Red Hat CloudForms 4.0

Integration with AWS CloudFormation and OpenStack Heat

How to Install and Configure the Amazon CloudFormation and OpenStack Heat in Red Hat CloudForms environment
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How to Install and Configure the Amazon CloudFormation and OpenStack Heat in Red Hat CloudForms environment

Red Hat CloudForms Documentation Team
cloudforms-docs@redhat.com
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Abstract

This guide provides instructions on the implementation of Amazon CloudFormation and OpenStack Heat in Red Hat CloudForms, and discusses the various areas of integration. Information and procedures in this book are relevant to CloudForms Management Engine administrators. If you have a suggestion for improving this guide or have found an error, please submit a Bugzilla report at http://bugzilla.redhat.com against Red Hat CloudForms Management Engine for the Documentation component. Please provide specific details, such as the section number, guide name, and CloudForms version so we can easily locate the content.
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AWS CloudFormation enables users to orchestrate the instantiation of multi-instance services via templates. You can use CloudFormation’s sample templates or create your own templates to describe the AWS resources, and any associated dependencies or runtime parameters, required to run your applications. Similarly, you can configure and monitor cloud resources in Red Hat Enterprise Linux OpenStack Platform using the Orchestration service. The Orchestration service provides a framework through which you can define an instance’s resource parameters (for example, floating IPs, volumes, or security groups) and properties (for example, key pairs, image to be used, or flavor) using OpenStack Heat templates.

Instances deployed using templates through the orchestration service are known as stacks. A user can author the stack templates, or can upload them from other sources. Red Hat CloudForms has enabled CloudFormation and Heat integration, and now allows you to launch, delete, and update stacks using the dashboard.
CHAPTER 2. INTEGRATION WITH AWS CLOUDFORMATION AND OPENSTACK HEAT

Red Hat CloudForms' integration with AWS CloudFormation and OpenStack Heat provides an ability to:

- Inventory all **AWS CloudFormation** and **OpenStack Heat** stacks and elements into **CFME’s VMDB**.

- Model the relationships of instances to their stacks, inclusive of the UI. Example, selecting an instance within a region that is within a stack, the UI shows this on the standard instance view.

- Model the stack and its elements in the UI.

**NOTE**

When importing a template into Red Hat CloudForms, the selected elements are converted according to their type. For example, lists convert to list boxes, and single items convert to text boxes.
CHAPTER 3. CLOUD ORCHESTRATION

Cloud Orchestration is a service that allows you to create, update and manage cloud resources and their software components as a single unit and then deploy them in an automated, repeatable way through a template. Templates use a human-readable syntax and can be defined in text files (thereby allowing users to check them into version control). Templates allow you to easily deploy and re-configure infrastructure for applications within your cloud. A user can author the stack templates, or can upload them from other sources.

3.1. ADDING A NEW ORCHESTRATION TEMPLATE

Use this procedure to add new orchestration templates using the dashboard UI.

1. Navigate to Services → Catalog and select Orchestration Templates in the accordion menu.

2. Click Configuration, then click Create a new Orchestration Template. The Adding a new Orchestration Template window is displayed.

   New Orchestration Template Information

<table>
<thead>
<tr>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Template Type</td>
</tr>
<tr>
<td>Draft</td>
</tr>
</tbody>
</table>

   3. In Name, enter a name for the new template.

   4. In Description, enter a description for the template. Select Amazon CloudFormation or OpenStack Heat from the Template Type list. The default is Amazon CloudFormation.

   5. You can select the Draft box to create a draft template.

   6. Define your new template following the specification structure of the selected Template Type.

   7. Click Add.

3.2. EDITING ORCHESTRATION TEMPLATES
Use this procedure to edit orchestration templates using the dashboard UI.

1. Navigate to Services → Catalog and select Orchestration Templates in the accordion menu.

2. Select the orchestration template you want to edit from the All Orchestration Templates list.

3. Click Configuration, then click Edit selected Orchestration Template. The Edit selected Orchestration Template window is displayed.

4. You can only edit the Name and Description of a read-only template as there can be stacks associated with the selected template. For templates that are not read-only, you can edit all content in the template as required.

5. Click Save.

### 3.3. COPYING ORCHESTRATION TEMPLATES

Use this procedure to copy an orchestration template to create a new template.

1. Navigate to Services → Catalog and select Orchestration Templates in the accordion menu.

2. Click Configuration, then click Copy selected Orchestration Template. The Copy selected Orchestration Template window is displayed.

3. You can copy the selected template to create a new template, and include the changes as required.

   **NOTE**

   In order to create the new template its content must be unique.

4. Click Save.

### 3.4. DELETING ORCHESTRATION TEMPLATES

Use this procedure to delete orchestration templates using the dashboard UI.

1. Navigate to Services → Catalog and select Orchestration Templates in the accordion menu.

2. Select the orchestration template you want to delete from the All Orchestration Templates list.

3. Click Configuration, then click Remove selected Orchestration Template.

4. A warning window to confirm the permanent removal of the selected item from the VMDB appears.

5. Click OK.

This instantly deletes the selected orchestration template. Note that only non read-only templates can be removed.
CHAPTER 4. CLOUDFORMATION PROVISIONING VIA SERVICES

After creating your template, you can add it as a catalog item to the Service Catalog. Stacks can then be created from templates and launched from the Service Catalog.

4.1. ADDING A NEW CATALOG

Use this procedure to add a new catalog using the dashboard UI.

Adding a new Catalog

Basic Info

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>

Assign Catalog Items

<table>
<thead>
<tr>
<th>Unassigned</th>
<th>Selected</th>
</tr>
</thead>
</table>

1. Navigate to Services → Catalog and select Catalogs in the accordion menu.

2. Click Configuration, then click Add a New Catalog. The Adding a new Catalog window is displayed.

3. In Basic Info, add Name and Description for the new catalog.

4. You can assign catalog items in Assign Catalog Item.

5. Click Add.

4.2. ADDING A NEW SERVICE DIALOG

Use this procedure to add a new service dialog based on the input parameters defined in the orchestration template.

1. Navigate to Services → Catalog and click Orchestration Templates in the accordion menu.

2. From All Orchestration Templates, select the orchestration template you want to create a service dialog from.
3. Click 

\textbf{Configuration}, then click \textbf{Create Service Dialog} from \textbf{Orchestration Template}. The \textbf{Adding a new Service Dialog from Orchestration Template} window is displayed.

\begin{center}
\begin{tabular}{|c|}
\hline
Service Dialog Information \\
\hline
Service Dialog Name [ ] \\
\hline
\end{tabular}
\end{center}

\textbf{Adding a new Service Dialog from Orchestration Template "aws-demo"}

4. In \textbf{Service Dialog Information}, add a \textbf{Service Dialog Name}.

5. Click \textbf{Save}.

\textbf{4.3. ADDING A NEW CATALOG ITEM}

Use this procedure to add a new service catalog item using the dashboard UI.

1. Navigate to \textbf{Services} \rightarrow \textbf{Catalog} and select \textbf{Catalog Items} in the accordion menu.

2. Click \textbf{Configuration}, then click \textbf{Add a New Catalog Item}. The \textbf{Adding a new Service Catalog Item} window is displayed.

\begin{center}
\begin{figure}
\centering
\includegraphics[width=\textwidth]{catalog_item_type}
\end{figure}
\end{center}

3. Choose \textbf{Orchestration} from \textbf{Catalog Item Type}.
4. In **Basic Info**, add **Name** and **Description**. Select the **Display** in **Catalog box**.

Adding a new Service Catalog Item

<table>
<thead>
<tr>
<th>Name / Description</th>
<th>/catalog-item-1</th>
<th>/catalog-item-1</th>
<th>Display in Catalog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catalog</td>
<td>Heat Catalog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialog</td>
<td>hot-dialog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orchestration Template</td>
<td>hot-demo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider</td>
<td>&lt;Choose&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provisioning Entry Point (NS/ClS/Inst)</td>
<td>/Cloud/Orchestration/Provisioning/StateMachines/Provision/default</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Select the **Catalog**, **Dialog**, and **Orchestration Template** from their respective list.

6. Select **Provisioning Entry Point**. The default is:

   /Cloud/Orchestration/Provisioning/StateMachines/Provision/default.

7. Click **Add**.

### 4.4. ORDERING SERVICE

Use this procedure to order a service catalog item using the dashboard UI.

1. Navigate to **Services → Catalog** and select **Service Catalogs** in the accordion menu. From **All Services** catalogs, select the **catalog item** that you want to order. The **Service** window with the name and description of the service to be ordered is displayed.
2. Click Order. The Order Service window with Options and Parameter is displayed.

Order Service "orch_item"

Options

<table>
<thead>
<tr>
<th>Stack Name</th>
<th>heat-stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Failure</td>
<td>Rollback</td>
</tr>
<tr>
<td>Timeout</td>
<td></td>
</tr>
</tbody>
</table>

Parameters

<table>
<thead>
<tr>
<th>Private network name or ID</th>
<th>292fce8f-0365-4f63-88ee-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image name or ID</td>
<td>cirros</td>
</tr>
<tr>
<td>Flavor</td>
<td>m1.small</td>
</tr>
<tr>
<td>Key name</td>
<td>userkey</td>
</tr>
</tbody>
</table>

3. Enter stack name in Stack Name.

4. The On Failure value is Rollback by default.

5. Timeout is optional. You can type the number of seconds to timeout the provision at the provider side.

   **NOTE**
   
   The number of seconds get converted (rounded) to minutes when ordering the provision through Red Hat Enterprise Linus OpenStack Platform. For example, 100 seconds rounds to two minutes.

6. You can use the default parameter values from the template, or enter new values as appropriate.

   **NOTE**
   
   The Parameters vary per dialog; therefore, the parameters shown in the Order Service window may or may not exist depending on the dialog.
7. Click Submit.

The order request is submitted. After a request has been approved, the various stages of fulfillment are executed. You can see the progress status of the provisioning process in Services → Requests.

4.5. ORCHESTRATION STACKS

After ordering a service, you can see the progress state of the provisioning process in Services → Requests.

1. Initially, the Request State shows Pending with its Approval State as Pending Approval.

Requests

| Order Request was Submitted |

Filter By

| Requester: | Administrator |
| Approval State: | Approved | Denied | Pending Approval |
| Type: | All |
| Request Date: | Last 7 Days |
| Reason: |

2. After the request is Approved, the various stages of fulfillment are executed, and reflect accordingly under Request State.

Desc. by: Last Update

<table>
<thead>
<tr>
<th>Status</th>
<th>Request State</th>
<th>Request ID</th>
<th>Request Type</th>
<th>Complej</th>
<th>Description</th>
<th>Approve State</th>
<th>Approve By</th>
<th>Approve On</th>
<th>Approve On</th>
<th>Created On</th>
<th>Last Update</th>
<th>Reason</th>
<th>Last Message</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Approved</td>
<td>22 Adminstr</td>
<td>Service Provision</td>
<td></td>
<td>Provision Service</td>
<td>Approved</td>
<td>Administrator</td>
<td>05/28/15 23:55:05 UTC</td>
<td>05/28/15 23:55:05 UTC</td>
<td>05/28/15</td>
<td>Auto-App</td>
<td>Creating Stack</td>
<td>Region 0</td>
<td></td>
</tr>
</tbody>
</table>

3. After the Request State is Finished, you can see the stack entry created in Clouds → Stacks. In the screen capture below, you can see the heat-stack we created from the catalog item ordered from the Service Catalog as shown in the previous section.
You can click on the stack to see a summary of its properties and relationships, and the instance(s) included in the stack. You can click on the instance(s) to see all instance details.

### heat-stack (Summary)

<table>
<thead>
<tr>
<th>Properties</th>
<th>details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>heat-stack</td>
</tr>
<tr>
<td>Description</td>
<td>Simple template to deploy a single compute instance</td>
</tr>
<tr>
<td>Type</td>
<td>Orchestration Stack/Openstack</td>
</tr>
<tr>
<td>Status</td>
<td>CREATE_COMPLETE</td>
</tr>
<tr>
<td>Status Reason</td>
<td>Stack create completed successfully</td>
</tr>
</tbody>
</table>

### Relationships

<table>
<thead>
<tr>
<th>Cloud Provider</th>
<th>qeblade38</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orchestration Template</td>
<td>TKGIAENF</td>
</tr>
<tr>
<td>Instances</td>
<td>1</td>
</tr>
<tr>
<td>Security Groups</td>
<td>0</td>
</tr>
<tr>
<td>Cloud Networks</td>
<td>0</td>
</tr>
<tr>
<td>Parameters</td>
<td>{} 7</td>
</tr>
<tr>
<td>Outputs</td>
<td>1</td>
</tr>
<tr>
<td>Resources</td>
<td>1</td>
</tr>
</tbody>
</table>

You have now deployed instances and its associated collection of resources (called a stack) using an orchestration template.