor for your instance. The flavor selection determines the computing resources available to your instance. The resources used by the flavor are displayed in the **Flavor Details** pane.
5. Enter **1** in the **Instance Count** field.
6. Select a boot option from the **Instance Boot Source** list:
   - **Boot from image** - displays a new field for **Image Name**. Select the image from the drop-down list.
   - **Boot from snapshot** - displays a new field for **Instance Snapshot**. Select the snapshot from the drop-down list.
   - **Boot from volume** - displays a new field for **Volume**. Select the volume from the drop-down list.
   - **Boot from image (creates a new volume)** - boot from an image and create a volume by choosing **Device Size** and **Device Name** for your volume. Some volumes can be persistent. To ensure the volume is deleted when the instance is deleted, select **Delete on Terminate**.

- **Boot from volume snapshot (creates a new volume)** - boot from volume snapshot and create a new volume by choosing **Volume Snapshot** from the drop-down list and adding a **Device Name** for your volume. Some volumes can be persistent. To ensure the volume is deleted when the instance is deleted, select **Delete on Terminate**.

7. Click **Networking** and select a network for the instance by clicking the **+** (plus) button for the network from **Available Networks**.

8. Click **Launch**.

1.6. ADDING A FLOATING IP ADDRESS

When you create an instance, Red Hat OpenStack Platform automatically assigns it a fixed IP address in the network to which the instance belongs. This IP address is permanently associated with the instance until the instance is terminated.

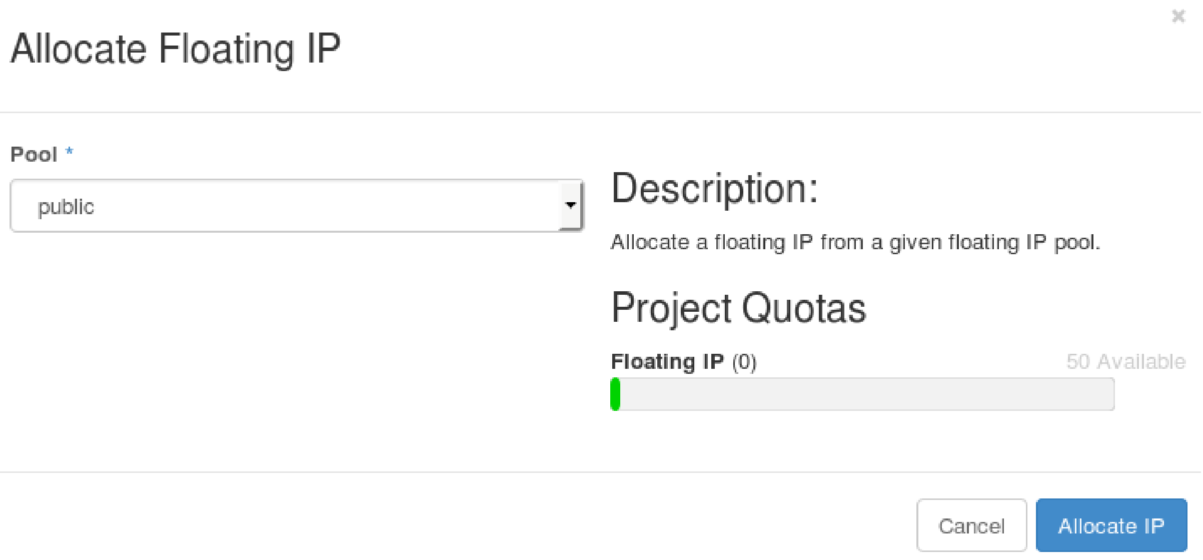
In addition to the fixed address, you can also assign a floating IP address to an instance. Unlike fixed IP addresses, you can modify floating IP addresses associations at any time, regardless of the state of the instances involved.

1. At the command-line on your RHEL OpenStack Platform host, create a pool of floating IP addresses using the **`nova-manage floating create`** command. Replace **IP_BLOCK** with the desired block of IP addresses expressed in CIDR notation.

```
$ nova-manage floating create IP_BLOCK
```

2. In the **Project** tab, navigate to **Compute** → **Access & Security**.

3. Click **Floating IPs** → **Allocate IP To Project**. The **Allocate Floating IP** window is displayed.



Allocate Floating IP

Pool * public

Description:

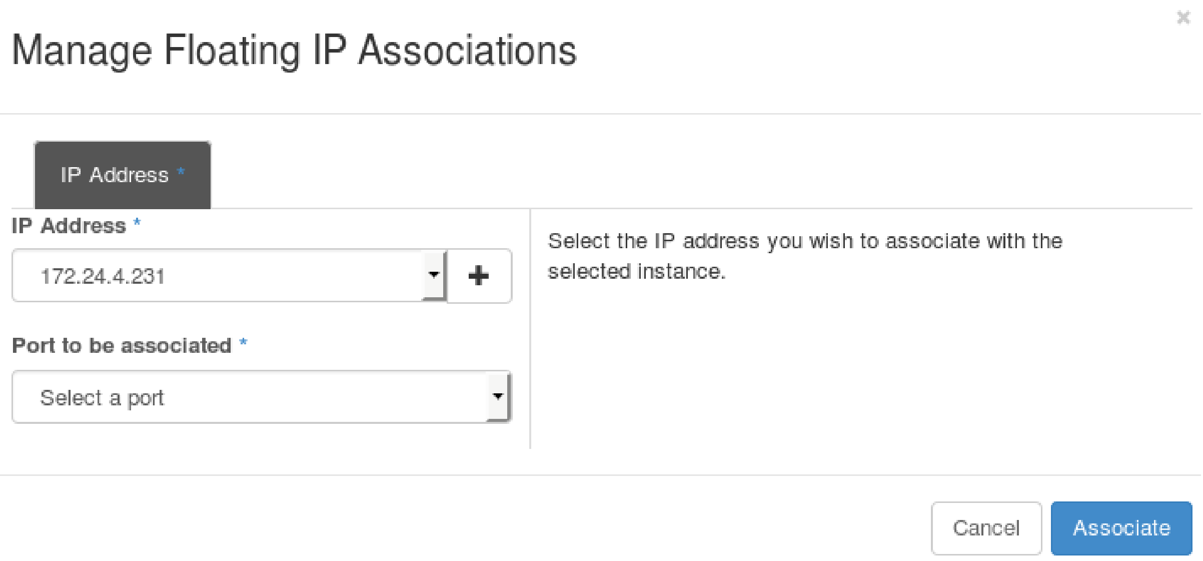
Allocate a floating IP from a given floating IP pool.

Project Quotas

Floating IP (0) 50 Available

4. Click **Allocate IP** to allocate a floating IP from the pool. The allocated IP address appears in the **Floating IPs** table.

5. Select the newly allocated IP address from the **Floating IPs** table. Click **Associate** to assign the IP address to a specific instance.



Manage Floating IP Associations

IP Address *

IP Address *: 172.24.4.231

Port to be associated *: Select a port

Select the IP address you wish to associate with the selected instance.

6. Select an instance with which to associate the floating IP Address.

7. Click **Associate** to associate the IP address with the selected instance.

NOTE

To disassociate a floating IP address from an instance when it is no longer required, click **Release Floating IPs**.

CHAPTER 2. CONFIGURING CLOUDFORMS

Although the CloudForms Management Engine Appliance comes configured to be integrated immediately into your environment, you can make some changes to its configuration.

NOTE

The CloudForms Management Engine Appliance is intended to have minimal configuration options.

2.1. CHANGING CONFIGURATION SETTINGS

The procedure describes how to make changes to the configuration settings on the CloudForms Management Engine appliance.

1. After starting the appliance, log in with a user name of **`root`** and the default password of **`smartvm`**. This displays the Bash prompt for the **`root`** user.

2. Enter the **`appliance_console`** command. The CloudForms Management Engine Appliance summary screen displays.

3. Press **`Enter`** to manually configure settings.

4. Press the number for the item you want to change, and press **`Enter`**. The options for your selection are displayed.

5. Follow the prompts to make the changes.

6. Press **`Enter`** to accept a setting where applicable.

NOTE

The CloudForms Management Engine Appliance console automatically logs out after five minutes of inactivity.

2.2. ADVANCED CONFIGURATION SETTINGS

After logging in, you can use the following menu items for advanced configuration of the appliance:

- Use **Set DHCP Network Configuration** to use DHCP to obtain the IP address and network configuration for your CloudForms Management Engine Appliance. The appliance is initially configured as a DHCP client with bridged networking.

- Use **Set Static Network Configuration** if you have a specific IP address and network settings you need to use for the CloudForms Management Engine Appliance.

- Use **Test Network Configuration** to check that name resolution is working correctly.

- Use **Set Hostname** to specify a hostname for the CloudForms Management Engine Appliance.

  IMPORTANT

  A valid fully qualified hostname for the CloudForms Management Engine appliance is required for SmartState analysis to work correctly,

- Use **Set Timezone, Date, and Time** to configure the time zone, date, and time for the CloudForms Management Engine Appliance.

- Use **Restore Database from Backup** to restore the VMDB database from a previous backup.

- Use **Setup Database Region** to create regions for VMDB replication.

- Use **Configure Database** to configure the VMDB database. Use this option to configure the database for the appliance after installing and running it for the first time.

- Use **Extend Temporary Storage** to add temporary storage to the appliance. The appliance formats an unpartitioned disk attached to the appliance host and mounts it at **`/var/www/miq_tmp`**. The appliance uses this temporary storage directory to perform certain image download functions.

- Use **Configure External Authentication (httpd)** to configure authentication through an IPA server.

- Use **Generate Custom Encryption Key** to regenerate the encryption key used to encode plain text password.

- Use **Harden Appliance Using SCAP Configuration** to apply Security Content Automation Protocol (SCAP) standards to the appliance. You can view these SCAP rules in the **`/var/www/miq/lib/appliance_console/config/scap_rules.yml`** file.

- Use **Stop Server Processes** to stop all server processes. You may need to do this to perform maintenance.

- Use **Start Server Processes** to start the server. You may need to do this after performing maintenance.

- Use **Restart Appliance** to restart the CloudForms Management Engine Appliance. You can either restart the appliance and clear the logs or just restart the appliance.

- Use **Shut Down Appliance** to power down the appliance and exit all processes.

- Use **Summary Information** to go back to the network summary screen for the CloudForms Management Engine Appliance.

- Use **Quit** to leave the CloudForms Management Engine Appliance console.

2.3. CONFIGURING A DATABASE FOR CLOUDFORMS MANAGEMENT ENGINE

Before using CloudForms Management Engine, configure the database options for it. CloudForms Management Engine provides two options for database configuration:

- Install an internal PostgreSQL database to the appliance

- Configure the appliance to use an external PostgreSQL database

NOTE

See CPU Sizing Assistant for a Dedicated VMDB Host in the Deployment Planning Guide for guidelines on CPU requirements.

2.4. CONFIGURING AN INTERNAL DATABASE

IMPORTANT

Before installing an internal database, add a disk to the infrastructure hosting your appliance. See the documentation specific to your infrastructure for instructions on how to add a disk. As a storage disk usually cannot be added while a virtual machine is running, Red Hat recommends adding the disk before starting the appliance. Red Hat CloudForms only supports installing of an internal VMDB on blank disks. The installation will fail if the disks are not blank.

1. Start the appliance and open a terminal from your virtualization or cloud provider.

2. After starting the appliance, log in with a user name of **`root`** and the default password of **`smartvm`**. This displays the Bash prompt for the **`root`** user.

3. Enter the **`appliance_console`** command. The CloudForms Management Engine Appliance summary screen displays.

4. Press **Enter** to manually configure settings.

5. Select **8) Configure Database** from the menu.

6. You are prompted to create or fetch an encryption key.

   - If this is the first CFME appliance, choose **1) Create key**.

   - If this is not the first CFME appliance, choose **2) Fetch key** from remote machine to fetch the key from the first CFME appliance. All CFME appliances in a multi-region deployment must use the same key.

7. Choose **1) Internal** for the database location.

8. Choose a disk for the database. For example:

   ```
   1)  /dev/vdb: 20480

   Choose disk:
   ```

   Enter **1** to choose **`/dev/vdb`** for the database location.

9. When prompted, enter a unique three digit region ID to create a new region.

   IMPORTANT

   Creating a new region destroys any existing data on the chosen database.

10. Confirm the configuration when prompted.

CloudForms Management Engine configures the internal database.

2.5. CONFIGURING AN EXTERNAL DATABASE

The **`postgresql.conf`** file used with CloudForms Management Engine databases requires specific settings for correct operation. For example, it must correctly reclaim table space, control session timeouts, and format the PostgreSQL server log for improved system support. Due to these requirements, Red Hat recommends that external CloudForms Management Engine databases use a **`postgresql.conf`** file based on the standard file used by the CloudForms Management Engine appliance.

Ensure you configure the settings in the postgresql.conf to suit your system. For example, customize the **`shared_buffers`** setting according to the amount of real storage available in the external system hosting the PostgreSQL instance. In addition, depending on the aggregate number of appliances expected to connect to the PostgreSQL instance, it may be necessary to alter the **`max_connections`** setting.

Because the **`postgresql.conf`** file controls the operation of all databases managed by a single instance of PostgreSQL, do not mix CloudForms Management Engine databases with other types of databases in a single PostgreSQL instance.

NOTE

CloudForms Management Engine 4.x requires PostgreSQL version 9.4.

1. Start the appliance and open a terminal from your virtualization or cloud provider.
2. After starting the appliance, log in with a user name of **`root`** and the default password of **`smartvm`**. This displays the Bash prompt for the **`root`** user.
3. Enter the **`appliance_console`** command. The CloudForms Management Engine Appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Select **8) Configure Database** from the menu.
6. You are prompted to create or fetch a security key.
   - If this is the first CFME appliance, select the option to create a key.
   - If this is not the first CFME appliance, select the option to fetch the key from the first CFME appliance. All CFME appliances in a multi-region deployment must use the same key.
7. Choose **2) External** for the database location.
8. Enter the database hostname or IP address when prompted.
9. Enter the database name or leave blank for the default (**`vmdb_production`**).
10. Enter the database username or leave blank for the default (**`root`**).
11. Enter the chosen database user’s password.
12. Confirm the configuration if prompted.

CloudForms Management Engine configures the external database.

2.6. CONFIGURING A WORKER APPLIANCE FOR CLOUDFORMS MANAGEMENT ENGINE

You can configure a worker appliance through the terminal. These steps demonstrate how to join a worker appliance to an appliance that already has a region configured with a database.

1. Start the appliance and open a terminal from your virtualization or cloud provider.
2. After starting the appliance, log in with a user name of **`root`** and the default password of **`smartvm`**. This displays the Bash prompt for the **`root`** user.
3. Enter the **`appliance_console`** command. The CloudForms Management Engine Appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Select **8) Configure Database** from the menu.
6. You are prompted to create or fetch a security key. Select the option to fetch the key from the first CFME appliance. All CFME appliances in a multi-region deployment must use the same key.
7. Choose **2) External** for the database location.
8. Enter the database hostname or IP address when prompted.
9. Enter the database name or leave blank for the default (**`vmdb_production`**).
10. Enter the database username or leave blank for the default (**`root`**).
11. Enter the chosen database user’s password.
12. Confirm the configuration if prompted. == Additional Requirements

2.7. INSTALLING VMWARE VDDK ON CLOUDFORMS MANAGEMENT ENGINE

Execution of SmartState Analysis on virtual machines within a VMware environment requires the Virtual Disk Development Kit (VDDK). CloudForms Management Engine supports **`VDDK 5.5`**.

1. Download **`VDDK 5.5`** (**`VMware-vix-disklib-5.5.0-1284542.x86_64.tar.gz`** at the time of this writing) from the VMware website.

   NOTE

   If you do not already have a login ID to VMware, then you will need to create one. At the time of this writing, the file can be found by navigating to **Downloads** → **All Downloads** → **Drivers & Tools** → **VMware vSphere** → **Drivers & Tools**. Expand **Automation Tools and SDKs**, and select **`vSphere Virtual Disk Development Kit 5.5`**. Alternatively, find the file by searching for it using the **Search** on the VMware site.

2. Download and copy the **`VMware-vix-disklib-5.5.0-1284542.x86_64.tar.gz`** file to the **`/root`** directory of the appliance.
3. Start an **`SSH`** session into the appliance.
4. Extract and install **`VDDK 5.5.`** using the following commands:

```
# cd /root
# tar -xvf VMware-vix-disklib-5.5.0-1284542.x86_64.tar.gz
# cd vmware-vix-disklib-distrib
# /vmware-install.pl
```

5. Accept the defaults during the installation

```
Installing VMware VIX DiskLib API. You must read and accept the
VMware VIX DiskLib API End User License Agreement to continue. Press
enter to display it. Do you accept? (yes/no) yes

Thank you. What prefix do you want to use to install VMware VIX
DiskLib API? The prefix is the root directory where the other
folders such as man, bin, doc, lib, etc. will be placed. [/usr]
(Press Enter)

The installation of VMware VIX DiskLib API 5.5.0 build-1284542 for
Linux completed successfully. You can decide to remove this software
from your system at any time by invoking the following command:
"/usr/bin/vmware-uninstall-vix-disklib.pl". Enjoy, --the VMware team
```

6. Run **ldconfig** in order for CloudForms Management Engine to find the newly installed **VDDK** library.

NOTE

Use the following command to verify the VDDK files are listed and accessible to the appliance:

```
# ldconfig -p | grep vix
```

7. Restart the CloudForms Management Engine Appliance.

The **VDDK** is now installed on the CloudForms Management Engine Appliance. This enables use of the **SmartState Analysis Server Role** on the appliance.