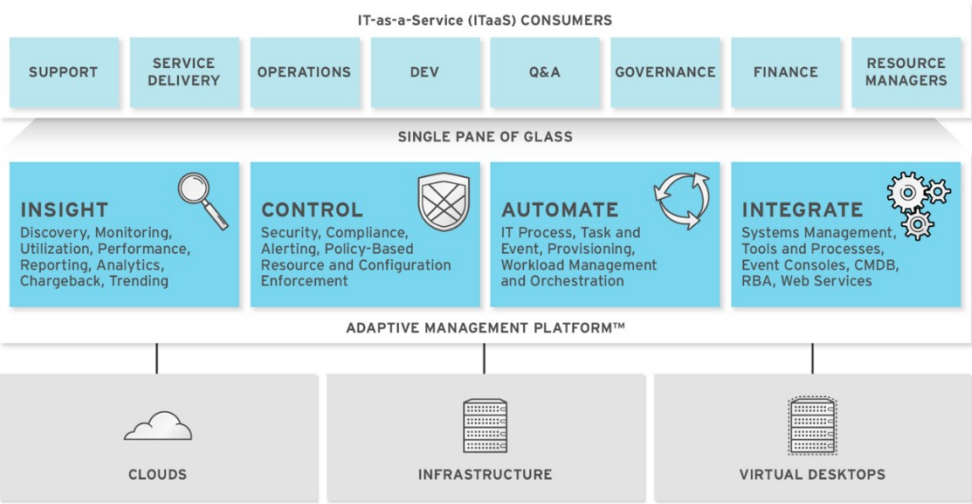


Chapter 1: Red Hat CloudForms Internals



Chapter2: Installing Red Hat CloudForms on Red Hat OpenStack

Create An Image

Name

CloudForms Management Engine Appliance **1**

Image Location

.com/sangram/oscf/cfme-rhos-5.3-66.x86_64.qcow2 **2**

Format

QCOW2 - QEMU Emulator **3**

Minimum Disk (GB)

4

Minimum Ram (MB)

5

Public **6**

Images

Images

Project (1) Shared with Me (0) Public (1)

[+ Create Image](#)

[✖ Delete Images](#)

<input type="checkbox"/>	Image Name	Type	Status	Public	Protected	Format	Size	Actions
<input type="checkbox"/>	CloudForms Management Engine Appliance	Image	Active	No	Yes	QCOW2	556.9 MB	Launch

Displaying 1 item

Launch Instance

Details * Access & Security * Networking * Post-Creation Advanced Options

Availability Zone
nova

Instance Name *
Red Hat CloudForms

Flavor * ?
m1.large

Instance Count * ?
1

Instance Boot Source * ?
Boot from image

Image Name
CloudForms Management Engine Applianc

Specify the details for launching an instance.
The chart below shows the resources used by this project in relation to the project's quotas.

Flavor Details

Name	m1.large
VCPUs	4
Root Disk	80 GB
Ephemeral Disk	0 GB
Total Disk	80 GB
RAM	8,192 MB

Project Limits

Number of Instances 0 of 10 Used

Number of VCPUs 0 of 20 Used

Total RAM 0 of 51,200 MB Used

Launch Instance

Details * **Access & Security *** Networking * Post-Creation Advanced Options

Key Pair ?
CFME KeyPair +

Security Groups * ?
 default

Control access to your instance via key pairs, security groups, and other mechanisms.

Launch Instance

Details * Access & Security * **Networking *** Post-Creation Advanced Options

Selected networks

NIC:1 ↕ public (46bc3d01-e955-45b9-b132-1a3ce8abef3c) -

Available networks

Choose network from Available networks to Selected networks by push button or drag and drop, you may change NIC order by drag and drop as well.

CFME Virtual Appliance

```
To administer this appliance, browse to https://172.29.5.8
Username: admin
Password: *****_
```

```
Welcome to the CFME Virtual Appliance.
```

```
To modify the configuration, use a web browser to access the management page.
```

```
Hostname:          host-192-168-1-2
IP Address:        192.168.1.2
Netmask:           255.255.255.0
Gateway:           192.168.1.1
Primary DNS:       192.168.1.3
Secondary DNS:
Search Order:      openstacklocal
MAC Address:       FA:16:3E:94:49:D7
Timezone:          America/New_York
Local Database:    not running
EUM Database:      postgresql @
Database/Region:  vmdb_production / 0
External Auth:     not configured
EUM Version:       5.3.3.2
EUM Console:       https://192.168.1.2
```

```
Note: Use the Ctrl-Alt-Del to exit out of any screen and return to the summary screen.
```

```
You may need to use Ctrl-Alt-Ins to send a Ctrl-Alt-Del to the virtual machine.
```

```
Press any key to continue.
```

Advanced Setting

- 1) Set DHCP Network Configuration
- 2) Set Static Network Configuration
- 3) Test Network Configuration
- 4) Set Hostname
- 5) Set Timezone, Date, and Time
- 6) Restore Database From Backup
- 7) Setup Database Region
- 8) Configure Database
- 9) Extend Temporary Storage
- 10) Configure External Authentication (httpd)
- 11) Generate Custom Encryption Key
- 12) Stop EUM Server Processes
- 13) Start EUM Server Processes
- 14) Restart Appliance
- 15) Shut Down Appliance
- 16) Summary Information
- 17) Log Off

Choose the advanced setting:

Date and Time Configuration

Timezone area: Asia
Timezone city: Calcutta
Date: 2015-04-26
Time: 20:24:00

Apply time and timezone configuration? (Y/N): Y_

Configure Database

No encryption key found.
For migrations, copy encryption key from a hardened appliance.
For worker and multi-region setups, copy key from another appliance.
If this is your first appliance, just generate one now.

Encryption Key

- 1) Create key
- 2) Fetch key from remote machine

Choose the encryption key: !! 1_

Database Location

- 1) Internal
- 2) External

Choose the database location: 1_

Setup Database Region

Each database region number must be unique.

Enter the database region number: 1_

Setup Database Region

Each database region number must be unique.

Enter the database region number: 1

Enter the database password on 127.0.0.1: *****_

Activating the configuration using the following settings...

Host: 127.0.0.1

Username: root

Database: vmdb_production

Region: 1

Initialize postgresql starting

Initialize postgresql complete

Create region starting

Create region complete

Configuration activated successfully.

Press any key to continue.

Start EUM Server Processes

Perform an EUM start? (Y/N): Y

Starting EUM...

Completed successfully.

Press any key to continue.



RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Username
Password

[Update password](#)

[Log In](#)

Region: Region 1
Zone: default
Appliance: EVM

RED HAT® CLOUDFORMS MANAGEMENT ENGINE Administrator | EVM

Cloud Intelligence | Services | Clouds | Infrastructure | Control | Automate | Optimize | Configure

Dashboard | Reports | Chargeback | Timelines | RSS

[+](#) [↶](#) [↷](#) Default Dashboard

Hosts Summary

2068190

Updated 07/03/15 15:00 | Next 07/03/15 16:00

Hosts - Summary by Version

2068190

5.5.0 / 2068190: 4

Updated 07/03/15 05:30 | Next 07/04/15 05:30

Guest OS Information

Unknown
Other Linux (64-bit)
Other Linux (32-bit)

Updated 07/03/15 05:30 | Next 07/04/15 05:30

Vendor and Guest OS Chart

Unknown
Other Linux (64-bit)
Other Linux (32-bit)

Virtual Infrastructure Platforms

ESXi


EVM: Recently Discovered VMs

ec2-test - location unknown
Date : 2015-07-03 10:38:08 +0530
-app-server - location unknown
Date : 2015-07-03 10:38:08 +0530
- location unknown
Date : 2015-07-02 20:33:25 +0530
-Nat - location unknown

Chapter 3: Building a Hybrid Cloud Environment Using Red Hat CloudForms



Add New Cloud Provider

 Credential validation was successful

Basic Information

Name	Public Cloud
Type	Amazon EC2
Region	US West (Oregon)
Zone	default

Credentials

Default

Access Key ID	IJRQWFVSANZUMRUEQ
Secret Access Key
Verify Secret Access Key

Required. Should have privileged access, such as root or administrator.

Add New Cloud Provider

Basic Information

Name	<input type="text" value="OpenStack Dev"/>
Type	<input type="text" value="OpenStack"/>
Host Name	<input type="text" value="controller1.somedomain.com"/>
IP Address	<input type="text" value="10.10.10.10"/>
API Port	<input type="text" value="5000"/>
Zone	<input type="text" value="default"/>

Credentials

Default AMQP

User ID	<input type="text" value="admin"/>
Password	<input type="password" value="••••••••"/>
Verify Password	<input type="password" value="••••••••"/>

Required. Should have privileged access, such as root or administrator.

Credentials

Default AMQP

User ID	<input type="text" value="admin"/>
Password	<input type="password" value="....."/>
Verify Password	<input type="password" value="....."/>

Used to authenticate with OpenStack AMQP Messaging Bus for event handling.

The screenshot shows the Red Hat CloudForms Management Engine interface. The top navigation bar includes "RED HAT CLOUDFORMS MANAGEMENT ENGINE" and several tabs: "Cloud Intelligence", "Services", "Clouds", "Infrastructure", "Control", "Automate", "Optimize", and "Configure". Below this, a secondary navigation bar lists "Providers", "Clusters", "Hosts", "Virtual Machines", "Resource Pools", "Datastores", "Repositories", "PXE", and "Requests". The "Providers" tab is selected. A dropdown menu is open under "Providers", showing options: "Configuration", "Policy", "Refresh Relationships and Power States", "Discover Infrastructure Providers", "Add a New Infrastructure Provider" (highlighted with a black border), "Edit Selected Infrastructure Provider", and "Remove Infrastructure Providers from the VMDB".

Add New Infrastructure Provider

 Credential validation was successful

Basic Information

Name	<input type="text" value="VMware Home Lab"/>
Type	<input type="text" value="VMware vCenter"/>
Host Name	<input type="text" value="localhost"/>
IP Address	<input type="text" value="31.220.65.87"/>
Zone	<input type="text" value="default"/>

Credentials

Default

User ID	<input type="text" value="root"/>
Password	<input type="password" value="•••••"/>
Verify Password	<input type="password" value="•••••"/>

Required. Should have privileged access, such as root or administrator.

Add New Infrastructure Provider

Basic Information

Name	<input type="text" value="RHEV-India"/>
Type	<input type="text" value="Red Hat Enterprise Virtualizator"/>
Host Name	<input type="text" value="rhevmanager.somedomain.com"/>
IP Address	<input type="text" value="31.220.73.87"/>
API Port	<input type="text" value="5000"/>
Zone	<input type="text" value="default"/>

Credentials

Default

C & U Database

User ID	<input type="text" value="admin@internal"/>
Password	<input type="password" value="••••••••"/>
Verify Password	<input type="password" value="••••••••"/>

Required. Should have privileged access, such as root or administrator.





RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services **Clouds** Infrastructure Control Automate Optimize Configure

Providers Availability Zones Tenants Flavors Security Groups Instances

Configuration Policy

AWS O

3 109

Properties Relationships

- Refresh Relationships and Power States
- Edit this Cloud Provider**
- Remove this Cloud Provider from the VMDB

Properties	
Region	US West (Oregon)
Type	Amazon EC2
Management Engine GUID	5a58d288-ee95-11e4-920b-fa163e52df6c

Authentication Status	
Default Credentials	Valid

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services **Clouds** Infrastructure Control Automate Optimize Configure

Providers Availability Zones Tenants Flavors Security Groups Instances

Configuration Policy

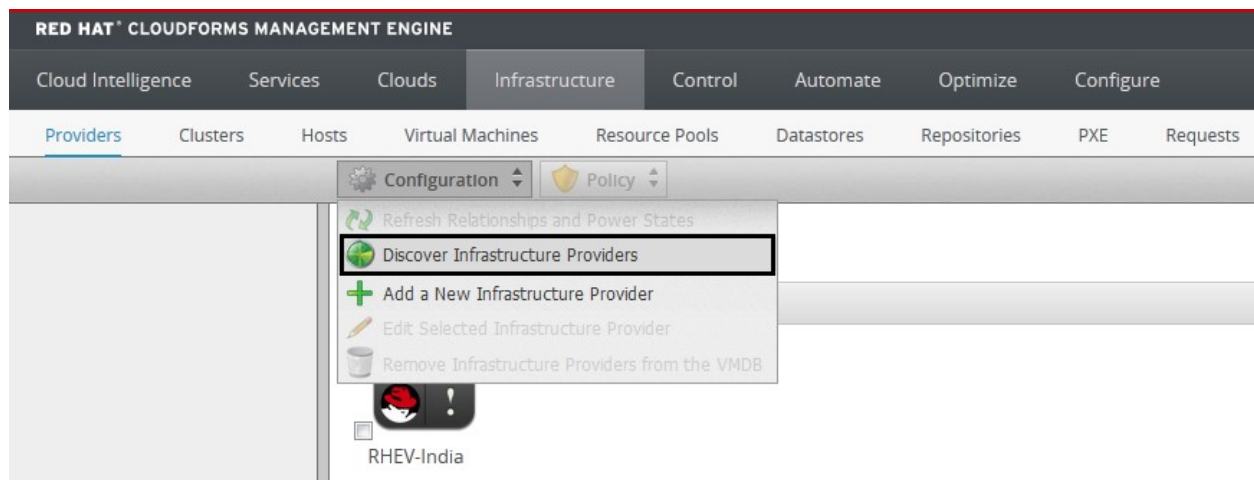
- Refresh Relationships and Power States
- Discover Cloud Providers**
- Add a New Cloud Provider
- Edit Selected Cloud Provider
- Remove Cloud Providers from the VMDB

AWS NV AWS O OpenStack NV

Amazon Cloud Providers Discovery

Credentials

User ID	<input type="text" value="doe@somedomain.com"/>
Password	<input type="password" value="••••••••"/>
Verify Password	<input type="password" value="••••••••"/>



Infrastructure Providers Discovery

Discover

<input checked="" type="checkbox"/>	Microsoft System Center VMM
<input checked="" type="checkbox"/>	Red Hat Enterprise Virtualization Manager
<input checked="" type="checkbox"/>	VMware vCenter

Subnet Range

From Address	<input type="text" value="10"/> . <input type="text" value="0"/> . <input type="text" value="10"/> . <input type="text" value="0"/>
To Address	<input type="text" value=""/> . <input type="text" value="0"/> . <input type="text" value="10"/> . <input type="text" value="100"/>

Dialogs "Sample Openstack Instance Provisi

Content

```
1 ---
2 :buttons:
3 - :submit
4 - :cancel
5 :dialogs:
6 :requester:
7   :description: Request
8   :fields:
9     :owner_phone:
10      :description: Phone
11      :required: false
12      :display: :hide
13      :data_type: :string
14     :owner_country:
15      :description: Country/Region
16      :required: false
17      :display: :hide
18      :data_type: :string
19     :owner_phone_mobile:
20      :description: Mobile
21      :required: false
22      :display: :hide
23      :data_type: :string
24     :owner_title:
25      :description: Title
26      :required: false
27      :display: :hide
28      :data_type: :string
29     :owner_first_name:
30      :description: First Name
```

Buttons

Tab

Fields

Dialogs "Sample Openstack Instance Provis

```
104         :display: :edit
105         :data_type: :string
106     :display: :show
107     :field_order:
108 :purpose:
109     :description: Purpose
110     :fields:
111         :vm_tags:
112             :required_method: :validate_tags
113             :description: Tags
114             :required: false — Required field or not
115             :options:
116                 :include: []
117                 :order: []
118                 :single_select: []
119                 :exclude: []
120             :display: :edit — Field display status
121             :required_tags: []
122             :data_type: :integer
123     :display: :show — Tab display status
124     :field_order:
125 :environment:
126     :description: Environment
127     :fields:
128         :placement_auto:
129             :values:
130                 false: 0 — Pre-determined values
131                 true: 1
132             :description: Choose Automatically
133             :required: false
134             :display: :edit
135             :default: false — Default value if any
136             :data_type: :boolean
137     :placement_availability_zone:
```

Chapter 4: Provisioning Instances Using Red Hat CloudForms

Image "ami-Wordpress-3.8"

Properties		Compliance	
Name	ami-Wordpress-3.8	Status	Never Verified
IP Address		History	Not Available
Container	Amazon (1 CPU, MB)	Power Management	
Platform Tools	N/A	Power State	never
Operating System	Unknown	Last Boot Time	N/A
Architecture	64 bit	State Changed On	Mon May 04 11:35:20 IST 2015
Advanced Settings	0	Security	
Resources	Available	Users	0
Management Engine GUID	8b30189e-f223-11e4-b0d3-fa163e52df6c	Groups	0
Virtualization Type	paravirtual	Configuration	
Root Device Type	ebs	Packages	0
		Init Processes	0
		Files	0
Lifecycle		Diagnostics	
Discovered	Mon May 04 11:35:20 IST 2015	Running Processes	Not Available
Last Analyzed	Never	Event Logs	Not Available
Retirement Date	Never	Smart Management	
Relationships		My Company Tags	No My Company Tags have been assigned
Cloud Provider	AWS NV		
Drift History	None		
Analysis History	None		
VMsafe			
Enable	false		

Configuration Policy Lifecycle Power

+ Provision Instances

Set Retirement Dates

Retire selected items

Provision Instances - Select an Image

	linux	1	0 Bytes	AWS O	0
	linux	1	0 Bytes	AWS NV	0
	linux	1	0 Bytes	AWS O	0
	linux	1	0 Bytes	AWS O	0
	linux	1	0 Bytes	AWS NV	0
	linux	1	0 Bytes	AWS O	0
	linux	1	0 Bytes	AWS NV	0
	windows	1	0 Bytes	AWS NV	0
	windows	1	0 Bytes	AWS NV	0
Ubuntu backup ami	linux	1	0 Bytes	AWS O	0
	windows	1	0 Bytes	AWS NV	0
	windows	1	0 Bytes	AWS NV	0
	windows	1	0 Bytes	AWS NV	0
wordpress	linux	1	0 Bytes	AWS O	0

Continue Cancel

Provision Instances

[Request](#)

[Purpose](#)

[Catalog](#)

[Environment](#)

[Properties](#)

[Customize](#)

[Schedule](#)

Request Information

E-Mail *	<input type="text" value="john.doe@somedomain.com"/>
First Name *	<input type="text" value="John"/>
Last Name *	<input type="text" value="Doe"/>
Notes	<input type="text"/>

Manager

Name	<input type="text"/>
------	----------------------

Provision Instances

Request Purpose Catalog Environment Properties Customize Schedule

Select Tags to apply

Tags

- ▶ Auto Approve - Max CPU *
- ▶ Auto Approve - Max Memory *
- ▶ Auto Approve - Max Retirement Days *
- ▶ Auto Approve - Max VM *
- ▶ Cost Center *
- ▶ Department
- ▶ EVM Operations *
- ▼ Environment *
 - Development
 - Production
 - Quality Assurance
 - Quarantine
 - Test*
- ▶ Exclusions
- ▶ Location *
- ▶ Network Location *

Provision Instances

Request Purpose Catalog Environment Properties Customize Schedule

Select

Name *	Name	Operating System	Platform	CPUs	Memory	Disk Size	Provider	Snapshots
	wordpress		linux	1	0 Bytes		AWS O	0

Number of Instances

Count

Naming

Instance Name *

Instance Description (0 / 100)

Provision Instances

Request Purpose Catalog Environment Properties Customize Schedule

Placement

Choose Automatically

Provision Instances

Request

Purpose

Catalog

Environment

Properties

Customize

Schedule

Properties

Instance Type *	t1.micro: T1 Micro ▼
Guest Access Key Pair	Sangram ▼
CloudWatch *	Basic ▼

Provision Instances

Request Purpose Catalog Environment Properties Customize Schedule

Credentials

Root Password

IP Address Information

Address Mode Static DHCP

Host Name

Subnet Mask

Gateway

DNS

DNS Server List

DNS Suffix List

Customize Template

Script Name

Name	Description	Last Updated
<None>		

Provision Instances

Request Purpose Catalog Environment Properties Customize Schedule

Schedule Info

When to Provision Schedule Immediately on Approval




Lifespan

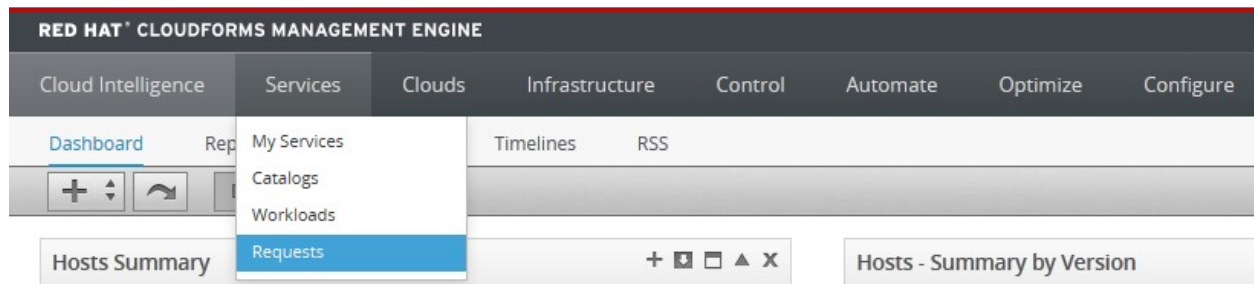
Time until Retirement Indefinite

Chapter 5: Life Cycle Management Using Red Hat CloudForms

Automate Instance [Default - Updated 04/26/15 20:37:43 IST by system]

Fields

Name	Value	On Entry	On Exit	On Error	Collect	Max Retries	Max Time	Message
 max_vms	1							create
 ValidateRequest		validate_request		pending_request		100		create
 ApproveRequest		approve_request				100		create



The screenshot shows the Red Hat CloudForms Management Engine interface. At the top, there is a navigation bar with the following tabs: Cloud Intelligence, Services, Clouds, Infrastructure, Control, Automate, Optimize, and Configure. Below this, there is a sub-navigation bar with 'Dashboard' and 'Rep' visible. A dropdown menu is open under 'Services', showing options: My Services, Catalogs, Workloads, and Requests (which is highlighted in blue). To the right of the dropdown, there are 'Timelines' and 'RSS' links. At the bottom of the screenshot, there is a 'Hosts Summary' panel on the left and a 'Hosts - Summary by Version' panel on the right. A control bar with icons for adding, deleting, and refreshing is visible between the two summary panels.

Requests

Filter By

Requester: None Available

Approval State: Approved Denied Pending Approval




Type: All

Request Date: Last 7 Days


Reason:

Automate Instance [Default - Updated 04/26/15 20:37:43 IST by system]

Fields

Name	Value	On Entry	On Exit	On Error	Collect	Max Retries	Max Time	Message
 max_vms	1							create
 ValidateRequest		validate_request		pending_request		100		create
 ApproveRequest		approve_request				100		create

Desc. by: Last Update

	Statu	Request State	Request ID	Requester	Request Type	Comple	Description	Approval State	Approved By	Approved On	Created On	Last Update	Reason	Last Message	Region
	Ok	Pending	1,000,000,000,008	Administrator	VM Provision		Provision from [hyclom-server2003] to [WebServer-iis###]	Pending Approval			07/28/15 19:24:19 IST	07/28/15 19:24:38 IST		Request was not auto-approved for the following reasons: (Requested VMs 2 limit is 1)	Region 1



Requests > Provision from [hyclom-server2003] to [WebServer-iis###]

Provision from [hyclom-server2003] to [WebServer-iis###]

Request Details

Request ID	1,000,000,000,008	Description	Provision from [hyclom-server2003] to [WebServer-iis###]
Status	Ok	Last Message	Request was not auto-approved for the following reasons: (Requested VMs 2 limit is 1)
Request State	Pending	Created On	Tue Jul 28 19:24:19 IST 2015
Requester	Administrator	Last Update	Tue Jul 28 19:24:38 IST 2015
Request Type	VM Provision	Completed	

Approval State	Pending Approval
Approved/Denied by	
Approved/Denied on	
Reason	<input type="text" value="Approved"/>

Submit



Copy Edit Delete Approve Deny

Configuration Policy Lifecycle Power

Cloud Providers » AWS V US East (All Instances)

Set Retirement Dates
Retire selected items

AWS V US East (All Instances)

(Check All) Sort by: Asc. by: Name



i-16a6ecbe

Cloud Providers » AWS V US East (All Instances) » Retire Vms

Retire Vms

Retirement Date	<input type="text" value="08/31/2015"/>	
Retirement Warning	<input type="text" value="1 Week before retirement"/>	

* Saving a blank date will remove all retirement dates

Save Cancel

i-16a6ecbe

Configuration Policy Lifecycle Power

Cloud Providers > AWS V US East (All Instances)

Set Retirement Dates
Retire selected items

AWS V US East (All Instances)

(Check All) Sort by: Asc. by: Name



i-16a6ecbe

Configuration Policy Lifecycle Power

Cloud Providers > AWS V US East (All Instances)

AWS V US E

(Check All) Sort



i-16a6ecbe

Retire the selected items?


OK Cancel

Retire Vms

Retirement Date	8/31/2015 
Retirement Warning	1 Week before retirement ▼

* Saving a blank date will remove all retirement dates

Save **Cancel**



i-16a6ecbe

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure Control Automate Optimize Configure

Explorer Simulation Customization Import / Export Log Requests

Datastore

- ▼ Datastore
 - ▶ RedHat (Locked)
 - ▶ ManageIQ (Locked)

Configuration

- ➕ Add a New Domain
- ✎ Edit Selected Domains
- 🗑 Remove Domains
- 📄 Edit Priority Order of Domains

Adding a new Automate Domain

Info

Name	HYCLOM
Description	Hybrid Cloud Management
Enabled	<input checked="" type="checkbox"/>

The screenshot shows the Automate console interface. The left pane displays the 'Datastore' tree with the following structure:

- Datastore
 - HYCLOM
 - RedHat (Locked)
 - ManagemIQ (Locked)
 - Cloud
 - VM
 - Lifecycle
 - Operations
 - Provisioning
 - Email
 - Naming
 - Placement
 - Profile
 - StateMachines
 - Methods

The 'ProvisionRequestApproval' class is selected and highlighted in blue. The right pane shows the 'Configuration' menu with 'Copy this Class' and 'Copy selected Instances' options. Below the menu, the 'Instances' tab is active, showing a table with one instance:

Instance Name	State
Default	<input checked="" type="checkbox"/>

Copy Automate Instance

From Domain	ManagelQ
To Domain	HYCLOM
Copy to same path	<input checked="" type="checkbox"/>
Replace items if they already exist?	<input type="checkbox"/>

1 Item selected to copy

Default

Configuration

- Edit this Instance
- Copy this Instance
- Remove this Instance

Automate Instance: Default - Updated 07/30/15 13:06:52 IST by admin]

Domain Overrides (by priority)

HYCLOM (Same Domain)
ManagelQ

Fields

Name	Value	On Entry	On Exit	On Error	Collect	Max Retries	Max Time	Message
max_vms	1							create
ValidateRequest		validate_request		pending_request		100		create
ApproveRequest		approve_request				100		create







Editing Automate Instance "Default"

Fields

Main Info


Fully Qualified Name	HYCLOM / Cloud / VM / Provisioning / StateMachines / ProvisionRequestApproval / Default
Name	Default
Display Name	
Description	

Fields

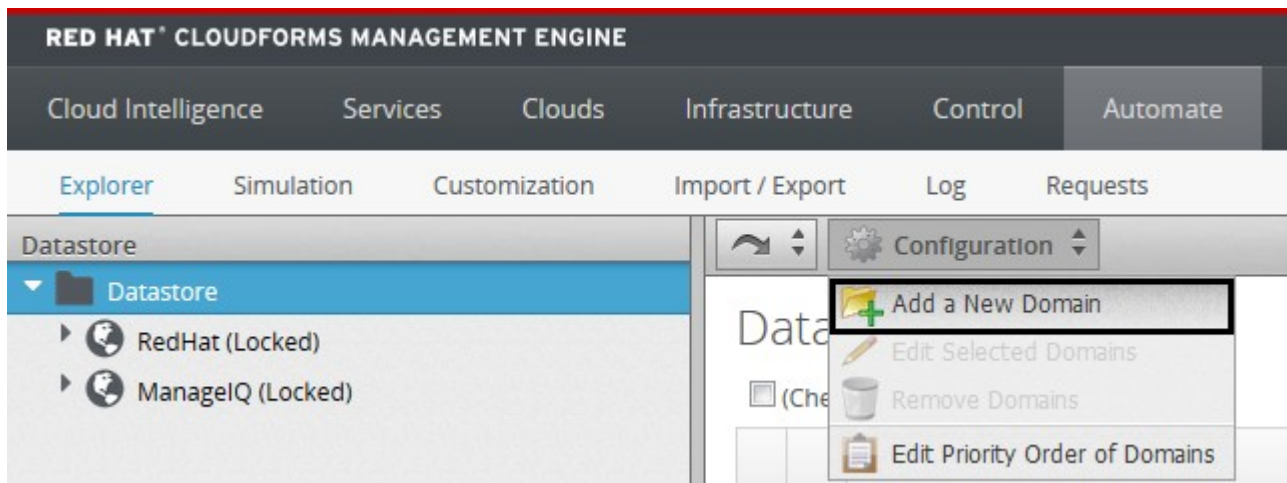
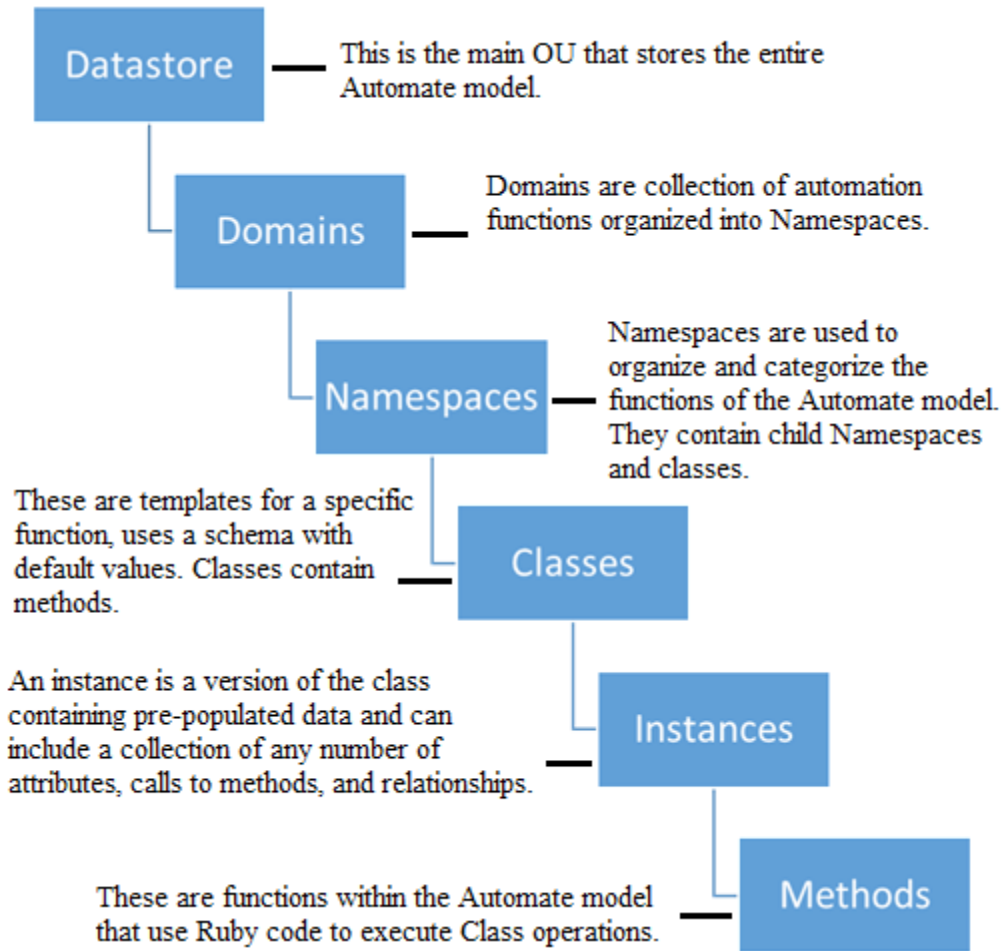
Name	Value	On Entry	On Exit
 ✓ (max_cpus)			
 ✓ (max_vms)	2		
 ✓ (max_memory)			
 ✓ (max_retirement_days)			
 ✓ (ValidateRequest)		validate_request	
 ✓ (ApproveRequest)		approve_request	

Automate Instance [Default - Updated 04/26/15 20:37:43 IST by system]

Fields

Name	Value	On Entry	On Exit	On Error	Collect	Max Retries	Max Time	Message
 ✓ ValidateQuotas		validate_quotas		rejected		100		create

Chapter 6: Automation Using Red Hat CloudForms



Adding a new Automate Domain

Info

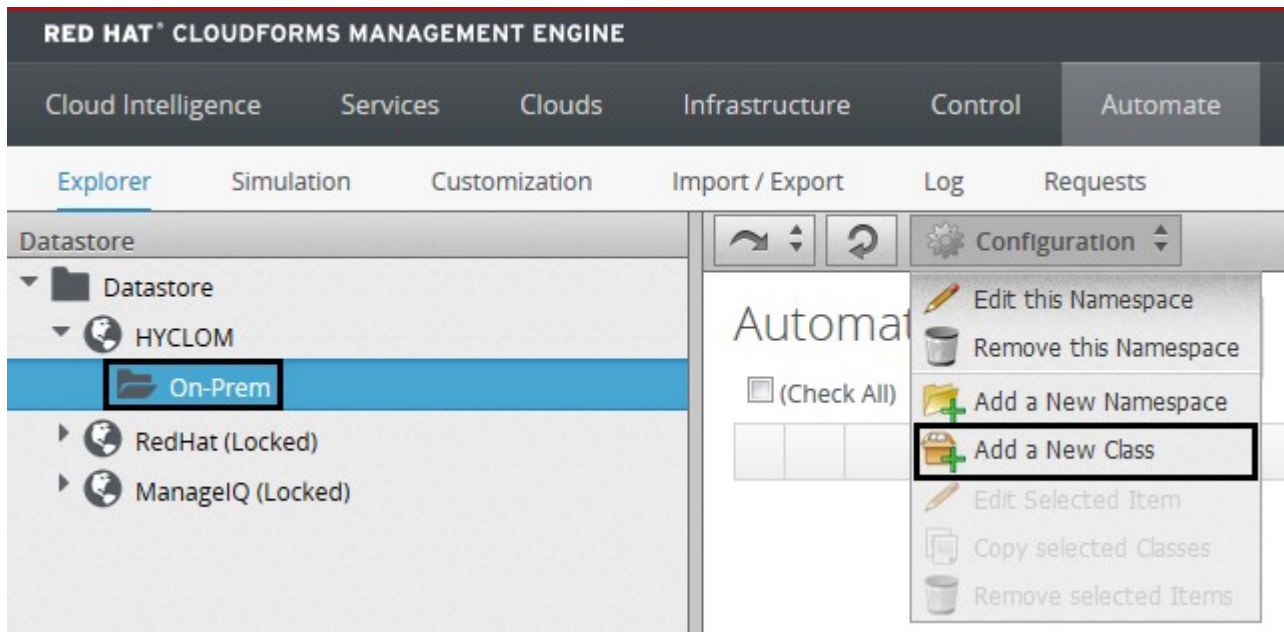
Name	HYCLOM
Description	Hybrid Cloud Management
Enabled	<input checked="" type="checkbox"/>

The screenshot shows the Red Hat CloudForms Management Engine interface. The top navigation bar includes 'Cloud Intelligence', 'Services', 'Clouds', 'Infrastructure', 'Control', and 'Automate'. Below this, there are tabs for 'Explorer', 'Simulation', 'Customization', 'Import / Export', 'Log', and 'Requests'. The 'Datastore' section is expanded, showing a tree view with 'Datastore' as the root, containing 'HYCLOM', 'RedHat (Locked)', and 'ManagelQ (Locked)'. The 'HYCLOM' item is selected. A context menu is open over the 'HYCLOM' item, showing options: 'Edit this Domain', 'Remove this Domain', '(Check All)', 'Lock this Domain', 'Add a New Namespace' (highlighted with a black box), 'Edit Selected Namespace', and 'Remove Namespaces'. The 'Configuration' dropdown menu is also visible at the top right of the context menu.

Adding a new Automate Namespace

Info

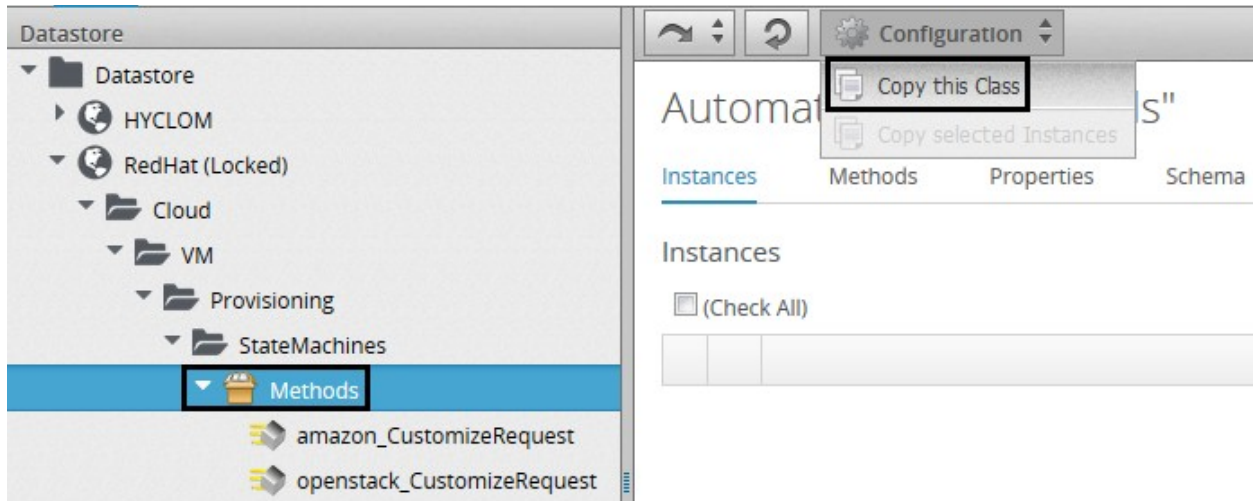
Fully Qualified Name	HYCLOM
Name	On-Prem
Description	On Premise Infrastructure



Adding a new Class

Properties

Fully Qualified Name	HYCLOM / On-Prem
Name	<input type="text" value="Windows-VM"/>
Display Name	<input type="text"/>
Description	<input type="text" value="Windows VMs Provisioning Templat"/>

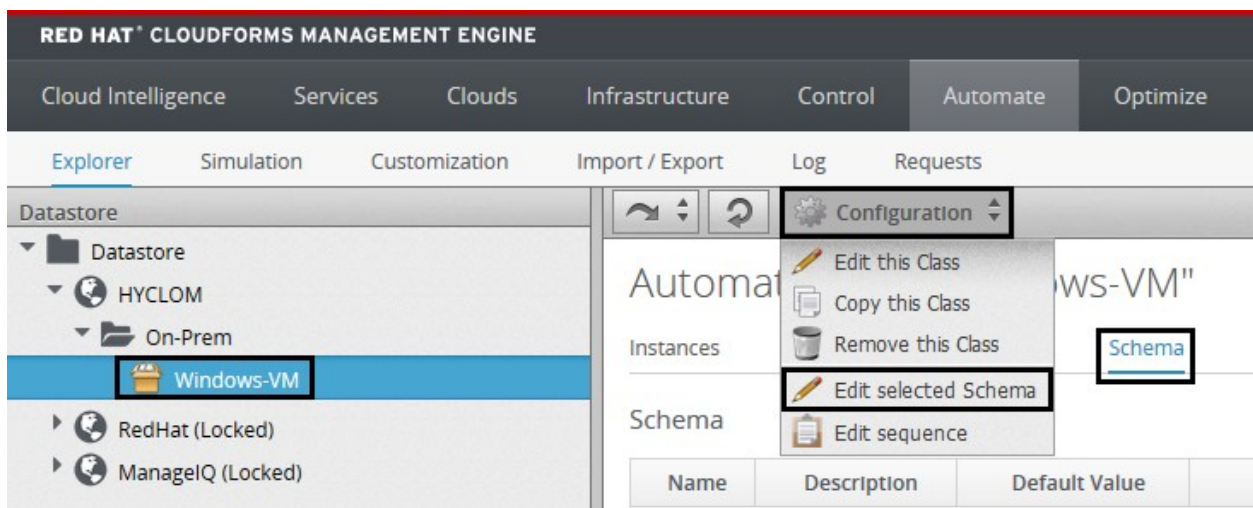


Copy Automate Class

From Domain	RedHat
To Domain	HYCLOM
Copy to same path	<input checked="" type="checkbox"/>

1 Item selected to copy

Methods



Editing Class Schema "Windows-VM"

Instances Methods Properties **Schema**

Schema

	Name	Type	Data Type	Default Value	Display Name	Description	Sub
✓	min_vcpus	Attribute	ab String	2	Minimum VCPUs		✓

Editing Class Schema "Windows-VM"

Instances Methods Properties **Schema**

Schema

	Name	Type	Data Type	Default Value	Display Name	Description	Sub
✖	min_vcpus	Attribute	ab String	2	Minimum VCPUs		✓
✖	min_ram	Attribute	ab String	4	Minimum RAM		✓
+	<New Field>						

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure Control **Automate**

Explorer Simulation Customization Import / Export Log Requests

Datastore

- Datastore
 - HYCLOM
 - Cloud
 - On-Prem
 - Windows-VM**
 - RedHat (Locked)
 - ManageIQ (Locked)

Configuration

Automate

- Edit this Class
- Copy this Class
- Remove this Class
- Add a New Instance**
- Edit Selected Instance
- Copy selected Instances
- Remove Instances

Instances

- (Check All)



Adding a new Automate Instance

[Instances](#) [Methods](#) [Properties](#) [Schema](#)

Main Info

Fully Qualified Name	HYCLOM / On-Prem / Windows-VM
Name	<input type="text" value="Windows2003"/>
Display Name	<input type="text"/>
Description	For Deploying Windows Server 2003

Fields

Name	Value	
 <input checked="" type="checkbox"/> Minimum VCPUs (min_vcpus)	<input type="text" value="1"/>	<input type="text"/>
 <input checked="" type="checkbox"/> Minimum RAM (min_ram)	<input type="text" value="2"/>	<input type="text"/>

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure Control Automate Optimize Configure

Explorer Simulation Customization Import / Export Log Requests

Datatore

- ▼ Datatore
 - ▶ HYCLOM
 - ▶ RedHat (Locked)
 - ▼ ManageIQ (Locked)
 - ▼ Cloud
 - ▼ VM
 - ▼ Lifecycle
 - Provisioning
 - Retirement
 - ▶ Operations
 - ▶ Provisioning
 - ▶ Retirement
 - ▶ Control
 - ▶ Infrastructure
 - ▶ Service
 - ▶ System

Configuration

Automate instance provisioning

Domain Overrides (by priority)

- HYCLOM
- ManageIQ (Same Domain)

Fields

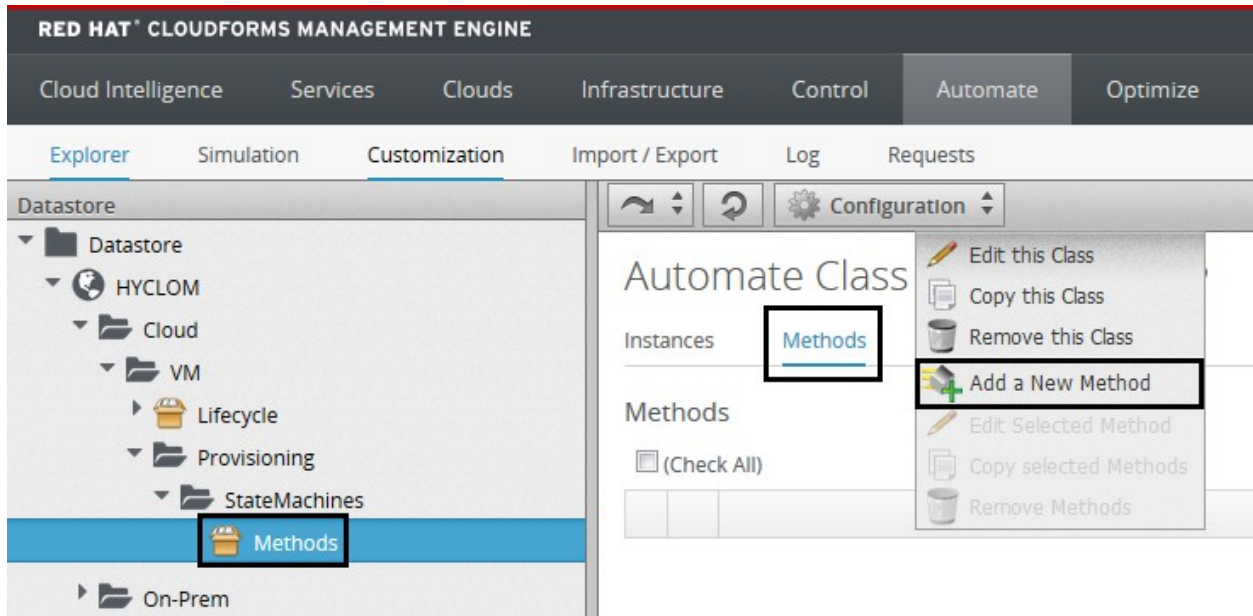
Name	Value	On Entry
Relationship5	/Cloud /VM/Provisioning /Profile /\${/#user.normalized_	
Relationship6	/Cloud /VM/Provisioning /StateMachines /\${/#state_machine} /\${/#miq_provision.pr	

Copy Automate Instance

From Domain	ManageIQ
To Domain	HYCLOM
Copy to same path	<input checked="" type="checkbox"/>
Replace items if they already exist?	<input type="checkbox"/>

1 Item selected to copy

Provisioning



Adding a new Automate Method

Instances Methods Properties Schema

Main Info

Fully Qualified Name	HYCLOM / Cloud / VM / Provisioning / StateMachines / Methods
Name	<input type="text" value="check_provisioned"/>
Display Name	<input type="text"/>
Location	<input type="text" value="inline"/>

Data

```

1 #
2 # Description: This method checks to see if the vm has been provisioned
3 #
4 # Get current provisioning status
5 task = $evm.root['miq_provision']
6 task_status = task['status']
7 result = task.status
8 $evm.log('info', "ProvisionCheck returned <#{result}> for state <#{task.state}> and status <#{task_status}>")
9 case result
10 when 'error'
11   $evm.root['ae_result'] = 'error'
12   reason = $evm.root['miq_provision'].message
13   reason = reason[7..-1] if reason[0..6] == 'Error: '
14   $evm.root['ae_reason'] = reason
15 when 'retry'
16   $evm.root['ae_result'] = 'retry'
17   $evm.root['ae_retry_interval'] = '1.minute'
18 when 'ok'
19   # Bump State
20   $evm.root['ae_result'] = 'ok'
21 end

```

Chapter 7: Managing Red Hat CloudForms

VM Operation

- | | | |
|--|--|--|
| <input type="checkbox"/> VDI Connecting to Session | <input type="checkbox"/> VDI Console Login Session | <input type="checkbox"/> VDI Disconnected from Session |
| <input type="checkbox"/> VDI Login Session | <input type="checkbox"/> VDI Logoff Session | <input type="checkbox"/> VM Analysis Complete |
| <input type="checkbox"/> VM Analysis Failure | <input type="checkbox"/> VM Analysis Request | <input type="checkbox"/> VM Analysis Start |
| <input type="checkbox"/> VM Guest Reboot | <input type="checkbox"/> VM Guest Reboot Request | <input type="checkbox"/> VM Guest Shutdown |
| <input type="checkbox"/> VM Guest Shutdown Request | <input type="checkbox"/> VM Live Migration (VMOTION) | <input type="checkbox"/> VM Power Off |
| <input type="checkbox"/> VM Power Off Request | <input type="checkbox"/> VM Power On | <input type="checkbox"/> VM Power On Request |
| <input type="checkbox"/> VM Remote Console Connected | <input type="checkbox"/> VM Removal from Inventory | <input type="checkbox"/> VM Removal from Inventory Request |
| <input type="checkbox"/> VM Reset | <input type="checkbox"/> VM Reset Request | <input type="checkbox"/> VM Snapshot Create Complete |
| <input type="checkbox"/> VM Snapshot Create Request | <input type="checkbox"/> VM Snapshot Create Started | <input type="checkbox"/> VM Standby of Guest |
| <input type="checkbox"/> VM Standby of Guest Request | <input type="checkbox"/> VM Suspend | <input type="checkbox"/> VM Suspend Request |

The screenshot displays the Red Hat CloudForms Management Engine interface. At the top, there is a navigation bar with tabs for 'Cloud Intelligence', 'Services', 'Clouds', 'Infrastructure', 'Control', and 'Automate'. Below this, there is a sub-navigation bar with 'Explorer', 'Simulation', 'Import / Export', and 'Log'. The main content area is divided into a left sidebar and a right main panel. The sidebar shows a tree view of 'Policy Profiles' with 'Policies' expanded to show 'All Policies', 'Compliance Policies', 'Control Policies', 'Host Control Policies', and 'Vm Control Policies'. The 'Vm Control Policies' item is highlighted in blue. The main panel shows a 'Configuration' dropdown menu with a '+' icon and the text 'Add a New Vm Control Policy'. Below this, there is a message box with an information icon and the text 'No Control Vm Policies are defined.'

Adding a new Vm Control Policy

Basic Information

Description	Shutdown VM/Instance without Firewall
Active	<input checked="" type="checkbox"/>

Scope (Choose an element of the Policy scope to edit)

???

<Choose> ▾

Notes (0 / 512)

Find ▾

VM and Instance.OS.Firewall Rules : Active ▾

= ▾ true ▾

Check All ▾ Required ▾ = ▾ true ▾

Adding a new Condition

Basic Information

Description	Firewall Enabled?
-------------	-------------------

Scope (Press the "Edit" button to edit the scope)



i No scope defined, the scope of this condition includes all elements.

Expression (Choose an element of the expression to edit)

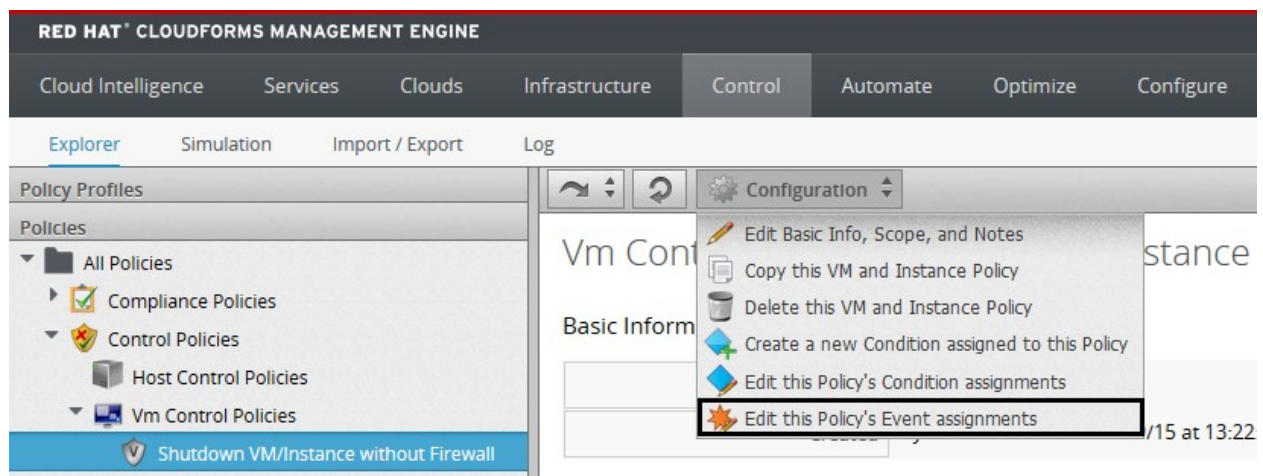
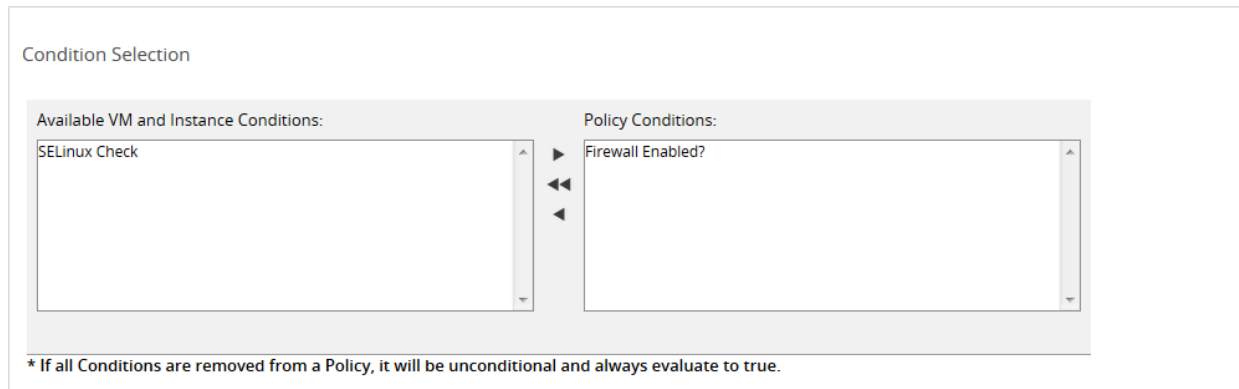
← → AND OR NOT ✕

FIND VM and Instance.OS.Firewall Rules : Active = 'true' CHECK ALL Required = 'true'

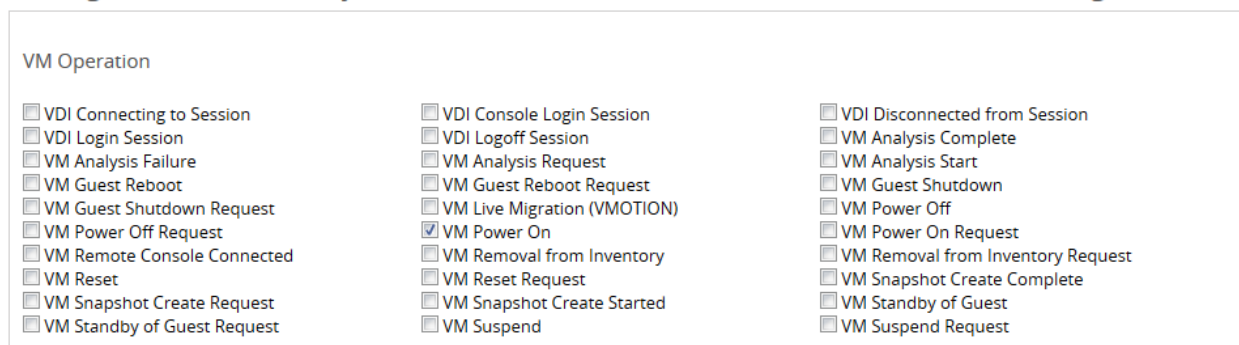
Notes (0 / 512)

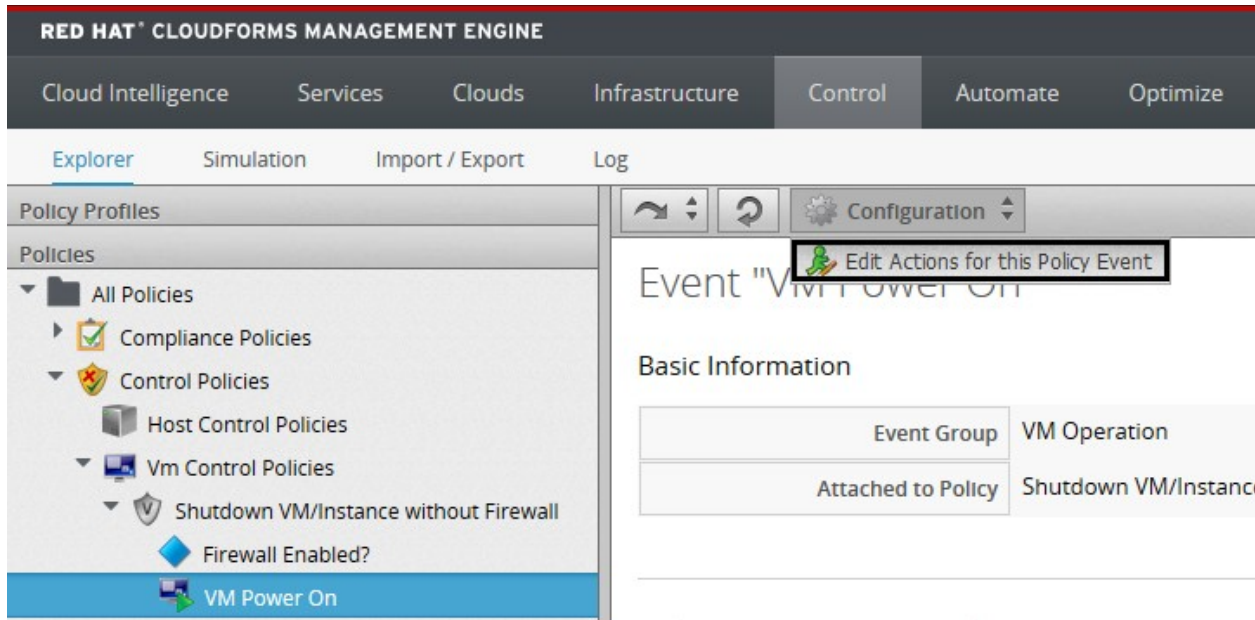
The screenshot shows the Red Hat CloudForms Management Engine interface. At the top, there is a navigation bar with tabs for Cloud Intelligence, Services, Clouds, Infrastructure, Control, Automate, Optimize, and Configure. Below this is a sub-navigation bar with Explorer, Simulation, Import / Export, and Log. The main content area is divided into a left sidebar and a main panel. The sidebar shows a tree view of Policy Profiles, with Policies expanded to show All Policies, Compliance Policies, Control Policies, Host Control Policies, and Vm Control Policies. The Vm Control Policies folder is selected, and a specific policy is highlighted. The main panel shows the configuration for this policy, with a Configuration menu open. The menu items are: Edit Basic Info, Scope, and Notes; Copy this VM and Instance Policy; Delete this VM and Instance Policy; Create a new Condition assigned to this Policy; Edit this Policy's Condition assignments (highlighted with a red box); and Edit this Policy's Event assignments. The bottom right corner of the screenshot shows a timestamp: /15 at 13:22.

Editing Vm Control Policy "Shutdown VM/Instance without Firewall" Condition Assignments



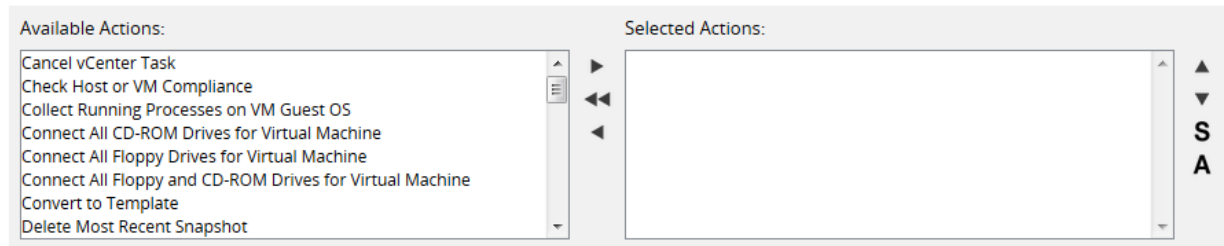
Editing Vm Control Policy "Shutdown VM/Instance without Firewall" Event Assignments



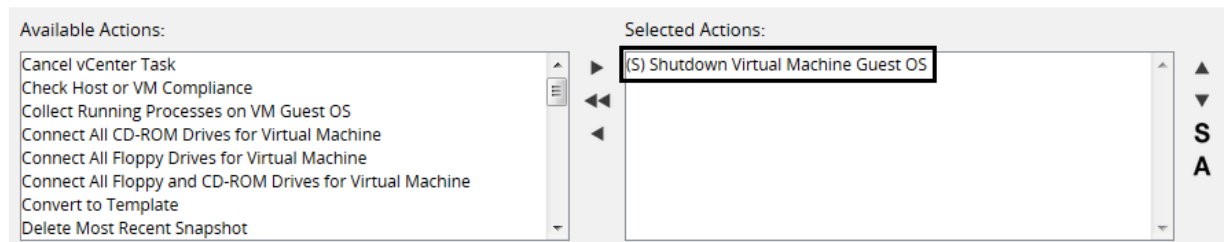


Editing Event "VM Power On"

Order of Actions if ALL Conditions are True



Order of Actions if ANY Conditions are False



RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure **Control** Automate

Explorer Simulation Import / Export Log

Policy Profiles

Policies

- All Policies
 - Compliance Policies
 - Host Compliance Policies
 - Vm Compliance Policies**

Configuration

+ Add a New Vm Compliance Policy

No Compliance Vm Policies are defined.

✓ ✕

Find

VM and Instance.Files : Name

= /etc/sysconfig/selinux

Check Any Contents = ^\s*SELINUX\s+enforcin

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure **Control** Automate Optimize Configure

Explorer Simulation Import / Export Log

Policy Profiles

Policies

- All Policies
 - Compliance Policies
 - Host Compliance Policies
 - Vm Compliance Policies
 - VM/Instance Compliance**
 - VM Compliance Check

Configuration

Vm Com

- Edit Basic Info, Scope, and Notes
- Copy this VM and Instance Policy
- Delete this VM and Instance Policy
- Create a new Condition assigned to this Policy
- Edit this Policy's Condition assignments**

Policy "VM

Basic Inform

Active Yes

Condition Selection

Available VM and Instance Conditions:	Policy Conditions:
Firewall Enabled?	SELinux Check

* If all Conditions are removed from a Policy, it will be unconditional and always evaluate to true.

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds

Explorer **Simulation** Import / Export

Options

Event Selection

Type: VM Operation

Event: VM Power On

VM Selection

Single VM

wp1


Display Options


Show out of scope Items:

Show policies: Passed Failed

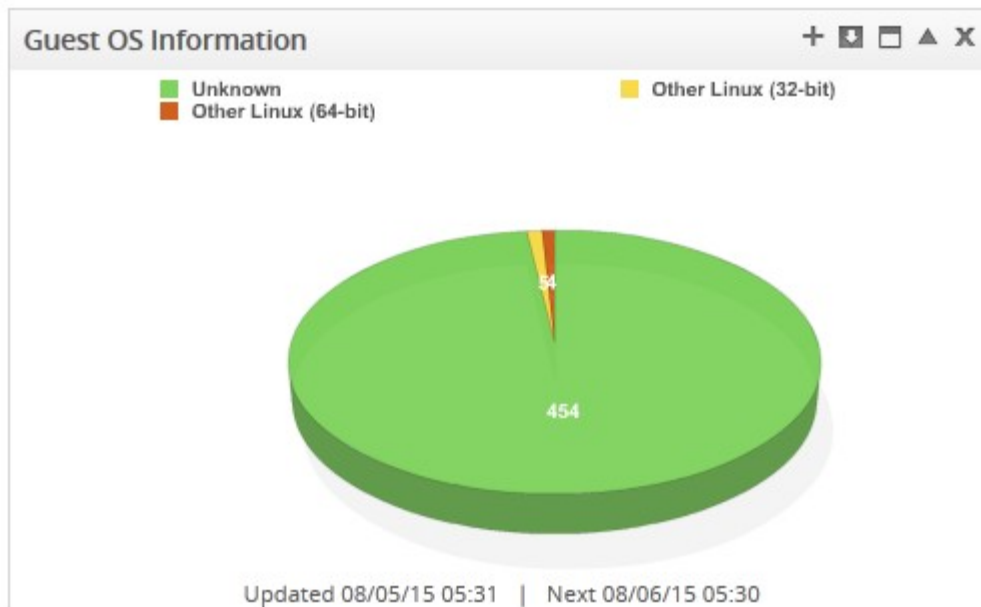
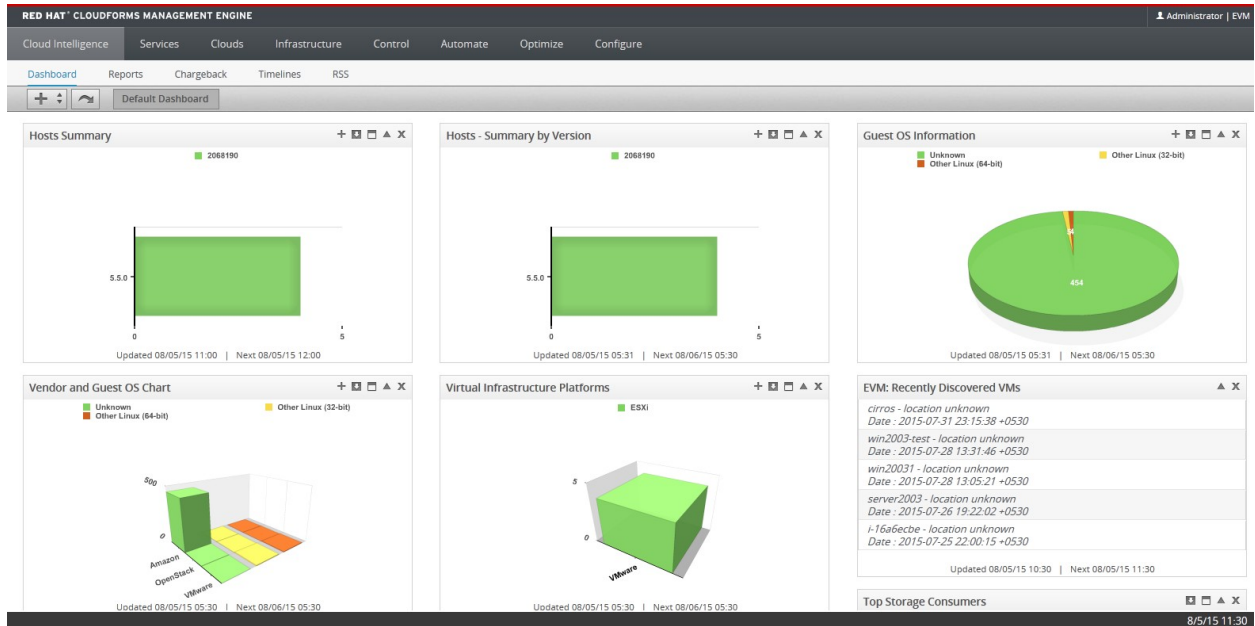
Policy Simulation Results

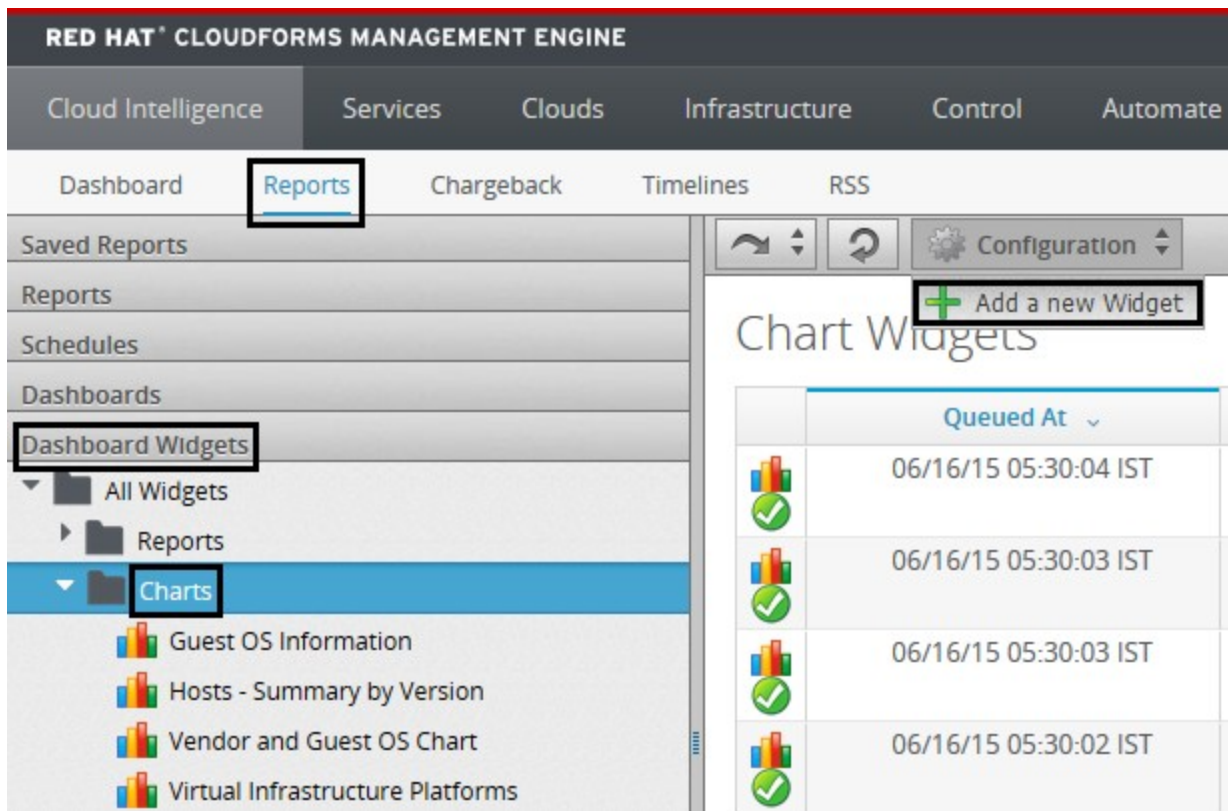
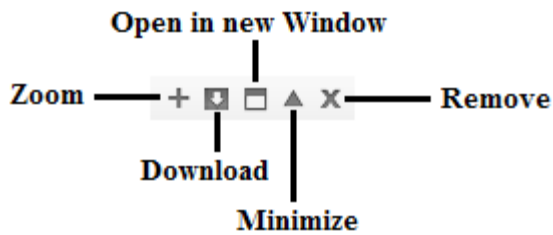
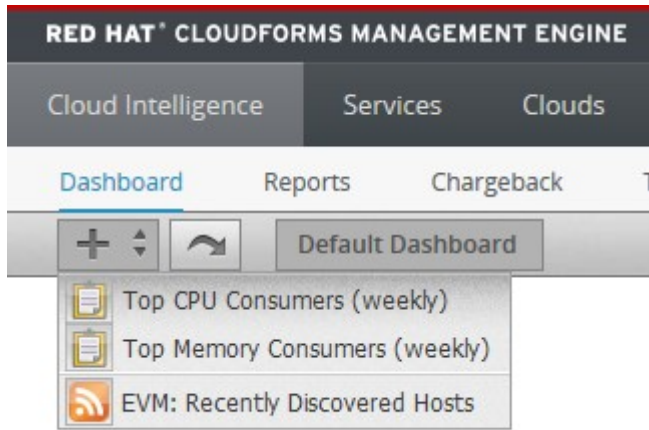
* Items in *red italics* do not change the outcome of the scope or expression.

 Policy Simulation Results for Event [VM Power On]

 VM: wp1

Chapter 8: Monitoring a Hybrid Cloud Infrastructure Using Red Hat CloudForms





Adding a new Widget

Basic Information

Title	<input type="text" value="Hosts Summary"/>
Description	<input type="text" value="Hosts Summary"/>
Active	<input checked="" type="checkbox"/>

Chart Report

Filter	<input type="text" value="Configuration Management/Hosts/Hosts Summary"/>
--------	---

Timer

Run	<input type="text" value="Hourly"/> every <input type="text" value="Hour"/>
Time Zone	<input type="text" value="(GMT+05:30) Mumbai"/> * Changing
Starting Date	<input type="text" value="6/17/2015"/>
Starting Time (UTC)	<input type="text" value="0"/> h <input type="text" value="0"/> m

Visibility

Show	<input type="text" value="<To All Users>"/>
------	---

Saved Reports

Reports

Schedules

Dashboards

Dashboard Widgets

- All Widgets
 - Reports
 - Charts
 - Guest OS Information
 - Hosts - Summary by Version
 - Hosts Summary**
 - Vendor and Guest OS Chart
 - Virtual Infrastructure Platforms

Configuration

- Edit this Widget 1
- Copy this Widget 2
- Delete this Widget from the Database 3
- Generate Widget content now 4

Chart W

Basic Inform

Title	Hosts Summary
Description	Hosts Summary
Active	true
Default	false

Adding a new Report

[Columns](#) Consolidation Formatting Styling Filter Summary Charts Timeline Preview

Basic Report Info

Menu Name	<input type="text" value="OS Process Report"/>
Title	<input type="text" value="OS Process Report"/>

Configure Report Columns

* Base the report on

Available Fields:

- Active
- Allocated Disk Storage
- Annotation
- Archived
- Autostart
- Boot Time
- Busy
- CPU - % Overallocated
- CPU - Aggregate Usage Rate for Child VMs for Collected Intervals 30 Day Avg (MHz)
- CPU - Aggregate Usage Rate for Child VMs for Collected Intervals 30 Day High Avg (MHz)



Selected Fields:

- OS.Processes : Name
- OS.Processes : PID
- OS.Processes : CPU %
- OS.Processes : Memory %
- OS.Processes : Date Created



* Caution: Changing these fields will clear all selected values below them!

Report Creation Timeout

Cancel after

Adding a new Report

Basic Report Info

Menu Name	<input type="text" value="OS Process Report"/>
Title	<input type="text" value="OS Process Report"/>

Group Records by up to 3 Columns

Column 1	<input type="text" value="<<< Nothing >>>"/>
----------	--

Note: Consolidating records will not show detail records in the report.

PDF Output

Page Size	<input type="text" value="A2 - 420mm x 594mm"/>
-----------	---

Specify Column Headers and Formats

Column Name	Header	Format
OS.Processes : Name	<input type="text" value="Process Name"/>	<input type="text" value="<None>"/>
OS.Processes : PID	<input type="text" value="Process PID"/>	<input type="text" value="<None>"/>
OS.Processes : CPU %	<input type="text" value="Process CPU %"/>	<input type="text" value="Percent, 1 Decimal (99.0%)"/>
OS.Processes : Memory %	<input type="text" value="Process Memory %"/>	<input type="text" value="Percent, 1 Decimal (99.0%)"/>
OS.Processes : Date Created	<input type="text" value="Process Date Created"/>	<input type="text" value="Date/Time (M/D/Y H:M:S Z)"/>

Specify Column Styles

Column Name	Style	If	
OS.Processes : Name	<input type="text" value="Red Background"/> <input type="text" value="Gray Background"/>	<input type="text" value="="/> <input type="text" value="Default"/> <input type="text" value="httpd"/>	<input type="text" value="Sample"/> <input type="text" value="Sample"/>
OS.Processes : PID	<input type="text" value="<Normal>"/>	Default	:
OS.Processes : CPU %	<input type="text" value="<Normal>"/>	Default	:
OS.Processes : Memory %	<input type="text" value="<Normal>"/>	Default	:
OS.Processes : Date Created	<input type="text" value="<Normal>"/>	Default	:

* Style "If" conditions are evaluated top to bottom for each column

Primary (Record) Filter - Filters the VmCloud table records



Instance : OS Name = "CentOS"

Secondary (Display) Filter - Filters the rows based on child table fields



Instance.OS.Processes : Memory % >= 25

Sort Criteria

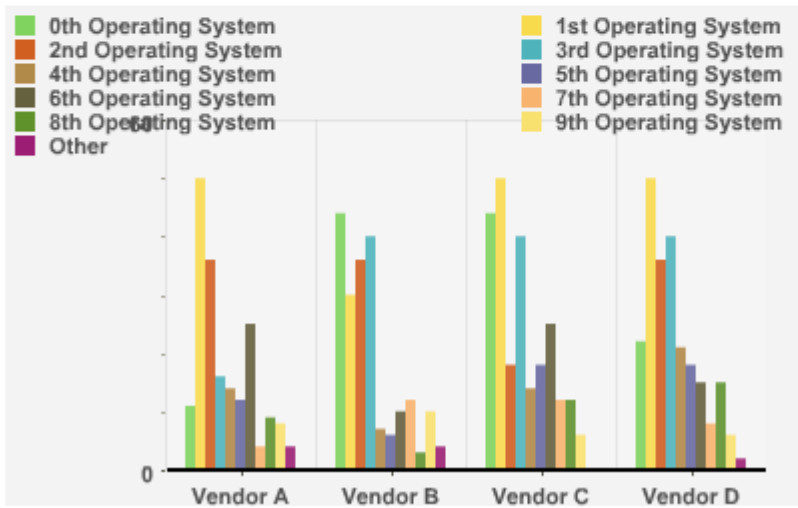
Sort the Report By	OS.Processes : Name ▾
Sort Order	Ascending ▾
Show Sort Breaks	No ▾
Within Above Field, Sort By	OS.Processes : Memory % ▾
Number of Rows to Show	All ▾

Chart Settings

Choose a chart type	Columns (2D) ▼
Top values to show	10 ▼
Sum 'Other' values	<input checked="" type="checkbox"/>

* Some charts may not produce desired results with a single sort field

Sample Chart



Timeline Settings

Base Timeline on	OS.Processes : Date Created ▼	Event to position at:	Last ▼	
First band unit:	Minute ▼	Show events from last:	1 ▼	Weeks ▼
Second band unit:	<<< Nothing >>> ▼			

Adding a new Schedule

Basic Information

Name	Online VMs (Powered On)
Description	Online VMs (Powered On)
Active	<input checked="" type="checkbox"/>


Report Selection

Filter	Operations
	Virtual Machines
	Online VMs (Powered On)

Timer

Run	Once
Time Zone	(GMT+05:30) Mumbai * Changing
Starting Date	06/19/2015
Starting Time (UTC)	0 h 30 m

E-Mail after Running

Send an E-mail	<input checked="" type="checkbox"/>
From (leave blank for default)	<input type="text"/> (Default: cfadmin@cfserver.com)
To (Click to remove)	jane.doe@somedomain.com
Add a User	None Available or All Selected
Add (enter manually)	<input type="text"/> 

Configuration

Saved Report "VMs Not Powered On - Fri Jun 19 00:22:55 IST 2015"

Host	Datastore	Datastore Path	VM Name	VM Power State	Last Analysis
ravellovmwarelabesxi1.localdomain	NFSDatastore	NFSDatastore/DSL/DSL.vmx	DSL		
ravellovmwarelabesxi1.localdomain	NFSDatastore	NFSDatastore/Tiny Linux/Tiny Linux.vmx	Tiny Linux		
ravellovmwarelabesxi1.localdomain Count: 2					
ravellovmwarelabesxi2.localdomain	NFSDatastore	NFSDatastore/CirrOS_1/CirrOS.vmx	CirrOS		
ravellovmwarelabesxi2.localdomain Count: 1					

VMs Not Powered On_2015_08_06.pdf - Adobe Acrobat Reader DC

File Edit View Window Help

Home Tools Document 1 / 10

VMs Not Powered On

Host	Datastore	Datastore Path	VM Name	VM Power State	Last Analysis Time
ravellovmwarelabesxi1.localdomain	NFSDatastore	NFSDatastore/DSL/DSL.vmx	DSL		
ravellovmwarelabesxi1.localdomain	NFSDatastore	NFSDatastore/Tiny Linux/Tiny Linux.vmx	Tiny Linux		
ravellovmwarelabesxi1.localdomain Count: 2					
ravellovmwarelabesxi2.localdomain	NFSDatastore	NFSDatastore/CirrOS_1/CirrOS.vmx	CirrOS		
ravellovmwarelabesxi2.localdomain Count: 1					

Settings Server "EVM [10000000000001]" (current)

Server Control

Server Roles

- Automation Engine
- Capacity & Utilization Coordinator
- Capacity & Utilization Data Collector
- Capacity & Utilization Data Processor
- Database Operations
- Database Synchronization
- Event Monitor
- Notifier
- Provider Inventory
- Provider Operations
- RHN Mirror
- Reporting
- Scheduler
- SmartProxy
- SmartState Analysis
- User Interface
- Web Services

Default Repository SmartProxy None Available

RED HAT CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure Control Automate Optimize Configure

Dashboard Reports Chargeback Timelines RSS

Reports

Rates

Assignments

- Assignments
 - Compute
 - Storage

Compute Rate Assignments

Basic Info

Assign To: Selected Cloud/Infrastructure Providers

Selections	Name	Rate
	AWS NV	Default
	AWS O	Default
	OpenStack NV	<Nothing>

VM and Instance

- Cluster
- Datastore
- Host
- Provider
- Server
- VM and Instance

<p>Cluster</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Hourly Performance Real Time Performance VMware Alarm Expression (Custom) 	<p>Datastore</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Expression (Custom) 	<p>Host</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Hostd Log Threshold Real Time Performance VMware Alarm Expression (Custom)
<p>Provider</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Expression (Custom) 	<p>Server</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Expression (Custom) 	<p>VM and Instance</p> <p>Nothing</p> <ul style="list-style-type: none"> Nothing Event Log Threshold Event Threshold Hardware Reconfigured Normal Operating Range Real Time Performance VM Value changed VMware Alarm Expression (Custom)

Adding a new Alert


Info

Description	VM/Instance Powered Off
Active	<input checked="" type="checkbox"/>
Based On	VM and Instance ▾
What to Evaluate	Event Threshold ▾
Notification Frequency	1 Minute ▾

Event Threshold Parameters

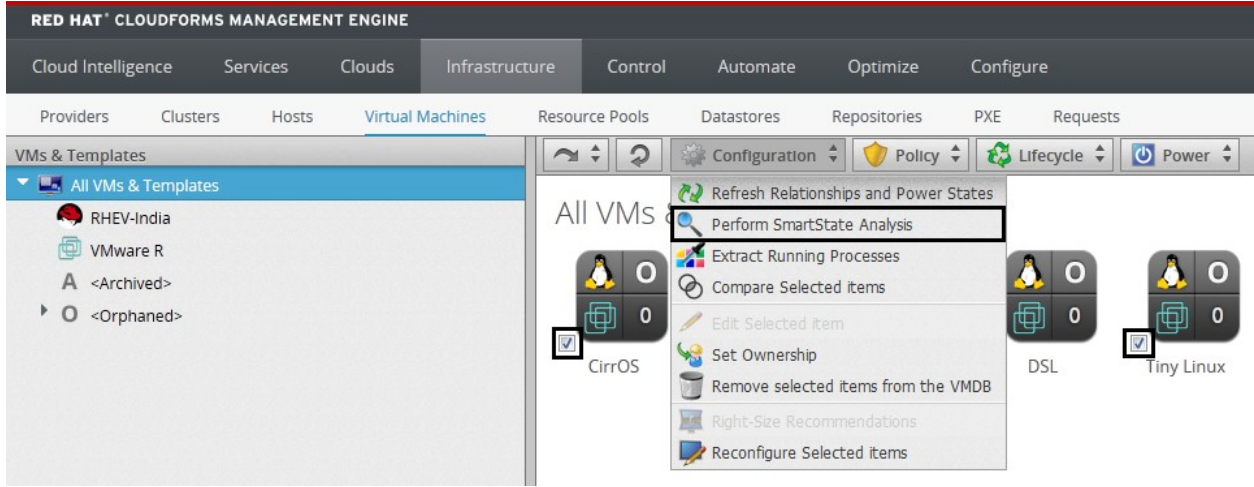
Event to Check	Power Activity: VmPoweredOffEvent ▾
How Far Back to Check	5 Minutes ▾
Event Count Threshold	0

E-mail

Send an E-mail	<input checked="" type="checkbox"/>
From (leave blank for default)	<input type="text"/> (Default: cfadmin@cfserver.com)
To (Click to remove)	jane.doe@somedomain.com
Add a User	None Available or All Selected
Add (enter manually)	<input type="text"/> 

SNMP Trap

Send an SNMP Trap	<input type="checkbox"/>
-------------------	--------------------------



Chapter 9: Optimizing Using Red Hat CloudForms

RED HAT® CLOUDFORMS MANAGEMENT ENGINE

Cloud Intelligence Services Clouds Infrastructure Control Automate Optimize Configure

Providers Clusters Hosts **Virtual Machines** Resource Pools Datastores Repositories PXE Requests

VMs & Templates

- All VMs & Templates
 - RHEV-India
 - VMware R
 - <Archived>
 - <Orphaned>

All VMs & Templates

CirrOS DSL

Configuration Policy Lifecycle Monitoring Power

VM and Instance "Cirros"

Utilization Timelines

Properties	
Name	Cirros
Hostname	
IP Address	
Container	VMware (1 CPU, 256 MB)
Parent Host Platform	ESXi
Platform Tools	toolsNotInstalled
Operating System	Other Linux (32-bit)
CPU Affinity	
Snapshots	None
Advanced Settings	0
Resources	Available
Management Engine GUID	529ed0d4-3c55-11e5-a8c5-fa163e52df6c

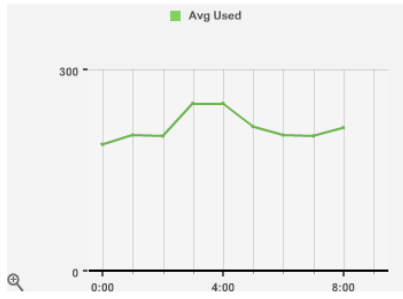
Compliance	
Status	Never Verified
History	Not Available

Power Management	
Power State	on
Last Boot Time	Thu Aug 06 22:19:14 IST 2015
State Changed On	Thu Aug 06 21:38:05 IST 2015

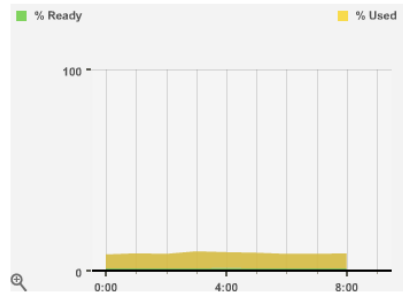
Security	
Users	0
Groups	0

Configuration

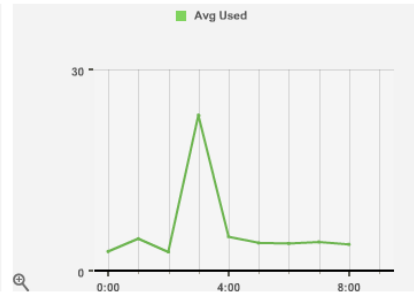
CPU (Mhz)



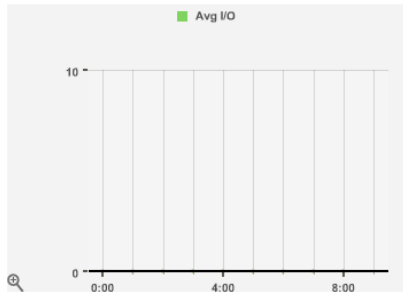
Virtual Machine CPU States



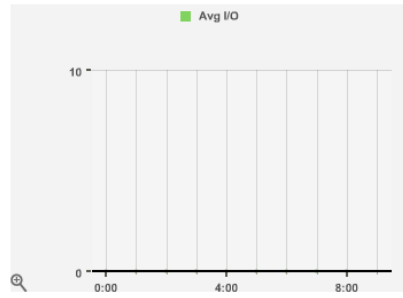
Memory (MB)



Disk I/O (KBps)

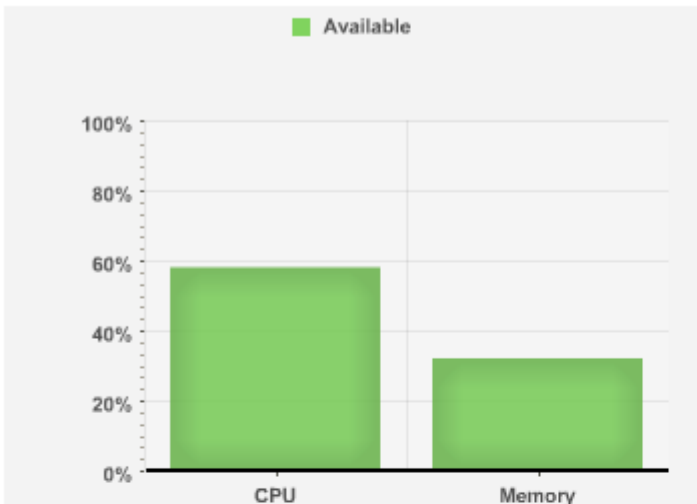


Network I/O (KBps)



Cluster "India" Utilization Trend Summary

Selected Day Percent Utilization



CPU	
Total	5 GHz (100%)
Available	2.9 GHz (58%)
CPU Max Used MHz Trend: Projected to hit Total	Trending Down
CPU Average Used MHz Trend: Projected to hit Total	Trending Down
CPU Max Used MHz Trend: Projected to hit Available	Trending Down
CPU Average Used MHz Trend: Projected to hit Available	Trending Down

Memory	
Total	4 GB (100%)
Available	1.3 GB (32%)
Memory Max Used Trend: Projected to hit Total	Trending Down
Memory Average Used Trend: Projected to hit Total	Trending Down
Memory Max Used Trend: Projected to hit Available	Trending Down
Memory Average Used Trend: Projected to hit Available	Trending Down

* Information shown is based on available trend data from 08/08/15 to 08/09/15 in the UTC time zone.

Reference VM Selection

By Infrastructure Provider	▼
AWS O	▼
sp-src	▼

VM Options

Source	Allocation ▼
vCPU Count	<input checked="" type="checkbox"/> 1
Memory Size	<input checked="" type="checkbox"/> 2048 MB
Disk Space	<input checked="" type="checkbox"/> 0 GB

Target Options / Limits

Show	Hosts ▼
Filter	<All> ▼
vCPUs per Core	10 ▼
Memory Size	90% ▼
Datastore Space	90% ▼

Chapter 10: APIs for Red Hat CloudForms

```
{ "name": "hosts", "count": 4, "subcount": 4, "resources": [{"href": "http://localhost:3000/api/hosts/10000000000004"}, {"href": "http://localhost:3000/api/hosts/10000000000003"}, {"href": "http://localhost:3000/api/hosts/10000000000001"}, {"href": "http://localhost:3000/api/hosts/10000000000002"}]}
```

```
{ "id": "http://localhost:3000/api/vms/1000000074058", "vendor": "vmware", "name": "Cirros", "location": "Cirros/Cirros.vmx", "host_id": 1000000000002, "created_on": "2015-08-06T16:08:06Z", "updated_on": "2015-08-07T15:57:42Z", "storage_id": 1000000000004, "guid": "529ed0d4-3c55-11e5-a8c5-fa163e52df6c", "ems_id": 1000000000014, "last_scan_attempt_on": "2015-08-06T16:15:55Z", "uid_ems": "564d24e5-49e4-12b7-ab4f-b09edec3f1ef", "boot_time": "2015-08-07T03:48:03Z", "tools_status": "toolsNotInstalled", "standby_action": "powerOnSuspend", "power_state": "on", "state_changed_on": "2015-08-06T16:08:05Z", "connection_state": "connected", "last_perf_capture_on": "2015-08-07T15:57:00Z", "memory_reserve": 0, "memory_reserve_expand": false, "memory_limit": -1, "memory_shares": 2560, "memory_shares_level": "normal", "cpu_reserve": 0, "cpu_reserve_expand": false, "cpu_limit": -1, "cpu_shares": 1000, "cpu_shares_level": "normal", "template": false, "ems_ref_obj": "--- !ruby/string:VimString\nstr: vm-47\n\n xsiType: :ManagedObjectReference\nvimType: :VirtualMachine\n", "vdi": false, "linked_clone": false, "fault_tolerance": false, "type": "VmVmware", "ems_ref": "vm-47", "cloud": false, "raw_power_state": "poweredOn" }
```

```
{ "name": "tags", "count": 138, "subcount": 1, "resources": [{"href": "http://localhost:3000/api/vms/1000000074058/tags/1000000000138"}], "actions": [{"name": "assign", "method": "post", "href": "http://localhost:3000/api/vms/1000000074058/tags"}, {"name": "unassign", "method": "post", "href": "http://localhost:3000/api/vms/1000000074058/tags"}]}
```