# Red Hat CloudForms 4.5

## Installing Red Hat CloudForms on VMware vSphere

How to install and configure Red Hat CloudForms on a VMware vSphere environment

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# Red Hat CloudForms 4.5 Installing Red Hat CloudForms on VMware vSphere

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## Legal Notice



## Abstract

This guide provides instructions on how to install and configure Red Hat CloudForms on a VMware vSphere 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

Red Hat CloudForms is able to be installed and ready to configure in a few quick steps. After downloading Red Hat CloudForms 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 Red Hat CloudForms appliance, you must configure the database for Red Hat CloudForms. See Section 2.3, “Configuring a Database for Red Hat CloudForms”.

## 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** → **Download Latest** to access the product download page.
5. From the list of installers and images, select the **CFME VMware Virtual Appliance** download link.

## 1.2. UPLOADING THE APPLIANCE ON VMWARE VSPHERE

Uploading the Red Hat CloudForms appliance file onto VMware vSphere systems has the following requirements:

- 44 GB of space on the chosen vSphere datastore.
- 12 GB RAM.
- 4 VCPUs.
- Administrator access to the vSphere Client.
- Depending on your infrastructure, allow time for the upload.

**NOTE**

These are the procedural steps as of the time of writing. For more information, consult the VMware documentation.

Use the following procedure to upload the Red Hat CloudForms appliance OVF template from your local file system using the vSphere Client.

1. In the vSphere Client, select **File** → **Deploy OVF Template**. The Deploy OVF Template wizard appears.
2. Specify the source location and click **Next**.

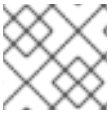
- Select **Deploy from File** to browse your file system for the OVF template, for example **`cfme-vsphere-5.4-43.x86_64.vsphere.ova`**.
- Select **Deploy from URL** to specify a URL to an OVF template located on the internet.

3. View the **OVF Template Details** page and click **Next**.
4. Select the deployment configuration from the drop-down menu and click **Next**. The option selected typically controls the memory settings, number of CPUs and reservations, and application-level configuration parameters.
5. Select the host or cluster on which you want to deploy the OVF template and click **Next**.
6. Select the host on which you want to run the run the Red Hat CloudForms appliance, and click **Next**.
7. Navigate to, and select the resource pool where you want to run the Red Hat CloudForms appliance and click **Next**.
8. Select a datastore to store the deployed Red Hat CloudForms appliance, and click Next. Ensure to select a datastore large enough to accommodate the virtual machine and all of its virtual disk files.
9. Select the disk format to store the virtual machine virtual disks, and click **Next**.
   - Select **Thin Provisioned** if the storage is allocated on demand as data is written to the virtual disks.
   - Select **Thick Provisioned** if all storage is immediately allocated.
10. For each network specified in the OVF template, select a network by right-clicking the **Destination Network** column in your infrastructure to set up the network mapping and click **Next**.
11. The **IP Allocation** page does not require any configuration changes. Leave the default settings in the **IP Allocation** page and click **Next**.
12. Set the user-configurable properties and click **Next**. The properties to enter depend on the selected IP allocation scheme. For example, you are prompted for IP related information for the deployed virtual machines only in the case of a fixed IP allocation scheme.
13. Review your settings and click **Finish**.

The progress of the import task appears in the vSphere Client Status panel.

# CHAPTER 2. CONFIGURING RED HAT CLOUDFORMS

Although the Red Hat CloudForms appliance comes configured to be integrated immediately into your environment, you can make some changes to its configuration.



**NOTE**

The Red Hat CloudForms appliance is intended to have minimal configuration options.

## 2.1. CHANGING CONFIGURATION SETTINGS

The following procedure describes how to make changes to the configuration settings on the Red Hat CloudForms appliance.

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.

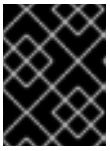
**NOTE**

The Red Hat CloudForms 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 Red Hat CloudForms 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 Red Hat CloudForms appliance.
- Use **Test Network Configuration** to check that name resolution is working correctly.
- Use **Set Hostname** to specify a hostname for the Red Hat CloudForms appliance.



**IMPORTANT**

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

- Use **Set Timezone** to configure the time zone for the Red Hat CloudForms appliance.
- Use **Set Date and Time** to configure the date and time for the Red Hat CloudForms appliance.
- Use **Restore Database from Backup** to restore the Virtual Management Database (VMDB) from a previous backup.
- Use **Setup Database Region** to create regions for VMDB replication.
- Use **Configure Database** to configure the VMDB. Use this option to configure the database for the appliance after installing and running it for the first time.
- Use **Configure Database Replication** to configure a primary or standby server for VMDB replication.
- Use **Configure Database Maintenance** to configure the VMDB maintenance schedule.
- Use **Configure Application Database Failover Monitor** to start or stop VMDB failover monitoring.
- 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 EVM Server Processes** to stop all server processes. You may need to do this to perform maintenance.
- Use **Start EVM Server Processes** to start the server. You may need to do this after performing maintenance.
- Use **Restart Appliance** to restart the Red Hat CloudForms 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 Red Hat CloudForms appliance.
- Use **Quit** to leave the Red Hat CloudForms appliance console.

## 2.3. CONFIGURING A DATABASE FOR RED HAT CLOUDFORMS

Before using Red Hat CloudForms, configure the database options for it. Red Hat CloudForms provides two options for database configuration:

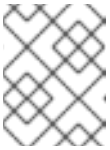
- Install an internal PostgreSQL database to the appliance
- Configure the appliance to use an external PostgreSQL database

### 2.3.1. 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.

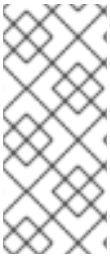
Red Hat CloudForms then configures the internal database.

### 2.3.2. 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 9.4.
- 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.

## 2.4. 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 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**).

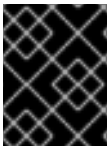
11. Enter the database username or leave blank for the default (**root**).

12. Enter the chosen database user's password.

13. Confirm the configuration if prompted.

# CHAPTER 3. ADDITIONAL CONFIGURATION FOR APPLIANCES ON VMWARE VSPHERE

## 3.1. INSTALLING VMWARE VDDK ON CLOUDFORMS



**IMPORTANT**

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

To install VMware VDDK:

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**. Select **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
```

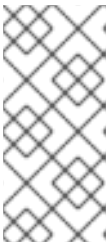
5. Accept the defaults during the installation:

```
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** to instruct CloudForms 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 appliance.

The VDDK is now installed on the CloudForms appliance. This enables use of the SmartState Analysis server role on the appliance.

## 3.2. TUNING APPLIANCE PERFORMANCE

By default, the CloudForms appliance uses the **tuned** service and its **virtual-guest** profile to optimize performance. In most cases, this profile provides the best performance for the appliance.

However on some VMware setups (for example, with a large vCenter database), the following additional tuning may further improve appliance performance:

- When using the **virtual-guest** profile in **tuned**, edit the **vm.swappiness** setting to **1** in the **tuned.conf** file from the default of **vm.swappiness = 30**.
- Use the **noop** scheduler instead. See the VMware documentation for more details on the best scheduler for your environment. See Setting the Default I/O Scheduler in the Red Hat Enterprise Linux *Performance Tuning Guide* for instructions on changing the default I/O scheduler.

# CHAPTER 4. 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**.

## 4.1. 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 |
|---|---|
| --region (-r) | region number (create a new region in the database - requires database credentials passed) |
| --internal (-i) | internal database (create a database on the current appliance) |
| --dbdisk | database disk device path (for configuring an internal database) |
| --hostname (-h) | database hostname |
| --port | database port (defaults to **5432**) |
| --username (-U) | database username (defaults to **root**) |
| --password (-p) | database password |
| --dbname (-d) | database name (defaults to **vmdb_production**) |

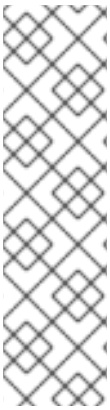
**Table A.2. v2_key Options**

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

| Option | Description |
| --- | --- |
| --sshlogin | ssh username for fetching the v2_key (defaults to **root**) |
| --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 |
| --ipaprincipal (-n) | IPA server principal (default: **admin**) |
| --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 |



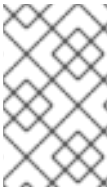
**NOTE**

- 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: **ipa**) |
| --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 **`/var/www/miq_tmp`**) |
| --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
```