



Red Hat CloudForms 4.6

Installing Red Hat CloudForms on Red Hat OpenStack Platform

How to install and configure Red Hat CloudForms on a Red Hat OpenStack Platform environment

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Abstract

This guide provides instructions on how to install and configure Red Hat CloudForms on a Red Hat OpenStack Platform environment. 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 RED HAT CLOUDFORMS

Installing Red Hat CloudForms consists of the following steps:

1. Downloading the appliance for your environment as a virtual machine image template.
2. Setting up a virtual machine based on the appliance.
3. Configuring the CloudForms appliance.

After you have completed all the procedures in this guide, you will have a working environment on which additional customizations and configurations can be performed.

1.1. OBTAINING THE 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.
5. From the list of installers and images, click the **Download Now** link for **CFME OpenStack Virtual Appliance**.

1.2. UPLOADING THE APPLIANCE ON OPENSTACK

Log in to your OpenStack dashboard to upload your Red Hat CloudForms 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 Red Hat CloudForms appliance.

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						+ Add Rule	x Delete Rules
<input type="checkbox"/>	Direction	Ether Type	IP Protocol	Port Range	Remote	Actions	
<input type="checkbox"/>	Egress	IPv4	Any	-	0.0.0.0/0 (CIDR)	Delete Rule	
<input type="checkbox"/>	Ingress	IPv6	Any	-	default	Delete Rule	
<input type="checkbox"/>	Ingress	IPv4	Any	-	default	Delete Rule	
<input type="checkbox"/>	Egress	IPv6	Any	-	:::0 (CIDR)	Delete Rule	

3. Click **Add Rule**.

Add Rule x

Rule *

Custom TCP Rule

Direction

Ingress

Open Port *

Port

Port

Remote *

CIDR

CIDR

0.0.0.0/0

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.

Cancel
Add

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

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 Red Hat CloudForms on a Red Hat OpenStack m1.large flavor, which specifies a virtual machine with 4 cores, 12 GB RAM, and 80 GB disk space. Creating a flavor to run Red Hat CloudForms is optional.

The following procedure demonstrates creating a flavor with the minimum requirements (4 cores, 12 GB RAM, 44 GB disk space) for Red Hat CloudForms. 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 Red Hat CloudForms system requirements.
 - a. Enter a name for the flavor.
 - b. Enter the following settings:
 - **VCPUs:** 4
 - **RAM MB:** 12288
 - **Root Disk GB:** 45
 - **Ephemeral Disk GB:** 0
 - **Swap Disk MB:** 0
5. Click **Create Flavor**.

A new flavor specific to Red Hat CloudForms is created.

1.5. LAUNCHING THE 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 *

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 RED HAT CLOUDFORMS

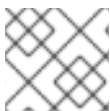
After installing CloudForms and running it for the first time, you must perform some basic configuration. To configure CloudForms, you must at a minimum:

1. Add a disk to the infrastructure hosting your appliance.
2. Configure the database.

Configure the CloudForms appliance using the internal appliance console.

2.1. ACCESSING THE APPLIANCE CONSOLE

1. Start the appliance and open a terminal console.
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 Red Hat CloudForms appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Press the number for the item you want to change, and press **Enter**. The options for your selection are displayed.
6. Follow the prompts to make the changes.
7. Press **Enter** to accept a setting where applicable.



NOTE

The CloudForms appliance console automatically logs out after five minutes of inactivity.

2.2. CONFIGURING A DATABASE

CloudForms uses a database to store information about the environment. Before using CloudForms, configure the database options for it; CloudForms provides the following two options for database configuration:

- Install an internal PostgreSQL database to the appliance
- Configure the appliance to use an external PostgreSQL database

2.2.1. Configuring an Internal Database



IMPORTANT

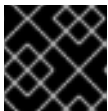
Before installing an internal database, add a disk to the infrastructure hosting your appliance. See the documentation specific to your infrastructure for instructions for adding a disk. As a storage disk usually cannot be added while a virtual machine is running, Red Hat recommends adding the disk before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

1. Start the appliance and open a terminal console.
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 Red Hat CloudForms appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Select **5) Configure Database** from the menu.
6. You are prompted to create or fetch an encryption key.
 - If this is the first Red Hat CloudForms appliance, choose **1) Create key**.
 - If this is not the first Red Hat CloudForms appliance, choose **2) Fetch key from remote machine** to fetch the key from the first appliance. For worker and multi-region setups, use this option to copy key from another appliance.

**NOTE**

All CloudForms appliances in a multi-region deployment must use the same key.

7. Choose **1) Create Internal Database** for the database location.
8. Choose a disk for the database. This can be either a disk you attached previously, or a partition on the current disk.

**IMPORTANT**

Red Hat recommends using a separate disk for the database.

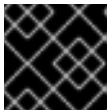
If there is an unpartitioned disk attached to the virtual machine, the dialog will show options similar to the following:

- ```
1) /dev/vdb: 20480
2) Don't partition the disk
```

- Enter **1** to choose **/dev/vdb** for the database location. This option creates a logical volume using this device and mounts the volume to the appliance in a location appropriate for storing the database. The default location is **/var/opt/rh/rh-postgresql95/lib/pgsql**, which can be found in the environment variable **\$APPLIANCE\_PG\_MOUNT\_POINT**.
  - Enter **2** to continue without partitioning the disk. A second prompt will confirm this choice. Selecting this option results in using the root filesystem for the data directory (not advised in most cases).
9. Enter **Y** or **N** for **Should this appliance run as a standalone database server?**
    - Select **Y** to configure the appliance as a database-only appliance. As a result, the appliance is configured as a basic PostgreSQL server, without a user interface.

- Select **N** to configure the appliance with the full administrative user interface.

10. When prompted, enter a unique number to create a new region.



### IMPORTANT

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

11. Create and confirm a password for the database.

Red Hat CloudForms then configures the internal database. This takes a few minutes. After the database is created and initialized, you can log in to CloudForms.

## 2.2.2. Configuring an External Database

Based on your setup, you will choose to configure the appliance to use an external PostgreSQL database. For example, we can only have one database in a single region. However, a region can be segmented into multiple zones, such as database zone, user interface zone, and reporting zone, where each zone provides a specific function. The appliances in these zones must be configured to use an external database.

The `postgresql.conf` file used with Red Hat CloudForms 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 Red Hat CloudForms databases use a `postgresql.conf` file based on the standard file used by the Red Hat CloudForms 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.



### NOTE

- Red Hat CloudForms 4.x requires PostgreSQL version 9.5.
- Because the `postgresql.conf` file controls the operation of all databases managed by a single instance of PostgreSQL, do not mix Red Hat CloudForms databases with other types of databases in a single PostgreSQL instance.

1. Start the appliance and open a terminal console.
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 Red Hat CloudForms appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Select **5) Configure Database** from the menu.
6. You are prompted to create or fetch a security key.

- If this is the first Red Hat CloudForms appliance, choose **1) Create key**.
- If this is not the first Red Hat CloudForms appliance, choose **2) Fetch key from remote machine** to fetch the key from the first appliance.

**NOTE**

All CloudForms appliances in a multi-region deployment must use the same key.

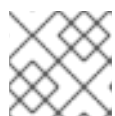
7. Choose **2) Create Region in External Database** for the database location.
8. Enter the database hostname or IP address when prompted.
9. Enter the database name or leave blank for the default (**vmdb\_production**).
10. Enter the database username or leave blank for the default (**root**).
11. Enter the chosen database user's password.
12. Confirm the configuration if prompted.

Red Hat CloudForms will then configure the external database.

## 2.3. CONFIGURING A WORKER APPLIANCE

You can use multiple appliances to facilitate horizontal scaling, as well as for dividing up work by roles. Accordingly, configure an appliance to handle work for one or many roles, with workers within the appliance carrying out the duties for which they are configured. You can configure a worker appliance through the terminal. The following 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 console.
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 Red Hat CloudForms appliance summary screen displays.
4. Press **Enter** to manually configure settings.
5. Select **5) Configure Database** from the menu.
6. You are prompted to create or fetch a security key. Since this is not the first Red Hat CloudForms appliance, choose **2) Fetch key from remote machine**. For worker and multi-region setups, use this option to copy the security key from another appliance.

**NOTE**

All CloudForms appliances in a multi-region deployment must use the same key.

7. Choose **3) Join Region in External Database** for the database location.
8. Enter the database hostname or IP address when prompted.

9. Enter the port number or leave blank for the default (**5432**).
10. Enter the database name or leave blank for the default (**vmdb\_production**).
11. Enter the database username or leave blank for the default (**root**).
12. Enter the chosen database user's password.
13. Confirm the configuration if prompted.



## CHAPTER 3. LOGGING IN AFTER INSTALLING RED HAT CLOUDFORMS

Once Red Hat CloudForms is installed, you can log in and perform administration tasks.

Log in to Red Hat CloudForms for the first time after installing by:

1. Navigate to the URL for the login screen. (<https://xx.xx.xx.xx> on the virtual machine instance)
2. Enter the default credentials (Username: **admin** | Password: **smartvm**) for the initial login.
3. Click **Login**.

### 3.1. CHANGING THE DEFAULT LOGIN PASSWORD

Change your password to ensure more private and secure access to Red Hat CloudForms.

1. Navigate to the URL for the login screen. (<https://xx.xx.xx.xx> on the virtual machine instance)
2. Click **Update Password** beneath the **Username** and **Password** text fields.
3. Enter your current **Username** and **Password** in the text fields.
4. Input a new password in the **New Password** field.
5. Repeat your new password in the **Verify Password** field.
6. Click **Login**.

## APPENDIX A. APPENDIX

### A.1. APPLIANCE CONSOLE COMMAND-LINE INTERFACE (CLI)

Currently, the `appliance_console_cli` feature is a subset of the full functionality of the `appliance_console` itself, and covers functions most likely to be scripted using the command-line interface (CLI).

1. After starting the Red Hat CloudForms 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_cli` or `appliance_console_cli --help` command to see a list of options available with the command, or simply enter `appliance_console_cli --option <argument>` directly to use a specific option.

**Table A.1. Database Configuration Options**

| Option                       | Description                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------|
| <code>--region (-r)</code>   | region number (create a new region in the database - requires database credentials passed) |
| <code>--internal (-i)</code> | internal database (create a database on the current appliance)                             |
| <code>--dbdisk</code>        | database disk device path (for configuring an internal database)                           |
| <code>--hostname (-h)</code> | database hostname                                                                          |
| <code>--port</code>          | database port (defaults to <b>5432</b> )                                                   |
| <code>--username (-U)</code> | database username (defaults to <b>root</b> )                                               |
| <code>--password (-p)</code> | database password                                                                          |
| <code>--dbname (-d)</code>   | database name (defaults to <b>vmdb_production</b> )                                        |

**Table A.2. v2\_key Options**

| Option                        | Description                                |
|-------------------------------|--------------------------------------------|
| <code>--key (-k)</code>       | create a new v2_key                        |
| <code>--fetch-key (-K)</code> | fetch the v2_key from the given host       |
| <code>--force-key (-f)</code> | create or fetch the key even if one exists |

| Option        | Description                                                     |
|---------------|-----------------------------------------------------------------|
| --sshlogin    | ssh username for fetching the v2_key (defaults to <b>root</b> ) |
| --sshpassword | ssh password for fetching the v2_key                            |

Table A.3. IPA Server Options

| Option               | Description                                                                                      |
|----------------------|--------------------------------------------------------------------------------------------------|
| --host (-H)          | set the appliance hostname to the given name                                                     |
| --ipaserver (-e)     | IPA server FQDN                                                                                  |
| --ipapincipal (-n)   | IPA server principal (default: <b>admin</b> )                                                    |
| --ipapassword (-w)   | IPA server password                                                                              |
| --ipadomain (-o)     | IPA server domain (optional). Will be based on the appliance domain name if not specified.       |
| --iparealm (-l)      | IPA server realm (optional). Will be based on the domain name of the ipaserver if not specified. |
| --uninstall-ipa (-u) | uninstall IPA client                                                                             |

**NOTE**

- In order to configure authentication through an IPA server, in addition to using **Configure External Authentication (httpd)** in the **appliance\_console**, external authentication can be optionally configured via the **appliance\_console\_cli** (command-line interface).
- Specifying **--host** will update the hostname of the appliance. If this step was already performed via the **appliance\_console** and the necessary updates made to **/etc/hosts** if DNS is not properly configured, the **--host** option can be omitted.

Table A.4. Certificate Options

| Option                      | Description                                        |
|-----------------------------|----------------------------------------------------|
| --ca (-c)                   | CA name used for certmonger (default: <b>ipa</b> ) |
| --postgres-client-cert (-g) | install certs for postgres client                  |
| --postgres-server-cert      | install certs for postgres server                  |

| Option              | Description                                                                    |
|---------------------|--------------------------------------------------------------------------------|
| --http-cert         | install certs for http server (to create certs/httpd* values for a unique key) |
| --extauth-opts (-x) | external authentication options                                                |



## NOTE

The certificate options augment the functionality of the **certmonger** tool and enable creating a certificate signing request (CSR), and specifying **certmonger** the directories to store the keys.

**Table A.5. Other Options**

| Option         | Description                                                                               |
|----------------|-------------------------------------------------------------------------------------------|
| --logdisk (-l) | log disk path                                                                             |
| --tmpdisk      | initialize the given device for temp storage (volume mounted at <b>/var/www/miq_tmp</b> ) |
| --verbose (-v) | print more debugging info                                                                 |

## Example Usage

```
$ ssh root@appliance.test.company.com
```

To create a new database locally on the server using **/dev/sdb**:

```
appliance_console_cli --internal --dbdisk /dev/sdb --region 0 --password smartvm
```

To copy the **v2\_key** from a host *some.example.com* to local machine:

```
appliance_console_cli --fetch-key some.example.com --sshlogin root --sshpassword smartvm
```

You could combine the two to join a region where *db.example.com* is the appliance hosting the database:

```
appliance_console_cli --fetch-key db.example.com --sshlogin root --sshpassword smartvm --hostname db.example.com --password mydatabasepassword
```

To configure external authentication:

-

```
appliance_console_cli --host appliance.test.company.com
 --ipaserver ipaserver.test.company.com
 --ipadomain test.company.com
 --iparealm TEST.COMPANY.COM
 --ipaprincipal admin
 --ipapassword smartvm1
```

To uninstall external authentication:

```
appliance_console_cli --uninstall-ipa
```