Red Hat OpenStack Platform 8
QuickStart Guide for CloudForms with Red Hat OpenStack Platform

Getting started with CloudForms on Red Hat OpenStack Platform

OpenStack Team

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Abstract

Getting started with CloudForms on Red Hat OpenStack Platform

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CHAPTER 1. INTRODUCTION TO RED HAT CLOUDFORMS

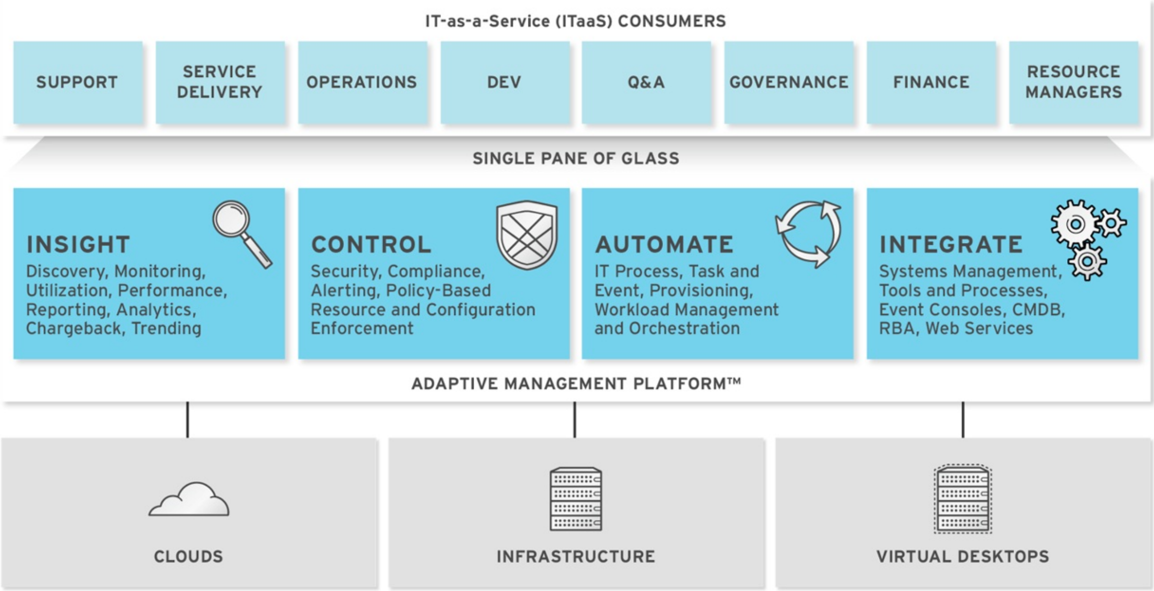
CloudForms Management Engine delivers the insight, control, and automation that enterprises need to address the challenges of managing virtual environments. This technology enables enterprises with existing virtual infrastructures to improve visibility and control, and those starting virtualization deployments to build and operate a well-managed virtual infrastructure.

Red Hat CloudForms 4.0 is comprised of a single component, the *CloudForms Management Engine*. It has the following feature sets:

- Insight: Discovery, Monitoring, Utilization, Performance, Reporting, Analytics, Chargeback, and Trending.
- Control: Security, Compliance, Alerting, Policy-Based Resource, and Configuration Enforcement.
- Automate: IT Process, Task and Event, Provisioning, and Workload Management and Orchestration.
- Integrate: Systems Management, Tools and Processes, Event Consoles, Configuration Management Database (CMDB), Role-based Administration (RBA), and Web Services.

1.1. ARCHITECTURE

The diagram below describes the capabilities of *CloudForms Management Engine*. Its features are designed to work together to provide robust management and maintenance of your virtual infrastructure.


IT-as-a-Service (ITaaS) CONSUMERS
SUPPORT
SERVICE DELIVERY
OPERATIONS
DEV
Q&A
GOVERNANCE
FINANCE
RESOURCE MANAGERS
SINGLE PANE OF GLASS
INSIGHT
Discovery, Monitoring, Utilization, Performance, Reporting, Analytics, Chargeback, Trending
CONTROL
Security, Compliance, Alerting, Policy-Based Resource and Configuration Enforcement
AUTOMATE
IT Process, Task and Event, Provisioning, Workload Management and Orchestration
INTEGRATE
Systems Management, Tools and Processes, Event Consoles, CMDB, RBA, Web Services
ADAPTIVE MANAGEMENT PLATFORM™
CLOUDS
INFRASTRUCTURE
VIRTUAL DESKTOPS

The architecture comprises the following components:

- The *CloudForms Management Engine* Appliance (Appliance) which is supplied as a secure, high-performance, preconfigured virtual machine. It provides support for HTTPS communications.
- The *CloudForms Management Engine* Server (Server) resides on the Appliance. It is the software layer that communicates between the SmartProxy and the Virtual Management Database. It includes support for HTTPS communications.
- The Virtual Management Database (VMDB) resides either on the Appliance or another computer

accessible to the Appliance. It is the definitive source of intelligence collected about your Virtual Infrastructure. It also holds status information regarding Appliance tasks.

- The *CloudForms Management Engine* Console (Console) is the Web interface used to view and control the Server and Appliance. It is consumed through Web 2.0 mash-ups and web services (WS Management) interfaces.
- The SmartProxy can reside on the Appliance or on an ESX Server. If not embedded in the Server, the SmartProxy can be deployed from the Appliance. A SmartProxy agent must be configured in each storage location, and must be visible to the Appliance. The SmartProxy acts on behalf of the Appliance communicating with it over HTTPS on standard port 443.

1.2. REQUIREMENTS

To use *CloudForms Management Engine*, the following requirements must be met:

- One of the following web browsers:
  - Mozilla Firefox for versions supported under Mozilla's Extended Support Release (ESR)
  - Internet Explorer 8, or higher
  - Google Chrome for Business
- A monitor with a minimum resolution of 1280x1024.
- Adobe Flash Player 9, or above. At the time of publication, you can access it at http://www.adobe.com/products/flashplayer/
- The *CloudForms Management Engine* Appliance must already be installed and activated in your enterprise environment.
- The SmartProxy must have visibility to the virtual machines and cloud instances that you want to control.
- The resources that you want to control must have a SmartProxy associated with them.

Important

Due to browser limitations, Red Hat supports logging in to only one tab for each multi-tabbed browser. Console settings are saved for the active tab only. For the same reason, *CloudForms Management Engine* does not guarantee that the browser's **Back** button will produce the desired results. Red Hat recommends using the breadcrumbs provided in the Console.

1.3. GETTING HELP AND GIVING FEEDBACK

If you experience difficulty with a procedure described in this documentation, visit the Red Hat Customer Portal at http://access.redhat.com. Through the Customer Portal, you can:

- Search or browse through a knowledgebase of technical support articles about Red Hat products.
- Submit a support case to Red Hat Global Support Services (GSS).
- Access other product documentation.

Red Hat also hosts a large number of electronic mailing lists for discussion of Red Hat software and technology. You can find a list of publicly available mailing lists at https://www.redhat.com/mailman/listinfo. Click on the name of any mailing list to subscribe to that list or to access the list archives.

1.4. DOCUMENTATION FEEDBACK

If you find a typographical error in this manual, or if you have thought of a way to make this manual better, please submit a report to GSS through the customer portal.

When submitting a report, be sure to mention the manual's identifier: **`QuickStart Guide for CloudForms with OpenStack`**

- If you have a suggestion for improving the documentation, try to be as specific as possible when describing it.
- If you have found an error, please include the section number and some of the surrounding text so that we can easily find it.

CHAPTER 2. INSTALLING CLOUDFORMS

Red Hat CloudForms can be installed on a number of virtualization platforms, such as VMware vSphere, and Red Hat Enterprise Virtualization. This chapter describes how to install and configure Red Hat CloudForms on *Red Hat OpenStack Platform*.

CloudForms Management Engine can be installed and configured in a few quick steps. After downloading the *CloudForms Management Engine* appliance from the Red Hat Customer Portal, the installation process takes you through the steps of uploading it to a supported virtualization environment or cloud provider.

Note

After installing the *CloudForms Management Engine* appliance, you must configure the database for Red Hat CloudForms. See Section 2.7, “Configuring a Database for CloudForms Management Engine”.

2.1. 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**.

2.2. UPLOADING THE APPLIANCE TO OPENSTACK

Log in to your OpenStack dashboard to upload the *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 from an HTTP URL are supported.

6. In **Image Location**, enter the external (HTTP) URL you will 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**.

The appliance’s 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`**.

2.3. ADDING A RULE TO A SECURITY GROUP

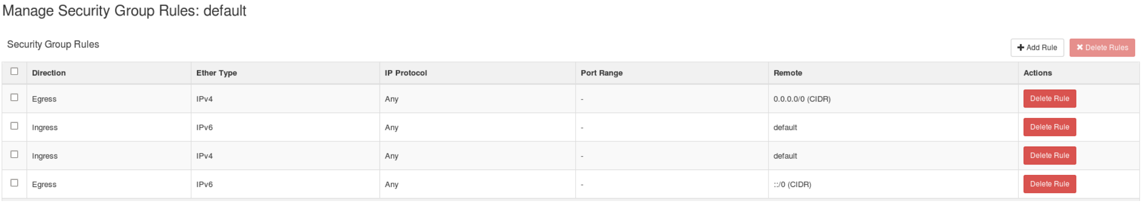
Security groups allow you to control whether network traffic can reach an instance on its public IP address. Note that the security group rules are processed before the network traffic reaches the firewall rules defined within the instance itself.

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.

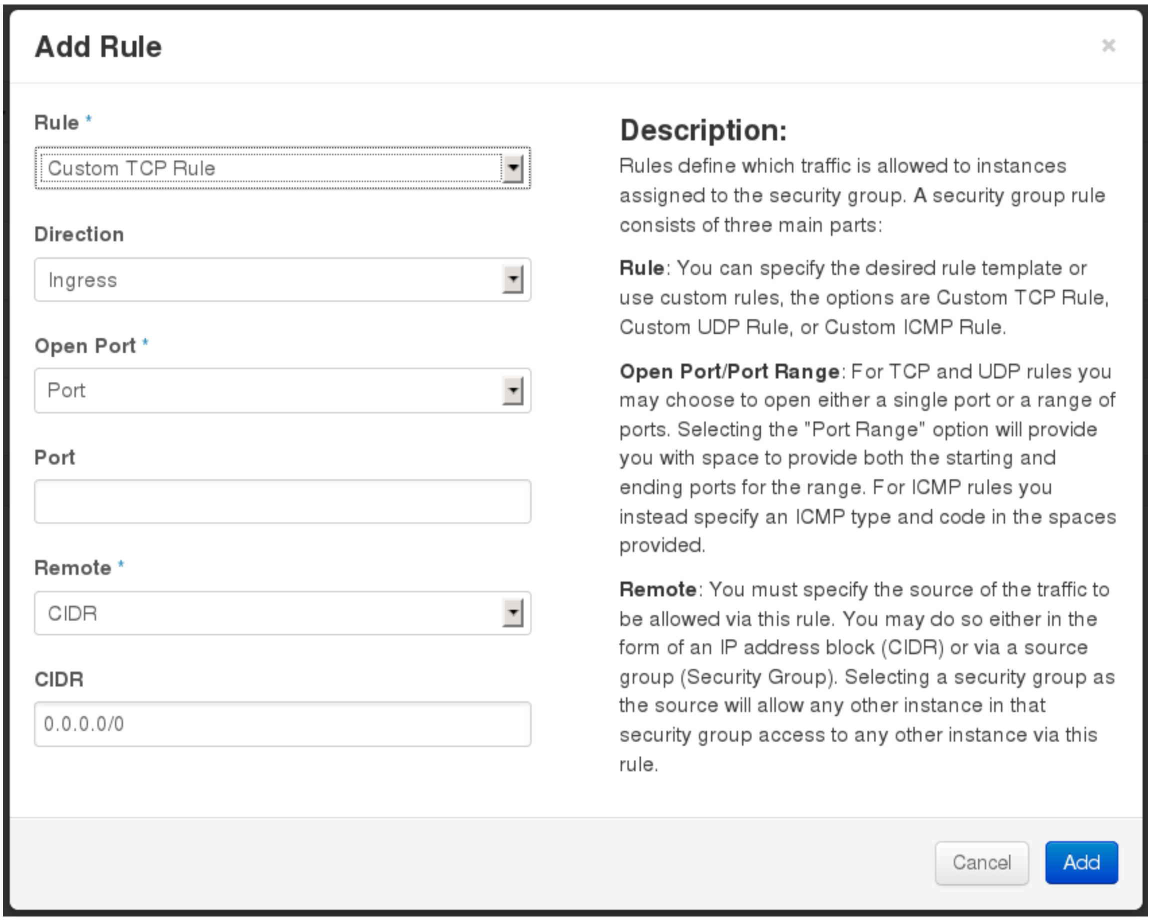


Manage Security Group Rules: default

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**.



Add Rule

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.

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**.

2.4. 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. For example, you can 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 how to create a flavor with the minimum requirements (4 vCPUs, 6GB RAM, 40GB disk space) for *CloudForms Management Engine*. For more information about flavors, see the *Red Hat Enterprise Linux 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**.

As a result, a new flavor specific to *CloudForms Management Engine* is created.

2.5. LAUNCHING THE CLOUDFORMS MANAGEMENT ENGINE APPLIANCE

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**.

2.6. ADDING A FLOATING IP ADDRESS

When you create an instance, Red Hat OpenStack Platform automatically assigns 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.

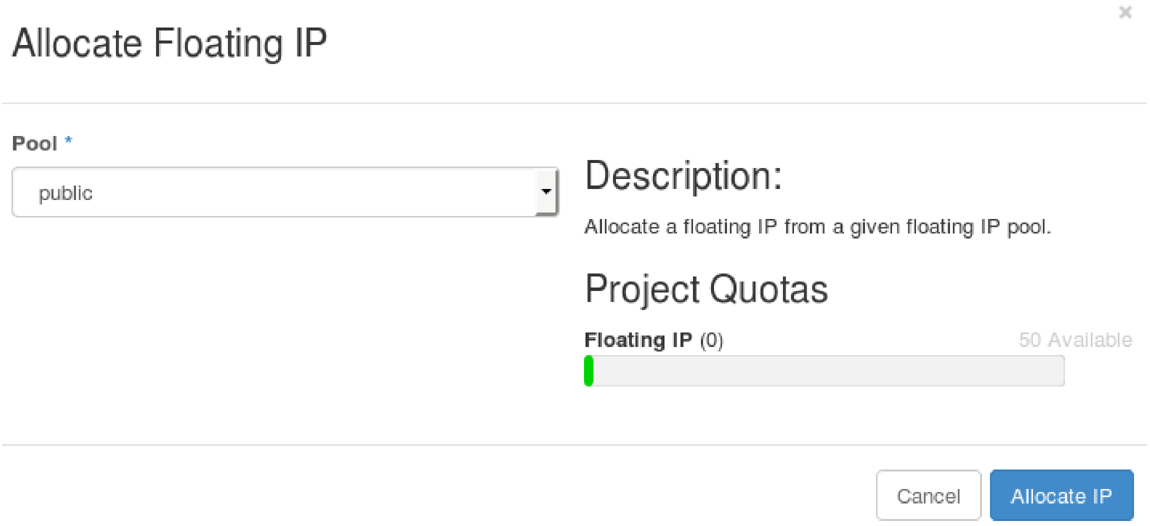
In addition to the fixed address, you can also assign a floating IP address to an instance. Unlike fixed IP addresses, you can modify floating IP addresses associations at any time, regardless of the state of the instances involved.

1. At the command-line on your Red Hat OpenStack Platform controller, 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:

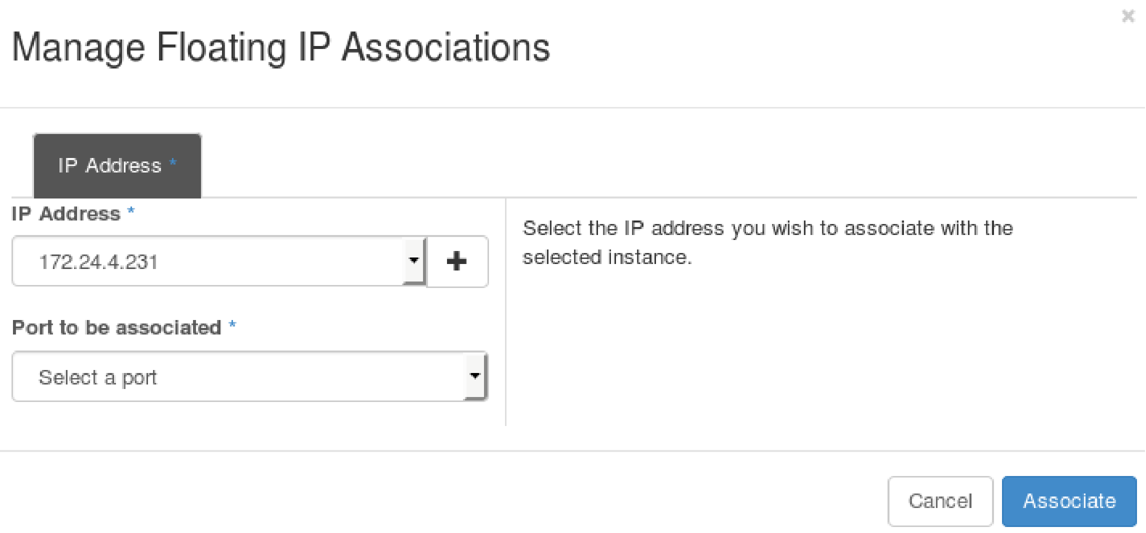
Allocate a floating IP from a given floating IP pool.

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**.

2.7. CONFIGURING A DATABASE FOR CLOUDFORMS MANAGEMENT ENGINE

Before using *CloudForms Management Engine*, you will need to 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.

2.8. 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.

2.9. 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.

CHAPTER 3. ADDING AN OPENSTACK CLOUD PROVIDER

CloudForms Management Engine supports operating with the OpenStack **`admin`** tenant. When creating an OpenStack provider in CloudForms Management Engine, select the OpenStack provider's **`admin`** user because it is the default administrator of the OpenStack**`admin`** tenant. When using the **`admin`** credentials, a user in CloudForms Management Engine provisions into the **`admin`** tenant, and sees images, networks, and instances that are associated with the **`admin`** tenant.

1. Navigate to **Clouds** → **Providers**.
2. Click ⚙ (**Configuration**), then click ➕ (**Add a New Cloud Provider**).
3. Enter a **Name** for the provider.
4. From the **Type** drop down menu select **OpenStack**.
5. Enter the **Host Name (or IPv4 or IPv6 address)** of the provider.

   Important

   The **Host Name** must use a unique fully qualified domain name.

6. Enter the **API Port** of your Keystone service. The default port is **`5000`**.

   Important

   If the Keystone service is configured to use SSL, you must enter the SSL port for Keystone.

7. Select the appropriate **API Version** from the list. The default is **`Keystone v2`**.
8. Select the appropriate **Zone** for the provider. By default, the zone is set to **default**.
9. In the **Credentials** area, under **Default**, provide the login credentials required for the Keystone user:

   Important

   To enable discovery of OpenStack cloud providers, ensure that the **`iptables`** for the OpenStack host providing Keystone services allows port 5000 access to all hosts on the same network.

   - Enter the user name in the **Username** field.
   - Enter the user password in the **Password** field.
   - Confirm the user password in the **Confirm Password** field.
   - Click **Validate** to confirm CloudForms Management Engine can connect to the OpenStack Infrastructure instance.

10. You can use AMPQ if ceilometer is not configured for *Events*. If AMQP credentials were changed during the OpenStack provider install, use the **AMQP** tab of the **Credentials** area to provide the login credentials required for the Advanced Message Queuing Protocol messaging service on your OpenStack Nova component:

    - Enter the administrative user name in the **Username** field.
    - Enter the user password in the **Password** field.
    - Confirm the user password in the **Confirm Password** field.
    - Click **Validate** to confirm CloudForms Management Engine can connect to the messaging service.

    Note

    To enable ceilometer to store events sent by OpenStack services, you will need to configure the following:

    - Undercloud - Before running *openstack undercloud install*, edit *undercloud.conf* by setting *store_events* to *true*.
    - Overcloud - On your controller, create an additional environment file called *ceilometer.yaml* with the following options:

    ```
    parameter_defaults:
      CeilometerStoreEvents: true
    ```

    Then, add this environment file to the **`overcloud deploy`** command, for example:

    ```
    openstack overcloud deploy --templates -e
    ~/ceilometer.yaml
    ```

11. Click **Add**.

Note

In order to collect inventory and metrics from an OpenStack environment, the CloudForms Management Engine Appliance requires that the adminURL endpoint for the OpenStack environment should be on a non-private network. Hence, the OpenStack adminURL endpoint should be assigned an IP address other than **`192.168.x.x`**. Additionally, make sure that all the Keystone endpoints must be accessbile, otherwise refresh will fail.

Note

For Red Hat CloudForms to be able to receive events from a Red Hat OpenStack provider, the OpenStack configuration file must be modified. Specifically, the **notification_driver** field must be defined.

For Nova and Heat, in order to start getting notifications, manually change the configuration files as below and restart services.

```
/etc/heat/heat.conf
notification_driver=glance.openstack.common.notifier.rpc_notifie
r
notification_topics=notifications
```

```
/etc/nova/nova.conf
notification_driver=messaging
notification_topics=notifications
```

CHAPTER 4. ADDING AN OPENSTACK INFRASTRUCTURE PROVIDER

After you have deployed your *CloudForms Management Engine* appliance, you can begin managing your OpenStack environment by adding it as an *OpenStack Infrastructure provider*. Supply the details of the **`admin`** account to get access to the resources in the **`admin`** tenant:

1. Navigate to **`Infrastructure > Providers`**.

2. Click ⚙ (**Configuration**), then click ✚ (**Add a New Infrastructure Provider**).

3. Enter the **Name** of the provider to add. The **Name** is how the device is labeled in the console.

4. Select **OpenStack Platform Director** from the **Type** list.

5. Enter the **Host Name or IP address(IPv4 or IPv6)** of the provider.

   > **Important**
   >
   > The **Host Name** must use a unique fully-qualified domain name (FQDN).

6. Select the **API Version** of the keystone service from the list. The default is **`Keystone v2`**.

   > **Important**
   >
   > If the keystone service is configured to use SSL, you must enter the keystone SSL port.

7. Select the appropriate **Zone** for the provider. By default, the zone is set to **`default`**.

8. In the **Credentials** area, under **Default**, provide the login credentials required for the OpenStack Infrastructure administrative user:

   - Enter the user name in the **Username** field.
   - Enter the password in the **Password** field.
   - Confirm the user password in the **Confirm Password** field.
   - Click **Validate** to confirm that the *CloudForms Management Engine* can connect to the OpenStack Infrastructure instance using the user name and password.

9. Under **AMQP**, provide the login credentials required for the Advanced Message Queuing Protocol messaging service:

   - Enter the administrative user name in the **Username** field.
   - Enter the user password in the **Password** field.
   - Confirm the user password in the **Confirm Password** field.
   - Click **Validate** to confirm CFME can connect to the messaging service.

10. Under **RSA key pair**, provide the user name and private key required to connect via SSH to all hosts in the provider:

    - Enter the administrative user name in the **Username** field.

    - Enter the private key from the machine on which OpenStack was deployed in the **Private Key** field.

11. Click **Add**.

> **Note**
>
> *CloudForms Management Engine* requires that the *adminURL* endpoint for all OpenStack services be on a non-private network. As a result, you should assign the adminURL endpoint an IP address of something other than **`192.168.x.x`**. The adminURL endpoint must be accessible to the CFME Appliance that is responsible for collecting inventory and gathering metrics from the OpenStack environment. In addition, make sure that all the keystone endpoints are accessible, otherwise the *refresh* process will fail.

4.1. CONFIGURING RED HAT CLOUDFORMS TO RECEIVE EVENTS

To allow Red Hat CloudForms to receive events from a Red Hat OpenStack Platform environment, you must configure the **notification_driver** option for the Compute service and Orchestration service in that environment.

1. Edit */etc/heat/heat.conf*, and specify the following options:

```
notification_driver=glance.openstack.common.notifier.rpc_notifier
notification_topics=notifications
```

2. Edit */etc/nova/nova.conf*, and specify the following options:

```
notification_driver=messaging
notification_topics=notifications
```

3. Restart the Compute service and Orchestration services:

```
# systemctl restart openstack-heat-api.service \
  openstack-heat-api-cfn.service \
  openstack-heat-engine.service \
  openstack-heat-api-cloudwatch.service
# systemctl restart openstack-nova-compute.service
```

4.2. CONFIGURING THE TELEMETRY SERVICE TO STORE EVENTS

By default, the Telemetry service does not store events emitted by other services in a Red Hat OpenStack Platform environment. The following procedure outlines how to enable the Telemetry service to store such events so that they are exposed to Red Hat CloudForms when a Red Hat OpenStack Platform environment is added as an infrastructure provider.

1. On the director node, edit *undercloud.conf*, and set *store_events* to *true*.

2. Create an environment file called *ceilometer.yaml*, and add the following contents:

   ```
   parameter_defaults:
     CeilometerStoreEvents: true
   ```

3. Add the environment file to the *overcloud deploy* command:

   ```
   # openstack overcloud deploy --templates -e ~/ceilometer.yaml
   ```

CHAPTER 5. CLOUDFORMS LIFECYCLE MANAGEMENT

This chapter discusses lifecycle activities that are part of the *CloudForms Management Engine* Automate component; these activies can include the provisioning and retirement of instances. *CloudForms Management Engine* Automate enables real-time, bidirectional process integration and adaptive automation for management events and administrative or operational activities.

- **Operations Management** with service level resource enforcement.
- **Resource Management** - including datastore cleanup, snapshot aging and enforcement, and virtual machine/instance aging and retirement.
- **Configuration and Change Management** - including enforced closed loop change management.
- **Lifecycle Management** - including provisioning, customization, reconfiguration, approval, CMDB updates, and retirement.

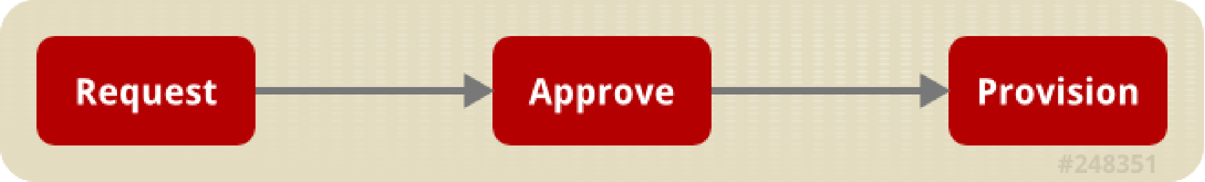
Important

Provisioning requires that the **Automation Engine** server role be enabled. Check your server role settings in **`Configure > Configuration > Server > Server Control`**.

5.1. PROVISIONING

When a virtual machine or cloud instance is provisioned, it goes through multiple phases:

- **Phase 1** - the request must be made, and includes ownership information, tags, virtual hardware requirements, the operating system, and any customization of the request.
- **Phase 2** - the request must go through an approval phase, either automatic or manual.
- **Phase 3** - the request is executed. This part of provisioning consists of pre-processing and post-processing. Pre-processing acquires IP addresses for the user, creates CMDB instances, and creates the virtual machine or instance based on information in the request. Post-processing activates the CMDB instance and emails the user. The steps for provisioning may be modified at any time using *CloudForms Management Engine*.



5.2. PROVISIONING AN OPENSTACK INSTANCE FROM AN IMAGE

Cloud instances follow the same process (Request, Approval, Deployment) as a standard virtual machine from virtualization infrastructure. First, a user makes a request for instances and specifies the image, tags, availability zone and hardware profile flavor. Second, the request goes through the approval phase. Finally, *CloudForms Management Engine* executes the request.

This procedure describes how to provision an OpenStack instance from an image:

1. Navigate to *Menu* > *Clouds* > *Instances*.

2. Click ♻ (**Lifecycle**), then click + (**Provision Instances**).

3. Select an OpenStack image from the list presented. These images must be available on your OpenStack provider.

4. Click **Continue**.

5. On the **Request** tab, enter information about this provisioning request. In **Request Information**, type in at least a first and last name and an email address. This email is used to send the requester status emails during the provisioning process for items such as auto-approval, quota, provision complete, retirement, request pending approval, and request denied. The other information is optional. If the *CloudForms Management Engine* Server is configured to use LDAP, you can use the **Look Up** button to populate the other fields based on the email address.

   > **Note**
   >
   > Parameters with a * next to the label are required to submit the provisioning request.

6. Click the **Purpose** tab to select the appropriate tags for the provisioned instance.

7. Click the **Catalog** tab for basic instance options.

   a. To change the image to use as a basis for the instance, select it from the list of images.

   b. Select the **Number of Instances** to provision.

   c. Type an **Instance Name** and **Instance Description**.

8. Click the **Environment** tab to select the instance’s **Tenant**, **Availabilty Zones**, **Cloud Network**, **Security Groups**, and **Public IP Address**. If no specific Tenant is required, select the **Choose Automatically** checkbox.

9. Click the **Properties** tab to set provider options such as flavors and security settings.

   a. Select a flavor from the **Instance Type** list.

   b. Select a **Guest Access Key Pair** for access to the instance.

10. Click the **Customize** tab to set additional instance options.

    a. Under **Credentials**, enter a **Root Password** for the **root** user access to the instance.

    b. Enter **IP Address Information** for the instance. Leave as **DHCP** for automatic IP assignment from the provider.

    c. Enter any **DNS** information for the instance if necessary.

    d. Use **Customize Template** to configure additional instance settings. You can select from the *Cloud-Init* scripts stored on your appliance.

11. Click the **Schedule** tab to set the provisioning and retirement date and time.

    a. In **Schedule Info**, choose whether the provisioning begins upon approval, or at a specific time. If you select **Schedule**, you will be prompted to enter a date and time.

    b. In **Lifespan**, select whether to power on the instances after they are created, and whether to set a retirement date. If you select a retirement period, you will be prompted for when to receive a retirement warning.

12. Click **Submit**.

The provisioning request is sent for approval. For the provisioning to begin, a user with the admin, approver, or super admin account role must approve the request. The admin and super admin roles can also edit, delete, and deny the requests. You will be able to see all provisioning requests where you are either the requester or the approver.

After submission, the appliance assigns each provision request a **Request ID**. If an error occurs during the approval or provisioning process, use this ID to locate the request in the appliance logs. The Request ID consists of the region associated with the request followed by the request number. As regions define a range of one trillion database IDs, this number can be several digits long.

Request ID Format

Request 99 in region 123 results in Request ID 123000000000099.

5.3. CONTROLLING THE POWER STATE OF AN INSTANCE

This procedure allows you to control the power states of an instance using the CloudForms Management Engine console.

1. Navigate to **`Clouds > Instances`**.
2. Click the instance to change the power state.
3. Click **Power Operations**, then click the button for the desired power operation:
    - Click ⏻ (**Start**) to start the selected instances.
    - Click ⏻ (**Terminate**) to terminate the selected instances.
    - Click ⏸ (**Suspend**) to suspend the selected instances.
    - Click 🔄 (**Reset**) to reset the selected instances.
    - Click 🟥 (**Stop Guest**) to stop the guest operating system.
    - Click 🔄 (**Restart Guest**) to restart the guest operating system.
4. Click **OK**.

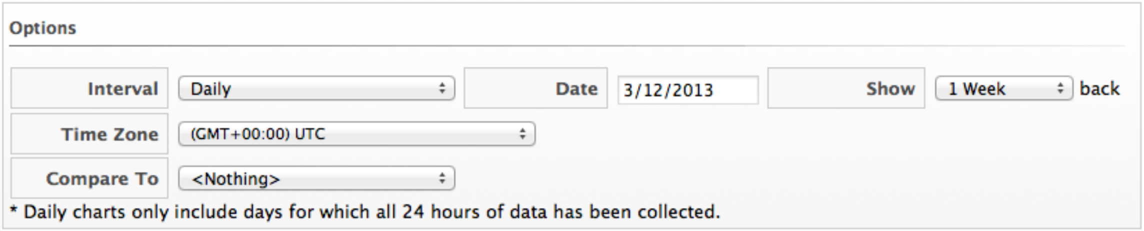
5.4. VIEWING CAPACITY AND UTILIZATION CHARTS FOR AN INSTANCE

This procedure allows you to review the capacity and utilization data for instances that are part of a cluster.

Note

To use this feature, you must have a server assigned to the **Capacity & Utilization Collector** server role. In additon, this server will require network visibility of the cloud provider. For more information, see the CloudForms General Configuration guide.

1. Navigate to **Clouds** → **Instances**.
2. Click the accordion to view capacity data.
3. Click the item to view.
4. Click (**Monitoring**), and then (**Utilization**) on the taskbar.
5. Select to view hourly, most recent hour, or daily data points for the dates to view data.

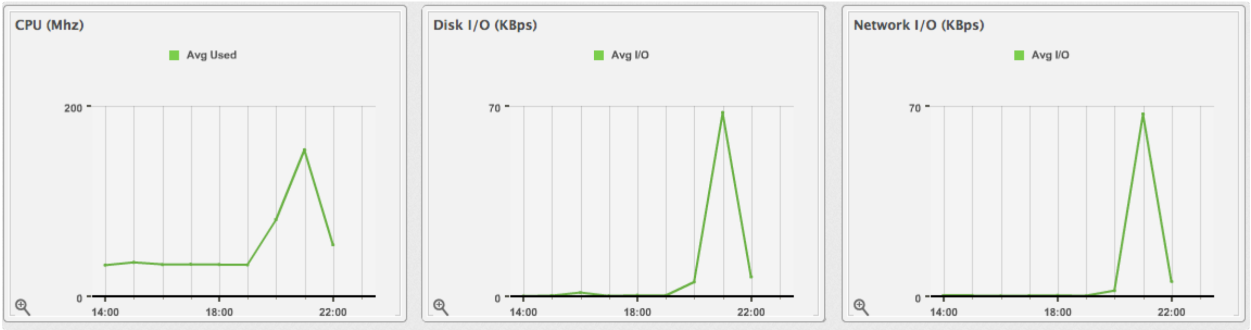


Options

Interval	Daily	Date	3/12/2013	Show	1 Week back
Time Zone	(GMT+00:00) UTC				
Compare To	<Nothing>				

* Daily charts only include days for which all 24 hours of data has been collected.

6. Select a **Time Profile**.



Note

Daily charts only include full days of data; this means that *CloudForms Management Engine* requires a complete 24 data point range for that day.

CHAPTER 6. FURTHER READING

For more information on Red Hat CloudForms, see the official documentation.

Note

Red Hat OpenStack Platform is the only OpenStack cloud provider supported by Red Hat CloudForms.