VMware vCloud Director provider for ManageIQ Installation Guide

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1. Overview

This documentation provides installation and configuration steps required by VMware vCloud Director provider for ManageIQ. Functionality covered is described in VMware vCloud Director provider for ManageIQ Release Notes section.

2. VMware vCloud Director provider for ManageIQ Release Notes

ManageIQ supports VMware vCloud Director with limited functionality. The VMware vCloud Director coverage is limited to the following functionality:

- Authorization
- Inventory
- Power Operations
- Provisioning
- Reconfiguration
- Events

Due to the limited support of VMware vCloud Director, some functionalities are not straightforward. The most exceptional is provisioning of a virtual machine which is only possible by instantiating a predefined vApp template. More details on this matter can be found in vApp Provisioning in VMware vCloud Director Provider for ManageIQ section.

2.1. Authorization

Authorization is a basic functionality that creates a link from ManageIQ appliance to VMware vCloud Director host and enables collecting data from VMware vCloud Director host. Authorization is possible through VMware vCloud Director's **organization** (tenant) accounts. More details on adding a new provider are described in Adding a New VMware vCloud Director Provider to ManageIQ section.

2.2. Inventory

VMware vCloud Director provider inventories VMware vCloud Director's entities, e.g. virtual machines, and persists them into ManageIQ' database. There is a gap between how VMware vCloud Director names entities and how are they named in ManageIQ. Below please find a mapping between the two.

ManageIQ Convention.	**VMware vCloud Director Convention.**
Instance	Virtual Machine
Image	Virtual Machine Inside vApp Template

ManageIQ Convention.	VMware vCloud Director Convention.
Orchestration Stack	vApp
Orchestration Template	vApp Template
Availability Zone	Virtual Datacenter (VDC)
(not mapped)	Organization
OrgVdcNet Network & Subnet	VDC Network
OrgVappNet Network & Subnet	vApp Network
Network Port	Network Interface Card (NIC)
Floating IP	External IP

2.3. Power Operations

Power operations cover the control functionality over the virtual machines and vApps, similarly that you expect from other providers.

Service Operations

Supported service operations are:

- Set retirement date of a service.
- Retire service immediately.

NOTE	When retiring services all virtual machines in the service will be stopped and deleted.

Virtual Machine Operations

Supported virtual machine operations are:

- Start virtual machine.
- Stop virtual machine.
- Suspend virtual machine.
- Create snapshot of a virtual machine.
- Revert virtual machine from a snapshot.
- Delete snapsthot.
- Delete virtual machine.

2.4. Provisioning

The major difference of VMware vCloud Director from other platforms is that it provisions all resources wrapped in vApps. The images, virtual machines and vApp templates can be stored in catalogs, but only vApps can be provisioned directly. To provision other resources, a corresponding vApp needs to be built first.

The VMware vCloud Director provider for ManageIQ has limited functionality and does not support building or changing vApps from within ManageIQ directly, therefore the vApp templates need to be created in advance within VMware vCloud Director host. Provisioning process of existing vApp template is described in vApp Provisioning in VMware vCloud Director Provider for ManageIQ section.

2.5. Reconfiguration

All virtual machines that are inventoried by VMware vCloud Director provider for ManageIQ can be reconfigured. Following reconfiguration actions are supported:

- Adjust number of CPU cores and number of CPU sockets.
- Adjust memory size.
- Increase disk size.
- Delete disk.
- Add a new disk.
- Add a new network interface (NIC) and connect it to vApp network.
- Remove network interface (NIC).

More details on how to reconfigure a virtual machine and what limitations apply can be found in Virtual Machine Reconfiguration in VMware vCloud Director Provider for ManageIQ section.

2.6. Events

Events from VMware vCloud Director can be published to AMQP broker which filters them per organization (tenant). ManageIQ supports an option to provide AMQP credentials for VMware vCloud Director provider in order to consume messages from AMQP broker. More details on how to configure eventing support can be found in AMQP Event Monitoring Configuration for VMware vCloud Director section.

3. Prerequisites

Following prerequisites need to be met to start using VMware vCloud Director provider for ManageIQ:

- Valid organization must exist on VMware vCloud Director host.
- Administrative account access to VMware vCloud Director's organization is required.
- ManageIQ appliance must be able to reach VMware vCloud Director host through at least one network interface.

4. Tested Versions

Below please find matrix of tested versions.

ManageIQ	VMware vCloud Director
4.5	9.0.0.7033385 (also known as 9.0.1)
4.6	9.0.0.7033385 (also known as 9.0.1)

NOTE It has been reported that vApp provisioning does not work for vCloud Director versions prior to vCloud 5.6 due to massive API changes in vCloud API. Please use more recent vCloud versions e.g. 9.0 or 9.1.

5. Installing ManageIQ

To install ManageIQ please refer to ManageIQ Installation Guide.

6. Installing VMware vCloud Director

To install VMware vCloud Director please refer to vCloudDirector Installation Guide.

7. AMQP Event Monitoring Configuration for VMware vCloud Director

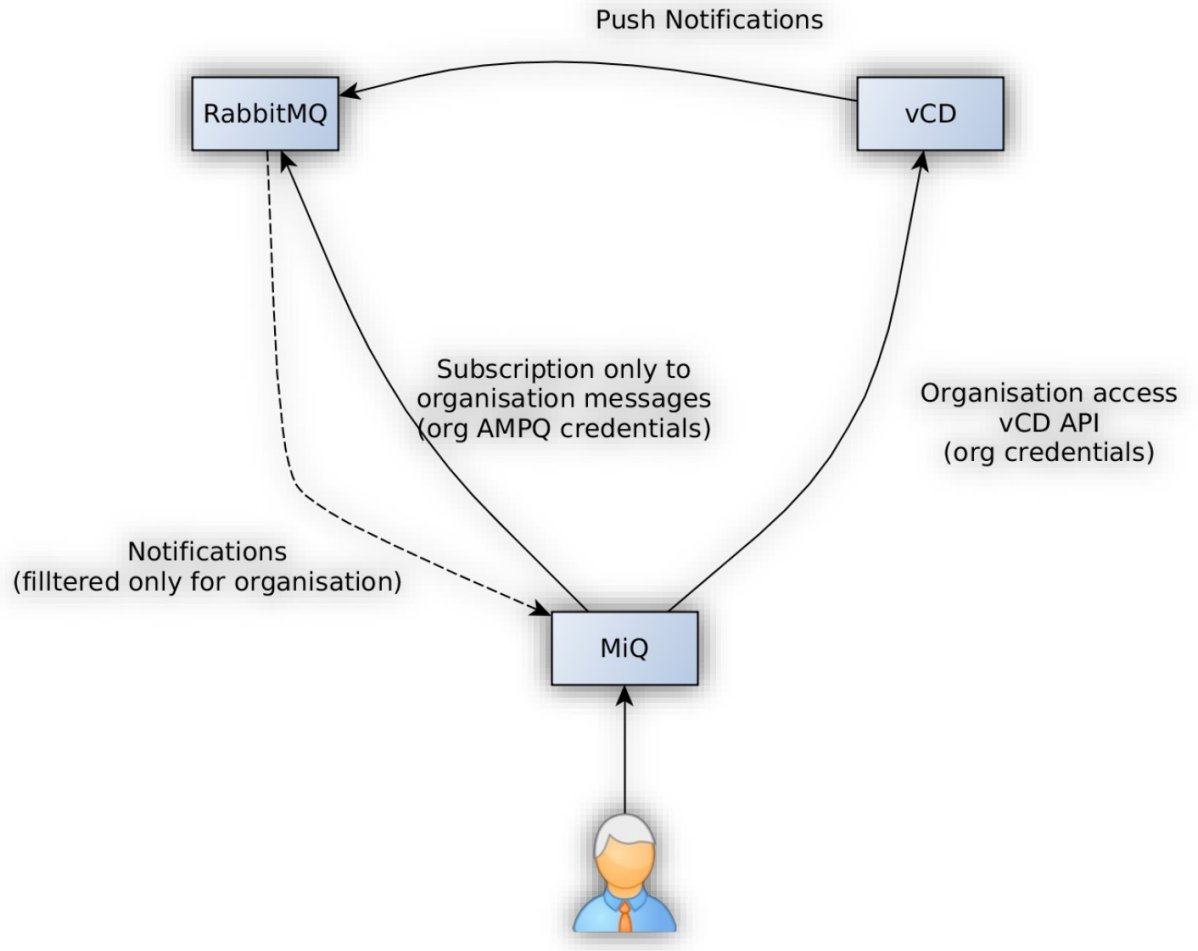
NOTE Event monitoring is optional, VMware vCloud Director provider can also be added with event monitoring disabled.

AMQP Event monitoring refers to a setup where observed entity emits messages to an AMQP broker from where another entity can consume them. Event monitoring is an improvement over periodical polling for changes through observerd entity's API for performance reasons.

VMware vCloud Director host supports AMQP event monitoring but has it disabled by default. There are two configuration scopes to take care of in order to make event monitoring work for VMware vCloud Director provider for ManageIQ:

1. Enable AMQP event monitoring option in VMware vCloud Director.
2. Configure RabbitMQ for per-organization consumption.

Following scheme demonstrates expected setup to support event monitoring for VMware vCloud Director cloud provider.



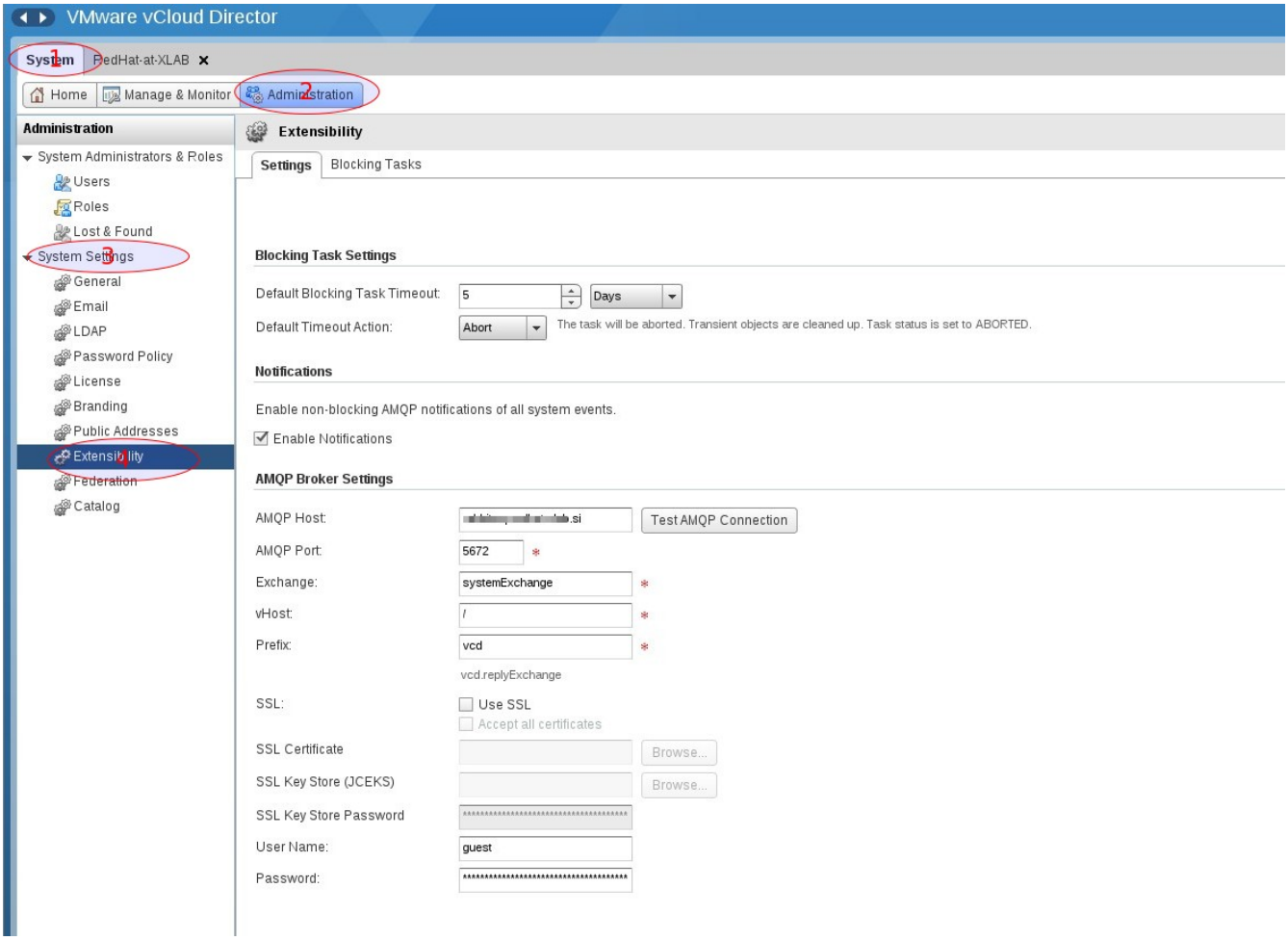
7.1. Prerequisites

We assume RabbitMQ message broker is deployed and accessible both from ManageIQ appliance as well as from VMware vCloud Director host. Administrative access to RabbitMQ and VMware vCloud Director is required.

7.2. Enable AMQP Event Monitoring Option in VMware vCloud Director

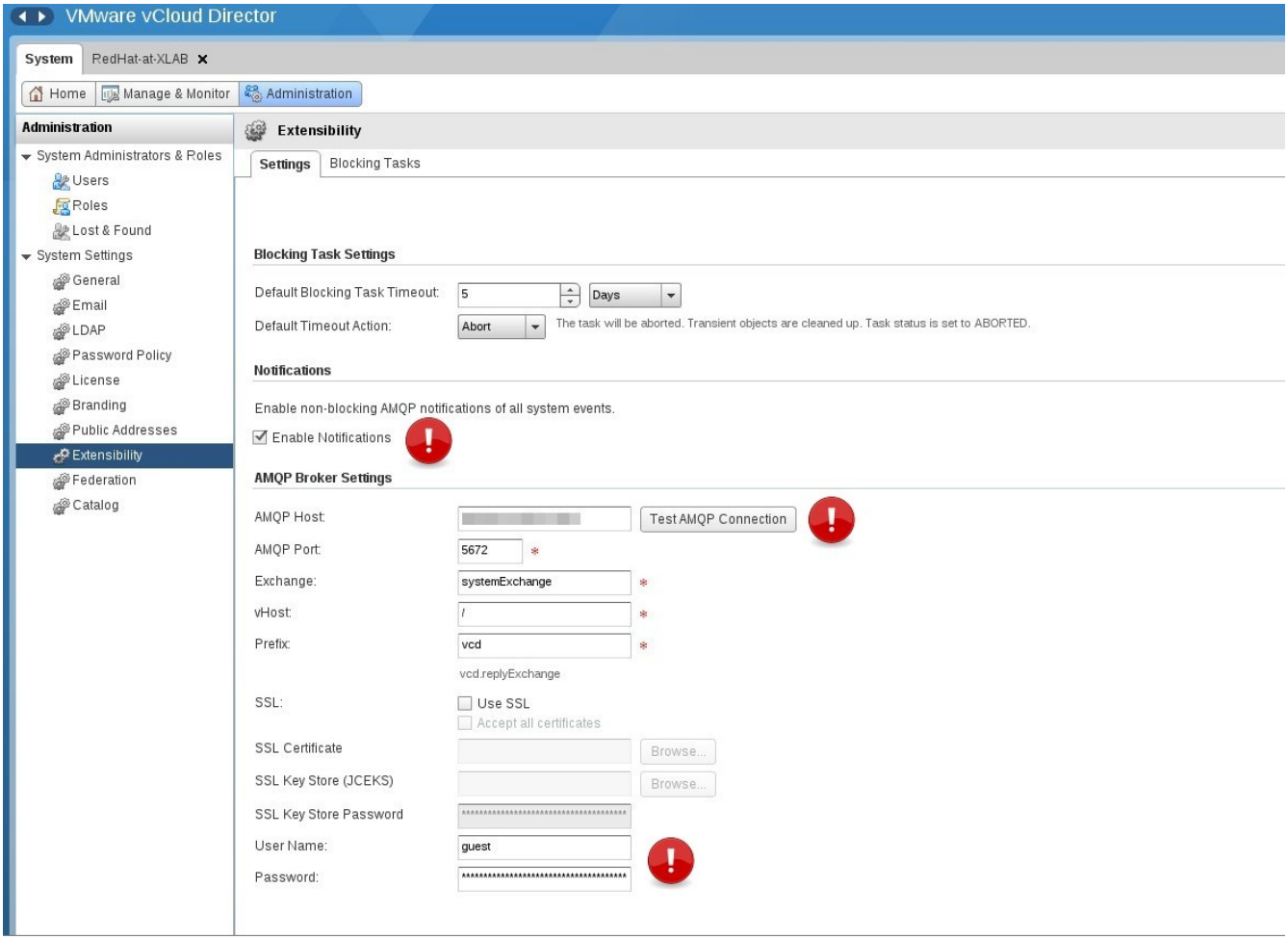
Following configuration is required on VMware vCloud Director host to enable AMQP event monitoring.

Login into VMware vCloud Director host's graphical interface as system administrator and navigate to **System** → **Administration** → **Management** → **System settings** → **Extensibility**.



Check **Enable Notifications** checkbox and fill in the required credentials for RabbitMQ in **AMQP Broker Settings** section. As soon as you save changes, VMware vCloud Director host will start emitting events to the RabbitMQ broker exchange.

NOTE When configuring RabbitMQ in the next section we assume **Exchange** name is set to **systemExchange**. Please use your actual exchange name in case you pick a different one in this form.



7.3. Configure RabbitMQ for Per-Organization Consumption

Having VMware vCloud Director host successfully configured to be sending messages to the AMQP broker, administrator then needs to perform some additional configuration on the AMQP broker to restrict access to user's own organization only. Only then it's safe to dispatch AMQP credentials to organization administrators who manage VMware vCloud Director provider for ManageIQ.

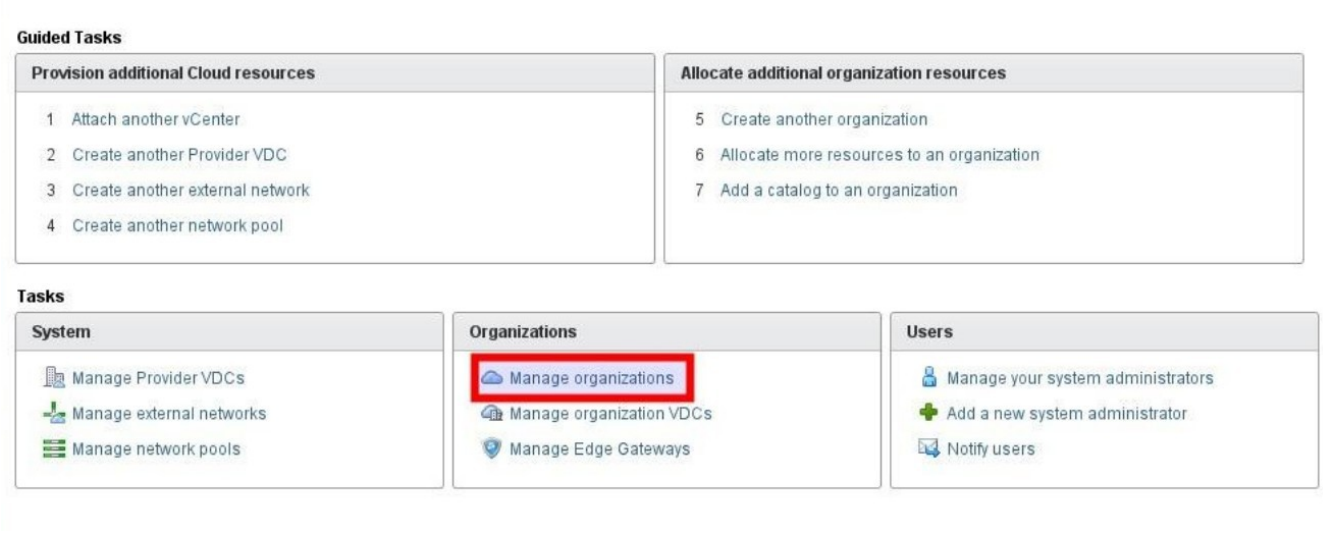
RabbitMQ configuration consists of following steps:

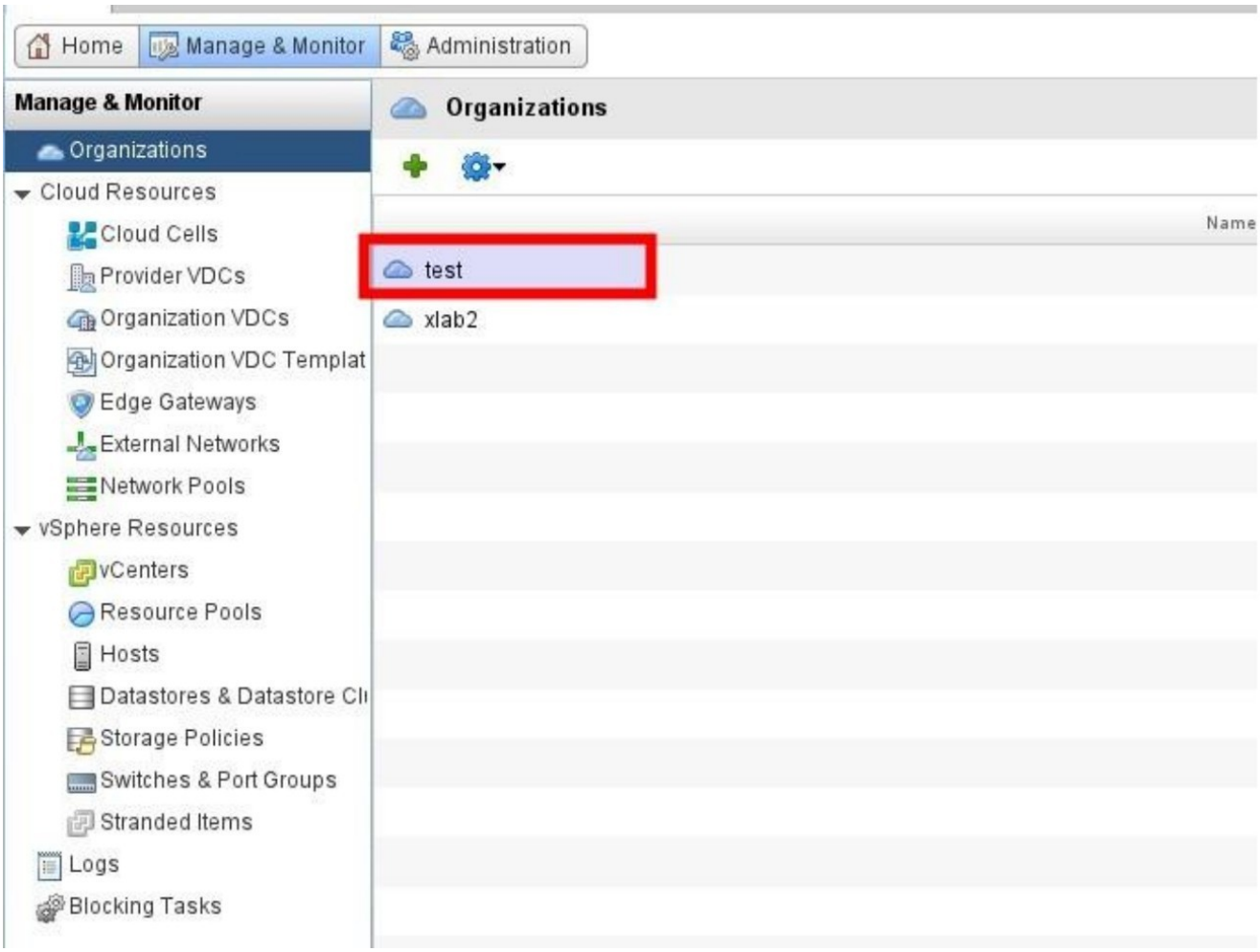
- Obtain UUID of the VMware vCloud Director's organization.
- Prepare **queue** for VMware vCloud Director's organization.
- Prepare **user** for VMware vCloud Director's organization.

7.3.1. Obtain UUID of the Organization

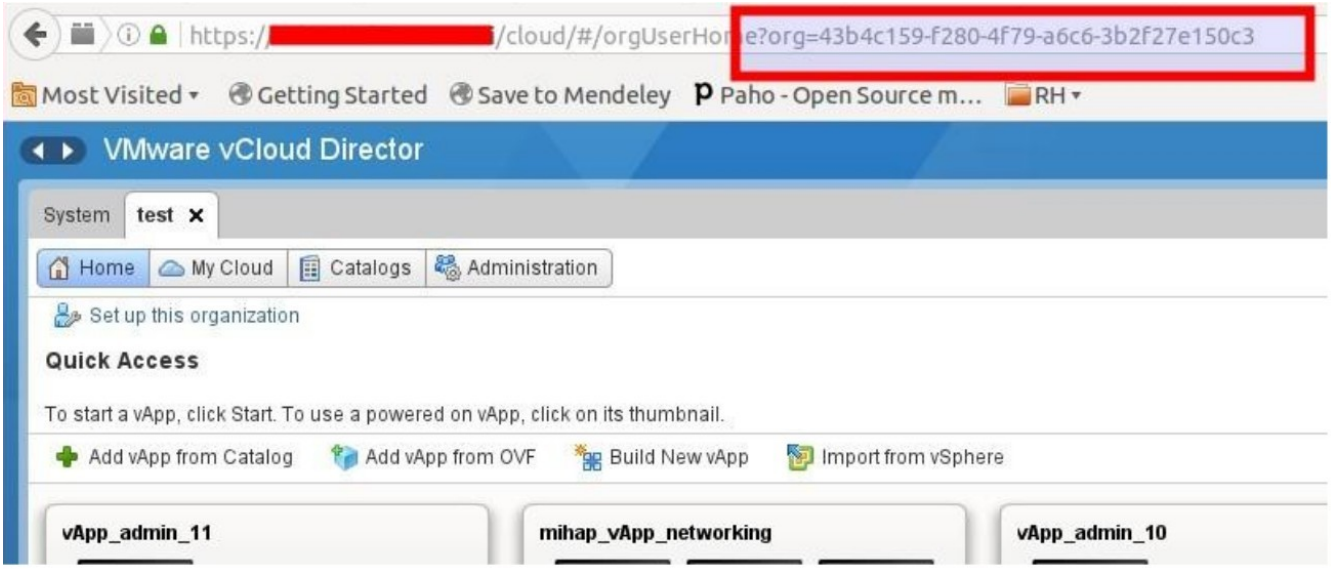
VMware vCloud Director's messages that are emitted to RabbitMQ are routed based on VMware vCloud Director's organization UUID (ORG_UUID). Please follow steps below to obtain it.

- Login into VMware vCloud Director host's graphical interface as system administrator.
- Navigate to organization through **Manage organizations** shortcut.





- Read UUID from the URL.



7.3.2. Prepare RabbitMQ Queue for the Organization

VMware vCloud Director host is sending messages (events, notifications) to AMQP exchange named **systemExchange**. Multiple queues can be subscribed to **systemExchange** exchange, each of them will receive replica of all messages.

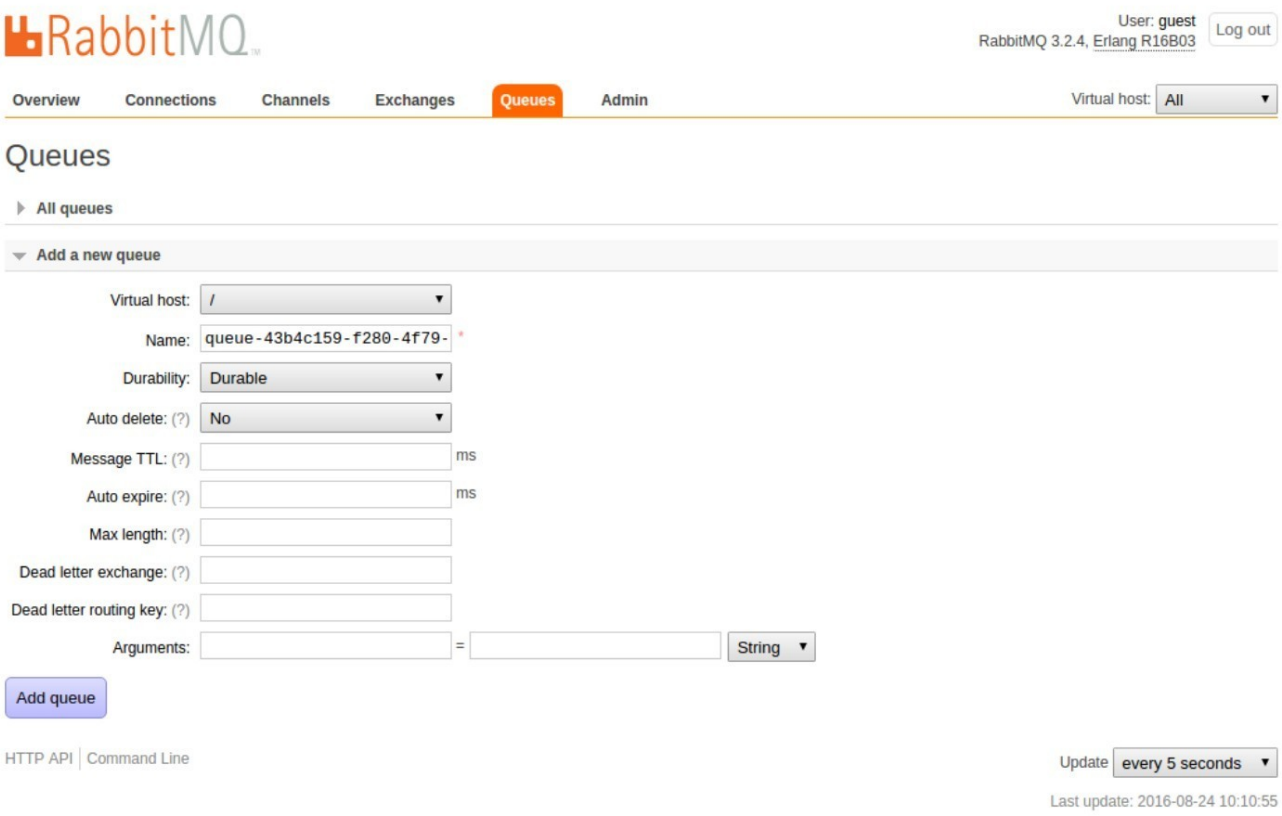
Steps below describe how to create a new AMQP queue and subscribe it to **systemExchange** exchange in a way that only messages for specific organization are delievered to it. ManageIQ then consumes messages from the queue to perform event-based actions.

NOTE	Steps below demonstrate AMQP queue configuration via Web GUI, but all the configuration can also be done via CLI.

Create Queue with Predefined Name

Follow steps below to create a queue with predefined name so that ManageIQ will be able to connect and consume messages.

Login into RabbitMQ broker Web GUI with administrative user and navigate to **Queues** tab to add a new queue. Assign it to the same virtual host as where **systemExchange** exchange exists. Name it `queue-<ORG_UUID>` and leave all other parameters on default.



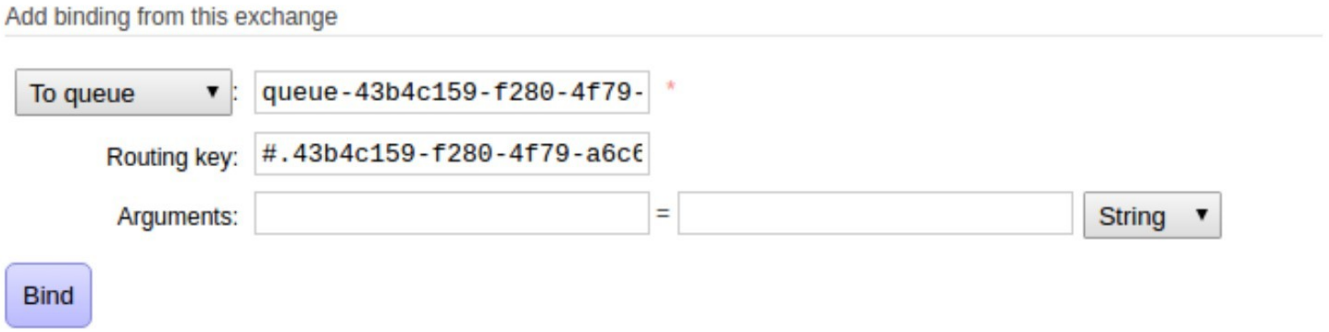
IMPORTANT	Please set parameters exactly as shown in the screenshot above, otherwise ManageIQ won't be able to consume messages. If you accidentally, for example, set auto delete to Yes instead No, ManageIQ won't be able to connect.

Subscribe Queue to **systemExchange** *Exchange*

Follow steps below to subscribe newly created queue to **systemExchange** exchange so that queue will start receiving messages from the exchange.

Navigate to **Exchanges** tab and open up **systemExchange** exchange details. In the **Bindings** subsection add a new binding for your queue and assign it following routing key (replace `<ORG_UUID>` with organization UUID):

```
#.<ORG_UUID>.#
```



Your queue will now receive all messages (events, notifications) regarding specified organization.

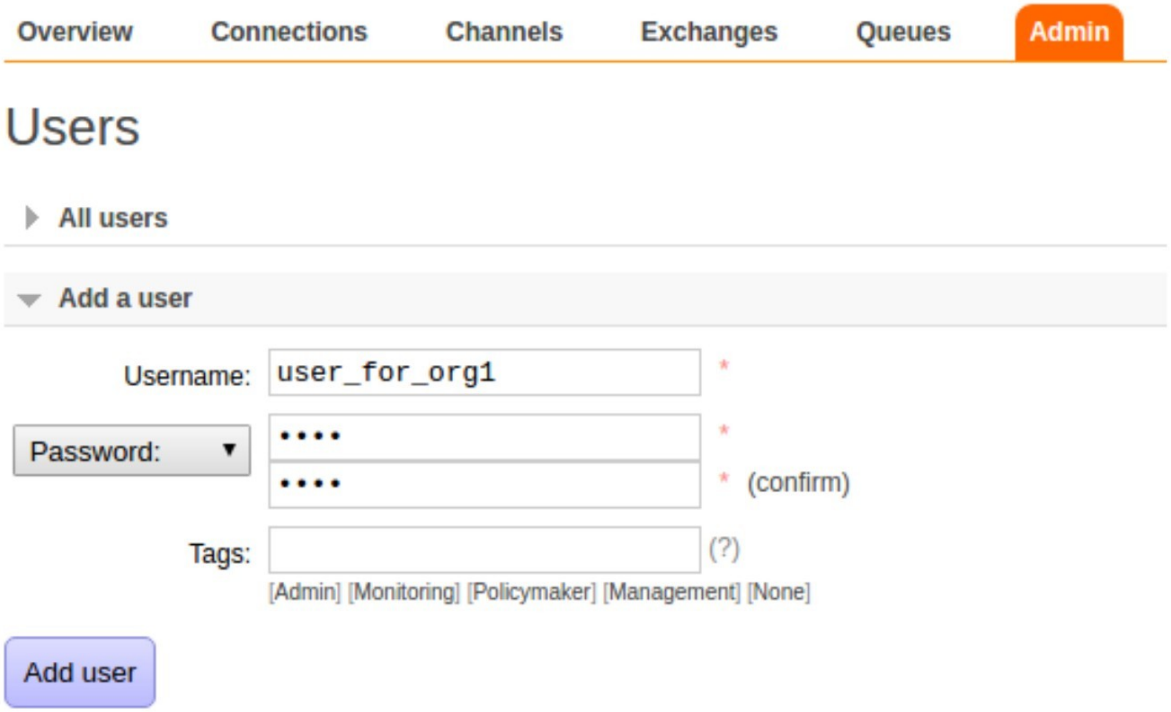
7.3.3. Prepare RabbitMQ User for the Organization

Having a working queue with predefined name configured, we only need to provide authentication for it yet so that ManageIQ will be able to connect. For this reason we create a new RabbitMQ user and assign it just enough permissions to access the one queue it needs. Eventually we'll pass this credentials to ManageIQ in order to grant access required for eventing.

Create RabbitMQ User

Navigate to **Admin** tab and add a new user without any tags. Omitting all tags restricts user from connecting to any queue.

NOTE User without any tags won't be able to even access RabbitMQ Web UI.



NOTE Credentials used at this step will need to be entered to the ManageIQ because ManageIQ will be connecting to the one queue accessible to this user. Please see Adding a New VMware vCloud Director Provider to ManageIQ section for exact instructions on where to provide them.

Allow User to Access One Specific Queue

Open up user details and in **Permissions** subsection set **Configure regexp**, **Write regexp** and **Read regexp** permissions to point to specific queue. For all three of them simply use queue name and set the permission.

IMPORTANT	Make sure you click **Set permission** button after you've input queue name or else configuration won't be stored and user won't be able to consume messages.

NOTE	**Configure regexp** and **Write regexp** permissions are required due to a bug in underlying ManageIQ's library that fails to connects to the queue unless full permission is granted.

7.3.4. Share Credentials with VMware vCloud Director provider Administrator

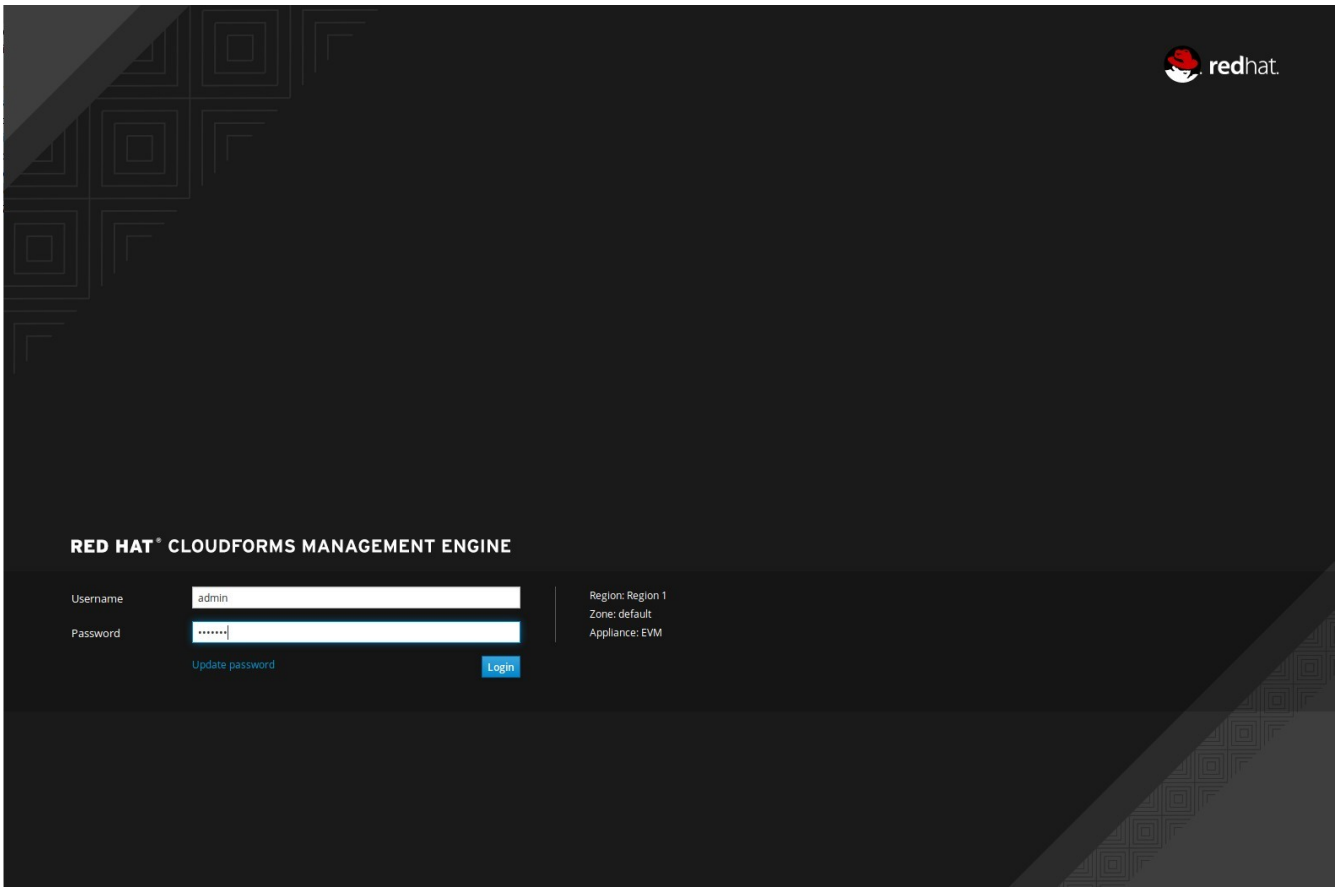
Following above instructions you now have the RabbitMQ broker configured in a way that it's safe to provide respective VMware vCloud Director organization administrator with:

- RabbitMQ broker IP/hostname address.
- Credentials of the newly created user.

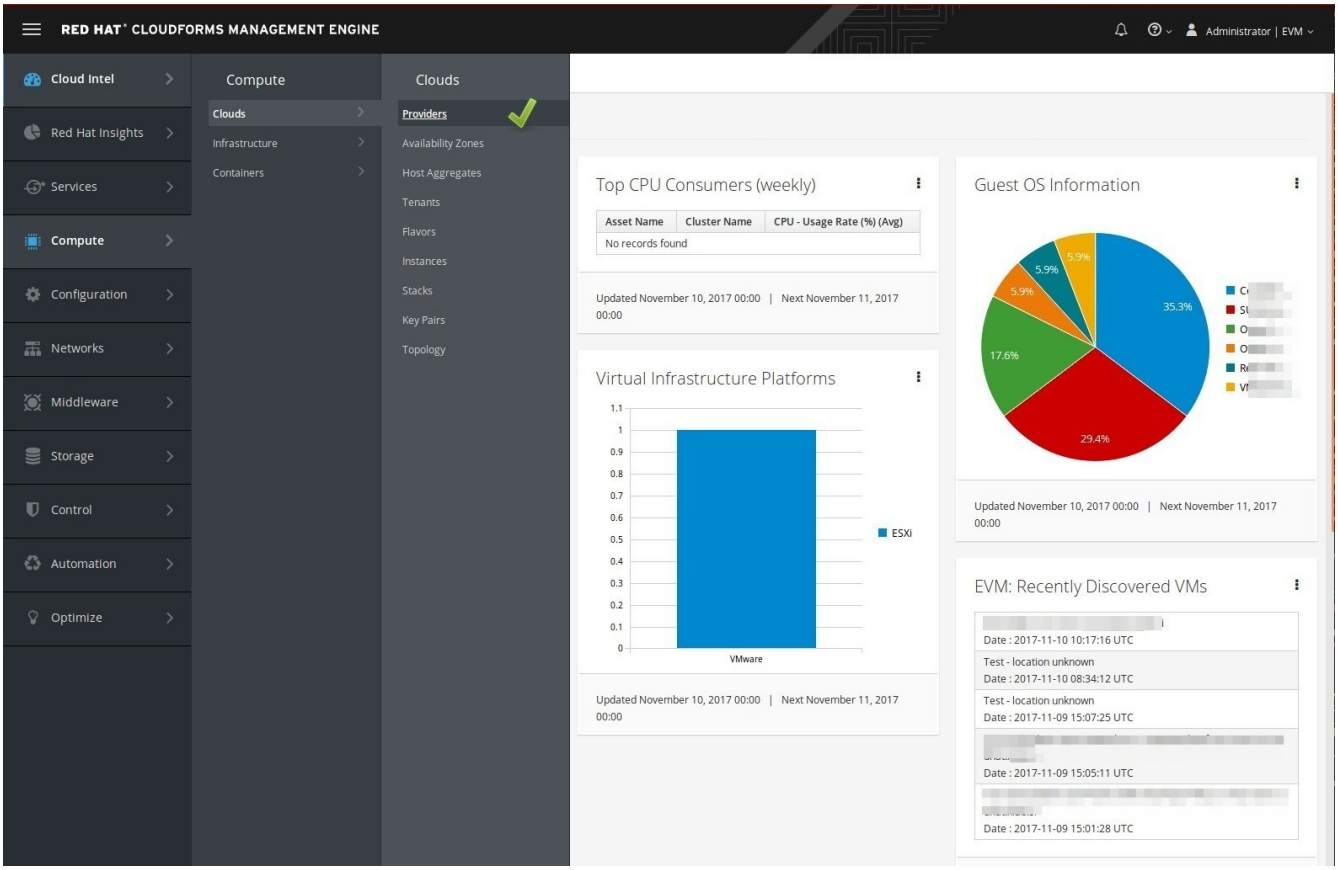
Using credentials provided, she will only be able to connect to the queue prepared for her organization and therefore only consume messages related to her organization.

8. Adding a New VMware vCloud Director Provider to ManageIQ

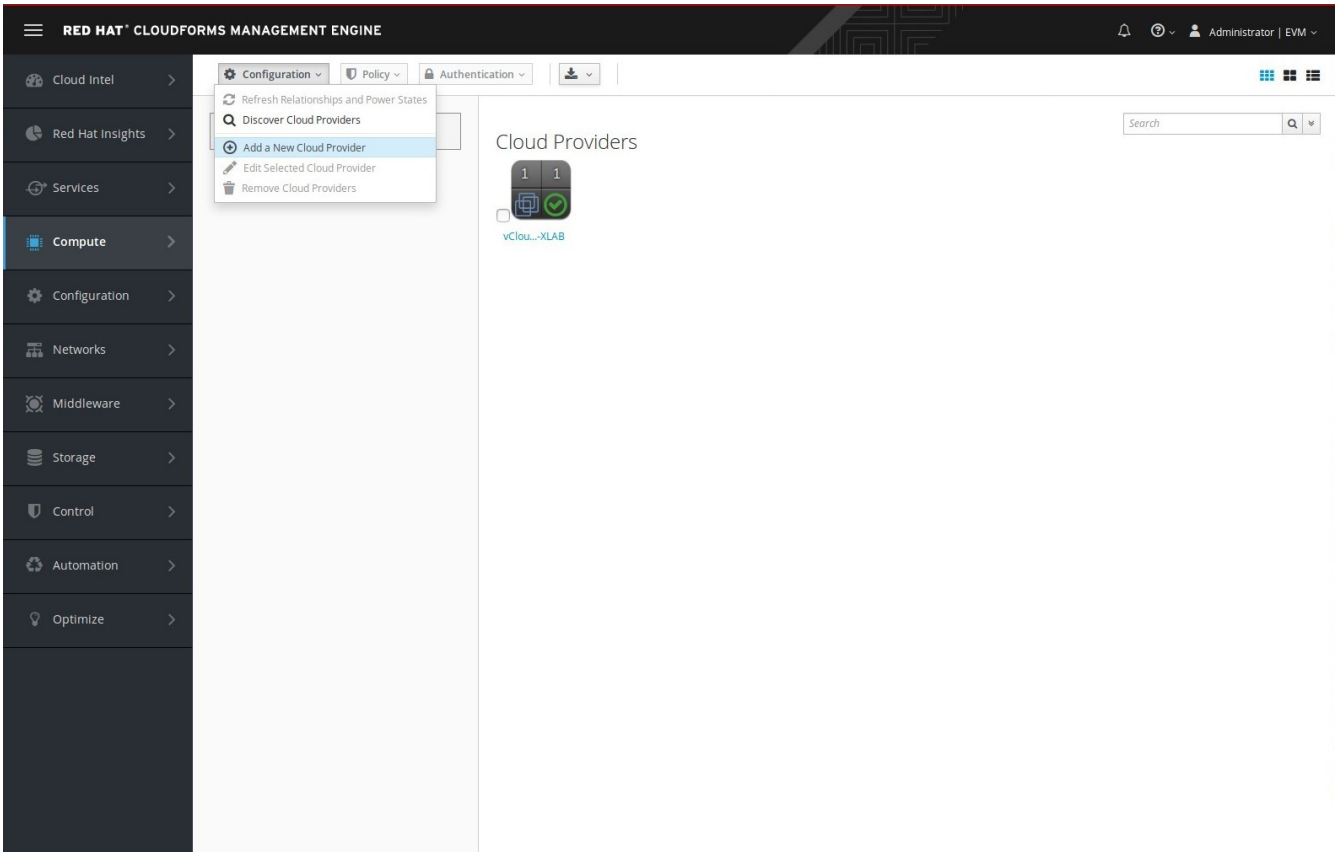
This section describes how to add a new VMware vCloud Director provider to ManageIQ using ManageIQ graphical interface. First step is to login:



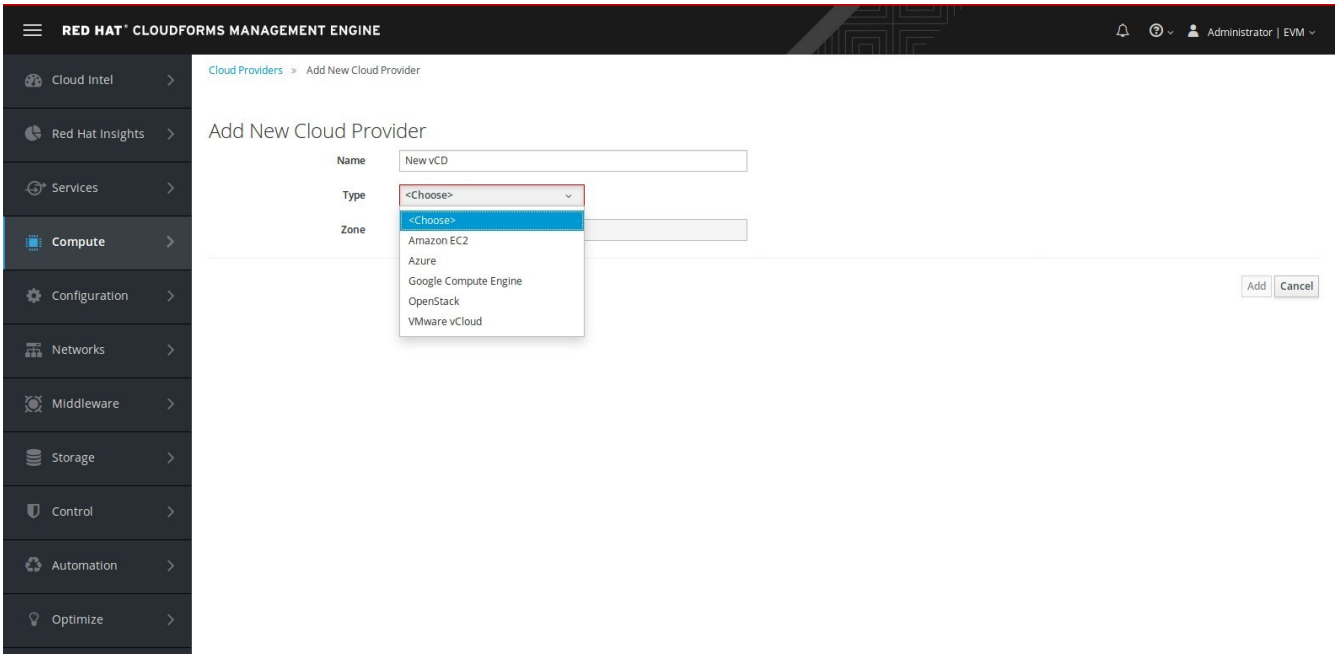
Then navigate to **Compute** → **Clouds** → **Providers** page using the main navigation on the left.



Option **Configuration → Add a New Cloud Provider** appears in center menu. Pick it.



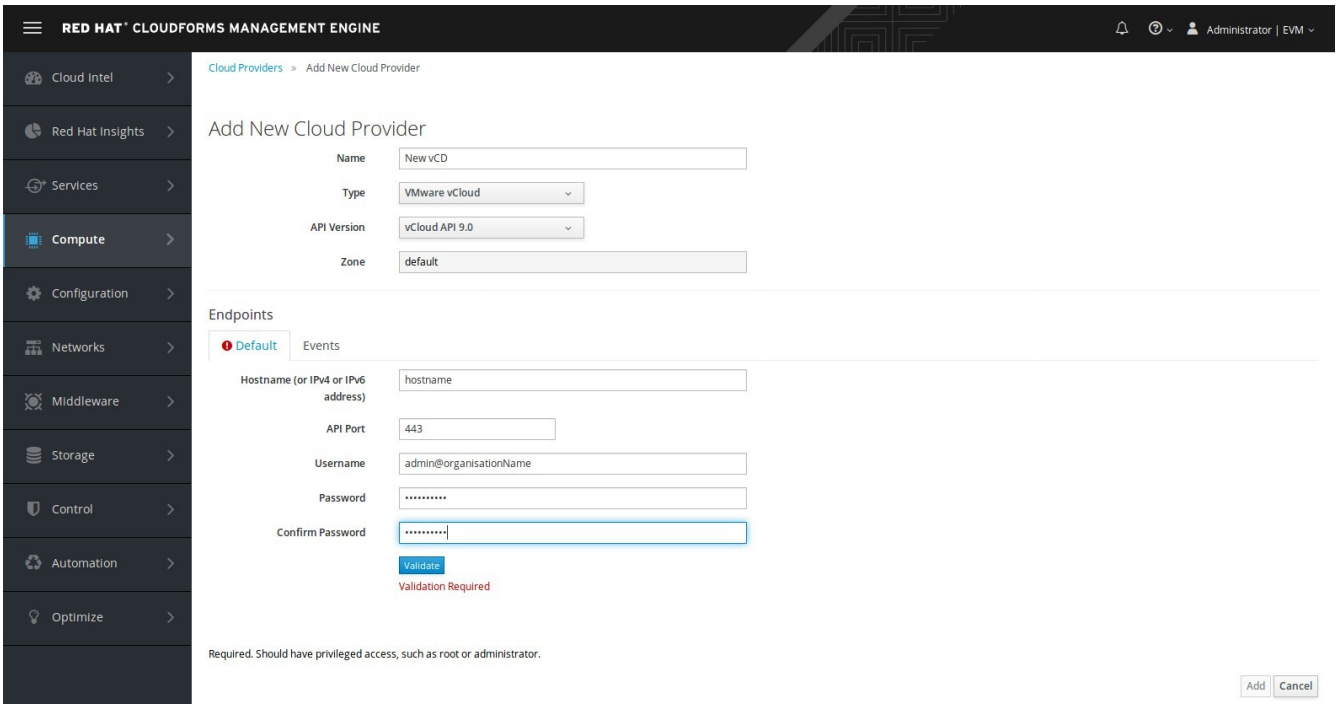
Opt-in for **VMware vCloud** provider type in a form that appears. Doing so will make other relevant form fields appear.



Populate the rest of the form with appropriate data to grant ManageIQ access to your VMware vCloud Director host.

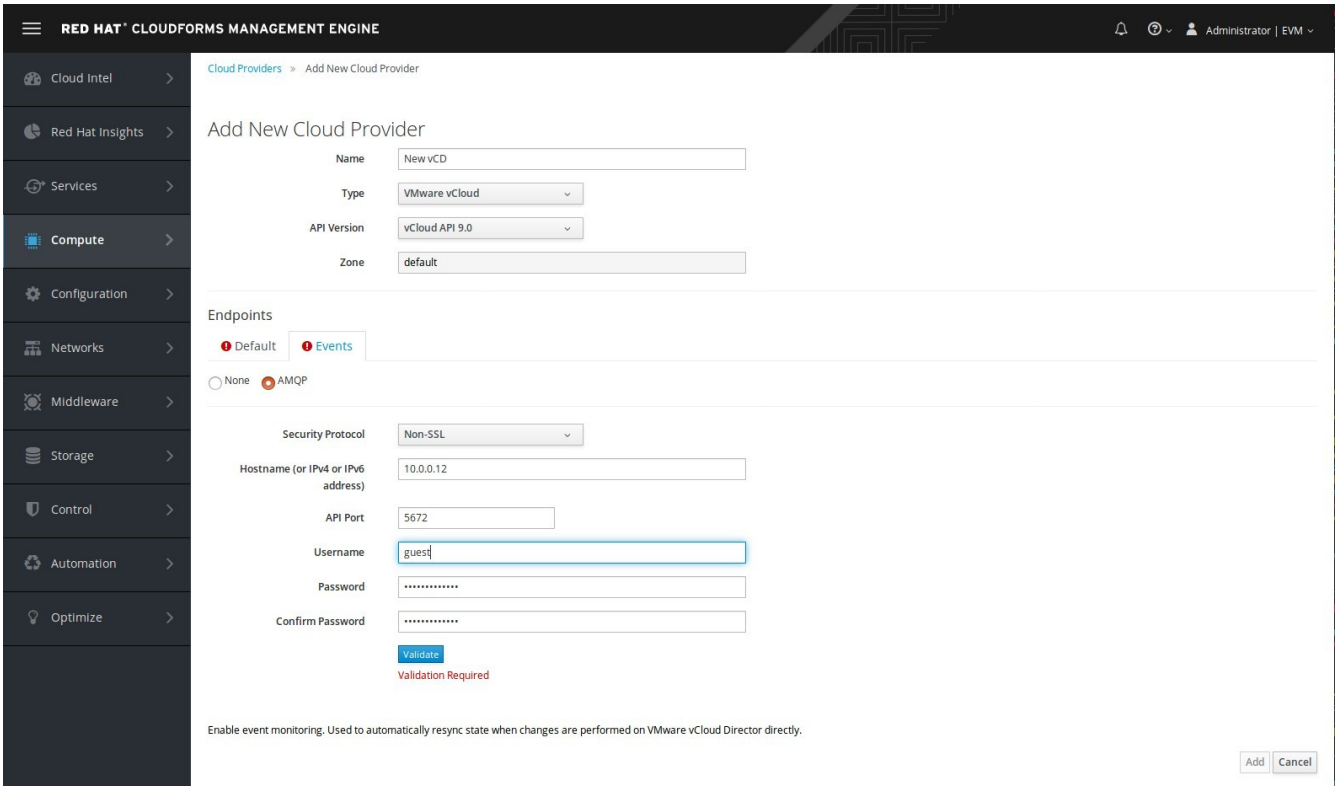
NOTE

- VMware vCloud Director provider requires organization-level access. Therefore you need to provide both user credentials and organization name, hence **Username** field must be of form `username@organization`.
- **Hostname (IPv4 or IPv6 address)** must not contain any URL path nor protocol prefix (HTTPS is assumed).



Hit **Validate** when you're done. Validation needs to succeed prior adding the provider. Once green, you can opt-in to click **Add** immediately to add provider without eventing support or you can open **Endpoints** → **Events** tab to fill-in your AMQP credentials. Please see AMQP Event Monitoring Configuration for VMware vCloud Director section to learn how AMQP needs to be configured to

make it work.



Validate the **Events** tab by pressing **Validate** button and eventually save the provider by clicking on **Add** button in bottom-right corner of the form.

9. vApp Provisioning in VMware vCloud Director Provider for ManageIQ

vApp template is a basic entity of provisioning on VMware vCloud Director. It describes both virtual machines specifications and vApp networks specifications as well as connection between the two. In ManageIQ, vApp template is inventoried as an orchestration template and can be assigned a service dialog to allow provisioning.

NOTE	ManageIQ currently only supports vApp provisioning through vApp template instantiation. Composing a new vApp is not supported at the moment.

9.1. Prerequisites

vApp provisioning process through ManageIQ requires:

- Properly configured VMware vCloud Director host:
  - Desired vApp template must be available in catalog owned by or shared by our organization. In case of shared catalog, ManageIQ settings must allow inventoring public images.
  - vApp template should be prepared following some recommendations (please see below) to offer better experience to users during provisioning.

- Properly configured ManageIQ appliance:
  - Setting **:get_public_images:** must be set to **true** in case we're using vApp template from shared catalog. vApp template won't be inventoried otherwise.
  - VMware vCloud Director provider must be added to the ManageIQ and inventory fetched.

Following guide assumes VMware vCloud Director provider inventory is successfully fetched, meaning also vApp template is stored in ManageIQ as an orchestration template. Please verify by navigating to **Services → Catalogs** in the main menu and then examining **Orchestration Templates → vApp Templates** tab. Your vApp template should be listed there.

9.2. vApp Template Design Recommendations

ManageIQ is able to inventory and provision any vApp template obtained from VMware vCloud Director host, but not all of them will be fully customizable due to following limitations:

- **Adding/removing vApp networks not supported.** Service dialog supports editing any vApp network that is defined in vApp template, but creating/deleting them is currently not supported. Bear this in mind when preparing vApp template on VMware vCloud Director: if you expect user will want to hook virtual machine's NIC to a vApp network, please create it upon vApp template creation.
- **Connecting vApp network to VDC network.** Service dialog is currently not able to determine what value to select initially in vApp network's drop-down for selecting parent network, therefore it always selects none. User is then offered to pick desired VDC/external network to connect vApp network to. Please take this into account when preparing vApp template: rather connect all VM's NICs to isolated vApp networks and let user connect those to VDC/external networks during provisioning customization.
- **Real-time validation not supported.** Service dialog will capture all the customization parameters from user and send provisioning request to ManageIQ backend, automation engine, where it will be executed. Potential problems with service dialog parameters (e.g. duplicated vApp name) will only be visible via ManageIQ logging mechanism. For this reason we recommend you to prepare vApp templates in a way that minimizes probability of failing request:
  - Make sure virtual machines actually boot and that they have VMware Tools already installed. If not, provisioning may fail if user opts-in to enable guest customization. Alternatively, make sure guest customization is disabled by default to let user know she probably shouldn't turn it on.
  - Make sure VDC (virtual data center) has enough resources. If no IP addresses are available, for example, and user opts-in for IP allocation using IP pool, provisioning will fail.

9.3. vApp Provisioning Process in ManageIQ

vApp provisioning is a three-step process. First step is catalog item preparation, carried out by VMware vCloud Director provider's owner. Catalog item represents orderable unit, ordering one is in fact vApp template provisioning through ManageIQ. Second step is catalog item ordering, carried out by user. Final step is order approval, carried out by owner:

1. Catalog, service dialog and catalog item preparation (owner).
2. Catalog item ordering with customization (user).
3. Order approval, which results in actual provisioning to happen (owner).

NOTE	New catalog item and service dialog need to be created for each **vApp template**. But they can be added to the same catalog.

9.3.1. Catalog, Service Dialog and Catalog Item Preparation

Login into ManageIQ graphical interface where you have your VMware vCloud Director provider added. Then follow these steps to create a new catalog and catalog item (with service dialog) that users will be able to order.

Prepare Catalog

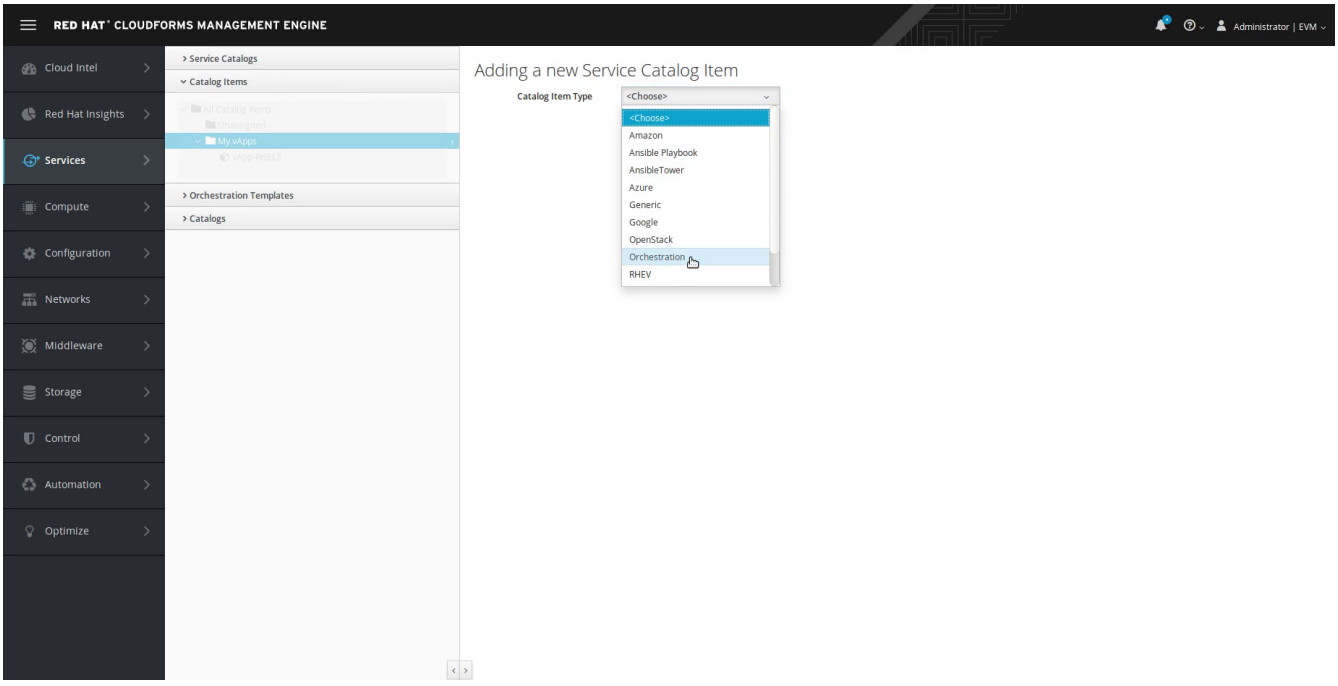
Navigate to **Services** → **Catalogs** in the main menu and then open **Catalogs** tab. Option **Configuration** → **Add a New Catalog** appears in center menu. Please pick descriptive catalog name and click **Add**.

Prepare Service Dialog

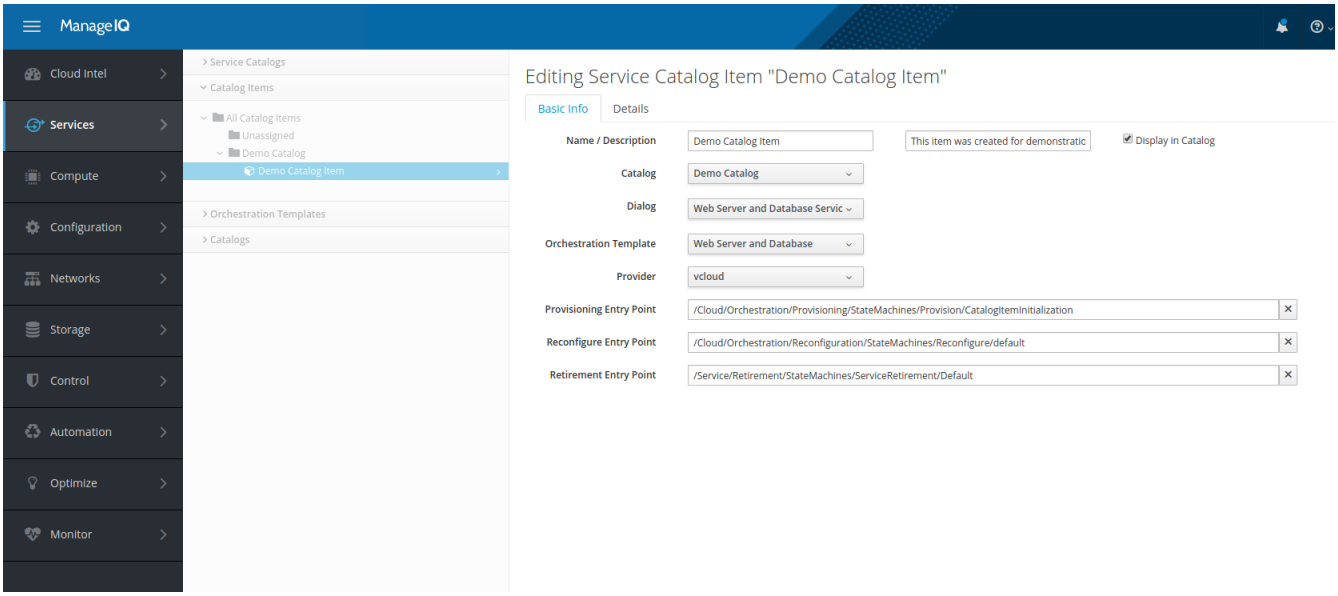
Navigate to **Services** → **Catalogs** in the main menu and then open **Orchestration Templates** → **vApp Templates** tab. Your vApp template should be listed here. When you select it, option **Configuration** → **Create Service Dialog from Orchestration Template** appears in center menu. Please pick descriptive service dialog name and click **Save**.

Prepare Catalog Item

Navigate to **Services** → **Catalogs** in the main menu and then open **Catalog Items** tab. Option **Configuration** → **Add a New Catalog Item** appears in center menu.



Choose **Orchestration** type and populate form with appropriate data.



Name / Description	Catalog item name and description.
Display in Catalog	Select this checkbox to make item visible in catalog.
Catalog	Pick catalog that was created in previous step.
Dialog	Pick service dialog that was created in previous step.
Orchestration Template	Pick vApp template that service dialog was created for.
Provider	Pick VMware vCloud Director provider instance that service dialog was created for.
Provisioning Entry Point	(leave default)
Reconfigure Entry Point	(leave default)
Retirement Entry Point	(leave default)

IMPORTANT

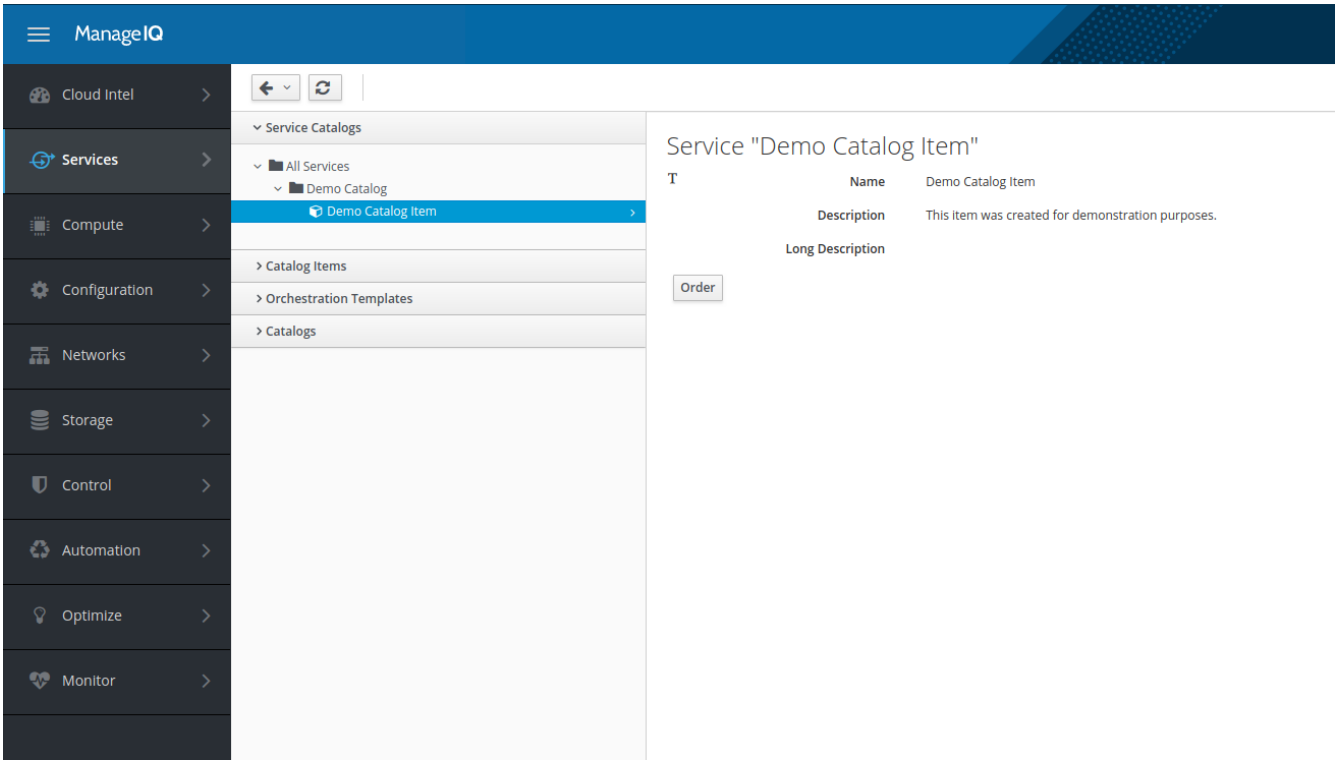
- Selected orchestration template **MUST** match vApp template that service dialog was created from. Provisioning will fail otherwise.
- Selected provider **MUST** match VMware vCloud Director provider instance that service dialog was created for.

Eventually click **Add** to save catalog item. It becomes visible in catalog and therefore available for users to order it.

9.3.2. Catalog Item Ordering with Customization

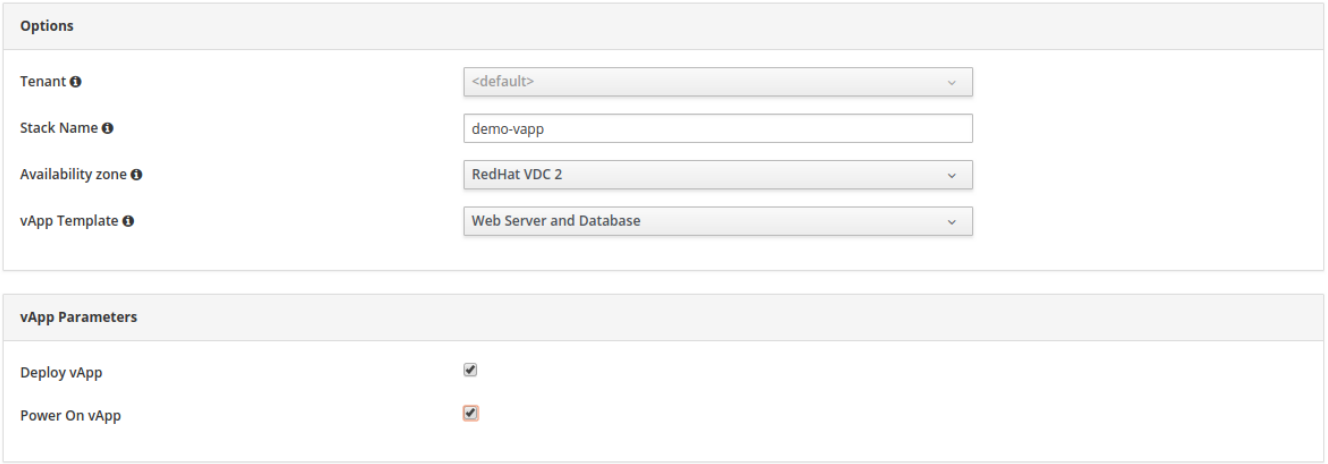
Login into ManageIQ as a regular user. Then follow steps below to customize and order catalog item.

Navigate to **Services** → **Catalogs** in the main menu and then open **Service Catalogs** tab. Select desired catalog item from the list and click **Order**:



Service dialog opens offering you vApp template customization prior ordering. Exact number of inputs varies depending on concrete vApp template it bases on, but there are always three main sections present: basic information section, vApp networks customization section and virtual machines customization section. You need to fill-in the basic section while other sections are optional and can be left with default values.

Basic Information Section of vApp Template Provisioning Dialog

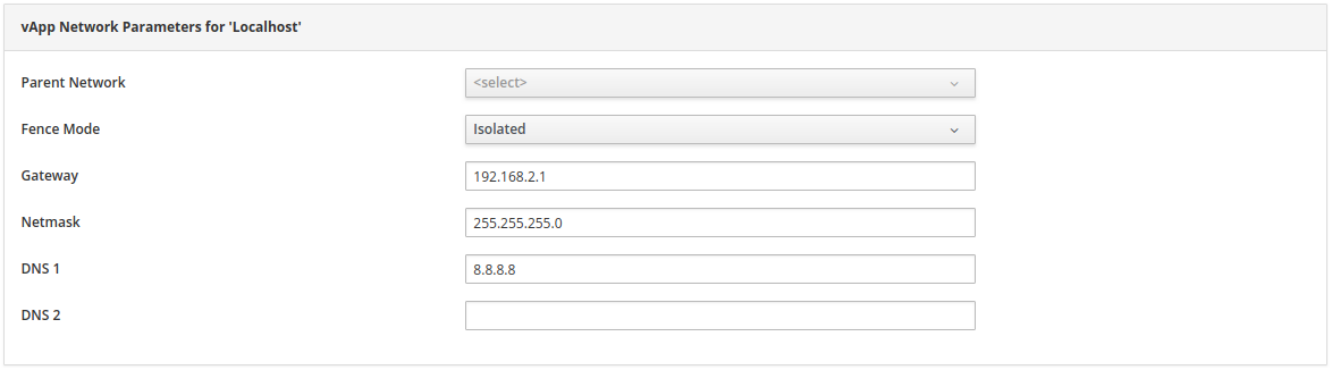


Below please find essential fields bold that must always be filled-in. All other fields are optional and don't need to be modified for provisioning to succeed:

Tenant	(leave default)
Stack Name	Enter name for the new vApp.
Availability zone	VDC to deploy the new vApp to.
vApp Template	(leave default)

Deploy vApp	Decide whether vApp should be deployed upon provisioning.
Power On vApp	Decide whether vApp should be powered on upon provisioning.

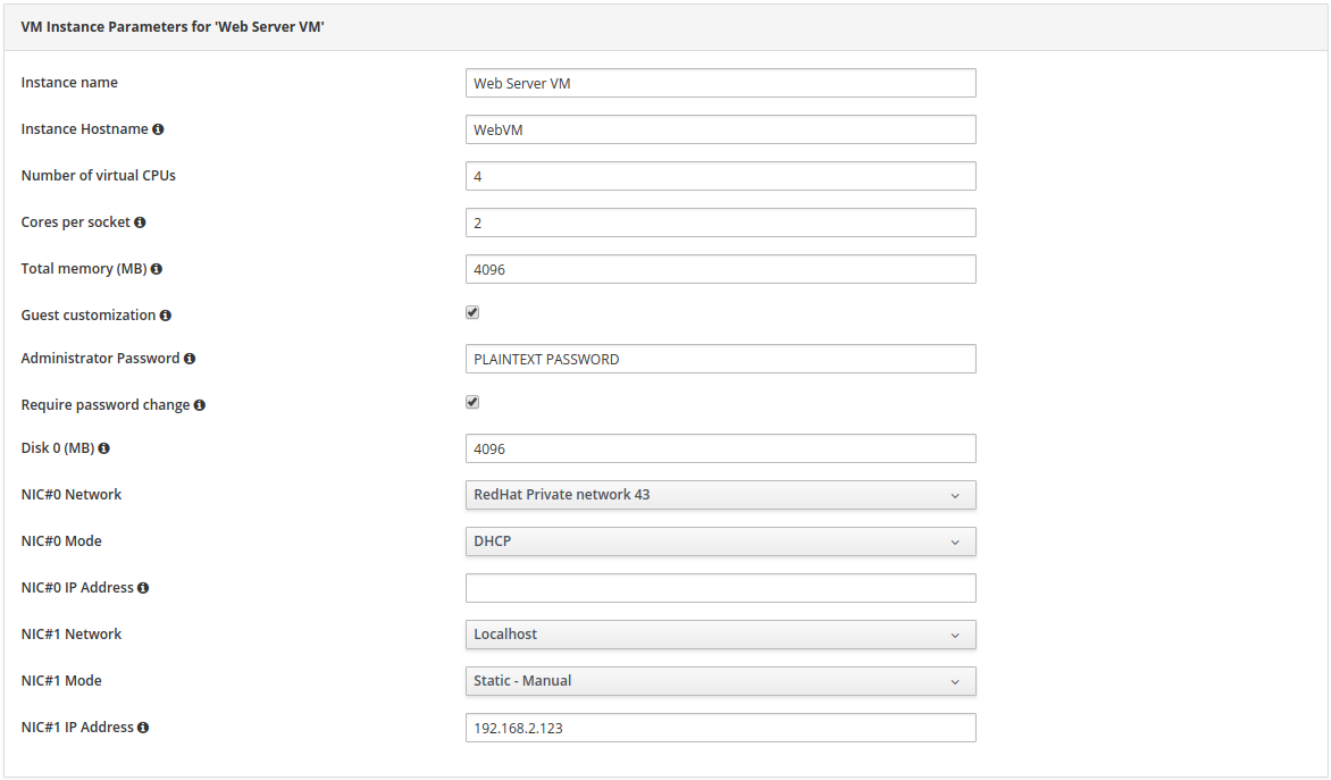
vApp Networks Customization Section of vApp Template Provisioning Dialog



Service dialog displays one vApp network customization section form (see screenshot above) for each vApp network from given vApp template. Default values are populated based on vApp template defaults.

Parent Network	VDC/external network to connect this vApp network to. Leave unselected to keep vApp network isolated i.e. limited to vApp only.
Fence Mode	How to connect to parent VDC/external network. Please select **Isolated** when not connecting to any VDC/external network.
Gateway	Enter vApp network's default gateway.
Netmask	Enter vApp network's netmask.
DNS1, DNS2	Enter IP addresses of DNS servers (optional).

Virtual Machine Customization Section of vApp Template Provisioning Dialog



Service dialog displays one virtual machine customization section form (see screenshot above) for each virtual machine from given vApp template. Number of form fields varies depending on number of disks attached to the machine and number of NICs (network interface cards) attached to the machine. Screenshot above shows form for VM with one disk (Disk 0) and two NICs (NIC#0 and NIC#1).

Instance Name	Enter virtual machine name.
Instance Hostname	Enter virtual machine hostname i.e. computer name (can only contain alphanumeric characters and hypens).
Number of virtual CPUs	Specify how many virtual CPU cores to assign to virtual machine.
Cores per socket	Specify how many virtual CPU cores to assign to each CPU socket (must be a divisor of number of CPU cores).
Total memory (MB)	Specify VM memory in megabytes.
Guest customization	Decide whether to apply guest customization (administrator password etc.) to the guest operating system. Please enable this only for VMs that support guest customization or provisioning will fail.
Administrator Password	Specify password to apply upon first VM boot. Leave empty to let VMware vCloud Director autogenerate it for you. Guest customization must be enabled for this to work.
Require password change	Decide whether to require administrator to change password upon first login.

Disk *n* (MB)	Specify disk size in megabytes. Original value can only be increased, decreasing it will fail provisioning. Form input is rendered per VM's disk.
NIC#*n* Network	vApp network to connect NIC to. Form input is rendered per VM's NIC.
NIC#*n* Mode	NIC's IP allocation mode. Please also specify static IP address in case you opt-in for Static - MANUAL. Form input is rendered per VM's NIC.
NIC#*n* IP Address	NIC's static IP address. Ignored unless mode is set to Static - MANUAL Please make sure IP address is within vApp network's range or provisioning will fail. Form input is rendered per VM's NIC.

Click **Submit** to submit order. Please note that VMware vCloud Director provider owner needs to approve your order before it gets provisioned.

10. Virtual Machine Reconfiguration in VMware vCloud Director Provider for ManageIQ

Virtual machine reconfiguration refers to virtual hardware modifications of an existing virtual machine. ManageIQ offers virtual machine reconfiguration for VMware vCloud Director provider to some extent and under some conditions.

NOTE	Reconfiguration request can be initiated by ManageIQ user, but has to be approved by VMware vCloud Director provider administrator prior execution.

All virtual machines that are inventoried by VMware vCloud Director provider for ManageIQ can be reconfigured. Following reconfiguration actions are supported:

- Adjust number of CPU cores and number of CPU sockets.
- Adjust memory size.
- Increase disk size.
- Delete disk.
- Add a new disk.
- Add a new network interface (NIC) and connect it to vApp network.
- Remove network interface (NIC).

Please note that number of CPU cores and CPU sockets can only be reconfigured when virtual machine is either turned off or has **Virtual CPU hot add** option set. Similarly, memory size can only be modified when virtual machine is either turned off or has **Memory hot add** option set.

10.1. Prerequisites

Virtual machine reconfiguration process through ManageIQ requires:

- **Fast provisioning disabled (affects disk resizing only)** in VMware vCloud Director host. Fast provisioned virtual machines's disks cannot be resized due to limitation in VMware vCloud Director, unless they are manually consolidated first using the VMware vCloud Director host's graphical interface with top-level administrative account (please see Reducing the Chain Length of Linked Clones for more details). Disabling fast provisioning will make sure that disk resizing will always succeed.

Following guide assumes VMware vCloud Director provider inventory is successfully fetched.

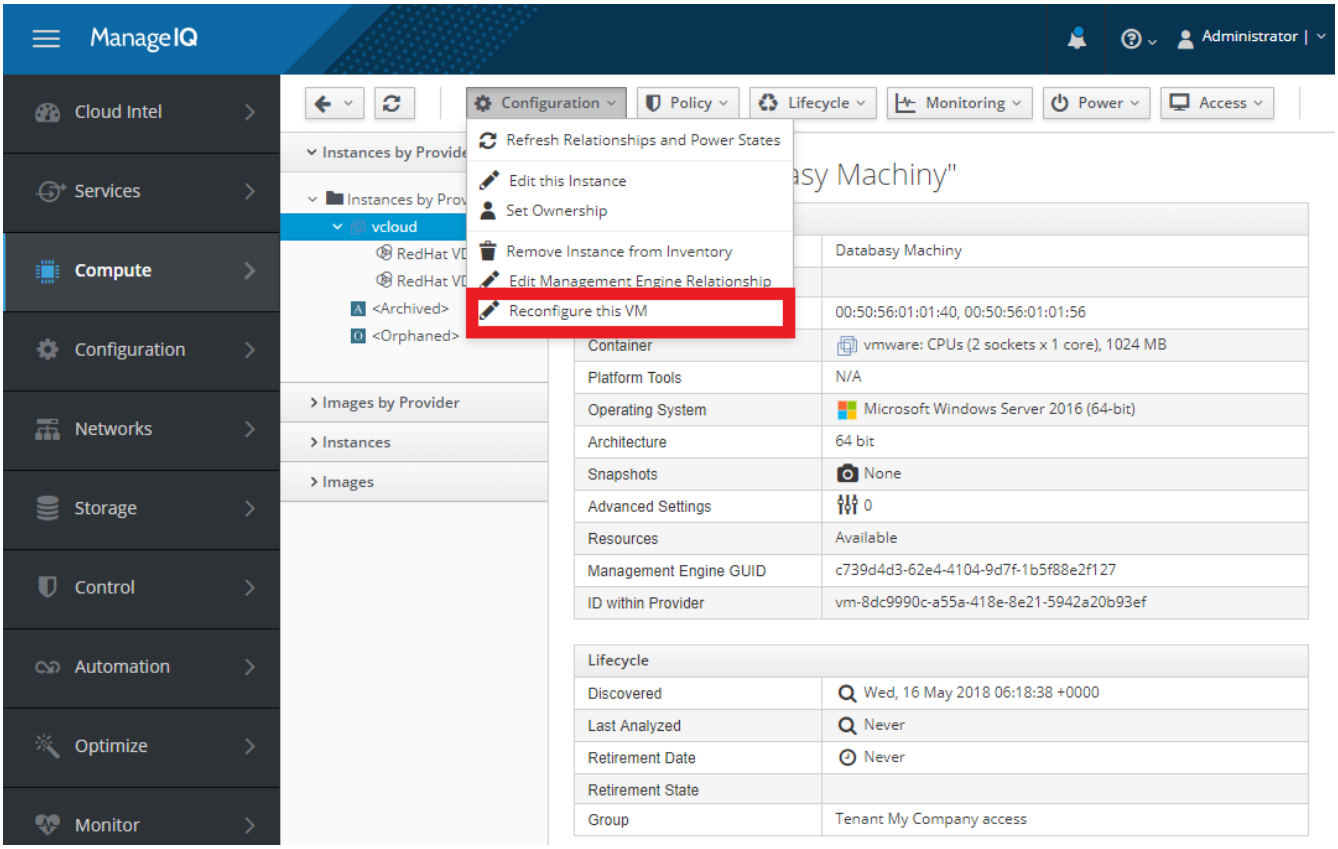
NOTE	**Fast provisioning** setting only affects disk resizing part of reconfiguration. CPU, memory and NIC reconfiguration as well as disk removal and disk adding will work independently.

10.2. Virtual Machine Reconfiguration Process in ManageIQ

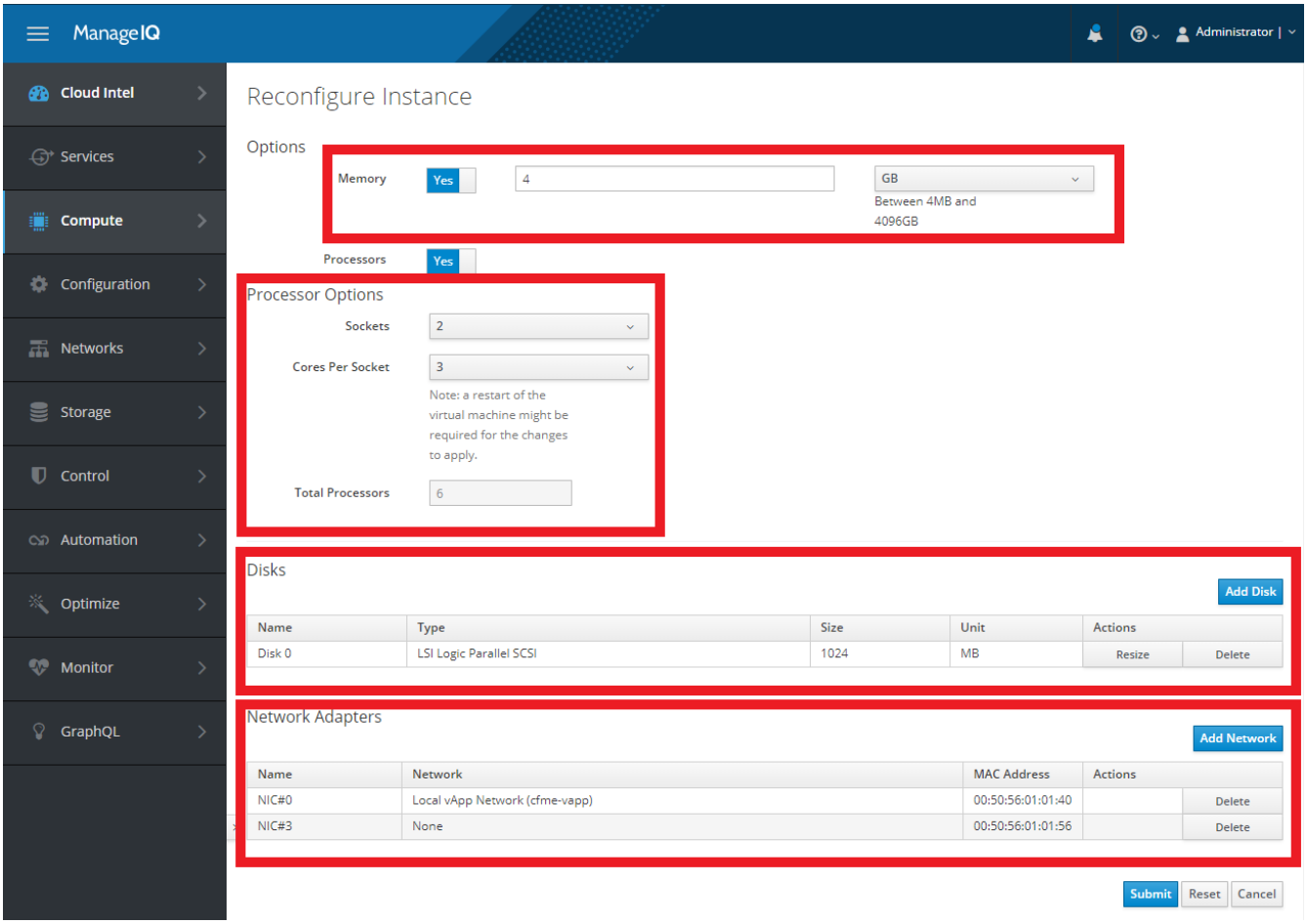
Login into ManageIQ graphical interface where you have your VMware vCloud Director provider added. Then follow these steps to reconfigure a virtual machine.

Reconfiguration Request

Navigate to virtual machine's details page and select **Configuration** → **Reconfigure this VM** in the center menu.



Reconfiguration form opens offering following four sections to modify virtual machine: Memory, Processor Options, Disks and Network Adapters.



Input new required resources into reconfigure form and click **Submit**. A request will be created and sent to VMware vCloud Director provider administrator for approval. You can follow its current status by navigating to **Services** → **Requests** in the main menu and selecting it from the list.

11. Remote Console Access to VMware vCloud Director provider for ManageIQ

Remote console is a graphical window that allows you to view desktop of a virtual machine, and to interact with that virtual machine in a similar way to a physical machine.

VMware vCloud Director provider supports establishing remote console against running virtual machines. Console window is opened in browser using VMware HTML5 WebMKS Console SDK. Due to VMware licensing restrictions, Red Hat cannot ship the WebMKS SDK in ManageIQ.

NOTE	VMware vCloud Director itself needn't be accessible from user's browser directly since ManageIQ appliance serves as proxy between the two. Remote console feature should work as long as browser can access ManageIQ.

11.1. Prerequisites

Following prerequisites need to be met in order to be able to use remote console access:

- VMware WebMKS SDK must be installed on ManageIQ appliance.
- **VMware WebMKS** option must be selected as default VMware Console Support.
- Virtual machine that we're establishing remote console against must be powered on.

11.1.1. Installing VMware WebMKS SDK on ManageIQ Appliance

Remote console for VMware vCloud Director provider requires VMware WebMKS SDK to be installed on ManageIQ appliance. Following steps are needed to install it:

1. SSH to the ManageIQ appliance console as root user.
2. Create a new directory `webmks` in the `/var/www/miq/vmdb/public/` directory.

```
/var/www/miq/vmdb/public/webmks
```

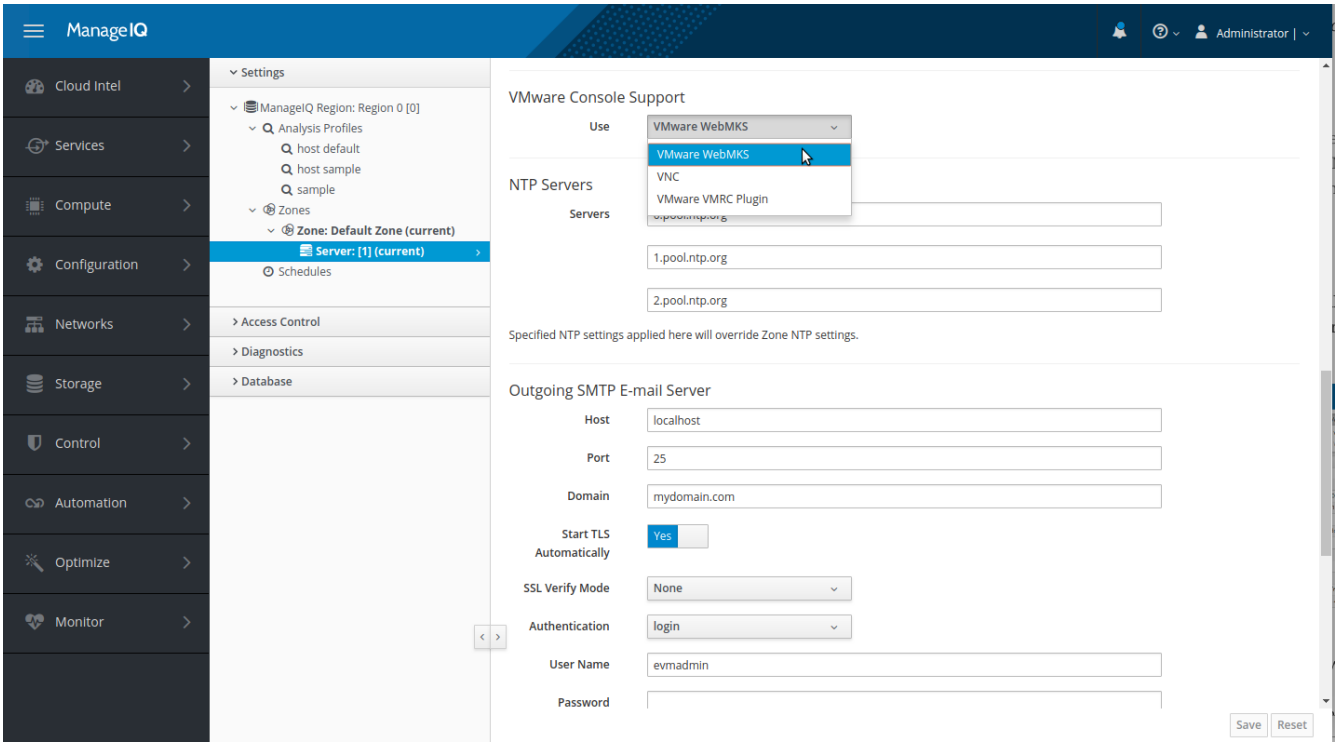
3. Download and extract the contents of VMware WebMKS SDK into the `webmks` directory.

Directory structure similar to the one shown below should now reside in the newly created webmks directory.

```
webmks/
 ├──── css
 │     ├──── extended-keypad.css
 │     ├──── main-ui.css
 │     ├──── trackpad.css
 │     └──── wmks-all.css
 ├──── img
 │     ├──── touch_sprite_feedback.png
 │     └──── touch_sprite.png
 └──── wmks.min.js
```

11.1.2. Configure VMware WebMKS as Default Console Type for VMware vCloud Director Provider

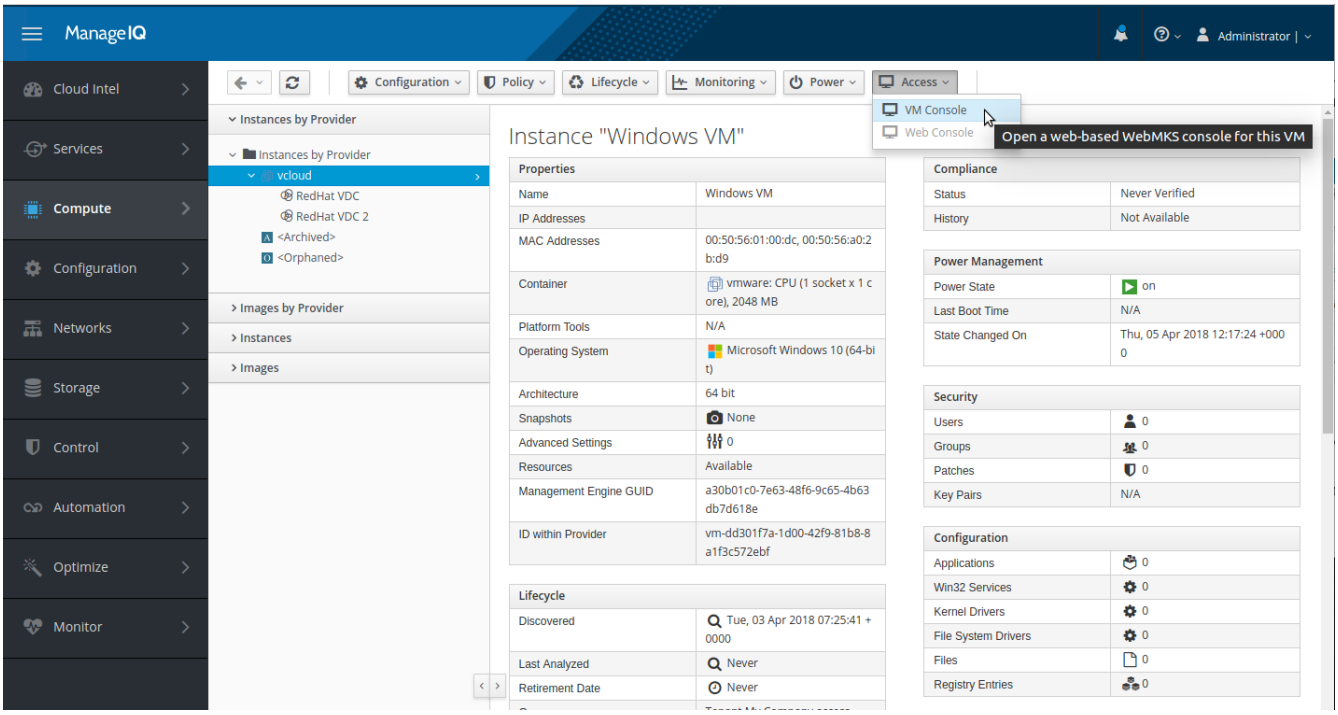
1. Log in to the ManageIQ graphical interface as an administrative user.
2. From the settings menu, select **Configuration**.
3. Click on the **Settings** → **Zones** accordion and pick server from your zone.
4. In **Server** tab scroll down to **VMware Console Support** section and pick **VMware WebMKS** option.
5. Click **Save**.



NOTE	**VMware Console Support** setting will affect both VMware vCloud Director provider as well as VMware vSphere provider. It is currently not possible to use different setting for the each.

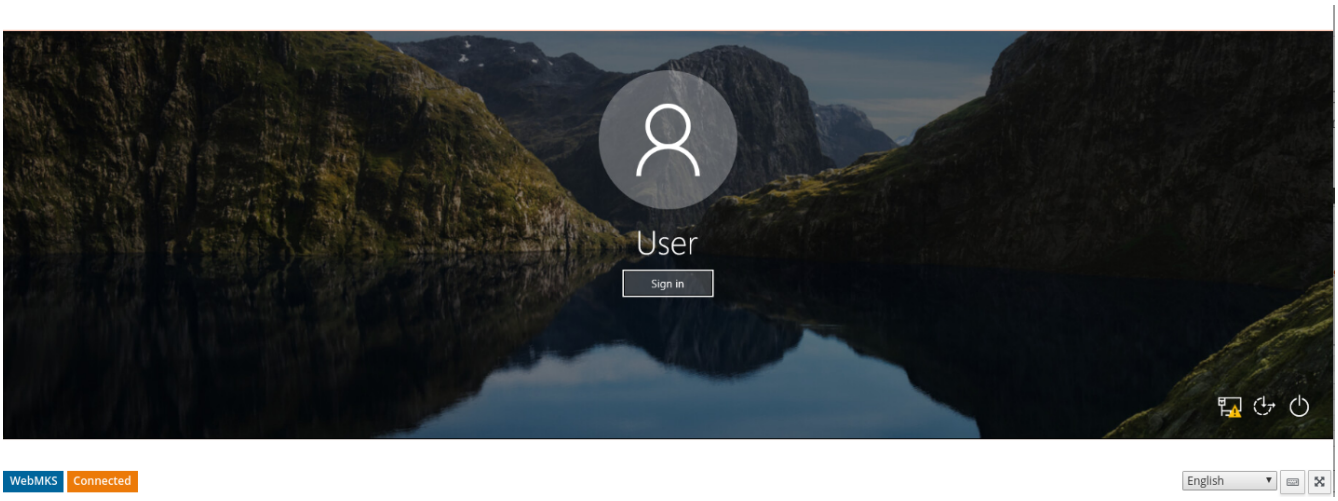
11.2. Using Remote Console Access

Log in to the ManageIQ graphical interface and open details page of a running VMware vCloud Director provider's virtual machine. Menu option **Access** → **VM Console** appears in center menu.



Click it and remote console will open in a popup window. Focus console by left-clicking into the remote desktop section to start using virtual machine remotely (mouse moving, mouse clicking and

keyboard typing). Close popup when you're done.



NOTE If nothing happens when you click on **VM Console** button, please make sure popus are not being blocked by your browser. See image below.