

# Scenarios

VMware Validated Design 4.0

VMware Validated Design for IT Automating IT 4.0



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**VMware, Inc.**  
3401 Hillview Ave.  
Palo Alto, CA 94304  
[www.vmware.com](http://www.vmware.com)

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# Contents

About Scenarios for VMware Validated Design for IT Automating IT	6
Updated Information	8
<b>1 Scenarios Solution Paths</b>	<b>9</b>
Using a Distributed Logical Router for Your Single-Region Scenarios	11
Using a Distributed Logical Router for Your Dual-Region Scenarios	13
Using a Universal Distributed Logical Router for Cross-Region Deployment	14
<b>2 Preparing for Region A Scenario Deployment</b>	<b>16</b>
Create Virtual Machine Templates from a Content Library in Region A	17
Create Customization Specifications in Region A	20
Create a vSphere Endpoint for vRealize Automation in Region A	23
Configure User Roles in vRealize Automation in Region A	24
Create Fabric Groups in Region A	26
Add Compute Resources to a Fabric Group in Region A	27
Create Business Groups in Region A	28
Create Logical Switches in Region A	30
Create External Network Profiles in Region A	31
Configuring Reservation Policies and Network Policies in Region A	33
Creating Self-Service Catalogs and Entitlements in Region A	38
<b>3 Creating and Publishing Single Machine Blueprints in Region A</b>	<b>46</b>
Create Machine Prefixes in Region A	46
Create Single Machine Blueprints in Region A	47
<b>4 Creating Blueprints with Dynamic Resource Tiering in Region A</b>	<b>51</b>
Create Storage Reservation Policies in Region A	51
Apply a Storage Reservation Policy to a Datastore in Region A	52
Enable Users to Change Storage Policies in Region A	53
Provision a Virtual Machine With a Modified Storage Policy in Region A	54
<b>5 Integrating vRealize Automation with IPAM in Region A</b>	<b>56</b>
Deploy Infoblox vNIOS Appliance in Region A	57
Configure the Appliance as a Grid Master in Region A	58
Configure the IPAM Network Profile for the Rainpole Tenant in Region A	60
Create the Cloud API User in Region A	62
Integrate the IPAM Plug-in With vRealize Orchestrator in Region A	64

- Register the IPAM Endpoint in vRealize Automation in Region A 65
- Create Logical Switches in Region A 70
- Create External Network Profiles 71
- Modify an Existing Blueprint in Region A to Incorporate IPAM 73
- Provision Blueprints in Region A with IPAM and Validate the Blueprints 74
  
- 6 Creating Multi-Tier Applications in Region A 76**
  - Create Software Components for the Multi-Tier Application in Region A 76
  - Prepare for Multi-Tier Application Patterns in Region A 90
  - Implement Multi-Tier Application Patterns in Region A 97
  
- 7 Configuring Micro-Segmentation for Multi-Tier Applications in Region A 108**
  - Creating NSX Security Policies in Region A 108
  - Create a Working Web Application Blueprint in Region A 110
  - Create Distributed Firewall Rules for the Security Policies in Region A 111
  
- 8 Managing Virtual Machine Lease and Ownership in Region A 115**
  - Configure Lease and Ownership on the Blueprint in Region A 115
  - Set a Lease and Change the Ownership of the Provisioned Machine in Region A 116
  - Extend the Lease of a Provisioned Machine in Region A 117
  
- 9 Modeling and Monitoring Cost with vRealize Business in Region A 118**
  - Set up Pricing on a Per-Blueprint Basis in Region A 118
  - Set Up Pricing on a Per-Reservation Basis in Region A 121
  
- 10 Forwarding Log Events to vRealize Log Insight in Region A 125**
  - Install the vRealize Log Insight Agent in Region A 125
  - Configure a Linux Virtual Machine to Forward Events to vRealize Log Insight in Region A 126
  
- 11 Monitoring Workload Health and Capacity with vRealize Hyperic in Region A 129**
  - Install the End Point Operations Monitoring Agent in Region A 129
  - Configure Workload Monitoring in Region A 132
  - Configure Monitoring for Windows Services in Region A 133
  
- 12 Preparing for Region B Scenario Deployment 138**
  - Create Virtual Machine Templates from a Content Library 139
  - Create Customization Specifications in Compute vCenter Server in Region B 142
  - Create a vSphere Endpoint in vRealize Automation in Region B 145
  - Create Fabric Groups in Region B 146
  - Add Compute Resources to a Fabric Group in Region B 147
  - Create Logical Switches in Region B 149
  - Create External Network Profiles in Region B 151

Configuring Reservation Policies and Network Policies in Region B 152

**13** Creating Single-Machine Blueprints and Self-Service Catalogues in Region B 158

Creating and Publishing Single Machine Blueprints in Region B 158

Creating Self Service Catalogues in Region B 161

**14** Configure Unified Single Machine Blueprints for Cross-Region Deployment 165

Create Logical Switches for Cross-Region Deployment 166

Create External Network Profiles for Cross-Region Deployment 167

Create Fabric Groups for Cross-Region Deployment 169

Add Data Center Locations to the Compute Resource Menu 170

Associate Compute Resources with a Location 171

Add a Property Group and a Property Definition for Data Center Location 172

Create a Reservation Policy for the Unified Blueprint 174

Specify Reservation Information for the Unified Blueprint 175

Create a Service Catalog for the Unified Blueprint 176

Create Unified Single Machine Blueprints 177

Configure Entitlements for Blueprints in the Cross-Region Deployment 180

Test the Cross-Region Deployment of the Single Machine Blueprints 182

# About Scenarios for VMware Validated Design for IT Automating IT

The *Scenarios* documentation for VMware Validated Design for IT Automating IT provides implementation steps for a set of scenarios. Based on the VMware Validated Design reference architecture, the guide includes step-by-step instructions for commonly executed tasks.

Each scenario explains how to implement a common use case. Information on prerequisites is included at the beginning of each chapter.

Each scenario is a VMware Validated Design and is based on the products that are used in the VMware Validated Design for the Software-Defined Data Center. Scenarios include step-by-step instructions and provides screen shots for complex steps.

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**Note** Some of the scenarios include some setup tasks that are also covered in the *Deployment* documentation for the VMware Validated Design for the Software-Defined Data Center. In those cases, do not duplicate the setup to avoid problems.

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## Required VMware Software

*VMware Validated Design for IT Automating IT* is compliant and validated with certain product versions. See the *VMware Validated Design Release Notes* for more information about supported product versions.

## Intended Audience

The *Scenarios* documentation for VMware Validated Design for IT Automating IT is intended for cloud architects, infrastructure administrators, and cloud administrators. These users are familiar with VMware software and want to deploy it using a VMware Validated Design.

## Requirements

The scenarios in this document assume that you have installed and configured a single-region design of the VMware Validated Design for the Software-Defined Data Center . See the documents for the VMware Validated Design for the Software-Defined Data Center for details.

This document can be used for a single-region or dual-region deployment.

- All procedures with Region A in the title are suitable for a single-region deployment.
- All procedures with Region B in the title are for use in a dual-region deployment.

See [Chapter 1 Scenarios Solution Paths](#) for information on deployments in single region and dual region, and networking configuration supported with each path.

# Updated Information

This *Scenarios* documentation is updated with each release of the product or when necessary.

This table provides the update history of the *Scenarios* documentation for the VMware Validated Design for IT Automating IT.

Revision	Description
002450-01	<ul style="list-style-type: none"><li>■ Added <a href="#">Chapter 1 Scenarios Solution Paths</a></li><li>■ Revised the document to use region-specific information.</li><li>■ Added Region B documentation.<ul style="list-style-type: none"><li>■ <a href="#">Chapter 12 Preparing for Region B Scenario Deployment.</a></li><li>■ <a href="#">Chapter 13 Creating Single-Machine Blueprints and Self-Service Catalogues in Region B.</a></li></ul></li><li>■ Added information on setting up a cross-region deployment using a UDLR in <a href="#">Chapter 14 Configure Unified Single Machine Blueprints for Cross-Region Deployment.</a></li></ul>
002450-00	Initial release.

# Scenarios Solution Paths

The scenarios in this guide illustrate how an IT organization can automate provisioning in their Software Defined Data Center using vRealize Automation. Each scenario has a set of prerequisites, and consists of a set of procedures that you perform in sequence.

Your goals determine which solution path you follow.

- If you are working on a single-region implementation, you use a Distributed Logical Router (DLR). In that case, you first prepare for Region A deployment, and then perform the procedures for your scenario in sequence.
- If your goal is a dual-region deployment, you must set up the two DLRs or UDLR as part of the Region A and Region B foundation. Then you have these choices.
  - If you use a UDLR, you must select existing networking when you deploy the scenario. You cannot use any on-demand networking types when you configure a blueprint. You must select existing networking.
  - If you use DLRs, you also set them up as part of the foundation deployment, and select them during scenario deployment.

When you have decided on implementing a scenario, you follow these steps.

- 1 First you deploy the SDDC foundation and cloud management components following the steps in the VMware Validated Design for the Software-Defined Data Center documentation.
- 2 Perform additional prerequisite procedures, depending on the scenario and the deployment type.

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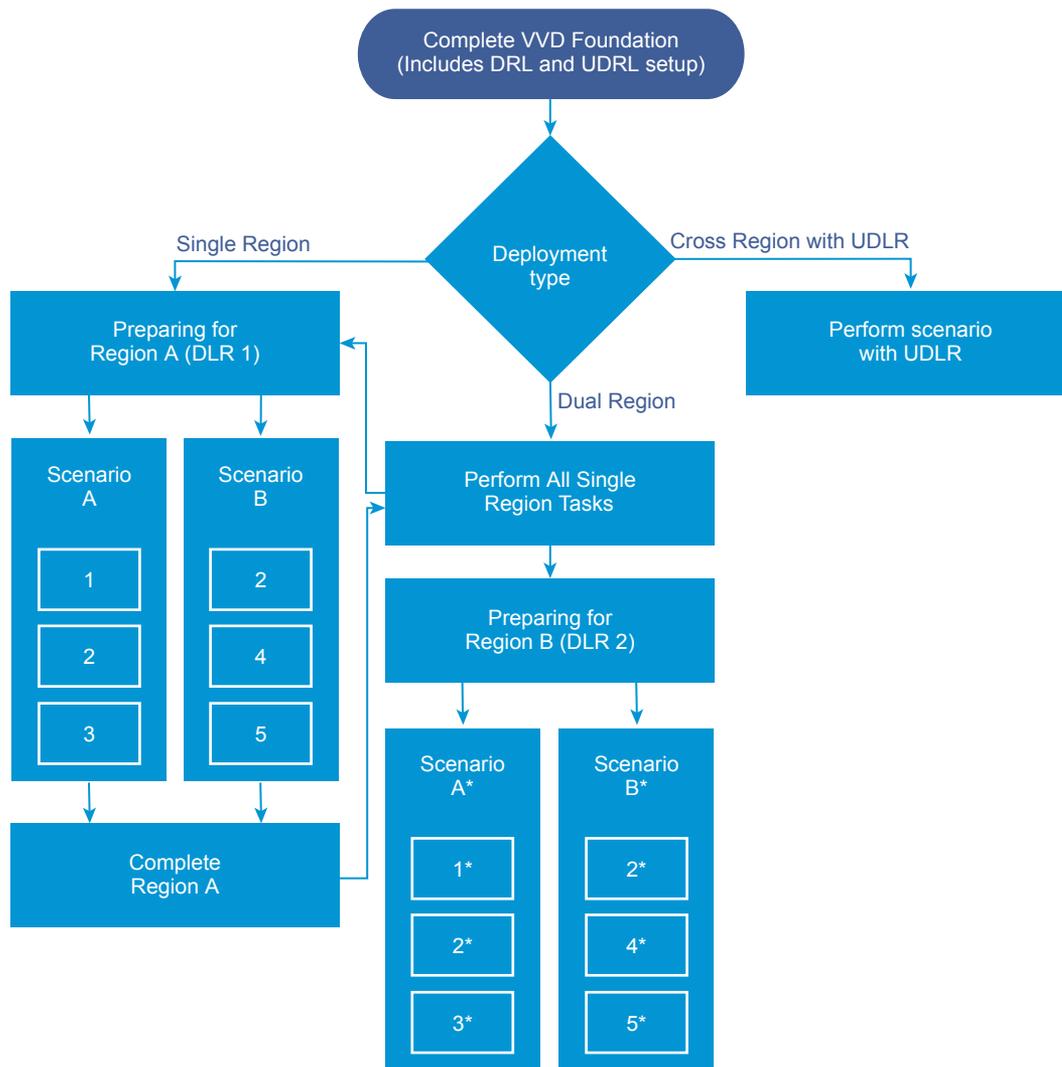
**Note** The Distributed Logical Router (DLR) and Universal Distributed Logical Router (UDLR) that are used in the scenarios are created as part of the SDDC foundation setup.

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**Table 1-1. Deployment Types and Solution Paths**

Deployment Type	Solution Path
Single-region deployment using DLR	<ol style="list-style-type: none"> <li>1 Deploy Region A of the foundation.</li> <li>2 Perform all procedures in <i>Preparing for Region A Deployment</i>.</li> <li>3 Perform all procedures listed in the scenario, including prerequisites.</li> </ol>
Dual-region deployment using DLR	<ol style="list-style-type: none"> <li>1 Deploy Region A and Region B of the foundation.</li> <li>2 Perform all procedures in <i>Preparing for Region A Deployment</i>.</li> <li>3 Deploy the Region A scenario</li> <li>4 Perform all procedures in <i>Preparing for Region B Deployment</i>.</li> <li>5 Deploy the Region A scenario again, but use Region B networking, host name, and other information.</li> </ol> <p><b>Note</b> <a href="#">Chapter 13 Creating Single-Machine Blueprints and Self-Service Catalogues in Region B</a> illustrates how to deploy a Region B scenario.</p>
Cross-region deployment using UDLR	<ol style="list-style-type: none"> <li>1 Deploy the foundation.</li> <li>2 Perform all procedures, but use the UDLR for networking. <a href="#">Chapter 14 Configure Unified Single Machine Blueprints for Cross-Region Deployment</a> is an example of this solution path.</li> </ol>

Figure 1-1. Solution Paths for Scenarios



This chapter includes the following topics:

- [Using a Distributed Logical Router for Your Single-Region Scenarios](#)
- [Using a Distributed Logical Router for Your Dual-Region Scenarios](#)
- [Using a Universal Distributed Logical Router for Cross-Region Deployment](#)

## Using a Distributed Logical Router for Your Single-Region Scenarios

All VMware Validated Design use cases are based on the VMware Validated Design for the Software-Defined Data Center. Depending on the use case, you install all products in the foundation. You can then deploy scenarios following the instructions in this document. Different use cases might require installation of additional products.

If you use a single-region scenario, you set up Region A of the VMware Validated Design for the Software-Defined Data Center, and perform additional preparation following the steps in *Preparing for Region A Scenario Deployment*. After that, you set up your environment following the detailed instructions for the scenario. Because some scenarios do not depend on other scenarios, the result is three groups of scenarios with three distinct DLRs.

For example, to create blueprints with dynamic resource tiering in a single-region deployment, you follow these steps.

- 1 Deploy the Region A foundation.
- 2 Perform all procedures listed in the Prerequisites in [Chapter 4 Creating Blueprints with Dynamic Resource Tiering in Region A](#). This includes the procedures in *Preparing for Region A Scenario Deployment*
- 3 Perform all procedures listed in the scenario.
  - a Create Storage Reservation Policies in Region A
  - b Apply a Storage Reservation Policy to a Datastore in Region A
  - c Enable Users to Change Storage Policies in Region A
  - d Provision a Virtual Machine With a Modified Storage Policy in Region A

The following table gives an overview.

Scenario	Perform All Procedures In...	Provision Workload On...
<a href="#">Chapter 3 Creating and Publishing Single Machine Blueprints in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Configuring Reservation Policies and Network Policies</li> <li>■ Creating and Publishing Single Machine Blueprints</li> <li>■ Creating Self-Service Catalogues</li> </ul>	vPOD 192.168.51.0/24
<a href="#">Chapter 4 Creating Blueprints with Dynamic Resource Tiering in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Configuring Reservation Policies and Network Policies</li> <li>■ Creating and Publishing Single-Machine Blueprints</li> <li>■ Creating Self-Service Catalogues</li> <li>■ Creating Blueprints with Dynamic Resources Tiering</li> </ul>	vPOD 192.168.51.0/24
<a href="#">Chapter 5 Integrating vRealize Automation with IPAM in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Configuring Reservation Policies and Network Policies</li> <li>■ Integrating vRealize Automation with IPAM</li> </ul>	vPOD 192.168.61.0/24

Scenario	Perform All Procedures In...	Provision Workload On...
<a href="#">Chapter 6 Creating Multi-Tier Applications in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Configuring Reservation Policies and Network Policies</li> <li>■ Creating Multi-Tier Applications</li> </ul>	vPOD 192.168.70.0/29
<a href="#">Chapter 7 Configuring Micro-Segmentation for Multi-Tier Applications in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Configuring Reservation Policies and Network Policies</li> <li>■ Creating Multi-Tier Applications</li> <li>■ Configuring Micro-segmentation for Multi-Tier Applications</li> </ul>	vPOD 192.168.70.0/29
<a href="#">Chapter 8 Managing Virtual Machine Lease and Ownership in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Managing Virtual Machine Lease and Ownership</li> </ul>	vPOD 192.168.51.0/24
<a href="#">Chapter 9 Modeling and Monitoring Cost with vRealize Business in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Modeling and Monitoring Cost with vRealize Business</li> </ul>	vPOD 192.168.51.0/24
<a href="#">Chapter 10 Forwarding Log Events to vRealize Log Insight in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Forwarding Log Events to vRealize Log Insight</li> </ul>	vPOD 192.168.51.0/24
<a href="#">Chapter 11 Monitoring Workload Health and Capacity with vRealize Hyperic in Region A</a>	<ul style="list-style-type: none"> <li>■ Preparing for Region A Scenario Deployment</li> <li>■ Monitoring Workload Health and Capacity with vRealize Hyperic</li> </ul>	vPOD 192.168.51.0/24

## Using a Distributed Logical Router for Your Dual-Region Scenarios

If your VMware Validated Design foundation deployment uses a Region B, and if you want to implement your scenario to use both regions, you can use the Distributed Logical Router (DLR) that is already set up for your dual-region scenario.

With a DLR, you have the following benefits and limitations.

- Your environment can use on-demand networking
- Virtual machines in your environment cannot migrate from one region to another.

To deploy a Region B scenario, perform these procedures.

- 1 Set up the VMware Validated Design for the Software-Defined Data Center foundation for Region A and Region B.
- 2 Deploy the Region A scenario using a DLR.

- 3 Perform all procedures in [Chapter 12 Preparing for Region B Scenario Deployment](#).
- 4 Select a scenario and perform all procedures in that scenario. Follow the steps for Region A, but use the networking information for Region B. This document includes two example scenarios.
  - [Creating and Publishing Single-Machine Blueprints in Region B](#)
  - [Creating Self-Service Catalogues in Region B](#)

For all other scenarios, you use the Region A procedure with the Region B networking and host name information.

For example, for a dual-region deployment of the Dynamic Resource Tiering scenario, you use the following solution path.

- 1 Deploy Region A and Region B the foundation.
- 2 Perform all procedures listed in the Prerequisites in [Chapter 4 Creating Blueprints with Dynamic Resource Tiering in Region A](#), including those in *Preparing for Region A Deployment*.
- 3 Perform all procedures listed in [Chapter 4 Creating Blueprints with Dynamic Resource Tiering in Region A](#).
  - a Create Storage Reservation Policies in Region A
  - b Apply a Storage Reservation Policy to a Datastore in Region A
  - c Enable Users to Change Storage Policies in Region A
  - d Provision a Virtual Machine With a Modified Storage Policy in Region A
- 4 Perform all procedures in *Preparing for Region B Deployment*.
- 5 Perform all procedures listed in [Chapter 4 Creating Blueprints with Dynamic Resource Tiering in Region A](#), but use the network and host name information for Region B.

This guide includes explicit instructions for implementing the following scenarios in Region B using a DLR.

Scenario	Prerequisites	Provision Workload On...
<a href="#">Creating and Publishing Single Machine Blueprints in Region B</a>	<ul style="list-style-type: none"> <li>■ <a href="#">Preparing for Region B Deployment</a></li> </ul>	vPOD 192.168.151.0/24
<a href="#">Creating Self Service Catalogues in Region B</a>	<ul style="list-style-type: none"> <li>■ <a href="#">Preparing for Region B Deployment</a></li> <li>■ <a href="#">Creating and Publishing Single Machine Blueprints in Region B</a></li> </ul>	vPOD 192.168.151.0/24

## Using a Universal Distributed Logical Router for Cross-Region Deployment

If you want to use a Universal Distributed Logical Router (UDLR), you have to set up networking before you create blueprints. If you select one of the on-demand networking options during blueprint creation, provisioning of blueprints fails.

For the scenarios, the UDLR is set up as part of the deployment of the VMware Validated Design for the Software-Defined Data Center.

Using a UDLR has the following advantages and limitations.

- Supports cross-region deployment.
- You must select an existing network with when you create the blueprint. With UDLRs, you can configure a blueprints with on-demand networking, but an error results when you use that blueprint.

See the [Checklist for Preparing NSX and Security Configuration](#), which is part of the vRealize Automation 7.2 documentation set, for details.

This Scenarios documentation gives one example scenario for using the UDLR. You can deploy other scenarios using a UDLR instead of DLRs using the same approach.

Scenario	Follow the Procedures In...	Provision Workload On...
<a href="#">Chapter 14 Configure Unified Single Machine Blueprints for Cross-Region Deployment</a>	Configure Unified Single Machine Blueprints for Cross-Region Deployment  <b>Note</b> The UDLR is set up as part of the foundation deployment.	vPOD 192.168.80.0/24

# Preparing for Region A Scenario Deployment

# 2

The IT Automating IT scenarios are based on the VMware Validated Design for Software-Defined Data Center (SDDC). All the scenarios in this guide have been validated with that architecture. Your environment must meet prerequisites before you can deploy a scenario.

Before you implement any scenarios in region A or in a single-region deployment, follow these steps to deploy the foundation.

- 1 Perform all tasks in *Region A Virtual Infrastructure Implementation* in the *Deployment for Region A* document of the VMware Validated Design for the Software-Defined Data Center.
- 2 Perform all tasks in *Region A Cloud Management Platform Implementation* in the *Deployment for Region A* document of the VMware Validated Design for the Software-Defined Data Center.
- 3 Depending on your scenario, you might have perform some tasks in Region A Operations Implementation. For example, some scenarios use vRealize Log Insight.
- 4 Depending on your scenario, you might consider deploying Region B as well. See the *Deployment for Region A* documentation.

You can find the documents on the [VMware Validated Design Documentation](#) page.

After you deploy the foundation, you perform the tasks in this chapter before you implement scenarios.

At the beginning of each scenario, you might find additional setup tasks that apply to just that scenario.

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**Note** This set of scenario preparation procedures uses a DLR. See [Chapter 1 Scenarios Solution Paths](#) for an introduction to the benefits and disadvantages to using a DLR or UDLR.

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This chapter includes the following topics:

- [Create Virtual Machine Templates from a Content Library in Region A](#)
- [Create Customization Specifications in Region A](#)
- [Create a vSphere Endpoint for vRealize Automation in Region A](#)
- [Configure User Roles in vRealize Automation in Region A](#)
- [Create Fabric Groups in Region A](#)
- [Add Compute Resources to a Fabric Group in Region A](#)
- [Create Business Groups in Region A](#)

- [Create Logical Switches in Region A](#)
- [Create External Network Profiles in Region A](#)
- [Configuring Reservation Policies and Network Policies in Region A](#)
- [Creating Self-Service Catalogs and Entitlements in Region A](#)

## Create Virtual Machine Templates from a Content Library in Region A

In each scenario, you use virtual machine templates to create machine blueprints and publish them in a service catalog in vRealize Automation. You can use the predefined Linux and Windows virtual machine template that are available in the vCenter Server content library after you deploy the Software-Defined Data Center (SDDC).

Creating virtual machine templates from a content library includes several tasks. At a high level, you first create a virtual machine by importing it from the content library. Then you convert the virtual machine to a virtual machine template.

### Prerequisites

Verify that you have performed the content library configuration for Region A according to the *VMware Validated Design Deployment Guide for Region A*.

- Configure a Content Library in the First Compute vCenter Server Instance
- Import the Virtual Machine Template OVF Files

## Create Virtual Machines Using VM Templates in the Content Library

vRealize Automation cannot directly access virtual machine templates in the content library. You must create a virtual machine using the virtual machine templates, then convert the template in vCenter Server.

Perform this procedure on all vCenter Server compute instances that you add to vRealize Automation, including the first vCenter Server compute instance.

Create virtual machines from the following Linux and Windows VM templates in the content libraries.

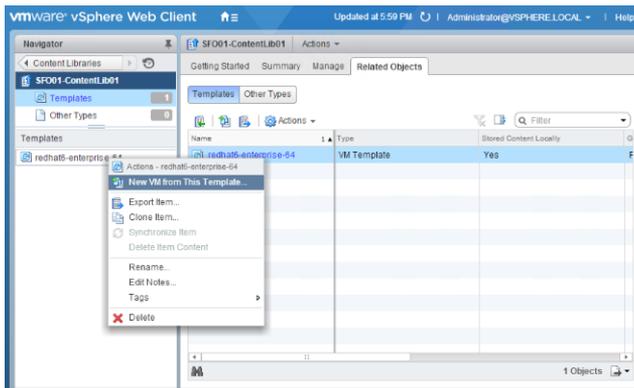
VM Template Name	Guest OS
redhat6-enterprise-64	Red Hat Enterprise Server 6 (64-bit)
windows-2012r2-64	Windows Server 2012 R2 (64-bit)

## Procedure

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > VMs and Templates** and expand the `comp01vc01.sfo01.rainpole.local` vCenter Server.
- 3 Right-click the **SFO01** data center tree control and select **New Folder > New VM and Template Folder**.
- 4 Create a new folder and label it **VM Templates**.
- 5 Navigate to **Home > Content Libraries** and click **SFO01-ContentLib01 > Templates**.
- 6 Right-click the VM template and click **New VM from This Template**.



The **New Virtual Machine from Content Library** wizard opens.

- 7 On the **Select name and location** page, use the same template name.

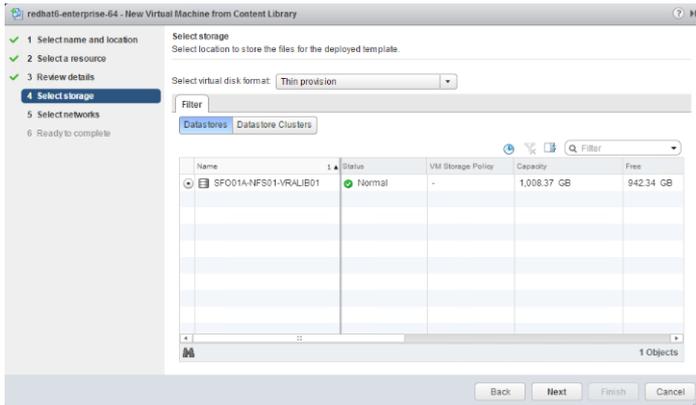
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**Note** Use the same template name to create a common service catalog that works across different vCenter Server instances within your datacenter environment.

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- 8 Select **VM Templates** as the folder for this virtual machine, and click **Next**.
- 9 On the **Select a resource** page, select the compute cluster that you want to deploy the virtual machine to.
- 10 On the **Review details** page, verify the template details and click **Next**.

- On the **Select storage** page, select the **SFO01A-NFS01-VRALIB01** datastore and select **Thin Provision** from the **Select virtual disk format** drop-down menu.



- On the **Select networks** page, select **VM Network** for the Destination Network, and click **Next**.

**Note** vRealize Automation will change the network according to the blueprint configuration.

- On the **Ready to complete** page, review the configurations that you made for the virtual machine, and click **Finish**.

A new task for creating the virtual machine appears in the **Recent Tasks** pane. After the task is complete, the new virtual machine is created.

- Repeat this procedure for the other VM Templates in the content library.

## Convert the Virtual Machine to a VM Template

You can convert a virtual machine directly to a template instead of making a copy by cloning.

Repeat this procedure for each of the VM templates in the content library. The table below lists the VM templates and the guest OS that each template uses to create a virtual machine.

VM Template Name	Guest OS
redhat6-enterprise-64	Red Hat Enterprise Server 6 (64-bit)
windows-2012r2-64	Windows Server 2012 R2 (64-bit)

**Procedure**

- 1 Log in to vCenter Server using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > VMs and Templates**.
- 3 In the **Navigator** pane, expand **comp01vc01.sfo01.rainpole.local > SFO > VM Templates**.
- 4 Right-click the **redhat6-enterprise-64** virtual machine located in the VM Templates folder, and click **Template > Convert to Template**.
- 5 Click **Yes** to confirm the template conversion.
- 6 Repeat this procedure for all of the VM Templates in the content library, verifying that each VM Template appears in the VM Templates folder.

## Create Customization Specifications in Region A

For your scenarios, you create two customization specifications, one for a Linux guest operating system and one for a Windows guest operating system, for use on the virtual machines you deploy from vRealize Automation. When you apply a specification to a guest operating system during virtual machine cloning or deployment, you prevent conflicts that might result if you deploy virtual machines with identical settings, such as duplicate computer names.

You later use the customization specifications when you create blueprints for use with vRealize Automation.

## Create a Linux Customization Specification in Region A

For your scenarios, you create a Linux guest operating system specification that you can apply when you create blueprints for use with vRealize Automation. This customization specification can be used to customize virtual machine guest operating systems when provisioning new virtual machines from vRealize Automation.

**Procedure**

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://mgmt01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > Operations and Policies > Customization Specification Manager**.
- 3 Select the vCenter Server `comp01vc01.sfo01.rainpole.local` from the drop-down menu.
- 4 Click the **Create a new specification** icon.  
The **Guest Customization** wizard appears.
- 5 On the **Specify Properties** page, select **Linux** from the **Target VM Operating System** drop-down menu, enter `itac-linux-custom-spec` for the specification name, and click **Next**.
- 6 On the **Set Computer Name** page, select **Use the virtual machine name**, enter `sfo01.rainpole.local` in the **Domain Name** text box and click **Next**.
- 7 On the **Time Zone** page, specify the time zone as shown in the table below for the virtual machine, and click **Next**.

Setting	Value
Area	America
Location	Los Angeles
Hardware Clock Set To	Local Time

- 8 On the **Configure Network** page, click **Next**.
- 9 On the **Enter DNS and domain settings** page, leave the default settings, and click **Next**.
- 10 Click **Finish** to save your changes.  
The customization specification that you created is listed in the Customization Specification Manager.

**Create a Customization Specification for Windows in Region A**

For your scenarios, you create a Windows guest operating system specification. You can apply the specification when you create blueprints for use with vRealize Automation. When you provision new virtual machines from vRealize Automation, the customization specification customizes the virtual guest operating system.

**Procedure**

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://mgmt01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > Operations and Policies > Customization Specification Manager**.
- 3 Select the vCenter Server `comp01vc01.sfo01.rainpole.local` from the drop-down menu.
- 4 Click the **Create a new specification** icon.  
The **Guest Customization** wizard appears.
- 5 On the **Specify Properties** page, select **Windows** from the **Target VM Operating System** drop-down menu, enter `itac-windows-joindomain-custom-spec` for the specification name, and click **Next**.
- 6 On the **Set Registration Information** page, enter **Rainpole** for the virtual machine owner's name and organization, and click **Next**.
- 7 On the **Set Computer Name** page, select **Use the virtual machine name**, and click **Next**.  
The operating system uses this name to identify itself on the network.
- 8 On the **Enter Windows License** page, provide licensing information for the Windows operating system, enter the `volume_license_key`, and click **Next**.
- 9 Specify the administrator password for use with the virtual machine, and click **Next**.
- 10 On the **Time Zone** page, select **(GMT-08:00) Pacific Time(US & Canada)**, and click **Next**.
- 11 On the **Run Once** page, click **Next**.
- 12 On the **Configure Network** page, click **Next**.
- 13 On the **Set Workgroup or Domain** page, select **Windows Server Domain**, configure the following settings, and click **Next**.

Setting	Value
Domain	sfo01.rainpole.local
User name	RAINPOLE\administrator
Password	admin_pwd

- 14 On the **Set Operating System Options** page, select **Generate New Security ID (SID)**, and click **Next**.

- Click **Finish** to save your changes.

The customization specification that you created is listed in the Customization Specification Manager.

## Create a vSphere Endpoint for vRealize Automation in Region A

In your scenarios, you can allow vRealize Automation to manage the infrastructure, by creating endpoints and configuring user credentials for those endpoints. After you create a vSphere Endpoint, vRealize Automation can communicate with the vSphere environment and discover compute resources that are managed by vCenter Server, collect data, and provision virtual machines.

### Procedure

- Log in to the vRealize Automation Rainpole portal.
  - Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- Navigate to **Infrastructure > Endpoints > Credentials** and click **New**.
- On the **Credentials** page, configure the vRealize Automation credential for the administrator of `comp01vc01.sfo01.rainpole.local` with the following settings, and click **Save**.

Setting	Value
Name	comp01vc01sfo01 admin
Description	Administrator of comp01vc01.sfo01.rainpole.local
User Name	svc-vra@rainpole.local
Password	<i>svc_vra_password</i>

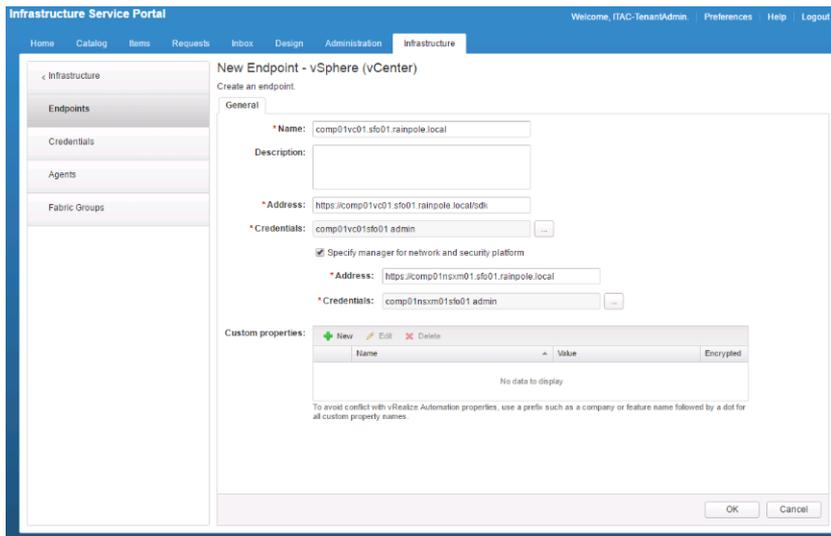
- Remain on the **Credentials** page and click **New** again.
- Configure the NSX administrator credentials of `comp01nsxm01.sfo01.rainpole.local` with the following settings, and click **Save**.

Setting	Value
Name	comp01nsxm01sfo01 admin
Description	Administrator of NSX Manager comp01nsxm01.sfo01.rainpole.local
User Name	svc-vra@rainpole.local
Password	<i>svc_vra_password</i>

- Navigate to **Infrastructure > Endpoints > Endpoints** and click **New Virtual > vSphere (vCenter)**.

- On the **New Endpoint - vSphere (vCenter)** page, create a vSphere Endpoint with the following settings, and click **OK**.

Setting	Value
Name	comp01vc01.sfo01.rainpole.local
Address	https://comp01vc01.sfo01.rainpole.local/sdk
Credentials	comp01vc01sfo01 admin
Specify manager for network and security platform	Selected
Address	https://comp01nsm01.sfo01.rainpole.local
Credentials	comp01nsm01sfo01 admin



## Configure User Roles in vRealize Automation in Region A

Before you implement scenarios, you must assign roles with the privileges that are required for to the tenant administrators and tenant architects (blueprint architects) to perform their responsibilities using vRealize Automation.

This procedure steps you through assigning roles to the ug-ITAC-TenantAdmins and ug-ITAC-TenantArchitects users and groups.

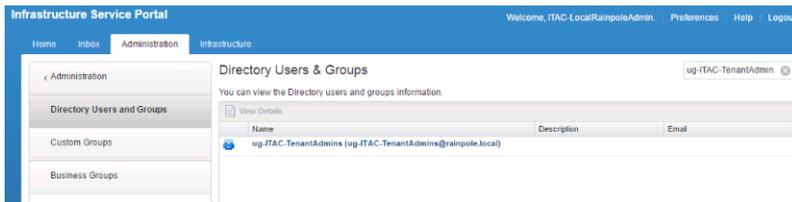
Roles are sets of privileges that you associate with users to determine what tasks they can perform. Based on their responsibilities, individuals might have one or more roles associated with their user account. All user roles are assigned within the context of a specific tenant. However, some roles in the default tenant can manage system-wide configuration settings that apply to multiple tenants.

**Procedure**

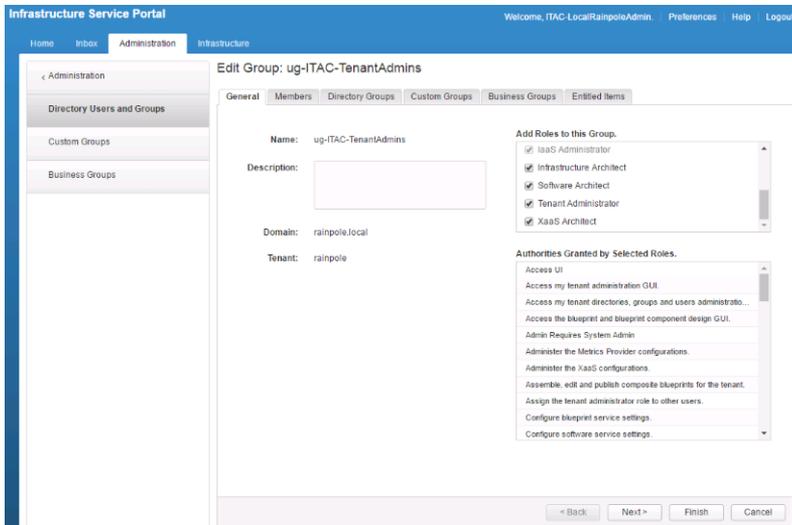
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	ITAC-LocalRainpoleAdmin
Password	<i>itac-localrainpoleadmin_password</i>
Domain	vsphere.local

- 2 Click the **Administration** tab.
- 3 Navigate to **Users & Groups > Directory Users and Groups**.
- 4 Enter `ug-ITAC-TenantAdmins` in the search box and press Enter.



- 5 Click the user group name `ug-ITAC-TenantAdmins`.
- 6 In the **Add Roles to this Group** item list, select the **Approval Administrator**, **Business Management Administrator**, **Infrastructure Architect**, **Software Architect**, **Tenant Administrator**, and **XaaS Architect** check boxes, and click **Finish**.



- 7 Enter `ug-ITAC-TenantArchitects` in the **Tenant Administrators** search box and press Enter.
- 8 Click the user group name `ug-ITAC-TenantArchitects`.

- 9 In the **Add Roles to this Group** list, select the **Software Architect** check box, and click **Finish**.

## Create Fabric Groups in Region A

You can organize virtualization compute resources and cloud endpoints into fabric groups by type and intent. One or more fabric administrators manage the resources in each fabric group. Before you implement a scenario, Fabric administrators must create reservations on the compute resources in their groups.

The reservations allocate fabric resources to specific business groups. Fabric groups are created in a specific tenant, but their resources can be made available to users who belong to business groups in all tenants.

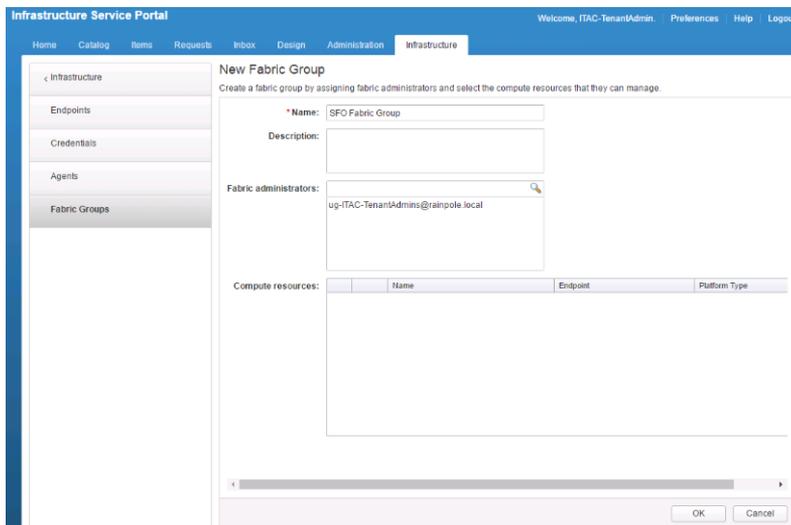
### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select **Infrastructure > Endpoints > Fabric Groups**.
- 3 Click **New Fabric Group**, enter the following settings and click **OK**.

Setting	Value
Name	SFO Fabric Group
Fabric administrators	ug-ITAC-TenantAdmins@rainpole.local



- Log out of the vRealize Automation portal.

## Add Compute Resources to a Fabric Group in Region A

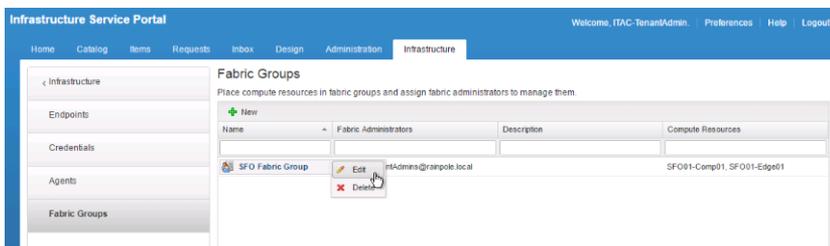
Before you implement a scenario, you allocate compute resources to fabric groups so that vRealize Automation can use the resources in that compute resource for that fabric group when provisioning virtual machines.

### Procedure

- Log in to the vRealize Automation Rainpole portal.
  - Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

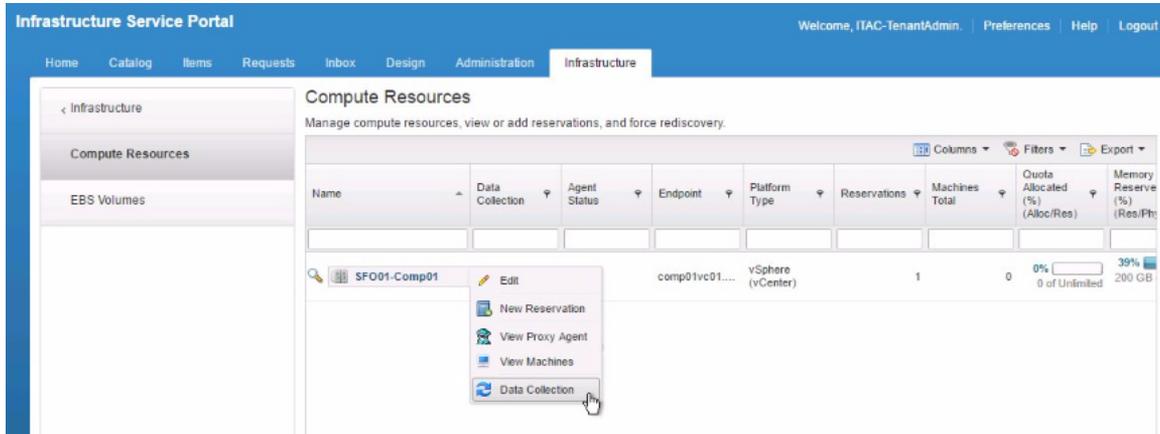
- Navigate to **Infrastructure > End Points > Fabric Groups**.
- In the **Name** column, hover the mouse pointer over the fabric group name SFO Fabric Group, and click **Edit**.



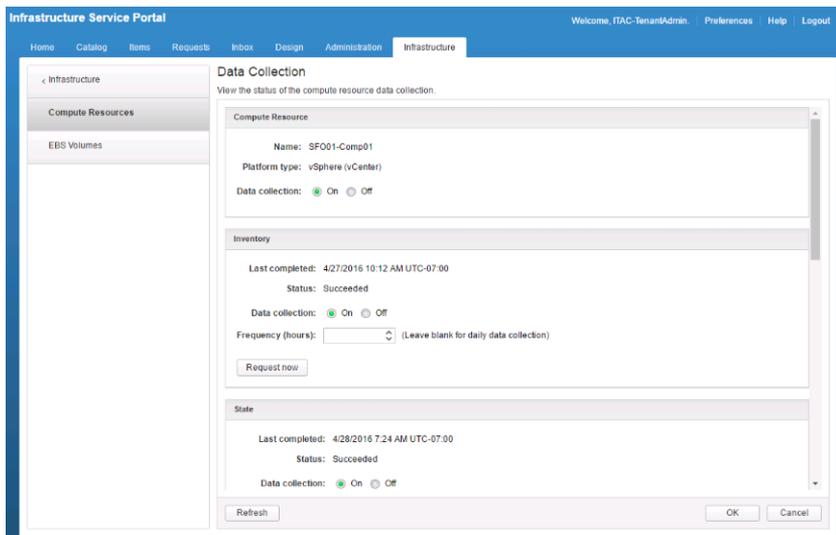
- On the **Edit Fabric Group** page, select **SFO01-Comp01** (compute cluster) from the **Compute Resources** table, and click **OK**.

**Note** It might take several minutes for vRealize Automation to connect to the Compute vCenter Server system and associated clusters. If you are still not able to see the compute cluster after sufficient time has passed, try to restart both proxy agent services in the virtual machines `vra01ias01.sfo01.rainpole.local` and `vra01ias02.sfo01.rainpole.local`.

- Navigate to **Infrastructure > Compute Resources > Compute Resources**.
- In the **Compute Resource** column, hover the mouse pointer over the compute cluster SFO01-Comp01, and click **Data Collection**.



- 7 Wait for the data collection process to complete and verify that the Status for both **Inventory** and **Network and Security Inventory** shows Succeeded.



## Create Business Groups in Region A

Tenant administrators create business groups to associate a set of services and resources with a set of users. The set of users often corresponds to a line of business, department, or other organizational unit. Users must belong to a business group to request machines. For this scenario implementation, create only a Production business group.

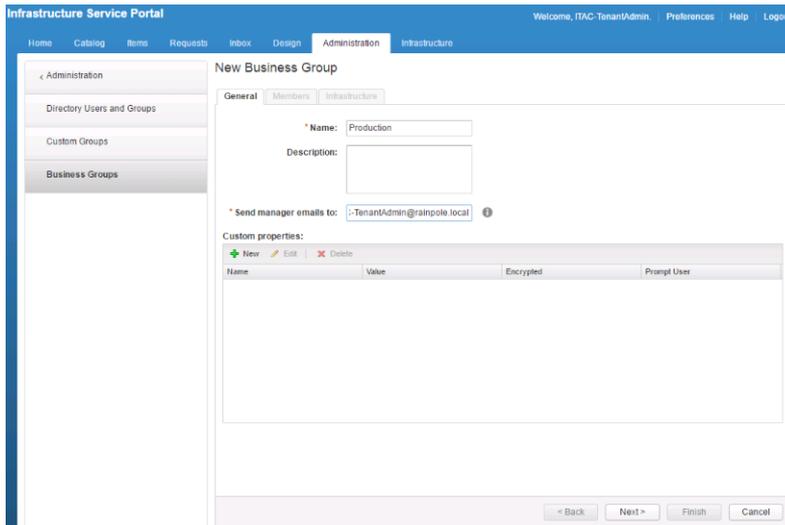
**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

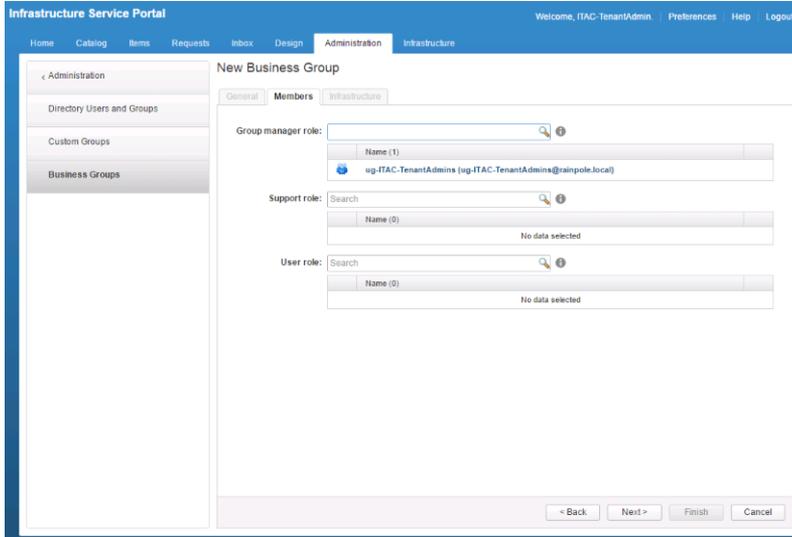
Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Administration > Users and Groups > Business Groups**.
- 3 Click the **New** icon.
- 4 On the **General** tab, enter the following values and click **Next**.

Setting	Value
Name	Production
Send Manager emails to	ITAC-TenantAdmin@rainpole.local



- 5 On the **Members** tab, enter **ug-ITAC-TenantAdmins@rainpole.local** in the **Group manager role** text box, and click **Next**.



6 On the **Infrastructure** tab, click **Finish**.

## Create Logical Switches in Region A

Before you can start with scenarios, you have to create logical switches for business groups. Several scenarios require a logical switch for the Production business group.

This procedure creates and configures the following logical switch

Logical Switch Name	Description
Production-VXLAN	Logical switch for the Production business group

**Note** You can connect the switch for production workloads to either the Distributed Logical Router or the Universal Distributed Logical Router. If the switch is connected to Universal Distributed Logical Router, workload deployment in Region B will fail because only the primary NSX Manager can create and manage universal objects. The NSX manager in Region B is not the primary NSX Manager. Thus the decision is to connect the switch to the Distributed Logical Router. As a result of this decision, deployed workloads can no longer move between Region A and Region B.

### Procedure

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

## 2 Create a logical switch.

- a Click **Networking & Security**.
- b In the Navigator, select **Logical Switches**.
- c From the **NSX Manager** drop-down menu, select **172.16.11.66** as the NSX Manager.
- d Click the **New Logical Switch** icon.

The **New Logical Switch** dialog box appears.

- e In the **New Logical Switch** dialog box, enter the following settings, and click **OK**.

Setting	Value
Name	Production-VXLAN
Description	Logical switch for Production Business Group
Transport Zone	Comp Global Transport Zone
Replication Mode	Hybrid
Enable IP Discovery	Selected
Enable MAC Learning	Deselected

## 3 Connect Production-VXLAN to the Distributed Logical Router.

- a On the **Logical Switches** page, select the **Production-VXLAN** Logical Switch.
- b Click the **Connect Edge** icon.
- c On the **Connect an Edge** page, select **SFOCOMP-DLR01** and click **Next**.
- d On the **Edit NSX Edge Interface** page, enter the following settings and click **Next**.

Option	Settings
Name	Production-VXLAN
Type	Internal
Connectivity Status	Connected
Primary IP Address	192.168.51.1
Subnet Prefix Length	24

- e On the **Ready to Complete** page, click **Finish**.

## Create External Network Profiles in Region A

Before members of a business group can request virtual machines, fabric administrators must create network profiles. The network profiles define the subnet and routing configuration for the virtual machines. Before you start scenario implementation, you create a Production Group External network profile.

Each network profile is configured for a specific network port group or virtual network. The network profile specifies the IP address and routing configuration for virtual machines that are provisioned to that network.

## Prerequisites

Create logical switches for business groups. See [Create Logical Switches in Region A](#).

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Network Profiles** and click **New > External**.
- 3 On the **New Network Profile - External** page, specify the network profiles on the **General** tab.
  - a Add the values for the Production Group External network profile.

Setting	Production Value
Name	Ext-Net-Profile-Production
Description	External Network profile for Production Business Group
IPAM endpoint	vRealize Automation IPAM
Subnet mask	255.255.255.0
Gateway	192.168.51.1

- 4 Click the **DNS** tab and enter the following values.

Setting	Value
Primary DNS	172.16.11.4
Secondary DNS	172.16.11.5
DNS Suffix	rainpole.local
DNS search suffixes	rainpole.local

- 5 Click the **Network Ranges** tab and follow these steps.
  - a Click the **New** button.
  - b Enter the following values for the Production Business IP Range profile.
  - c Click **OK**.

Setting	Production Value
Name	Production
Description	Static IP range for Production Group

Setting	Production Value
Starting IP address	192.168.51.20
Ending IP address	192.168.51.250

- Verify that all the static IP addresses are added to the profile and click **OK**.

## Configuring Reservation Policies and Network Policies in Region A

Scenarios use vRealize Automation reservation policies to group similar reservations. That means, for example, that you can assign different resources to a production environment than to a development environment. Create the reservation policy tag first, then assign the policy to reservations to allow a tenant administrator or business group manager to use the reservation policy in a blueprint.

---

**Note** Only some of the scenarios require that you configure reservation policies and network policies. Configure them only if instructed on the first page of the scenario.

---

### Create Reservation Policies in Region A

Scenarios use reservation policies to group similar reservations. Create the reservation policy tag first so that you can assign the policy to reservations. A tenant administrator or business group manager to use the reservation policy in a blueprint.

You create a reservation policy for virtual machine provisioning in a production environment.

When you request a machine, it can be provisioned on any reservation of the appropriate type that has sufficient capacity for the machine.

- You can apply a reservation policy to a blueprint to restrict the machines provisioned from that blueprint to a subset of available reservations.
- You can use a reservation policy to collect resources into groups for different service levels, or to make a specific type of resource easily available for a particular purpose.
- You can add multiple reservations to a reservation policy, but a reservation can belong to only one policy.
- You can assign a single reservation policy to more than one blueprint, however, each blueprint can have only one reservation policy.
- A reservation policy can include reservations of different types, but only reservations that match the blueprint type are considered when selecting a reservation for a particular request.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservation > Reservation Policies**.
- 3 Click the **New** icon, configure the following settings, and click **Save**.

Setting	Value
Name	SFO-Production-Policy
Description	Reservation policy for Production Business Group in SFO

- 4 Click the **New** icon, configure the following settings, and click **Save**.

Setting	Value
Name	SFO-Edge-Policy
Description	Reservation policy for Tenant Edge resources in SFO

## Create Reservations for the Compute Cluster in Region A

Before members of a business group can request machines, fabric administrators must allocate resources to them by creating a reservation. Each reservation is configured for a specific business group to grant them access to request machines on a specified compute resource. For the scenarios, you perform this procedure twice to create reservations for both the Production and Development business groups.

Group	Name
Production	SFO01-Comp01-Prod-Res01
Development	SFO01-Comp01-Dev-Res01

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservations**, and click **New > vSphere (vCenter)**.
- 3 On the **New Reservation - vSphere (vCenter)** page, click the **General** tab and configure the following values.

Setting	Production Group Value	Development Group Value
Name	SFO01-Comp01-Prod-Res01	SFO01-Comp01-Dev-Res01
Tenant	rainpole	rainpole
Business Group	Production	Development
Reservation Policy	SFO-Production-Policy	SFO-Development-Policy
Priority	100	100
Enable This Reservation	Selected	Selected

- 4 On the **New Reservation - vSphere (vCenter)** page, click the **Resources** tab.
  - a Select **SFO01-Comp01(comp01vc01.sfo01.rainpole.local)** from the **Compute resource** drop-down menu.
  - b In the **This Reservation** column of the **Memory (GB)** table, enter **200**.
  - c In the **Storage (GB)** table, select the check box for datastore **DS-NFS-Primary-HIGH**, and enter **2000** in the **This Reservation Reserved** text box, enter **1** in the **Priority** text box, and click **OK**.
  - d In the **Storage (GB)** table, select the check box for datastore **DS-NFS-Primary-MED**, and enter **2000** in the **This Reservation Reserved** text box, enter **2** in the **Priority** text box, and click **OK**.
  - e In the **Storage (GB)** table, select the check box for datastore **DS-NFS-Primary-LOW**, and enter **2000** in the **This Reservation Reserved** text box, enter **3** in the **Priority** text box, and click **OK**.
  - f Select **User-VMRP01** from the **Resource pool** drop-down menu.
- 5 On the **New Reservation - vSphere (vCenter)** page, click the **Network** tab.

- 6 On the **Network** tab, select the network path check boxes listed in the table below from the **Network Paths** list, and select the corresponding network profile from the **Network Profile** drop-down menu for the business group whose reservation you are configuring.

- a Configure the Production Business Group with the following values.

Production Network Path	Production Group Network Profile
vxw-dvs-xxxxx-Production-Web-VXLAN	Ext-Net-Profile-Production-Web
vxw-dvs-xxxxx-Production-DB-VXLAN	Ext-Net-Profile-Production-DB
vxw-dvs-xxxxx-Production-App-VXLAN	Ext-Net-Profile-Production-App

- b Configure the Development Business Group with the following values.

Production Network Path	Production Group Network Profile
vxw-dvs-xxxxx-Production-Web-VXLAN	Ext-Net-Profile-Production-Web
vxw-dvs-xxxxx-Production-DB-VXLAN	Ext-Net-Profile-Production-DB
vxw-dvs-xxxxx-Production-App-VXLAN	Ext-Net-Profile-Production-App

- 7 Click **OK** to save the reservation.
- 8 Repeat this procedure to create a reservation for the Development Business Group.

## Create Reservations for Edge Resources in Region A

In your scenario implementation, fabric administrators must allocate resources to business groups by creating a reservation. Each reservation is configured for a specific business group to grant them access to request virtual machines on a specified compute resource. Members of a business group can then request virtual machines.

By creating reservations for the Edge resources, any converge blueprint (or multi-machine blueprint) that deploys an NSX Edge device on-demand can automatically be placed in a datastore, cluster, or resource pools for Edge resources. That means Edge devices are separated from the workload virtual machine resources. By separating the workload compute resource and the network Edge resource, you can assign more reliable and higher performance resources to the infrastructure that is in use by workload virtual machines.

Perform this procedure to create Edge reservations for the Production business group.

## Procedure

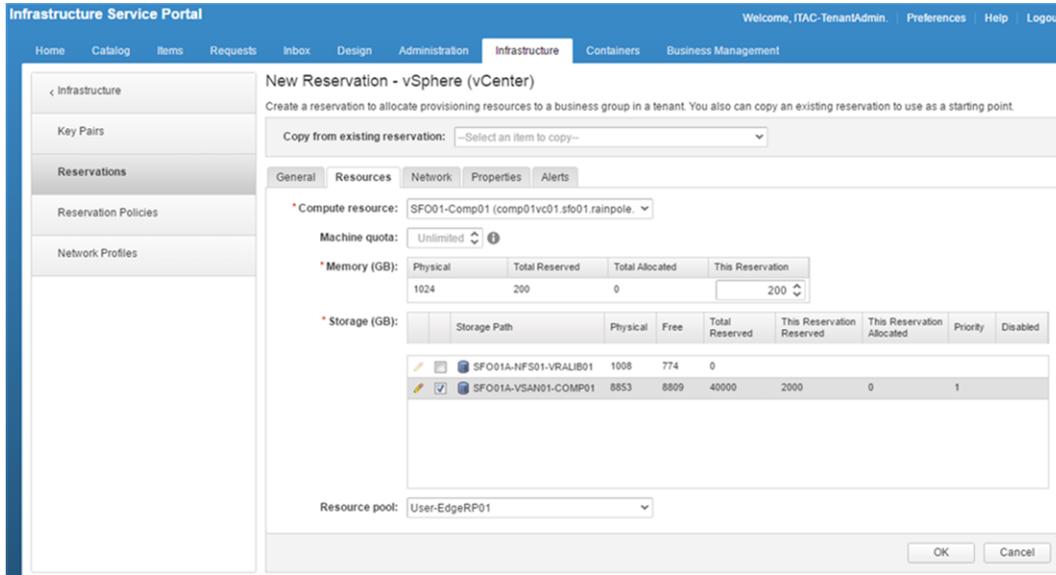
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservations**, and click **New > vSphere (vCenter)**.
- 3 On the **New Reservation - vSphere (vCenter)** page, click the **General** tab, and configure the following values for your business group.

Setting	Production Group Value
Name	SFO01-Edge01-Prod-Res01
Tenant	rainpole
Business Group	Production
Reservation Policy	SFO-Edge-Policy
Priority	100
Enable This Reservation	Selected

- 4 On the **New Reservation - vSphere (vCenter)** page, click the **Resources** tab.
  - a Select **SFO01-Comp01(comp01vc01.sfo01.rainpole.local)** from the **Compute resource** drop-down menu.
  - b Enter **200** in the **This Reservation** column of the **Memory (GB)** table.
  - c In the **Storage (GB)** table, select the check box for datastore **SFO01A-VSAN01-COMP01**, enter **2000** in the **This Reservation Reserved** text box, enter **1** in the **Priority** text box, and click **OK**.
  - d Select **User-EdgeRP01** from the **Resource pool** drop-down menu.



- 5 On the **New Reservation - vSphere (vCenter)** page, click the **Network** tab.
- 6 On the **Network** tab, map the network path to the network profile for the business group.
  - a Select the network path check boxes listed in the table below from the Network Paths list.
  - b Select the corresponding network profile from the **Network Profile** drop-down menu

Production Network Path	Production Group Network Profile
vwx-dvs-xxxx-Production-VXLAN	Ext-Net-Profile-Production

- 7 If a network path is not listed, resynchronize data collection from the NSX objects in the Compute vCenter Server inventory.
  - a Go back to **Infrastructure > Compute Resources**.
  - b Highlight **SFO01-Comp01**, select **Data Collection**, scroll down to **Network and Security Inventory**, and click **Request now**.
  - c Wait for synchronization to complete.
- 8 Click **OK** to save the reservation.

## Creating Self-Service Catalogs and Entitlements in Region A

For some of the IT Automating IT scenarios, you create a self-service catalog and corresponding entitlements before you start. A service catalog provides a common interface for consumers of IT services to request services, track their requests, and to manage their provisioned service items. Service architects and administrators can define new services and publish them to the common catalog. When defining a service, the architect can specify which items can be requested, and what which request options are configurable.

Users who are responsible for managing the catalog, such as tenant administrators and service architects, can manage the presentation of catalog items. For example, catalog managers can group items into service categories for easier navigation and highlight new services to consumers on the portal home page.

---

**Note** Only some of the scenarios require that you create self-service catalogs and the corresponding entitlements. Create the self-service catalogs only if instructed on the first page of the scenario.

---

### Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).
- 3 Perform the tasks in [Chapter 3 Creating and Publishing Single Machine Blueprints in Region A](#).

## Create the Catalog Service

The first step in creating a service catalog is creating a service. After that, administrators can associate entitlements and blueprints with the service to complete service catalog configuration.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

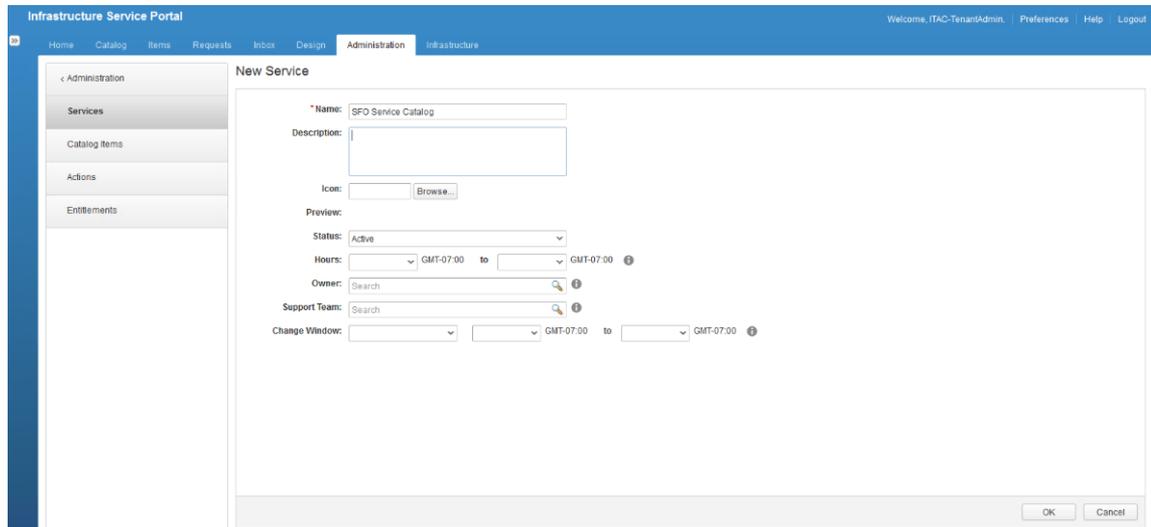
- 2 Navigate to the **Administration** tab, click **Catalog Management > Services**, and click **New**.

The **New Service** page appears.

- 3 On the **New Service** page, configure the following settings and click **OK**.

Setting	Value
Name	SFO Service Catalog
Description	Default setting (blank)
Status	Active
Icon	Default setting (blank)
Status	Default setting (blank)
Hours	Default setting (blank)
Owner	Default setting (blank)

Setting	Value
Support Team	Default setting (blank)
Change Window	Default setting (blank)



## Create Entitlements for Business Groups

You add a service, catalog item, or action to an entitlement, allowing the users and groups identified in the entitlement to request provisionable items in the service catalog. Entitlements allow members of a business group such as the Production business group to use the blueprint. Without the entitlement, users cannot use a blueprint.

Perform this procedure to create an entitlement for the Production business group.

Entitlement Name	Status	Business Group	User & Groups
Prod-SingleVM-Entitlement	Active	Production	ug-ITAC-TenantAdmins

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Click the **Administration** tab, and click **Catalog Management > Entitlement**.

3 Click **New**.

The **New Entitlement** page appears.

4 On the **New Entitlement** page, select the **Details** tab, configure the following values, and click **Next**.

Setting	Production Value
Name	Prod-SingleVM-Entitlement
Description	Default setting (blank)
Expiration Date	Default setting (blank)
Status	Active
Business Group	Production
Users & Groups	ug-ITAC-TenantAdmins

5 Click the **Items & Approvals** tab.

a On the **Entitled Actions** page, click the **Add Action** icon, add the following actions, and click **OK**.

- Connect using RDP (Machine)
- Power Cycle (Machine)
- Power Off (Machine)
- Power On (Machine)
- Reboot (Machine)
- Shutdown (Machine)

b Click **Finish**.

## Configure Entitlements for Blueprints in Region A

You entitle users to the actions and items that belong to the service catalog by associating each blueprint with an entitlement.

Repeat this procedure to associate the blueprints with their entitlement.

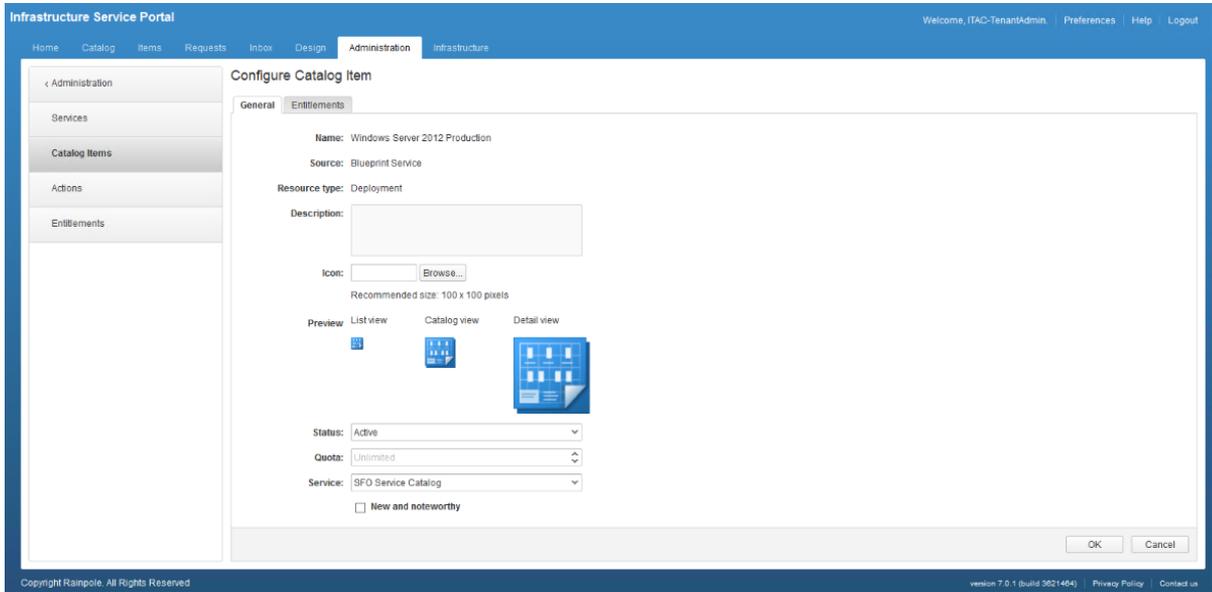
Blueprint Name	VM Template	Reservation Policy	Service Catalog	Add to Entitlement
Windows Server 2012 R2 - SFO Prod	windows-2012r2-64 (comp01vc01.sfo01.rainpole.local)	SFO-Production-Policy	SFO Service Catalog	Prod-SingleVM-Entitlement
Windows Server 2012 R2 - SFO Dev	windows-2012r2-64 (comp01vc01.sfo01.rainpole.local)	SFO-Development-Policy	SFO Service Catalog	Dev-SingleVM-Entitlement
Windows Server 2012 R2 With SQL2012 - SFO Prod	windows-2012r2-64-sql2012(comp01vc01.sfo01.rainpole.local)	SFO-Production-Policy	SFO Service Catalog	Prod-SingleVM-Entitlement
Windows Server 2012 R2 With SQL2012 - SFO Dev	windows-2012r2-64-sql2012(comp01vc01.sfo01.rainpole.local)	SFO-Development-Policy	SFO Service Catalog	Dev-SingleVM-Entitlement
Redhat Enterprise Linux 6 - SFO Prod	redhat6-enterprise-64(comp01vc01.sfo01.rainpole.local)	SFO-Production-Policy	SFO Service Catalog	Prod-SingleVM-Entitlement
Redhat Enterprise Linux 6 - SFO Dev	redhat6-enterprise-64(comp01vc01.sfo01.rainpole.local)	SFO-Development-Policy	SFO Service Catalog	Dev-SingleVM-Entitlement

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Select the **Administration** tab and navigate to **Catalog Management > Catalog Items**.
- 3 On the **Catalog Items** pane, select the **Windows Server 2012 R2 - SFO Prod** blueprint in the **Catalog Items** list and click **Configure**.
- 4 On the **General** tab of the **Configure Catalog Item** dialog box, select **SFO Service Catalog** from the **Service** drop-down menu, and click **OK**.



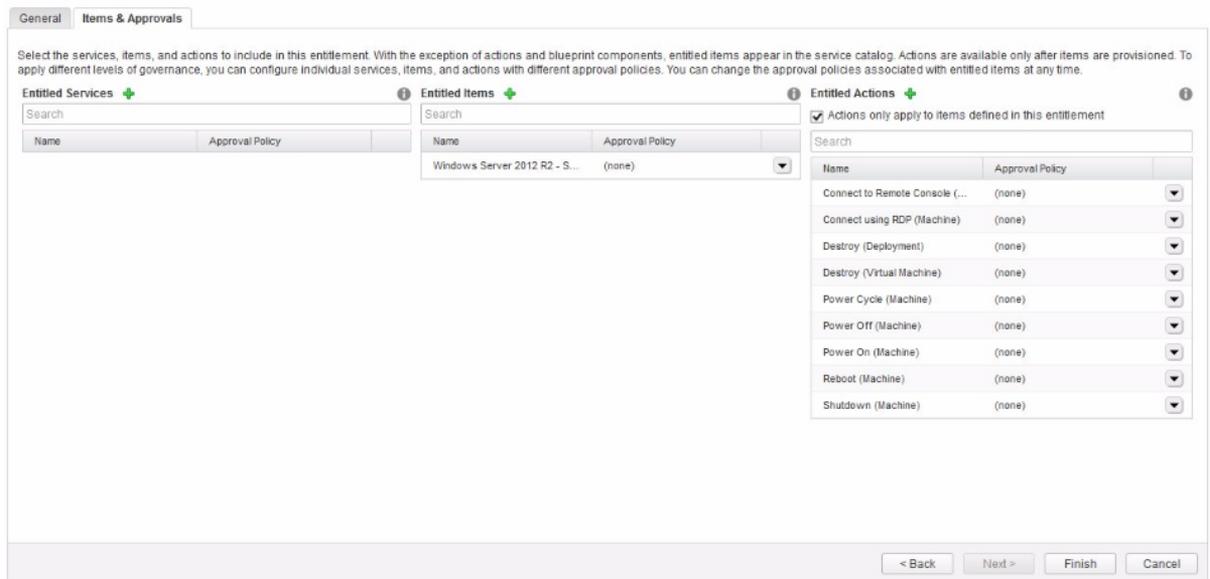
**5 Associate the blueprint with the **Prod-SingleVM-Entitlement** entitlement.**

- a Click **Entitlements** and select **Prod-SingleVM-Entitlement**.

The **Edit Entitlement** pane appears.

- b Select the **Items & Approvals** tab and add the **Windows Server 2012 R2 - SFO Prod** blueprint to the **Entitled Items** list.
- c Click **Finish**.

**Edit Entitlement**



**6 Select the **Catalog** tab and verify that the blueprints are listed in the Service Catalog.**



- 7 Click the **Request** button to request a virtual machine that uses the **Windows Server 2012 R2 - SFO Prod** blueprint.
- 8 Click the **Request** tab to monitor the status of the provision request and verify that the request completes successfully.
- 9 Repeat this procedure to associate all of the blueprints with their entitlements.

## Provision Blueprints and Validate the Configuration in Region A

After the blueprints for your scenario have been created, you can associate them with the service catalog and perform optional customization. After provisioning is complete, you verify that the naming prefixes and IP addresses are correct.

Because entitlements are already in place, the correct set of users can then use the service catalog item.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to the **Catalog** tab and click **SFO-Service-Catalog**.
- 3 Click **Request** for the blueprint named **Windows Server 2012 R2 - SFO Prod** and, optionally, customize the blueprint.
  - a (Optional) Select **Windows Server 2012 R2 - SFO Prod** and, under **General**, enter values for **Description**, **Reason for Request**, and **Lease days**.
  - b (Optional) Select **vSphere\_Machine\_1** and, under **General**, enter values for the CPUs and Memory options.
  - c (Optional) Select **vSphere\_Machine\_1** and under **Storage**, click **Edit** and select the **Storage Reservation Policy** option available from the drop-down menu.
- 4 Click **Submit** and click **OK**.

- 5 Repeat the steps to deploy the blueprint named **Redhat Enterprise Linux 6 - SFO Prod**.
- 6 Click the **Requests** tab and check the status of the new requests until **Status** is Successful.  
Provisioning might take some time.
- 7 Once provisioning is complete, click the **Infrastructure** tab, click **Reservations**, and click **Network Profiles**.
- 8 Click **Ext-Net-Profile-Production**, click the **IP Addresses** tab to verify that the blueprints are deployed correctly.
  - a Verify that two virtual machines exist with the machine name pattern Prod-xxxxx.  
This is the prefix that you defined according to [Create Machine Prefixes in Region A](#).
  - b Verify that the two virtual machines are using the IP addresses defined on [Create External Network Profiles in Region A](#).
  - c Click **Cancel** when verification is complete.

# Creating and Publishing Single Machine Blueprints in Region A

# 3

A blueprint specifies the workflow that is used to provision a virtual machine and includes information such as CPU, memory, and storage.

This scenario explains how to publish blueprints for the Production business group.

Machine blueprints include additional provisioning information such as the locations of required disk images or virtualization platform objects. Blueprints also specify policies such as the lease period and can include networking and security components such as security groups, policies, or tags.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).

This chapter includes the following topics:

- [Create Machine Prefixes in Region A](#)
- [Create Single Machine Blueprints in Region A](#)

## Create Machine Prefixes in Region A

As a fabric administrator, you create machine prefixes that are used to create names for machines provisioned through vRealize Automation. Tenant administrators and business group managers select these machine prefixes and assign them to provisioned machines through blueprints and business group defaults.

For the *Scenarios* documentation, you set up a machine prefix for the Production business group. Machine prefixes are shared across all tenants. Every business group has a default machine prefix. Every blueprint must have a machine prefix or use the group default prefix. Fabric administrators are responsible for managing machine prefixes.

A prefix consists of a base name to be followed by a counter of a specified number of digits. When the digits are all used, vRealize Automation rolls back to the first number.

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select **Infrastructure > Administration > Machine Prefixes**.
- 3 Click the **New** icon to create a default machine prefix for the Production group using the following settings and click **Save**.

Setting	Value
Machine Prefix	Prod-
Number of Digits	5
Next Number	1

## Create Single Machine Blueprints in Region A

To prepare for IT Automation IT scenarios, you create a blueprint for provisioning the Linux and Windows virtual machines. The blueprint uses resources on the Compute vCenter Server. Tenants can later use this blueprint for automatic provisioning.

A blueprint is the complete specification for a virtual, cloud, or physical machine. Blueprints determine a machine's attributes, the manner in which it is provisioned, and its policy and management settings.

Repeat this procedure to create the following blueprints.

Blueprint Name	VM Template	Customization Specification
Windows Server 2012 R2 - SFO Prod	windows-2012r2-64	itac-windows-joindomain-custom-spec
Redhat Enterprise Linux 6 - SFO Prod	redhat6-enterprise-64	itac-linux-custom-spec

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Click **New**.
- 4 In the **New Blueprint** dialog box, configure the following settings on the **General** tab and click **OK**.

Setting	Value
Name	Windows Server 2012 R2 - SFO Prod
Archive (days)	15
Minimum	30
Maximum	270

- 5 Select and drag the **vSphere Machine** icon to the Design Canvas.
- 6 Click the **General** tab, configure the following settings, and click **Save**.

Setting	Default
ID	Default setting (vSphere_Machine_1)
Description	Default setting (blank)
Display location on request	Deselected
Reservation policy	SFO-Production-Policy
Machine prefix	Prod-
Minimum	Default setting
Maximum	Default setting

- 7 Click the **Build Information** tab, configure the following settings, and click **Save**.

Setting	Value for Windows
Blueprint type	Server
Action	Clone
Provisioning workflow	CloneWorkflow

Setting	Value for Windows
Clone from	windows-2012r2-64
Customization spec	itac-windows-joindomain-custom-spec

8 Click the **Machine Resources** tab, configure the following settings, and click **Save**.

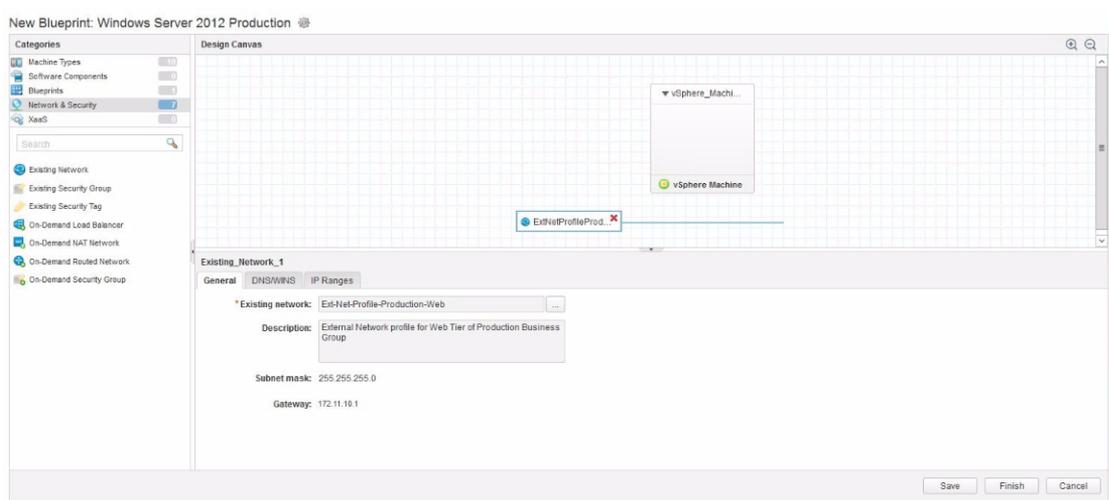
Setting	Minimum	Maximum
CPU	2	4
Memory (MB):	4096	16384
Storage	Default setting	Default setting

9 Set the network.

- a Click the **Network** tab.
- b Select **Network & Security** in the **Categories** section to display the list of available network and security components.
- c Select the **Existing Network** component and drag it onto the design canvas.
- d Click in the **Existing network** text box and select the **Ext-Net-Profile-Production** network profile.

Blueprint Name	Existing network
Windows Server 2012 R2 - SFO Prod	Ext-Net-Profile-Production
Redhat Enterprise Linux 6 - SFO Prod	Ext-Net-Profile-Production

e Click **Save**.



f Select **vSphere\_machine** properties from the design canvas.

- g Select the **Network** tab, click **New**, and configure the following settings.

For Existing Network	Network Setting	Assignment Type Setting	Address Setting
Ext-Net-Profile-Production	ExtNetProfileProduction	Static IP	Leave blank

- h Click **Save**.
- i Click **Finish** to save the blueprint.

**10** Select the blueprint and click **Publish**.

**11** Repeat this procedure to create the blueprint for Linux.

Setting	Value for Linux
Blueprint type	Server
Action	Clone
Provisioning workflow	CloneWorkflow
Clone from	redhat6-enterprise-64
Customization spec	itac-linux-custom-spec

# Creating Blueprints with Dynamic Resource Tiering in Region A

## 4

Resource tiering allows you to provision blueprints depending on demand. After you provision a deployment, you can adjust to changing workload demands by increasing or decreasing the number of instances of virtual or cloud machines in your deployment. In this scenario, you create several different storage reservation policies. Depending on the business requirements, you can then change the storage for the blueprint.

For example, assume that you deployed a three-tiered application with a clustered application server node, a database node, and a load balancer node. Demand increases, and you find that the two instances of your application server node cannot handle all the traffic. Because your blueprint supports up to ten instances of the application server, and you are entitled to scale actions, you can scale out your application.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

### Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).
- 3 Perform the tasks in [Chapter 3 Creating and Publishing Single Machine Blueprints in Region A](#).

This chapter includes the following topics:

- [Create Storage Reservation Policies in Region A](#)
- [Apply a Storage Reservation Policy to a Datastore in Region A](#)
- [Enable Users to Change Storage Policies in Region A](#)
- [Provision a Virtual Machine With a Modified Storage Policy in Region A](#)

## Create Storage Reservation Policies in Region A

Tenant administrators create storage reservation policies to group datastores that have similar characteristics, such as speed or price. After you create a storage reservation policy, you can populate it with datastores to use the policy in a blueprint in your scenario.

**Procedure**

- 1 Log in to the vRealize Automation console.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>vRA_tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservation > Reservation Policies**.
- 3 Create a high-performance storage reservation policy.
  - a Click **New** and choose **Storage Reservation Policy**.
  - b Type **Gold-Storage-Policy** in the **Name** text box.
  - c Type **High performance storage** in the **Description** text box.
  - d Click the **Save** icon.
- 4 Create a medium-performance storage reservation policy.
  - a Click **New** and choose **Storage Reservation Policy**.
  - b Type **Silver-storage-policy** in the **Name** text box.
  - c Type **Medium performance storage** in the **Description** text box.
  - d Click the **Save** icon.
- 5 Create a low-performance storage reservation policy.
  - a Click **New** and choose **Storage Reservation Policy**.
  - b Type **Bronze-storage-policy** in the **Name** text box.
  - c Type **Low performance storage** in the **Description** text box.
  - d Click the **Save** icon.

## Apply a Storage Reservation Policy to a Datastore in Region A

When you implement a scenario with dynamic resource tiering, you first create a storage policy. You can then apply the policy to a datastore so that tenant administrators and business group managers can use the policy in a blueprint.

**Procedure**

- 1 Log in to the vRealize Automation console.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - a Log in using the following credentials.

Options	Description
User name	itac-tenantadmin
Password	<i>vRA_tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Compute Resources > Compute Resources**.
- 3 Click **Edit** on the compute resource **SFO01-Comp01**.
- 4 Click the **Configuration** tab and click the **Edit** icon to apply the proper storage policy for each datastore, according to their performance.

Datastore	Storage policy
DS-NFS-Primary-HIGH	Gold-Storage-Policy
DS-NFS-Primary-MED	Silver-Storage-Policy
DS-NFS-Primary-LOW	Bronze-Storage-Policy

- 5 Click **OK** to save the storage policy configuration.

## Enable Users to Change Storage Policies in Region A

When you implement a scenario with dynamic resource tiering, you enable users to change storage policies in each blueprint. You set the option for both the Windows and the Linux blueprint.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Click the **Windows Server 2012 R2 - SFO Prod** blueprint
- 4 Select the **vSphere Machine** icon in the **Design Canvas**.
- 5 Click the **Storage** tab, select **Disk 0**, and click the **Edit** icon.

- Configure the following settings on the **Storage** tab, and click **Save**.

Storage Reservation Policy	Gold-Storage-Policy
Allow user to see and change storage reservation policies	checked

- Click **Finish**.
- Repeat the same steps for the blueprint named **Redhat Enterprise Linux 6 - SFO Prod**.

## Provision a Virtual Machine With a Modified Storage Policy in Region A

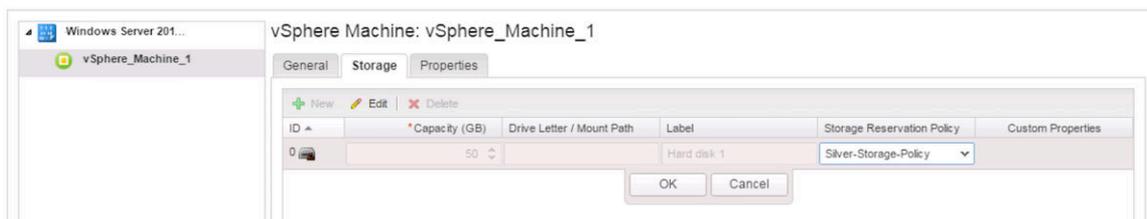
In the dynamic resource tiering scenario, you can select a storage policy in the blueprint each time you provision a virtual machine.

### Procedure

- Log in to the vRealize Automation Rainpole portal.
  - Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

- Click the **Catalog** tab and click the **Request** button for Windows Server 2012R2 - SFO Production.
- Click the **vSphere\_Machine\_1** icon in the left pane.



- Select the **Storage** tab.
- Select the disk 0, and click **Edit**.
- Select **Silver-storage-policy** from the **Storage Reservation Policy** drop-down menu and click **OK**.
- Click **Save** on the **vSphere Machine: vSphere\_Machine\_1** tab.
- Click the **Request** button for the Windows Server 2012R2 - SFO Production catalog item again and click **Submit**.

- 9 Click **OK** and monitor the status of the request.
- 10 Once the deployment is successful, verify that the virtual machine is in the **DS-NFS-Primary-MED** datastore.

# Integrating vRealize Automation with IPAM in Region A

# 5

IP address management (IPAM) supports planning, tracking, and managing the IP address space of a network. You can integrate an IPAM module, such as the Infoblox vNOIS appliance, with vRealize Automation to create an IPAM network for the Rainpole tenant. In this scenario, you start with an existing blueprint with a vRealize Automation network profile and modify the blueprint to work with IPAM.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

## Prerequisites

- 1 Prepare for the scenario. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).
- 3 Download the Infoblox DDI (DNS, DHCP, and IPAM) from the Infoblox Website. Infoblox DDI provides the Infoblox vNOIS appliance. This scenario uses version 7.3.6.
- 4 Download the VMware Cloud Adapter from the Infoblox Website. This scenario uses version 4.0 of this adapter.

This chapter includes the following topics:

- [Deploy Infoblox vNIOs Appliance in Region A](#)
- [Configure the Appliance as a Grid Master in Region A](#)
- [Configure the IPAM Network Profile for the Rainpole Tenant in Region A](#)
- [Create the Cloud API User in Region A](#)
- [Integrate the IPAM Plug-in With vRealize Orchestrator in Region A](#)
- [Register the IPAM Endpoint in vRealize Automation in Region A](#)
- [Create Logical Switches in Region A](#)
- [Create External Network Profiles](#)
- [Modify an Existing Blueprint in Region A to Incorporate IPAM](#)
- [Provision Blueprints in Region A with IPAM and Validate the Blueprints](#)

## Deploy Infoblox vNIOS Appliance in Region A

Infoblox DDI includes an IP address management (IPAM) component that integrates with vRealize Automation to provide an IP address solution for virtual machine provisioning. In this scenario, you use this functionality in your environment. First you deploy the Infoblox vNIOS appliance on the management vCenter Server and then you integrate the appliance with vRealize Automation.

### Prerequisites

Download Infoblox DDI software package from the Infoblox Web site.

### Procedure

- 1 Download and install VMware OVF Tool 4.2.0 from VMware website:  
<https://www.vmware.com/support/developer/ovf/>.
- 2 Run the command to import the Infoblox NIOS appliance using OVF Tool:

```
"c:\Program Files\VMware\VMware OVF Tool\ovftool.exe" "--datastore=SF001-NFS01-Mgmt01" "--name=mgmt01vnios01"
"--network=vDS-Mgmt-Management" --powerOn nios-7.3.6-335725-2016-07-21-05-10-54-160G-820.ova
"vi://administrator@vsphere.local:VMware1!@mgmt01vc01.sfo01.rainpole.local/SF001/host/SF001-Mgmt01"
```

- 3 Using the vSphere Web Client, log in to the Infoblox vNIOS appliance console with the initial preconfigured user name and password.

Setting	Value
User	admin
Password	infoblox

You change this user name and password later.

- 4 Configure a temporary license for 60 days
  - a At the Infoblox vNIOS appliance console, enter **set temp\_license**.
  - b Type the number **2**, then press **Enter**.
  - c Enter **set temp\_license**.
  - d Type the number **8**, then press **Enter**.
  - e Enter **set temp\_license**.
  - f Type the number **15**, then press **Enter**.
  - g Enter **y** to generate a temporary 60-day license for the DNSOne with Grid product.
  - h Enter **y** to restart the UI, and **y** again to confirm.

- 5 At the Infoblox vNIOS appliance console, enter **set network** and enter the following network configuration.

Setting	Value
Host IP	172.16.11.90
Netmask	255.255.255.0
Gateway	172.16.11.10
Configure IPv6 Network Settings?	No
Become grid member?	No

- 6 Enter **y** to accept the new configuration, and **y** again to accept the configuration change.
- 7 On the Active Directory server, add the following DNS name for the NIOS appliance.
- mgmt01vnios01.rainpole.local**

## Configure the Appliance as a Grid Master in Region A

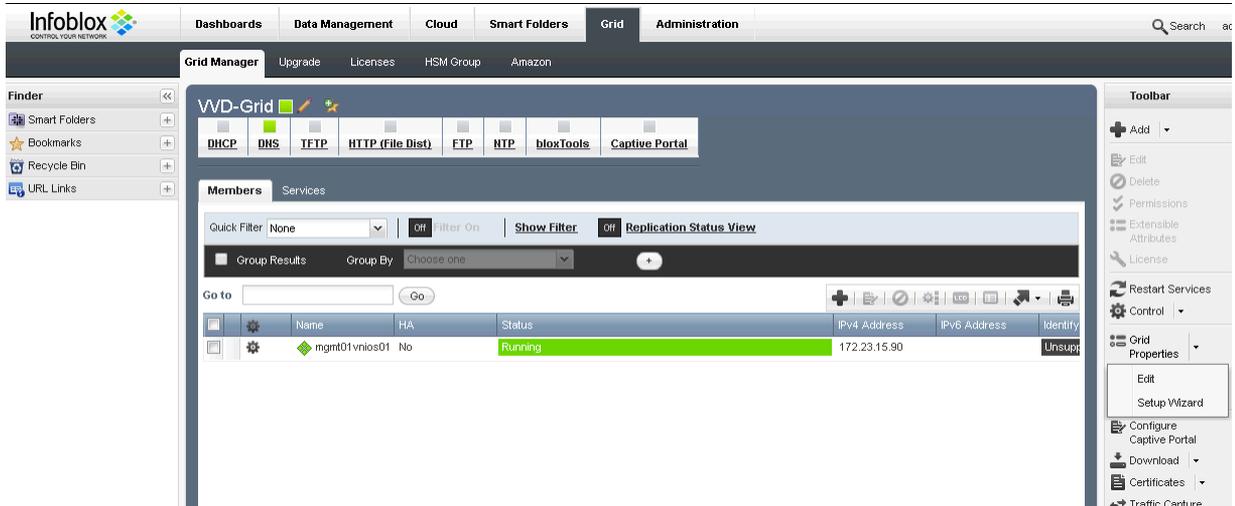
In an environment that uses IPAM, a grid master holds and maintains the central database of the grid. You can configure the Infoblox vNIOS appliance to be the grid master.

### Procedure

- 1 Log in to the Infoblox vNIOS appliance.
  - a Open a Web browser and go to **https://mgmt01vnios01.rainpole.local**.
  - b Log in using the following credentials.

Setting	Value
User name	admin
Password	infoblox

- 2 (Optional) If the **Setup Wizard** does not start, start it manually.
  - a Click the **Grid** tab and select **Grid Manager > Members**
  - b Expand the Toolbar on the right.
  - c Click the **Grid Properties** drop-down menu.
  - d Click **Setup Wizard**.



- 3 Click **I Accept** to accept the license agreement.
- 4 In the **Grid Setup** wizard, select the **Configure a Grid Master** radio button and click **Next**.
- 5 Enter the following grid properties.

Setting	Value
Grid Name	VVD-Grid
Shared Secret	<i>any_passphrase</i>
Host Name	mgmt01vnios01.rainpole.local
Type of Network	IPv4
Is the grid master an HA pair?	No

- 6 Keep the IP Address settings as is and click **Next**.
- 7 Change the default admin password to a password of your choice and click **Next**.
- 8 Configure the time zone and NTP server and click **Next**.

Setting	Value
Time Zone	(UTC-8:00) Pacific Time (US and Canada), Tihuana
Would you like to enable NTP?	Yes
NTP Server	ntp.rainpole.local

- 9 In the **Participate in the Infoblox Customer Experience Improvement Program** dialog box, leave the default and click **Next**.
- 10 Review the final configuration and click **Finish**.
- 11 In the **Warning** dialog box, click **Yes**.

## Configure the IPAM Network Profile for the Rainpole Tenant in Region A

Before you can take advantage of the IPAM functionality, you configure a network profile and the DNS service to be consumed by vRealize Automation blueprint and you start the DNS service.

### Procedure

1 Log in to the vNIOS management interface.

- a Open a Web browser and go to `https://mgmt01vnios01.rainpole.local`
- b Log in using the following credentials.

Setting	Value
User name	admin
Password	<i>vnios_admin_password</i>

2 Click the **Data Management** tab.

3 Create an IPAM network for the Rainpole tenant.

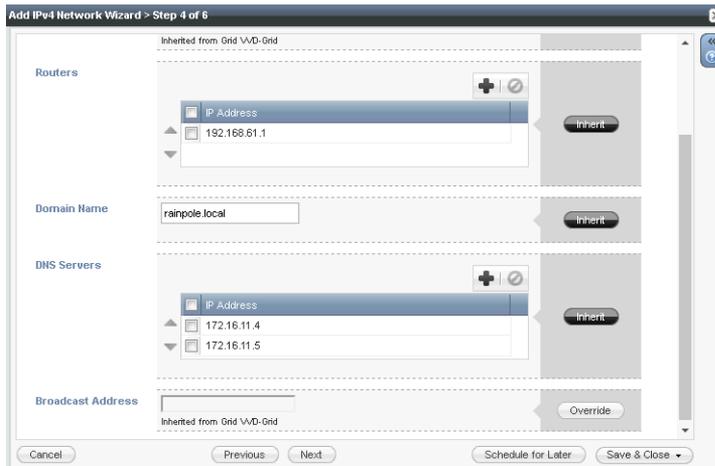
- a Click the **IPAM** submenu.
- b In the **default** network view, click the **Add** icon.
- c In the **Add IPv4 Network** wizard, select **Add Network**, select the **Manually** option, and click **Next**.
- d Enter the following network information and click **Next**.

Setting	Value
Netmask	24
Networks	192.168.61.0

- e On the **Members** page, click the **Add** icon, add `mgmt01vnios01.rainpole.local`, and click **Next**.

- f Override the following parameters and click **Next**.

Setting	Value
Routers	192.168.61.1
Domain Name	rainpole.local
DNS Servers	172.16.11.4 172.16.11.5



- g On the **Extensible Attributes** page, click **Next**.
  - h In the **Create IPv4 Network** pane, select **Now** and click **Save & Close**.
- 4 Create a DNS zone for the Rainpole tenant.
- a Click the **DNS** submenu.
  - b Click **Zones**.
  - c Click the **Add** icon and select **Authoritative Zone**.
  - d In the **Add Authoritative Zone** wizard, select **Add an authoritative forward-mapping zone**, and click **Next**.
  - e Enter the following parameters and click **Save & Close**.

Setting	Value
Name	rainpole.local

- 5 To prevent IPAM from using the IP address that is already assigned to the gateway, reserve that address.
  - a Click the newly-created rainpole.local zone.
  - b On the **Records** page, click the drop down menu next to the icon "+", move down to select **Record** and select **A Record**.

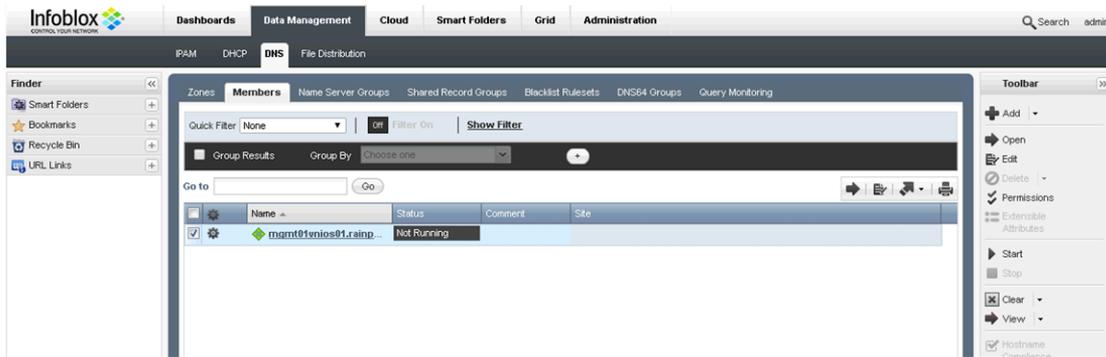
- c In the **Add A Record** wizard, enter the following parameters and click **Save & Close**.

Setting	Value
Name	dlr01
IP Address	192.168.61.1

- d In the **Warning** dialog box, click **Yes**.

**6** Start the DNS service.

- a Click the **DNS** submenu and click **Members**.
- b Select the **mgmt01vnios01.rainpole.local** check box, click **Start**, and click **Yes**.



## Create the Cloud API User in Region A

In this scenario, vRealize Automation has to connect to IPAM through an endpoint. To make this possible, a user must have proper permission to access Infoblox Restful Web API (WAPI). The user is part of Infoblox cloud-api-only group, with permission to query and update cloud attributes using WAPI.

**Procedure**

- 1 Log in to the vNIOs management interface.
  - a Open a Web browser and go to <https://mgmt01vnios01.rainpole.local>.
  - b Log in using the following credentials.

Setting	Value
User name	admin
Password	<i>vnios_admin_password</i>

- 2 Click the **Administration** tab and click **Administrators**.
- 3 Verify that the Cloud API group exists and create it if necessary.
  - a Click the **Groups** submenu.
  - b Verify that a group named cloud-api-only exists.

#### 4 Create new user for the Cloud API group.

- a Click **Admins**.
- b Click the **Add** icon, enter the following parameters, and click **Save & Close**.

Setting	Value
Authentication Type	Local
Login	cloudapi
Password	<i>cloudapi_password</i>
Admin Group	Click <b>Select</b> and select cloud-api-only.

#### 5 Give the proper permissions to the cloudapi user.

- a Click **Permissions**.
- b In the **Groups** window, select the **cloud-api-only** group name and click **Add**.
- c In the **Manage Global Permissions** wizard, select **cloud-api-only** as the Group Permission.
- d For the purpose of this scenario, give the user cloudapi full Read/Write privileges for the following permission types.

Setting	Value
Cloud Permissions	Check all boxes.
DHCP Permissions	Check all boxes except <b>All IPv4 Lease History</b> and <b>All IPv6 Lease History</b> .
DNS Permissions	Check all boxes.
Grid Permissions	Check all boxes.
IPAM Permissions	Check all boxes.

- e Click **Save & Close**.

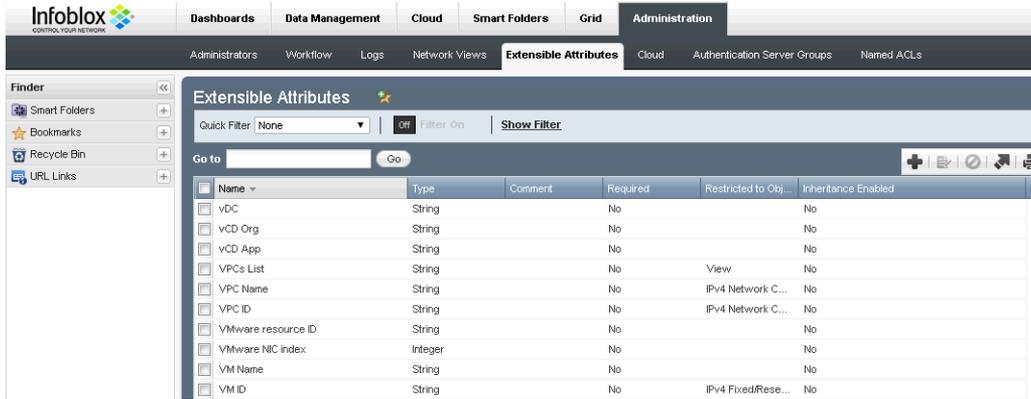
#### 6 Add extensible attributes required for integration with vRealize Automation.

- a Click the **Extensible Attributes** menu.
- b Click the **Add** icon, add the **VMware Resource ID** attribute, and click **Save & Close**.

Setting	Value
Name	VMware resource ID
Type	String

- c Click the **Add** icon, add the **VMware NIC index** attribute, and click **Save & Close**.

Setting	Value
Name	VMware NIC index
Type	Integer



## Integrate the IPAM Plug-in With vRealize Orchestrator in Region A

To integrate the IPAM plug-in with vRealize Orchestrator, you manually add the vNIOS appliance certificates to vRealize Orchestrator, import the vNIOS appliance as a plug-in, and validate the configuration.

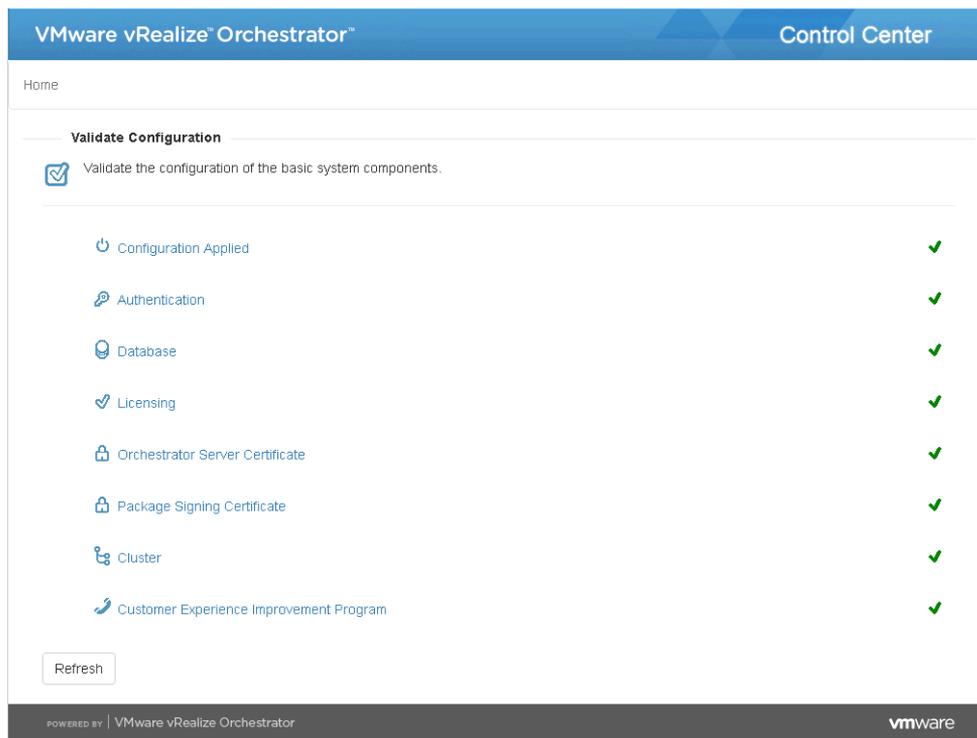
### Procedure

- 1 Log in to the vRealize Orchestrator Control Center.
  - a Open a Web browser and go to <https://vra01vro01a.rainpole.local:8283/vco-controlcenter>.
  - b Log in using the following credentials.

Setting	Value
User name	root
Password	hostA_root_password

- 2 Add the vNIOS appliance certificate to vRealize Orchestrator.
  - a In the **Manage** section, click **Certificates**.
  - b Click **Import** and select **Import from URL**.
  - c Enter the following URL and click **Import**.  
<https://mgmt01vnios01.rainpole.local>
  - d At the confirmation prompt, click **Import** again.
- 3 Upload the vNIOS appliance as a plug-in to vRealize Orchestrator.
  - a Click the **Home** icon.
  - b In the **Plug-ins** section, click **Manage Plug-Ins**.

- c Click **Browse**, select the 011nplugin-ipam.dar file, and click **Install**.
  - d Click **Install** again for confirmation.
- 4 Restart the vRealize Orchestrator server service to apply the new configuration.
- a Click the **Home** icon.
  - b Click **Startup Options** and click **Restart**.
- 5 After the vRealize Orchestrator service reboots, validate the configuration.
- a Click the **Home** icon.
  - b Under **Manager**, click **Validate Configuration** and verify that all check marks are green.



## Register the IPAM Endpoint in vRealize Automation in Region A

You can use vRealize Orchestrator to launch the Infoblox setup wizard. To do so, you connect vRealize Automation and IaaS to Infoblox IPAM, create group properties, and enable an IPAM endpoint in vRealize Automation.

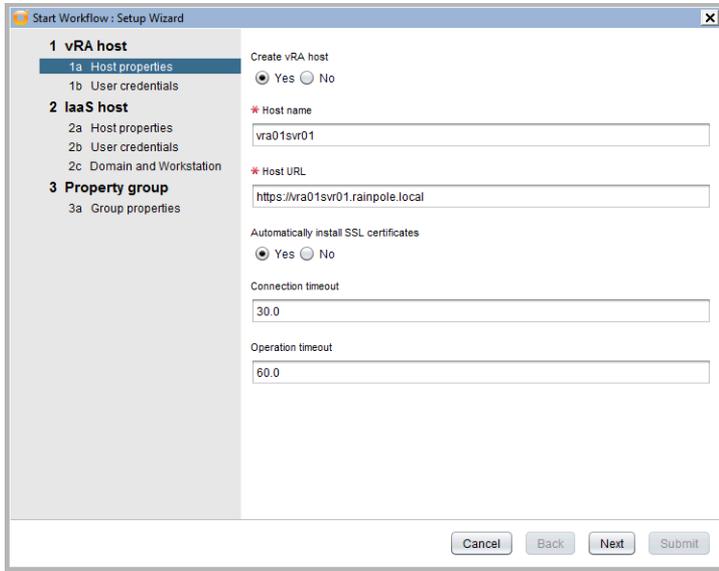
## Procedure

- 1 Log in to vRealize Orchestrator.
  - a Open a Web browser and go to **https://vra01vro01.rainpole.local:8281/vco**.
  - b Click **Start Orchestrator Client**.
  - c In the **VMware vRealize Orchestrator Login** wizard, specify the following credentials and click **Login**.

Setting	Value
Host name	vra01vro01.rainpole.local:8281
User name	svc-vra@rainpole.local
Password	svc-vra_password

- 2 Launch the **Setup Wizard** workflow from vRealize Orchestrator.
  - a In the VMware vRealize Orchestrator window, click the **Workflows** icon.
  - b Go to **svc-vRA@vra01vro01.rainpole.local > Library > Infoblox > vRA > Installation**.
  - c Right click **Setup Wizard** and select **Start Workflow**.
- 3 In **Start Workflow: Setup Wizard**, enter the following properties and user credentials for the **vRA host**.

Setting	Value
Create vRA host	Yes
Host name	vra01svr01
Host URL	https://vra01svr01.rainpole.local
Automatically install SSL certificates	Yes
Connection timeout	Default
Operation timeout	Default



4 Enter the following user credentials and click **Next**.

Setting	Value
Session mode	Shared Session
Tenant	vsphere.local
Authentication username	administrator@vsphere.local
Authentication password	<i>vsphere_admin_password</i>

5 Still in the **Start Workflow: Setup Wizard**, enter the following IaaS host properties for the **IaaS host**.

a Enter the following IaaS host properties and click **Next**.

Setting	Value
Create IaaS host	Yes
Host name	vra01iws01
Host URL	https://vra01iws01.rainpole.local
Automatically install SSL certificates	Yes
Connection timeout	Default
Operation timeout	Default
User proxy	No

b Enter user credentials and click **Next**.

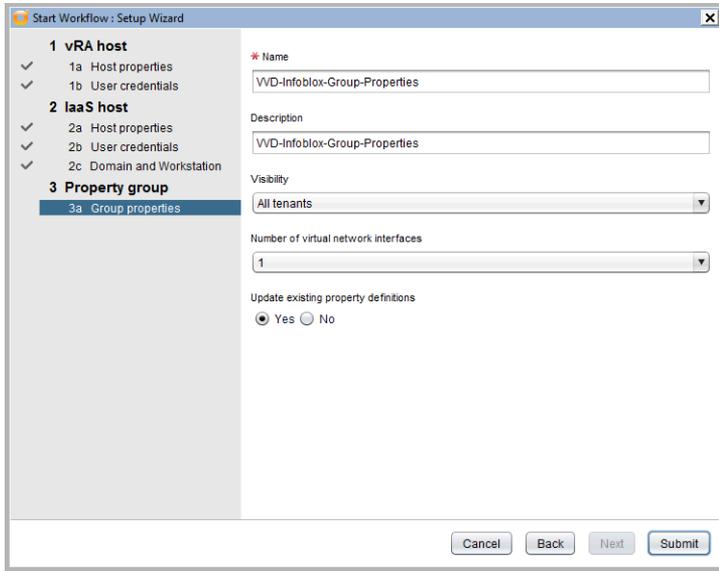
Setting	Value
Host's authentication type	NTLM
Authentication user name	administrator
Authentication password	<i>password for administrator@rainpole.local</i>

c Enter domain and workstation parameters and click **Next**.

Setting	Value
Workstation for NTLM authentication	Leave blank
Domain for NTLM authentication	rainpole.local

6 Still in the **Start Workflow: Setup Wizard**, enter the following **Property group** parameters and click **Submit**.

Setting	Value
Name	VVD-Infoblox-Group-Properties
Description	VVD-Infoblox-Group-Properties
Visibility	All tenants
Number of virtual network interfaces	1
Update existing property definitions	Yes



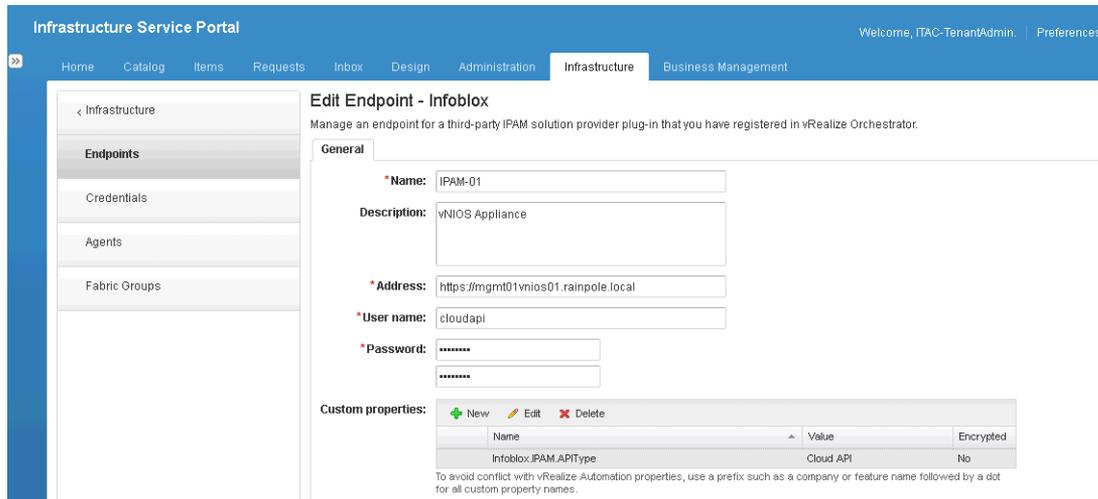
7 Configure an IPAM endpoint in vRealize Automation.

- a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
- b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- c Select **Infrastructure > Endpoints > Endpoints**.
- d Click **New**, select **IPAM** from the drop-down menu, and click **Infoblox**.
- e Enter the following settings and click **OK**.

Setting	Value
Name	IPAM-01
Description	vNIOS Appliance
Address	<a href="https://mgmt01vnios01.rainpole.local">https://mgmt01vnios01.rainpole.local</a>
User name	cloudapi
Password	<i>cloudapi_password</i>
Custom properties	Name - Infoblox.IPAM.APIType Value - Cloud API



## Create Logical Switches in Region A

In the IPAM scenario, you have to create logical switches for the IPAM IP pool. This procedure creates and configures a Production-IPAM-VXLAN logical switch for the Production business group using IPAM.

### Procedure

- 1 Log in to the Compute vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to **https://comp01vc01.sfo01.rainpole.local/vsphere-client**.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Create a logical switch.
  - a Click **Networking & Security**.
  - b In the Navigator, select **Logical Switches**.
  - c From the **NSX Manager** drop-down menu, select **172.16.11.66** as the NSX Manager.

- d Click the **New Logical Switch** icon.
- e In the **New Logical Switch** dialog box, enter the following values, and click **OK**.

Setting	Value
Name	Production-IPAM-VXLAN
Description	Logical switch for Production Business Group using IPAM
Transport Zone	Comp Global Transit Network
Replication Mode	Hybrid
Enable IP Discovery	Selected
Enable MAC Learning	Deselected

- 3 Connect Production-IPAM-VXLAN to the Global Distributed Logical Router.
  - a On the **Logical Switches** page, select the **Production-IPAM-VXLAN** logical switch.
  - b Click the **Connect Edge** icon.
  - c On the **Connect an Edge** page select **SFOCOMP-DLR01** and click **Next**.
  - d On the **Edit NSX Edge Interface** page enter the following settings, click **Next**, and click **Finish**.

Option	Settings
Name	Production-IPAM-VXLAN
Type	Internal
Connectivity Status	Connected
Primary IP Address	192.168.61.1
Subnet Prefix Length	24

## Create External Network Profiles

In the IPAM use case, fabric administrators must create network profiles to define the subnet and routing configuration for virtual machines. Each network profile is configured for a specific network port group or virtual network and specifies the IP address and routing configuration for virtual machines that are provisioned to that network. Members of a business group can request virtual machines.

### Prerequisites

Verify that the logical switches for business groups have been created.

**Procedure**

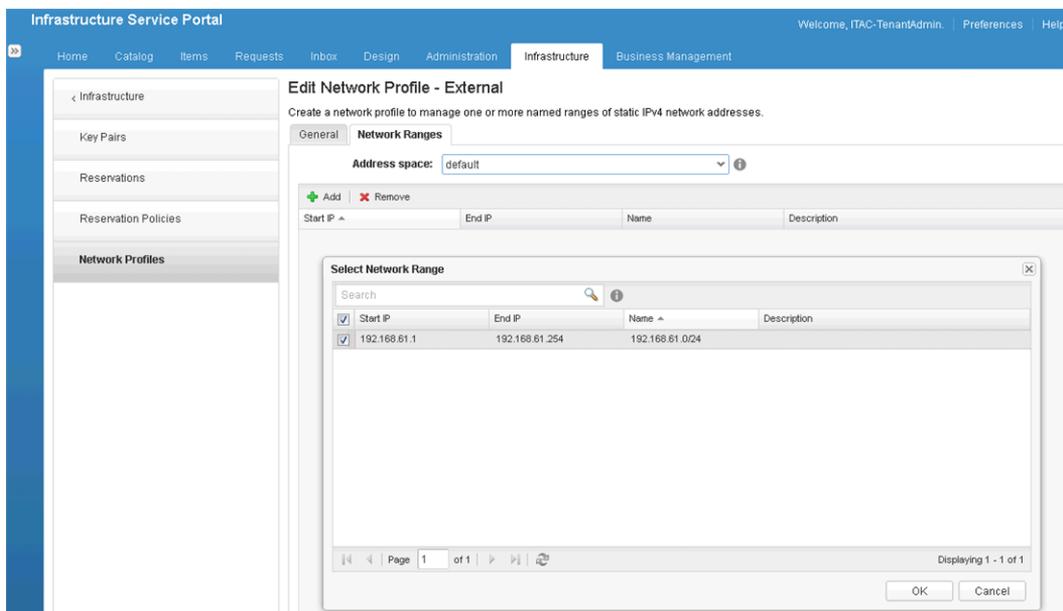
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Network Profiles** and click **New > External**.
- 3 On the **New Network Profile - External** page, add the values for the production group external network profile on the **General** tab.

Setting	Production Value
Name	Ext-Net-Profile-Production-IPAM
Description	External Network profile for Production Business Group using IPAM
IPAM endpoint	IPAM-01

- 4 Click the **Network Ranges** tab and follow these steps.
  - a From the **Address space** drop-down menu, select **default**.
  - b Click **Add**.
  - c In the **Select Network Range** wizard, click on the check box next to the **192.168.61.0/24** network range and click **OK**. If this network range is not displayed, click the refresh icon in the bottom.



- 5 Click **OK** to complete the network profile.

## Modify an Existing Blueprint in Region A to Incorporate IPAM

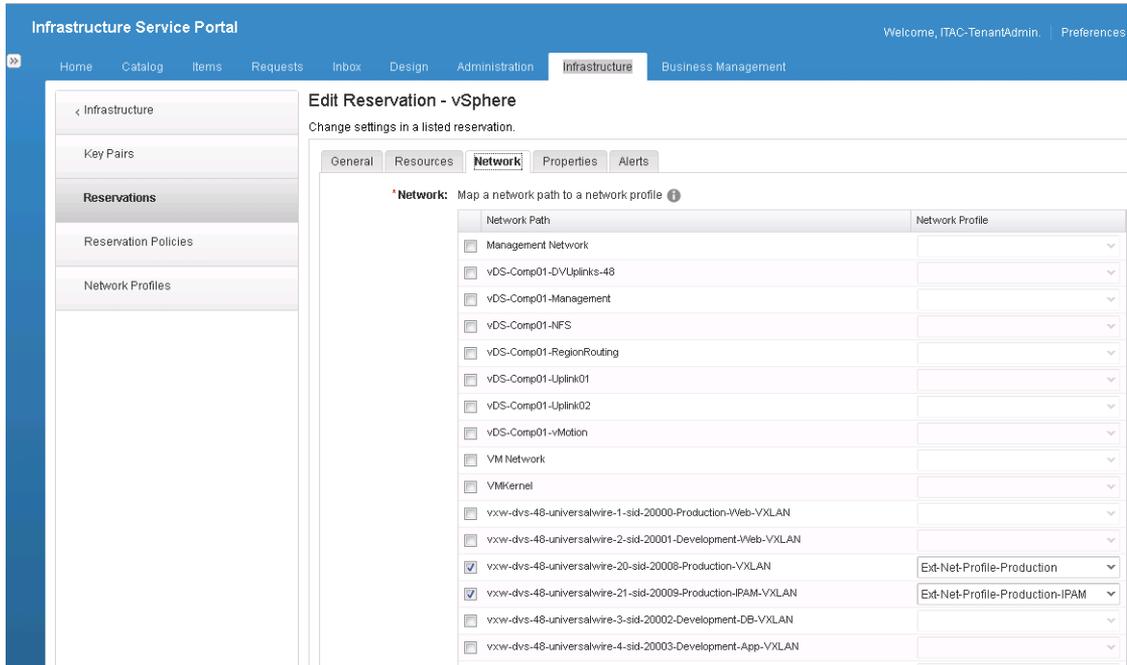
After you integrate the vNIOs appliance with vRealize Automation and perform the required extra configuration, you can modify an existing blueprint to use IPAM.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Modify the existing reservation to use the IPAM network profile.
  - a Navigate to **Infrastructure > Compute Resources > Compute Resources**, hover the mouse over **SFO01-Comp01** and click **Data Collection**.
  - b Under **Inventory**, click **Request Now**.
  - c Navigate to **Infrastructure > Reservations > Reservations** and click **SFO01-Comp01-Prod-Res01**.
  - d On the **Edit Reservation - vSphere** page, click the **Network** tab.
  - e In the **Network Path** column, click the check box for **vxw-dvs-xxxxx-Production-IPAM-VXLAN**.
  - f In the **Network Profile** column, click the drop-down menu and select **Ext-Net-Profile-Production-IPAM**.
  - g Click **OK**.



3 Modify the existing blueprint to use the IPAM network profile, as follows.

Blueprint Name	New network
Windows Server 2012 R2 - SFO Prod	Ext-Net-Profile-Production-IPAM
Redhat Enterprise Linux 6 - SFO Prod	Ext-Net-Profile-Production-IPAM

- Navigate to **Design > Blueprints** and click **Windows Server 2012 R2 - SFO Prod**.
- On the design canvas, click the **ExtNetProfileProd** network.
- In the **General** tab, in the **Existing network** pane, browse to **Ext-Net-Profile-Production-IPAM** and click **Save**.
- On the design canvas, click **vSphere\_Machine**.
- Click the **Properties** tab.
- Under Property Groups, click **Add**, select **VVD-Infoblox-Group-Properties**, and click **Ok**, and click **Finish**.
- Repeat the steps for the second blueprint (Redhat Enterprise Linux 6 - SFO Prod).

## Provision Blueprints in Region A with IPAM and Validate the Blueprints

After you complete all setup tasks, you can provision blueprints and perform some customization. After provisioning is complete, you verify that the naming prefixes and IP addresses are correct.

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to the **Catalog** tab and click **SFO-Service-Catalog**.
- 3 Click **Request** for the blueprint named **Windows Server 2012 R2 - SFO Prod** and, optionally, customize the blueprint.
  - a (Optional) Select **Windows Server 2012 R2 - SFO Prod** and, under **General**, enter value for **Description**, **Reason for Request**, and **Lease days**.
  - b (Optional) Select **vSphere\_Machine\_1** and enter CPU and Memory options under **General**.
  - c (Optional) Select **vSphere\_Machine\_1** and under **Storage**, click **Edit** and select the **Storage Reservation Policy** option available from the drop-down menu.
- 4 Click **Submit** and click **OK**.
- 5 Repeat the steps to deploy a blueprint named **Redhat Enterprise Linux 6 - SFO Prod**.
- 6 Click the **Requests** tab and check the status of the new requests until **Status** is Successful. Provisioning might take some time.
- 7 Validate IP allocation by IPAM.
  - a Open a Web browser and go to <https://mgmt01vnios01.rainpole.local>.
  - b Log in using the user name and password for the vNIOs appliance.

Setting	Value
User name	admin
Password	<i>vnios_admin_password</i>

- c Click the **Cloud** tab and click the **VMs** tab.
  - d Verify that the IP address that is allocated to the newly provision virtual machine is correct.

# Creating Multi-Tier Applications in Region A

# 6

A multi-tier application is any application with more than one layer. The number of layers depends on business and application requirements. A multi-tier application pattern simplifies blueprint authoring for both infrastructure and applications. Application patterns can be used by developers or deployed in mature stages of the release pipeline.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).

This chapter includes the following topics:

- [Create Software Components for the Multi-Tier Application in Region A](#)
- [Prepare for Multi-Tier Application Patterns in Region A](#)
- [Implement Multi-Tier Application Patterns in Region A](#)

## Create Software Components for the Multi-Tier Application in Region A

Software components are the building blocks of a software provisioning process that is executed by software installation agents. vRealize Automation configures software component dynamically with prespecified input parameters and scripts. Software architects, IaaS architects, and application architects can then customize and publish the software components to assemble application blueprints.

## Install the vRealize Automation Application Authoring Agent in Region A

You can install the Application Authoring Agent on any template that you want to leverage through the vRealize Automation design canvas. The Authoring Agent enables you to leverage the software component aspects of vRealize Automation.

**Procedure**

- 1 Log in to the vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc01.sfo01.rainpole.local/vsphere-client`
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

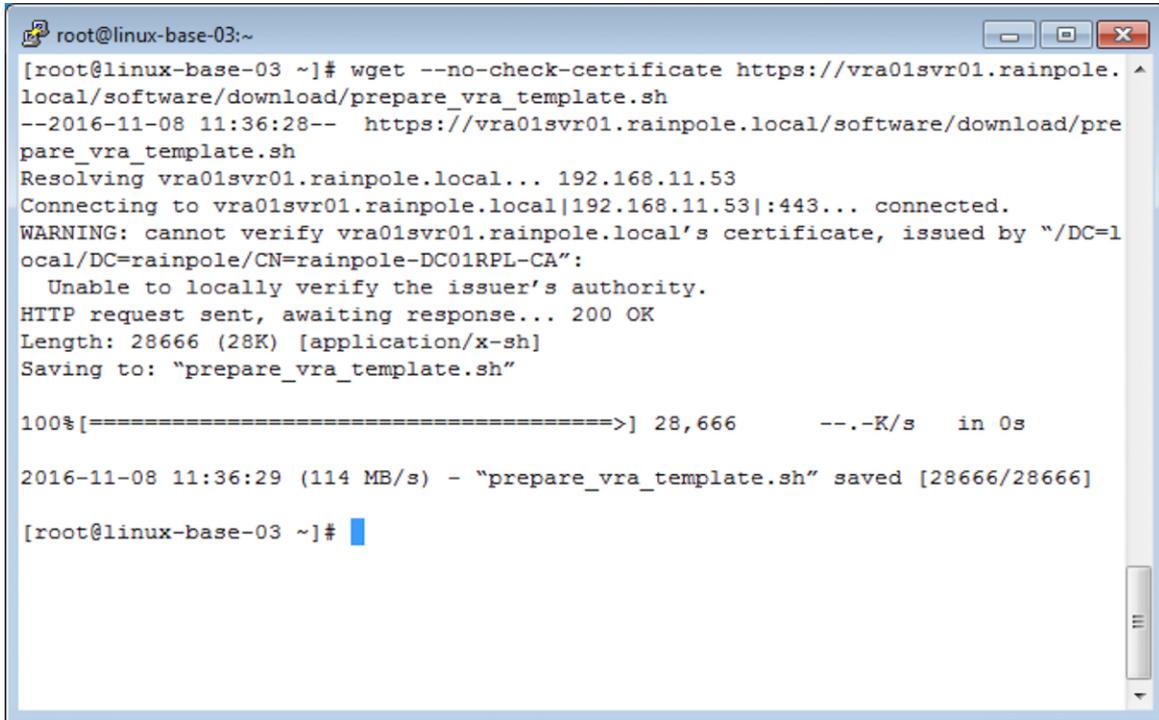
- 2 Right-click the **linux-base-03** virtual machine and power on the virtual machine.
- 3 Open a Secure Shell (SSH) prompt and log in to the virtual machine as the root user.
- 4 Install **wget** on the virtual machine.

```
yum install wget
```

If the yum command does not work, make sure that the virtual machine can ping a live site on the Internet.

- 5 Download the installation script from your vRealize Automation virtual appliance by running the following command.

```
wget --no-check-certificate  
https://vra01svr01.rainpole.local/software/download/prepare_vra_template.sh
```

A terminal window titled 'root@linux-base-03:~' showing the execution of the 'wget' command. The command is 'wget --no-check-certificate https://vra01svr01.rainpole.local/software/download/prepare\_vra\_template.sh'. The output shows the file being resolved to 192.168.11.53, connected to port 443, and a warning about the certificate. The file is successfully downloaded as 'prepare\_vra\_template.sh' with a size of 28,666 bytes. The terminal prompt returns to the root user.

```
root@linux-base-03:~  
[root@linux-base-03 ~]# wget --no-check-certificate https://vra01svr01.rainpole.  
local/software/download/prepare_vra_template.sh  
--2016-11-08 11:36:28-- https://vra01svr01.rainpole.local/software/download/pre  
pare_vra_template.sh  
Resolving vra01svr01.rainpole.local... 192.168.11.53  
Connecting to vra01svr01.rainpole.local|192.168.11.53|:443... connected.  
WARNING: cannot verify vra01svr01.rainpole.local's certificate, issued by "/DC=l  
ocal/DC=rainpole/CN=rainpole-DC01RPL-CA":  
  Unable to locally verify the issuer's authority.  
HTTP request sent, awaiting response... 200 OK  
Length: 28666 (28K) [application/x-sh]  
Saving to: "prepare_vra_template.sh"  
  
100%[=====>] 28,666      --.-K/s   in 0s  
  
2016-11-08 11:36:29 (114 MB/s) - "prepare_vra_template.sh" saved [28666/28666]  
  
[root@linux-base-03 ~]#
```

- 6 Make the `prepare_vra_template.sh` script executable by running the following command.

```
chmod +x prepare_vra_template.sh
```

- 7 Run the `prepare_vra_template.sh` installer script.

```
./prepare_vra_template.sh
```

```

root@linux-base-03:~
#####
# Executing a series of 'Pre-flight' checks #
# to make sure environment can support the script #
#####

#####
# 'Pre-flight' checks complete #
#####

vRealize
Automation
Agent Installer

Cloud Provider: (default=vsphere, vca, vcd, ec2, ):

```

8 Follow the prompts to complete the installation.

Prompt	Response
CloudProvider	vsphere
vRealize Appliance	vra01svr01.rainpole.local
Manager Service Server	vra01ims01a.rainpole.local
Do you accept this for the Manager Service (yes/no)?	yes
Do you accept this for the vRealize Appliance (yes/no)?	yes
Timeout	300
Java	y
Start the installation?	y

```

root@linux-base-03:~
#####
Architecture: 64-bit
#####
# Determining Linux Distro and version number #
#####
Distro is RHEL/CentOS
This distro is detected to have closest compatibility with: rhel64

#####
# Here are the current settings:
#
# vRealize Appliance Server IP:          vra01svr01.rainpole.local
# Manager Service Server IP:           vra01lms01a.rainpole.local
# Cloud provider:                       vsphere
# Check Certificates:                   false
# Download timeout:                     300
# Architecture:                         64
# Linux Distro*:                        rhel64
# Install Java 1.8.0_102:               true
# * This may be an approximation (e.g. CentOS/Redhat both show up as 'RHEL')
#####
Would you like to start the installation? [Y/n]:

```

You see a confirmation message when the installation completes successfully.

```

root@linux-base-04:~
#####
# Registering vRealize Automation Agent with Manager Service Server #
#####
/opt/vmware-appdirector/agent-bootstrap/vra_register.sh -m vra01lms01a.rainpole.local -M 443 -c vsphere
-f E7:19:9A:89:D0:45:0A:2B:47:A3:3A:4A:E1:73:0A:11:79:0A:4B:6D
Executing /usr/share/gugent/installgugent.sh vra01lms01a.rainpole.local:443 ssl vsphere ...
Creating /usr/share/gugent/cert.pem ...
Note that the vRA server vra01lms01a.rainpole.local:443 must be accessible from here.
RSA key fingerprint is E7:19:9A:89:D0:45:0A:2B:47:A3:3A:4A:E1:73:0A:11:79:0A:4B:6D.
Finished. Manager Service host key added to Guest Agent configuration.

Successfully registered vRealize Automation Agent to Manager Service Server

#####
# Checking that Service is Installed #
#####

vrm-agent service is installed: vrm-agent      0:off  1:off  2:off  3:on   4:off  5:on   6:off

#####
# Cleaning up /tmp/vmAgentInstaller
#####

#####
# Installation Completed Successfully #
# Ready to capture as a template #
#####

[root@linux-base-04 ~]#

```

- 9 If you see an error message and logs in the console, resolve the errors and run the installer script again.
- 10 When installation is complete, shut down the virtual machine and take a snapshot named **Application Authoring Snap** of the virtual machine.

## Run Inventory Collection in Region A

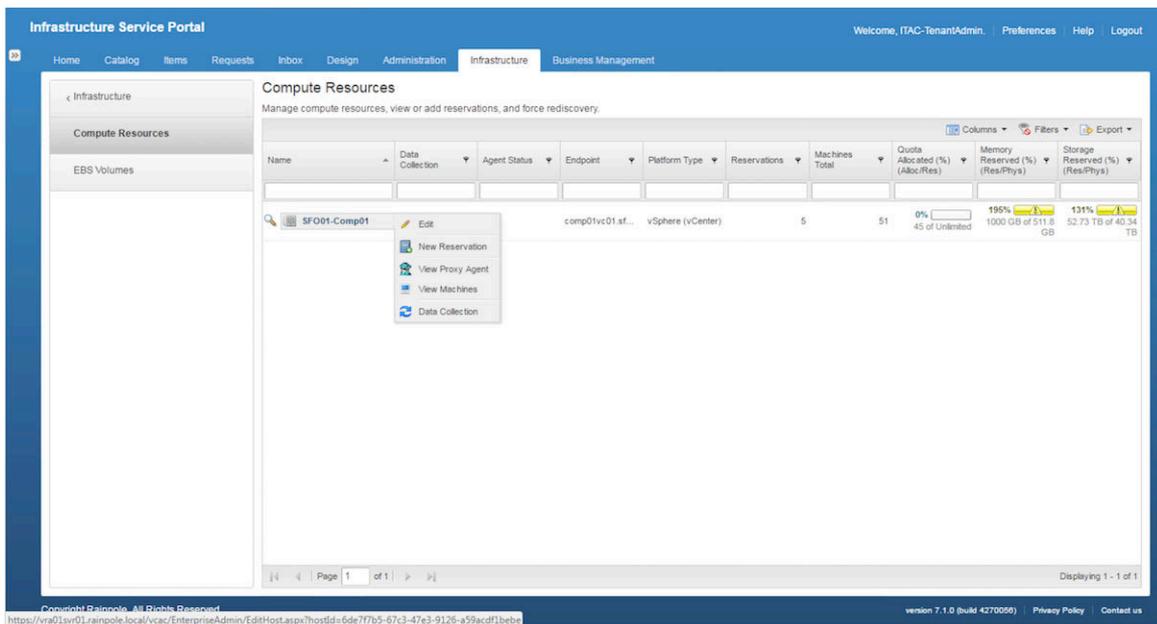
Before you build software components for your multi-tier application, run a cluster inventory collection to ensure that the snapshot that you created earlier is available for use.

### Procedure

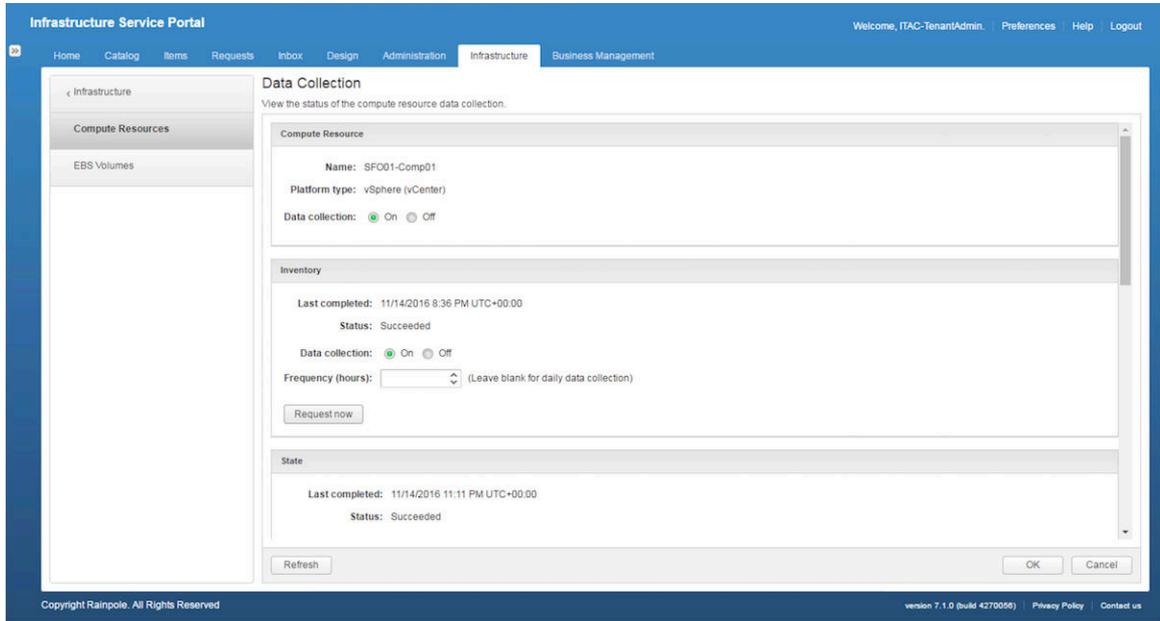
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole.**
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Go to **Infrastructure > Compute Resources > Compute Resources.**
- 3 Hover over **SFO01-Comp01** and select **Data Collection.**



- 4 Click **Request Now** in the **Inventory** pane.



- 5 Click **Refresh** to refresh the collection status until the inventory status shows Succeeded.
- 6 Click **OK**.

## Create the Apache Software Component in Region A

Before you can create multi-tier application patterns, you have to create the software components. This task creates a service that installs and configures an Apache web server on a Linux virtual machine.

### Procedure

- 1 Navigate to **Design > Software Components**.
- 2 Click **New** to create a new service.
- 3 Under **General**, enter the following values.

Setting	Value
Name	Apache Service
Description	Install and configure Apache Service on Linux systems.
Container	Machine

- 4 Click **Next** on the **Properties** page.

- 5 Set the actions for this service in the **Actions** pane.
  - a In the **Install** row, select **Bash** as the Script Type.

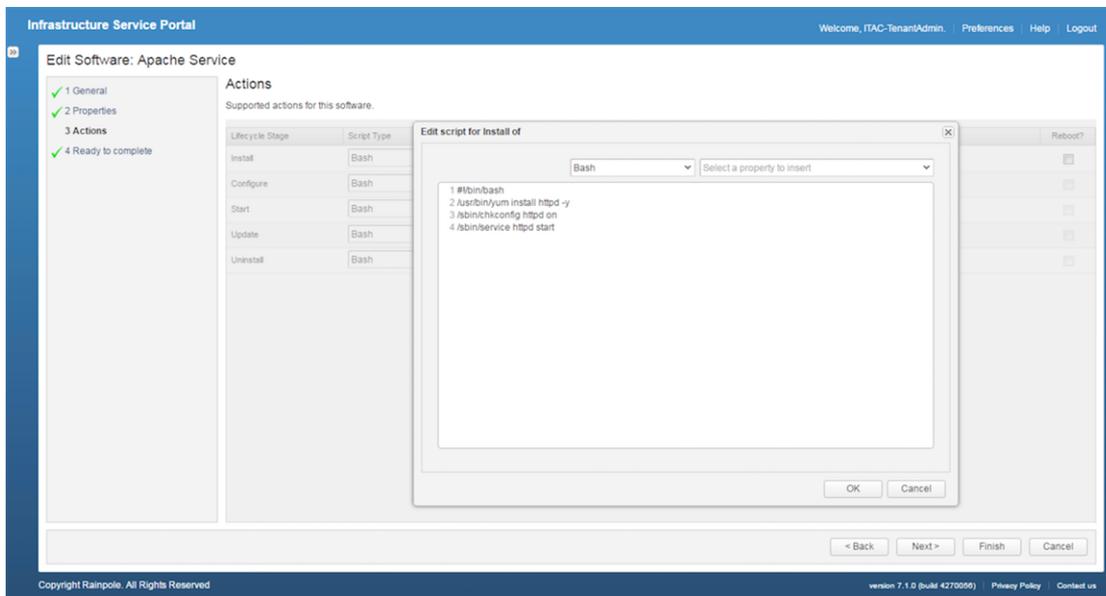
Actions

Supported actions for this software.

Lifecycle Stage	Script Type	Script	Reboot?
Install	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Configure	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Start	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Update	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Uninstall	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>

- b Still in the **Install** row, select **Click Here to edit** and paste the following code into the **Edit Script** text box.

```
#!/bin/bash
/usr/bin/yum install httpd -y
/sbin/chkconfig httpd on
/sbin/service httpd start
```



- 6 Click **Next** and click **Finish**.
- 7 Select the new service and click **Publish**.

## Create a MySQL Software Component in Region A

A multi-tier application pattern might require a database. This task creates a service that installs and configures a MySQL server on a Linux virtual machine.

**Procedure**

- 1 Click **New** to create a new software component.
- 2 Under **General** enter the following values and click **Next**.

Setting	Value
Name	MySQL
Description	MySQL Service Installation and Configuration
Container	Machine

- 3 Under Properties click **New**, enter the following values, click **OK**, and then click **Next**.

Setting	Value
Name	dbpassword
Description	Root Password
Type	String
Value	gogo123
Encrypted	Yes
Overridable	Yes
Required	No
Computed	No

**Properties**

Specify properties for this software.

<span style="color: green;">+</span> New <span style="color: orange;">✎</span> Edit <span style="color: red;">✖</span> Delete						
Name	Description	Type	Value	Encrypted	Overridable	Required
dbpassword	Root Password	Secure String	*****	Yes	Yes	No

- 4 Click **OK** and then **Next**.

- 5 Set the actions for this service in the **Actions** pane.
  - a In the **Install** row, select **Bash** as the Script Type.

Actions

Supported actions for this software.

Lifecycle Stage	Script Type	Script	Reboot?
Install	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Configure	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Start	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Update	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>
Uninstall	Bash	<a href="#">Click here to edit.</a>	<input type="checkbox"/>

- b Still in the **Install** row, select **Click Here to edit** and paste the following code into the **Edit Script** text box.

```
#!/bin/bash
/usr/bin/yum install mysql-server mysql-client -y
/sbin/chkconfig mysqld on
/sbin/service mysqld start
```

- c In the **Configure** row, select **Click here to Edit** and paste the following code into the text box.

```
#!/bin/bash
/usr/bin/mysql -e "UPDATE mysql.user SET Password=PASSWORD('$dbpassword') WHERE User='root';"
/usr/bin/mysql -e "DELETE FROM mysql.user WHERE User='';"
/usr/bin/mysql -e "DROP DATABASE test;"
/usr/bin/mysql -e "FLUSH PRIVILEGES;"
```

- 6 Click **Next** and click **Finish**.
- 7 Select the new **MySQL** service and click **Publish**.

## Create a PHP Software Component in Region A

A multi-tier application pattern might require a PHP component. This task creates a service that installs and runs a PHP service on a Linux virtual machine.

### Procedure

- 1 Click **New** to create a new service.
- 2 Under **General**, enter the following values.

Setting	Value
Name	PHP Service
Description	Add PHP Service
Container	Machine

- 3 Click **Next** to skip the **Properties** pane.

- 4 Set the actions for this service in the **Actions** pane.
  - a In the **Install** row, select **Bash** as the Script Type.
  - b Still in the **Install** row, select **Click Here to edit** paste the following code into the **Edit Script** text box.

```
#!/bin/bash
/usr/bin/yum install php php-mysql mysql-client -y
```

- c In **Start** row, select **Click here to Edit** and paste the following code into the **Edit Script** text box.

```
#!/bin/bash
/sbin/service httpd restart
```

- d Click **OK**.

**Actions**

Supported actions for this software.

Lifecycle Stage	Script Type	Script	Reboot?
Install	Bash	#!/bin/bash /usr/bin/yum install php php-mysql mysql-client -y	<input type="checkbox"/>
Configure	Bash	<a href="#">Click here to edit</a>	<input type="checkbox"/>
Start	Bash	#!/bin/bash /sbin/service httpd restart	<input type="checkbox"/>
Update	Bash	<a href="#">Click here to edit</a>	<input type="checkbox"/>
Uninstall	Bash	<a href="#">Click here to edit</a>	<input type="checkbox"/>

- 5 Click **Next** and click **Finish**.
- 6 Select the new service and click **Publish**.

## Create a System Configuration Software Component in Region A

A multi-tier application pattern might require a system configuration component. This task creates a standalone service that can disable and stop IP tables and IPv6 tables.

### Procedure

- 1 Click **New** to create a new service.
- 2 Under **General** enter the following values.

Setting	Value
Name	System Configuration
Description	Linux System Level Configuration
Container	Machine

- 3 Click **Next** to skip the **Properties** page.

- 4 Set the actions for this service in the **Actions** pane.
  - a In the **Install** row, select **Bash** as the Script Type.
  - b Still in the **Install** row, select **Click Here to edit**, paste the following code into the **Edit Script** text box, and click **OK**.

```
#!/bin/bash
/sbin/chkconfig iptables off
/sbin/chkconfig ip6tables off
/sbin/service iptables stop
/sbin/service ip6tables stop
```

- 5 Click **Next** and click **Finish**.
- 6 Select the new service and click **Publish**.

## Create a Wordpress Database Software Component in Region A

A multi-tier application pattern might require a Wordpress database. This task creates a service that creates the Wordpress database inside the MySQL component.

### Procedure

- 1 Click **New** to create a new service.
- 2 Under **General** enter the following values and click **Next**.

Setting	Value
Name	Wordpress Database
Description	Create Wordpress Database on MySQL
Container	MySQL

- 3 Under **Properties**, click **New** and enter the following values.

Setting	Value
Name	dbpassword
Description	Root Password
Type	String
Value	gogo123
Encryped	Yes
Overridable	Yes
Required	No
Computed	No

- 4 Click **OK**.

- 5 Under **Properties**, click **New** again and enter the following values.

Setting	Value
Name	dbuser
Description	Root User
Type	String
Value	root
Encrypted	No
Overridable	Yes
Required	No
Computed	No

- 6 Click **OK** and click **Next**.

- 7 Set the actions for this service in the **Actions** pane.

- In the **Install** row, select **Bash** as the Script Type.
- Still in the **Install** row, select **Click Here to edit** paste the following code into the **Edit Script** text box, and click **OK**.

```
/usr/bin/mysql -e "CREATE DATABASE wordpress;" --user=$dbuser --password=$dbpassword
/usr/bin/mysql -e "CREATE USER 'wordpressuser'@'%';" --user=$dbuser --password=$dbpassword
/usr/bin/mysql -e "SET PASSWORD FOR 'wordpressuser'@'%'=PASSWORD('$dbpassword');" --user=
$dbuser --password=$dbpassword
/usr/bin/mysql -e "GRANT ALL PRIVILEGES ON wordpress.* TO 'wordpressuser'@'% ' IDENTIFIED BY
'$dbpassword';" --user=$dbuser --password=$dbpassword
/usr/bin/mysql -e "FLUSH PRIVILEGES;" --user=$dbuser --password=$dbpassword
```

- 8 Click **Next** and click **Finish**.

- 9 Select the new service and click **Publish**.

## Create a Wordpress Service Software Component in Region A

A multi-tier application pattern might require a Wordpress service. This task creates a service that installs a Wordpress application inside the Apache component.

### Procedure

- Click **New** to create a new service.
- Under **General**, enter the following values and click **Next**.

Setting	Value
Name	Wordpress Service
Description	Install and configure Wordpress services inside the Apache service.
Container	Apache Service

- 3 Under **Properties**, click **New** to add a property for the Wordpress user.

Setting	Value
Name	WP_DB_USER
Type	String
Value	wordpressuser
Encrypted	No
Overridable	Yes
Required	No
Computed	No

- 4 Under **Properties** click **New** to add a property for the Wordpress password.

Setting	Value
Name	WP_DB_PASSWORD
Type	String
Value	gogo123
Encrypted	Yes
Overridable	Yes
Required	No
Computed	No

- 5 Under **Properties** click **New** to add a property for the Wordpress database.

Setting	Value
Name	WP_DB_NAME
Type	String
Value	wordpress
Encrypted	No
Overridable	Yes
Required	No
Computed	No

- 6 Under **Properties** click **New** to add a property for the Wordpress database host.

Setting	Value
Name	WP_DB_HOST
Type	String
Value	localhost
Encrypted	No
Overridable	Yes

Setting	Value
Required	No
Computed	No

7 Click **Next**.

8 Set the actions for this service in the **Actions** pane.

- a In the **Install** row, select **Bash** as the Script Type.
- b Still in the **Install** row, select **Click Here to edit**, paste the following code into the **Edit Script** text box, and click **OK**.

```
#!/bin/bash
cd /tmp
/usr/bin/wget http://wordpress.org/latest.tar.gz --output-document=/tmp/latest.tar.gz
/bin/tar -xzf /tmp/latest.tar.gz
mv /tmp/wordpress/* /var/www/html/
```

- c In **Configure** lifecycle row, click **Click here to Edit** and paste the following script fragment.

```
#!/bin/bash
cp /var/www/html/wp-config-sample.php /var/www/html/wp-config.php
/bin/sed -i "s/database_name_here/$WP_DB_NAME/g" /var/www/html/wp-config.php
/bin/sed -i "s/username_here/$WP_DB_USER/g" /var/www/html/wp-config.php
/bin/sed -i "s/password_here/$WP_DB_PASSWORD/g" /var/www/html/wp-config.php
/bin/sed -i "s/localhost/$WP_DB_HOST/g" /var/www/html/wp-config.php
```

9 Click **OK**, click **Next** and click **Finish**.

10 Select the new service and click **Publish**.

## Prepare for Multi-Tier Application Patterns in Region A

Before you can deploy a multi-tier application using vRealize Automation converged blueprints, you have to prepare for it.

A multi-tier application pattern does not require two regions.

However, if you are setting up a dual region setup, you repeat these tasks twice to create converged blueprints for Region A and Region B. You must substitute IP addresses, 192.168.101.x becomes 192.168.102.x, 172.16.x.x becomes 172.17.x.x and the DNS sfo01.rainpole.local becomes lax01.rainpole.local.

## Create a Routed Network Profile for the Multi-Tier Web Application in Region A

Before members of a business group can request virtual machines, fabric administrators must create network profiles to define the subnet and routing configuration for those virtual machines. Each network profile is configured for a specific network port group or virtual network to specify IP address and routing configuration for virtual machines provisioned to that network.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Network Policies**, and click **New > Routed**.
- 3 On the **General** tab, on the **New Network Profile - Routed** page, enter the following values for the profile that you are creating.

Setting	Value
Name	Routed Multi-Tier Web App
Description	Routed Network profile used for the Multi-Tier Web Application
External network profile	Ext-Net-Profile-Production
Subnet mask	255.255.255.0
Range subnet mask	255.255.255.248
Base IP	192.168.70.1

- 4 On the **DNS** tab, enter the following values for the profile that you are creating.

Setting	Value
Primary DNS	172.16.11.5
Secondary DNS	172.16.11.4
DNS suffix	rainpole.local
DNS search suffix	rainpole.local

- 5 Click the **IP Ranges** tab and click **Generate Ranges**.
- 6 Go back to the **General** tab and click **OK**.

## Modify Reservations for Use by the Global Transport Zone in Region A

When tenant administrators and business group managers create a new blueprint, the option to add a reservation policy becomes available. To add a reservation policy to an existing blueprint, you must edit the blueprint.

Repeat this procedure to create reservations for all of the reservations listed in the following table.

Reservation	Network Path	Network Profile	Transport Zone	Routed Gateways Name	Routed Gateways Network Profile
SFO01-Comp01-Prod-Res01	Global Transit Network	Ext-Net-Profile-Production	Comp Global Transport Zone	SFOCOMP-DLR01	Ext-Net-Profile-Production
SFO01-Edge01-Prod-Res01	Global Transit Network	Ext-Net-Profile-Production	Comp Global Transport Zone	SFOCOMP-DLR01	Ext-Net-Profile-Production

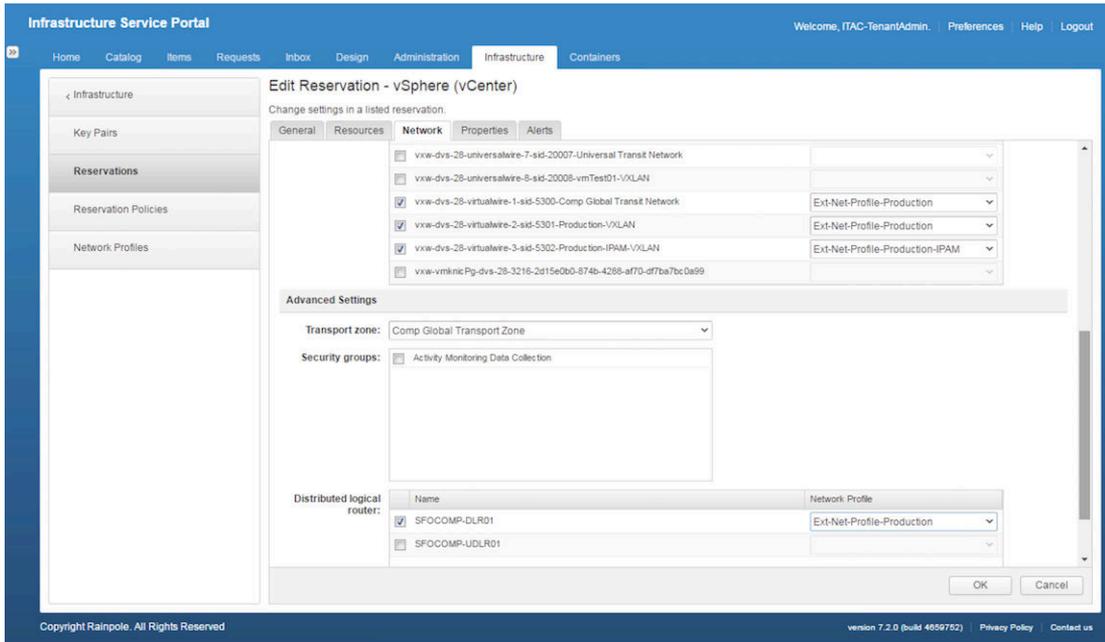
### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservations**.
  - a Select the **SFO01-Comp01-Prod-Res01** reservation policy and click **Edit**.
  - b Click the **Network** tab.
  - c In the **Network** section, select the **vxw-dvs-xxx-virtualwire-1-sid-xxx-Global Transit Network** check box for **Network Path**, and select **Ext-Net-Profile-Production** as the **Network Profile**.
  - d In the **Advanced Settings** section, select **Comp Global Transport Zone** from the **Transport Zone** drop-down menu

- e Select the **SFOCOMP-DLR01** check box for Routed gateways.
- f Select **Ext-Net-Profile-Production** from the **Network Profile** drop-down menu.



- 3 Click **OK**.
- 4 Repeat this procedure to modify the remaining reservations.

## Create a Service Catalog for Converged Blueprints in Region A

In the multi-tier application scenario, the service catalog provides a common interface for users of IT services. Users can request and manage the services and resources they need. Users can browse the catalog to request services, track their requests, and manage their provisioned service items.

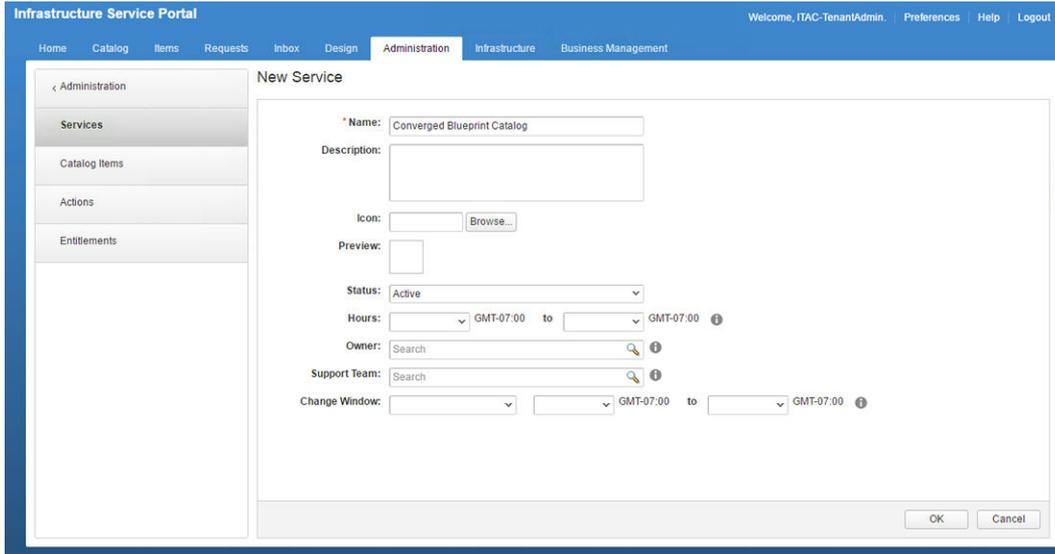
After the service catalog is created, business group managers can create entitlements for services, catalog items, and resource actions to groups of users. The entitlement allows members of a business group, for example, the Production business group, to use the blueprint. Without an entitlement, users cannot use the blueprint.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Click the **Administration** tab, and select **Catalog Management > Services**.
- 3 Click **New** and make the following changes in the **New Service** dialog box.
  - a Enter **Converged Blueprint Catalog** in the **Name** text box.
  - b Select **Active** from the **Status** drop-down menu.
  - c Click **OK**.



## Create Entitlements for the Converged Blueprint Catalog in Region A

You add a service, catalog item, or action to an entitlement to enable the users and groups identified in the entitlement to request provisionable items from the service catalog. An entitlement allows members of a particular business group (for example, the Production business group) to use the blueprint. Without the entitlement, users cannot use the blueprint.

Perform this procedure to create the following entitlements for the Production business group.

Entitlement Name	Status	Business Group	User & Group
Prod-ConvergedBlueprint-Entitlement	Active	Production	ug-ITAC-TenantAdmins

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Click the **Administration** tab, and click **Catalog Management > Entitlement**.
- 3 Click **New**.

The **New Entitlement** page appears.

- 4 On the **New Entitlement** page, select the **Details** tab, configure the following values, and click **Next**.

Setting	Production Value
Name	Prod-ConvergedBlueprint-Entitlement
Description	Default setting (blank)
Expiration Date	Default setting (blank)
Status	Active
Business Group	Production
Users & Groups	ug-ITAC-TenantAdmins

New Entitlement

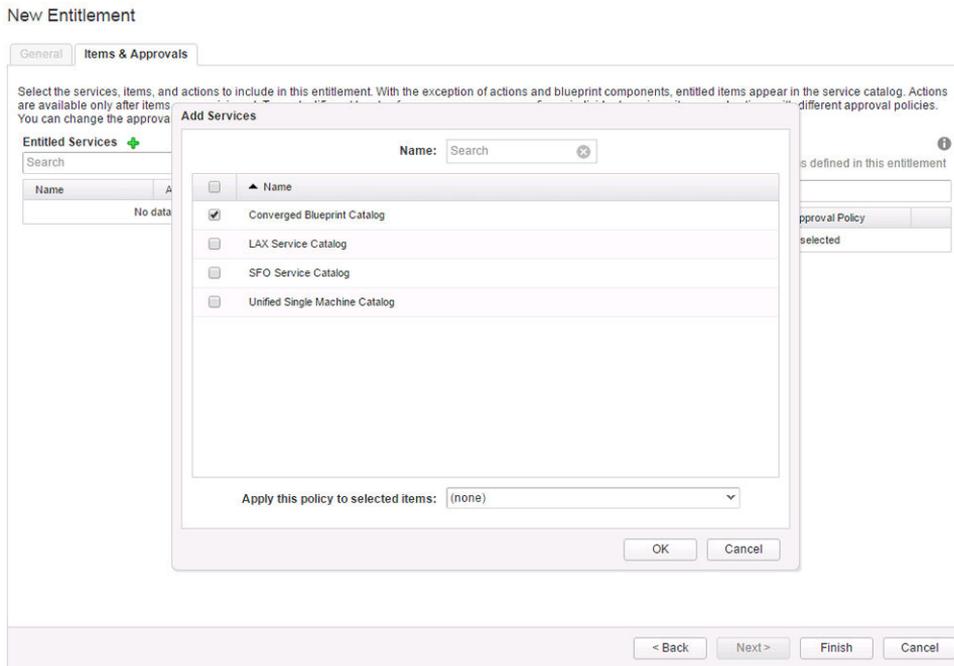
The screenshot shows the 'New Entitlement' configuration interface. It has two tabs: 'General' and 'Items & Approvals'. The 'General' tab is selected. On the left, there are several fields:
 

- Name:** A text box containing 'Prod-ConvergedBlueprint-Entitlement'.
- Description:** A large empty text area.
- Expiration Date:** A date picker with a calendar icon.
- Status:** A dropdown menu set to 'Active'.
- Business Group:** A dropdown menu set to 'Production'.

 On the right, there is a section titled 'Users & Groups' with a search bar and a list of users/groups. The list contains one entry: 'ug-ITAC-TenantAdmins (ug-ITAC-TenantAdmins@rainpole.local)', which is highlighted.

5 Click the **Items & Approvals** tab.

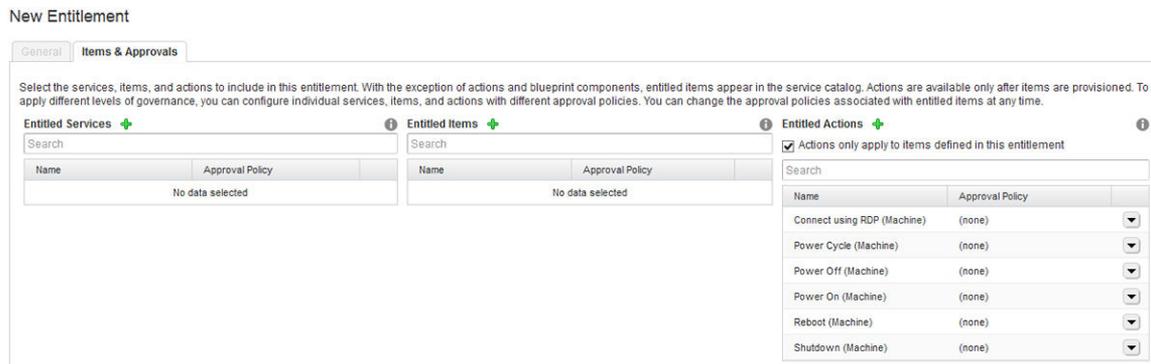
- a On the **Entitled Services** page click the **Add** icon.
- b Select the **Converged Blueprint Catalog** checkbox and click **OK**.



c Click the **Add Action** icon on the **Entitlement Actions** page, and add the following Entitled Actions.

- Power Cycle (Machine)
- Power Off (Machine)
- Power On (Machine)
- Reboot (Machine)
- Shutdown (Machine)

d Click **Finish**.



## Implement Multi-Tier Application Patterns in Region A

The implementation of a multi-tier application includes creation of multi-tier and multi-node blueprints and addition of dependencies and property bindings between components.

### Configure the Web Tier Blueprint in Region A

When you configure the blueprint for the Web tier of the application, you specify the NSX settings, build settings, and other attributes of the blueprint.

#### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Click **New**.
- 4 On the **General** tab of the **New Blueprint** dialog box, configure the following settings.

Setting	Value
Name	Multi-Tier Web App
Archive (days)	15
Minimum	30
Maximum	270

- 5 Click the **NSX Settings** tab and configure the following settings.

Setting	Value
Transport zone	Global Transport Zone
Routed gateway reservation policy	SFO-Edge-Policy

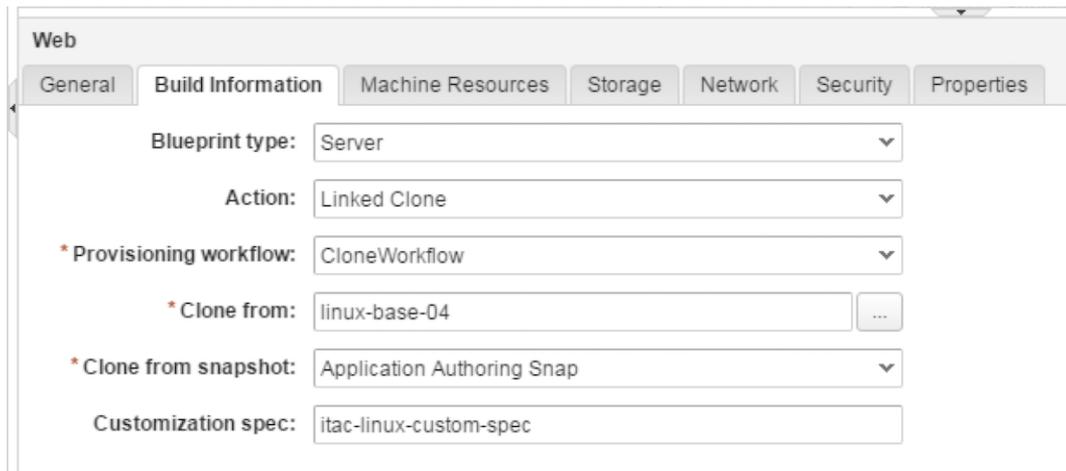
- 6 Click **OK**.
- 7 In the **New Blueprint** design canvas, click **Machine Types** under **Categories**.
- 8 Select and drag the **vSphere Machine** icon to the design canvas.

9 On the **General** tab, configure the following settings, and click **Save**.

Setting	Value
ID	Web
Reservation Policy	SFO-Production-Policy
Machine Prefix	Default setting
Instances	Minimum: 2 Maximum: 4

10 Click the **Build Information** tab, configure the following settings, and click **Save**.

Setting	Value
Blueprint Type	Server
Action	Linked Clone
Provisioning Workflow	CloneWorkflow
Clone from	linux-base-03
Clone from snapshot	Application Authoring Snap
Customization spec	itac-linux-custom-spec



11 Click the **Machine Resources** tab, configure the following settings, and click **Save**.

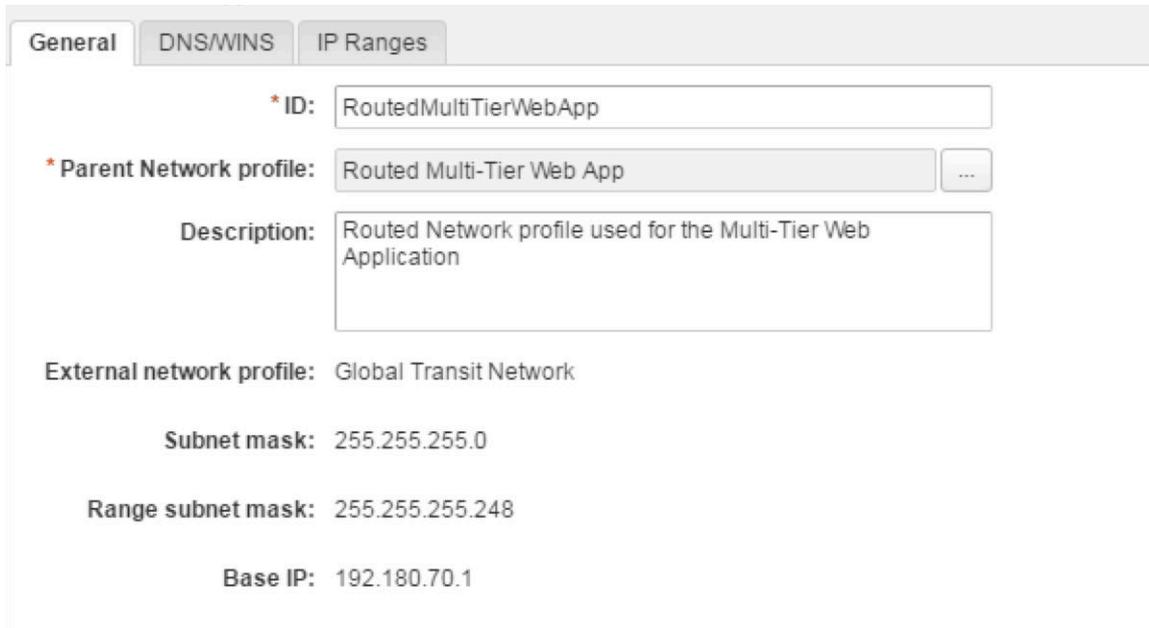
Setting	Minimum	Maximum
CPU	1	4
Memory (MB)	4096	16384
Storage	72	80



12 Click **Network & Security** under **Categories**.

13 Select and drag the **On-Demand Routed Network** icon to the design canvas.

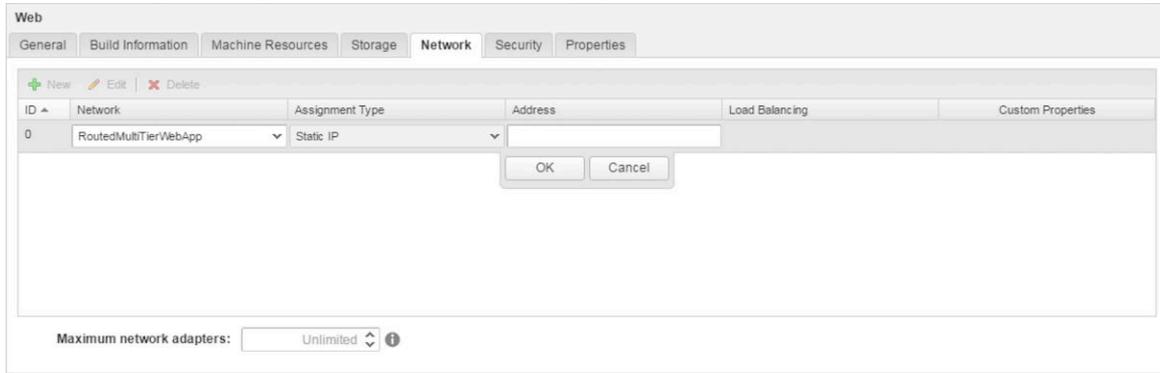
14 On the **General** tab, select the **Routed Multi-Tier Web App** for **Parent Network profile**.



15 Select the **vSphere\_machine** icon of the Web tier on the **design canvas**.

16 Select the **Network** tab, click **New**, configure the following settings, and click **OK**.

Setting	Value
Network	RoutedMultiTierWebApp
Assignment Type	Static IP
Address	Default setting (blank)



17 Click **Save**.

## Configure Load Balancing for the Web Tier in Region A

Load balancers distribute work among servers in high-availability deployments. You configure the services in the Web application to distribute network traffic across the application in a load-balanced fashion.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Select the **Multi-Tier Web App** blueprint and click **Edit**.
- 4 Click **Network & Security** under **Categories**.
- 5 Select and drag the **On-Demand Load Balancer** icon to the **Design Canvas**.

6 On the **General** tab, make the following changes.

a Specify the following settings.

Setting	Value
ID	Web-Tier-Load-Balancer
VIP Network	RoutedMultiTierWebApp
Machine	Web
IP Address	Default setting (blank)
NIC	0:RoutedMultiTierWebApp

b Under **Services to load balance**, select the **HTTP**, **HTTPS**, and **TCP** check boxes to enable load balancing.

The screenshot shows the configuration interface for a 'Web-Tier-Load-Balancer'. Under the 'General' tab, the following settings are visible:

- ID: Web-Tier-Load-Balancer
- VIP Network: RoutedMultiTierWebApp
- Machine: Web
- IP Address: (blank)
- NIC: 0:RoutedMultiTierWebApp

Under the 'Services to load balance' section, there is a table with the following data:

Name	Port	Health Check Interval (sec)	Response Timeout (sec)	Health Threshold (sec)	Unhealth Threshold (sec)
HTTP	80	5	5	5	10
HTTPS	443	5	5	5	10
TCP	8080	5	5	5	10

Below the table, there is a field for 'URL for HTTP Service:' which is currently empty.

7 Click **Save**.

## Configure the Database Tier Blueprint in Region A

When you configure the blueprint for the database tier, you specify the build information, machine information, and network settings.

### Procedure

1 Log in to the vRealize Automation Rainpole portal.

a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.

b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

2 Navigate to **Design > Blueprints**.

3 Select the **Multi-Tier Web App** blueprint and click **Edit**.

- 4 Click **Machine Types** under **Categories**.
- 5 On the **General** tab, configure the following settings, and click **Save**.

Setting	Value
ID	Database
Reservation Policy	SFO-Production-Policy
Machine Prefix	Default setting
Instances	Minimum: 1 Maximum: 1

- 6 Click the **Build Information** tab, configure the following settings, and click **Save**.

Setting	Value
Blueprint Type	Server
Action	Linked Clone
Provisioning Workflow	CloneWorkflow
Clone from	linux-base-03
Clone from snapshot	Application Authoring Snap
Customization spec	itac-linux-custom-spec

- 7 Click the **Machine Resources** tab, configure the following settings, and click **Save**.

Setting	Minimum	Maximum
CPU	1	4
Memory (MB):	4096	16384
Storage	72	80

- 8 Select the **Network** tab, click **New**, configure the following settings, and click **OK**.

Setting	Value
Network	RoutedMultiTierWebApp
Assignment Type	Static IP
Address	Default setting (blank)

- 9 Click **Save**.

## Add Software Components to a Blueprint in Region A

To add configured and published software components to a blueprint in your multi-tier scenario, you can drag drop the software components to a blueprint.

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Select the **Multi-Tier Web App** blueprint and click **Edit**.
- 4 In the **Categories** area of the design canvas, select **Software Components**.
- 5 Drag the **System Configuration** software component onto both the **Web** vSphere machine and the **Database** vSphere machine.

The System Configuration component is now available on both the Web and Database virtual machines that you create using this blueprint. The System Configuration component has a machine dependency and can therefore be directly placed on the vSphere machine.

- 6 Drag the **Apache Service** onto the **Web** vSphere Machine.

The Apache Service component is now available on all the Web virtual machines that you create with this blueprint. The Apache component has a machine dependency and can therefore be directly placed on the vSphere machine.

- 7 Drag the **MySQL** software component onto the **Database** vSphere Machine.

The MySQL component is now available on Database virtual machines that you create with this blueprint. The MySQL component has a machine dependency and can therefore be directly placed on the vSphere machine.

- 8 Drag the **PHP Service** onto the **Web** vSphere Machine and position it *below* the Apache Service.

The PHP Service component is now available on all the Web virtual machines that you create with this blueprint. The associated script is on the same virtual machines as the Apache Service script.

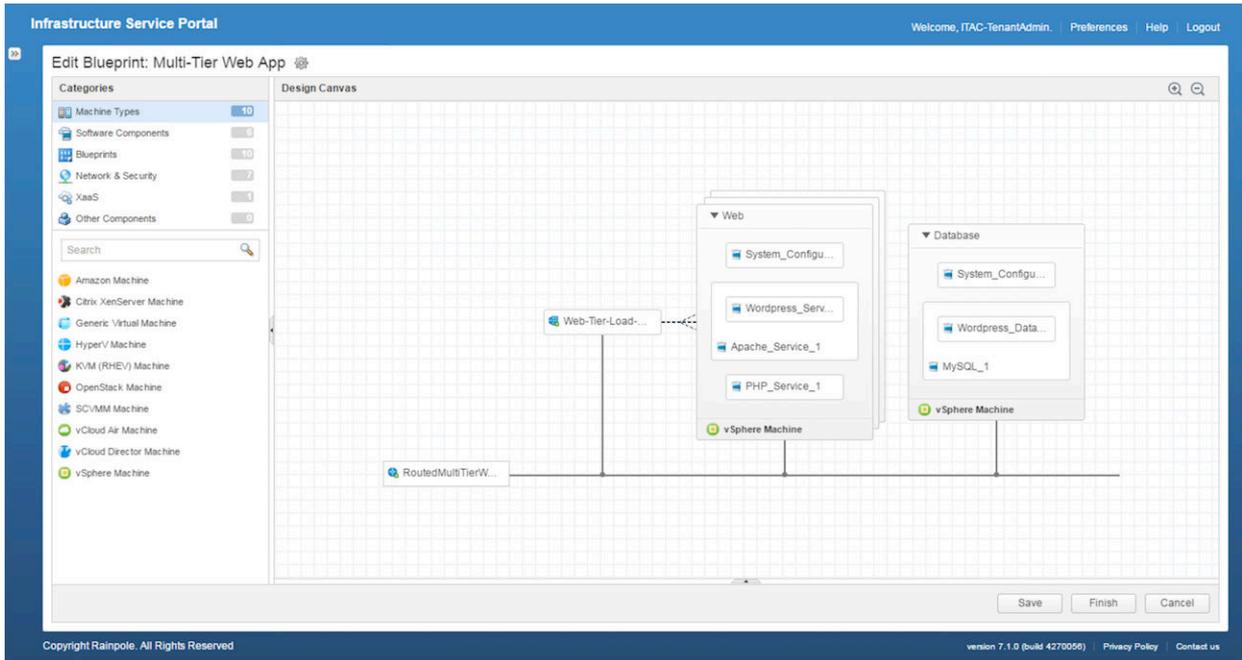
- 9 Drag the **Wordpress Database** inside the **MySQL** software component within the **Database** vSphere Machine.

The Wordpress Database component is now available on the Database virtual machines that you create with this blueprint. The Wordpress Database has a database parent dependency on MySQL. It is therefore placed inside the MySQL software component.

- 10 Drag the **Wordpress Service** inside the **Apache Service** within the **Web** vSphere Machine.

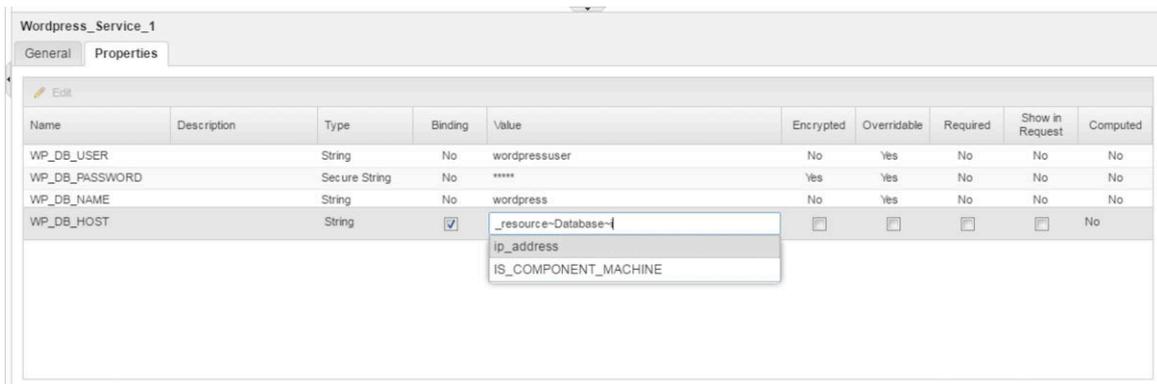
The Wordpress Service component is now available on Web virtual machines that you create with this blueprint. The Wordpress Service has a parent dependency on Apache Service and is therefore placed inside the Apache Service software component.

- 11 Select the **Wordpress Service** software component inside the **Apache Service** software component



- 12 Click the **Properties** tab, select **WP\_DB\_HOST**, and then click **Edit**.

- 13 Click the **Binding** check box, change the WP\_DB\_HOST value to **\_resource~Database~ip\_address**, and click **Save**.



## Configure Dependencies Between Application Components in Region A

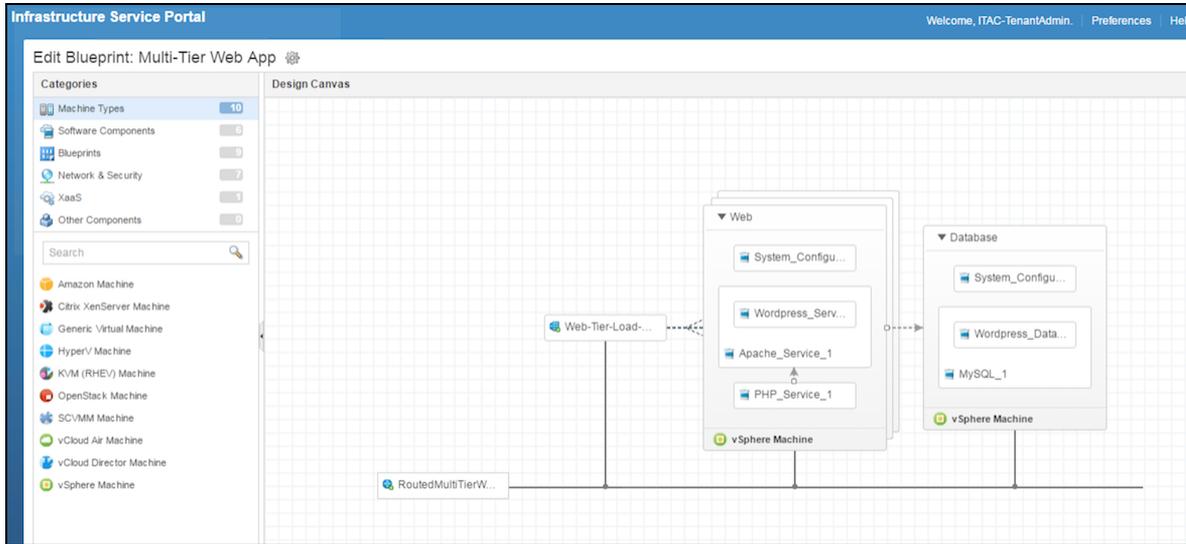
To account for dependencies between application components, you configure the blueprint to stagger the build process. You perform that configuration by mapping the dependencies directly on the design canvas.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Select the **Multi-Tier Web App** blueprint and click **Edit**.
- 4 Create two dependency lines.
  - a Hover over the upper left corner of the **Web tier** icon on the canvas until the blue circle appears and click and drag the dependency indicator to the edge of **Database tier icon**.  
A dotted dependency line appears.
  - b Hover over the **PHP Service** on the canvas until the blue circle appears, click and drag the dependency indicator to the edge of **Apache Service**.  
A short line appears. You have to add this dependency because you can only run a single yum process at a time while creating the software components. The dependency helps align the creation of software components in order and bind related components.
- 5 Click **Finish**.  
This saves the blueprint you have configured for use with the Web application.



## Publish the Multi-Tier Blueprint in Region A

You publish a blueprint to provision a virtual machine. You can then check that the blueprint meets all requirements.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Select the blueprint **Multi-Tier Web App** and click **Publish**.
- 4 Navigate to **Administration > Catalog Management > Catalog Items** and add the blueprint to the **Converged Blueprint** catalog.
  - a In the **Catalog Items** list, click the blueprint labelled **Multi-Tier Web App**.
  - b In the **Configure Catalog Items** dialog box, set **Service** to **Converged Blueprint Catalog**, and click **OK**.

Infrastructure Service Portal

Welcome, ITAC-TenantAdmin. Preferences Help Logout

Home Catalog Items Requests Inbox Design Administration Infrastructure Business Management

Administration Services Catalog Items Actions Entitlements

### Configure Catalog Item

General Entitlements

Name: Region A 3Tier Web App  
Source: Blueprint Service  
Resource type: Deployment

Description:

Icon:  Browse...  
Recommended size: 100 x 100 pixels

Preview List view Catalog view Detail view

Status: Active  
Quota: Unlimited  
Service: Converged Blueprint Catalog

New and noteworthy

OK Cancel

# Configuring Micro-Segmentation for Multi-Tier Applications in Region A

# 7

Micro-Segmentation can make the data center network more secure by isolating related groups of virtual machines onto a distinct logical network segment. You can use the Distributed Firewall (DFW) component of VMware NSX to implement micro-segmentation. Administrators can then separate traffic that is traveling from one segment of the data center to another (east-west traffic) by using firewalls. Distributed firewalls prevent attackers from moving laterally in the data center.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Chapter 6 Creating Multi-Tier Applications in Region A](#).

This chapter includes the following topics:

- [Creating NSX Security Policies in Region A](#)
- [Create a Working Web Application Blueprint in Region A](#)
- [Create Distributed Firewall Rules for the Security Policies in Region A](#)

## Creating NSX Security Policies in Region A

Before you can use NSX security policies in your multi-tier application scenario, you have to create the policies. This scenario uses a Web Server policy, Database Server policy, Application Server policy, and Default Web Application policy.

**Procedure**

1 Log in to the Compute vCenter Server by using the vSphere Web Client.

- a Open a Web browser and go to **`https://comp01vc01.sfo01.rainpole.local/vsphere-client`**
- b Log in using the following credentials.

Options	Description
User name	administrator@vsphere.local
Password	vsphere_admin_password

2 From the vCenter home screen, select **Networking & Security**

3 On the left panel, select **Service Composer**

4 In the main panel, select the **Security Policies** tab

5 Choose the **NSX Manager** for the Edge/Compute cluster from the drop down list.

6 Configure the security policy for the Web server.

- a Select the **Create Security Policy** icon, a small yellow document with a green plus.
- b Specify the name **Web Server Policy** and click **Finish**.

7 Configure the security policy for the database server.

- a Select the **Create Security Policy** icon, a small yellow document with a green plus.
- b Specify the name **Database Server Policy** and click **Finish..**

8 Configure the security policy for the application server.

- a Select the **Create Security Policy** icon, a small yellow document with a green plus.
- b Specify the name **Application Server Policy** and click **Finish**.

9 Configure the security policy for all servers in the Web application.

- a Select the **Create Security Policy** icon, a small yellow document with a green plus.
- b Specify the name **Default Web Application Policy** and click **Finish..**

10 Log in to the vRealize Automation Rainpole portal.

- a Open a Web browser and go to **`https://vra01svr01.rainpole.local/vcac/org/rainpole`**.
- b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

11 Go to **Infrastructure > Compute Resources > Compute Resources**.

- 12 Hover over SFO01-Comp01, select **Data Collection**, and scroll to the bottom of the **Data Collection** screen.
- 13 Under **Network and Security Inventory** click **Request now**.
- 14 Click **Refresh** at the bottom of the screen until the inventory status shows Succeeded and click **OK**.

## Create a Working Web Application Blueprint in Region A

After you create the security policies for your scenario, you can apply them to a multi-tier Web application. You copy an existing blueprint and add the security groups to the blueprint.

In this task, you copy a blueprint that is created in [Chapter 6 Creating Multi-Tier Applications in Region A](#). You can instead create a blueprint from scratch, and apply security policies to that blueprint.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to the **Design** tab and select the Multi-Tier Web App blueprint that is created in [Chapter 6 Creating Multi-Tier Applications in Region A](#).
- 3 Click **Copy** and enter the following information.

Name	Multi-Tier Web App - DFW
Description	Multi-tier Web application deployment protected by VMware NSX Micro-Segmentation

- 4 Click **OK** and click **Save** to save the blueprint
- 5 Add security groups to the Wordpress blueprint
  - a Select **Network & Security** under **Categories**.
  - b Drag the **On-Demand** security group to the design canvas.
  - c Repeat this step two more times for a total of three On-Demand groups.
- 6 Configure the Web\_Tier\_Group security group
  - a Click on the first **On-Demand** security group
  - b Under **General**, enter **Web\_Tier\_Group** in the **ID** text field

- c Under **Security Policies**, click **Add**.
  - d Select **Web Server Policy** and **Default Web Application Policy** and click **OK**.
- 7 Configure the DB\_Tier\_Group security group
- a Click on the second On-Demand security group.
  - b Under **General**, enter **DB\_Tier\_Group** in the **ID** text field
  - c Under **Security Policies**, click **Add**.
  - d Select **Database Server Policy** and **Default Web Application Policy** and click **OK**.
- 8 Configure the App\_Tier\_Group security group
- a Click on the third On-Demand security group
  - b Under **General**, enter **App\_Tier\_Group** in the **ID** text field.
  - c Under **Security Policies**, click **Add**.
  - d Select **Application Server Policy** and click **OK**.
- 9 Assign virtual machines to security groups
- a Click the Web vSphere Machine type in the design canvas.
  - b Click the **Security** tab.
  - c Select **Web\_Tier\_Group** and **App\_Tier\_Group** because both the web tier and the app tier are installed in the same virtual machines and click **Save**.
  - d Click on the Database vSphere Machine type in the design canvas.
  - e Click the **Security** tab
  - f Select **DB\_Tier\_Group**, click **Save**, and click **Finish**.
- 10 Publish the multi-tier blueprint.
- a Select **Multi-Tier Web App - DFW** and click **Publish**.
  - b Navigate to **Administration > Catalog Management > Catalog Items**.
  - c In the **Catalog Items** list, click the blueprint labelled **Multi-Tier Web App - DFW**.
  - d In the **Configure Catalog Items** dialog box, set Service to Converged Blueprint Catalog, and click **OK**.

## Create Distributed Firewall Rules for the Security Policies in Region A

After you have applied the security policies to the blueprint in your scenario, you can create the distributed firewalls and associate them with the security policies. Distributed firewall rules allow only network traffic that is required by the web application, thus making the environment more secure.

By default all incoming and outgoing traffic is blocked. For installing software packages and for other special situations, you can open ports. The scenarios in this guide use yum and wget. This task opens ports for HTTP, HTTPS, and DNS-UDP for looking up a proxy server and the port for connecting to the proxy server. Your firewall rule depends entirely on your environment.

### Procedure

- 1 Log in to the Compute vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to **https://comp01vc01.sfo01.rainpole.local/vsphere-client**.
  - b Log in using the following credentials.

Options	Description
User Name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 From the vCenter home screen, select **Networking & Security**.
- 3 On the left panel, select **Service Composer**.
- 4 In the main panel, select the **Security Policies** tab.
- 5 Choose the NSX Manager for the Compute/Edge cluster from the drop down list
- 6 Create firewall rules for the **Default Web Application Policy**.
  - a Right-click **Default Web Application Policy** and click **Edit**.
  - b Expand **Advanced options** and change **Weight** to 300.
  - c Click **Firewall Rules** in the left panel.
  - d Click the **Add** icon, and add a firewall rule with following values, and click **OK**.

Name	Allow outgoing http and https
Description/Comments	Allow outgoing http and https so we can install software with yum
Action	Allow
Source	Policy's Security Groups
Destination	Any
Service	HTTP, HTTPS, DNS-UDP

- e Click the **Add** icon, add a firewall rule with the following values, and click **OK**.

Name	Block all incoming traffic
Action	Block
Source	Any
Destination	Policy's Security Groups
Service	Any

- f Click the **Add** icon, add a firewall rule with the following values, click **OK**, and click **Finish**.

Name	Block all outgoing traffic
Action	Block
Source	Policy's Security Groups
Destination	Any
Service	Any

**7** Create firewall rules for the Application Server Policy

- a Right-click **Application Server Policy** and click **Edit**.
- b Click **Firewall Rules** in the left panel
- c Click the **Add** icon to add a firewall rule with the following values.

Name	Allow outgoing MySQL
Service	MySQL

- d Click **OK** and click **Finish**.

**8** Create firewall rules for the Database Server Policy.

- a Right-click **Database Server Policy** and click **Edit**.
- b Click **Firewall Rules** in the left panel.
- c Click the **Add** icon to add a firewall rule with the following values.

Name	Allow intra-group MySQL
Destination	Policy's Security Groups
Service	MySQL

- d Click **OK** and click **Finish**.

**9** Create firewall rules for the Web Server Policy

- a Right-click **Web Server Policy** and click **Edit**.
- b Click **Firewall Rules** in the left panel.

- c Click the **Add** icon to add a firewall rule with the following values and click **OK**.

Name	Block Internal Web
Action	Block
Destination	Policy's Security Groups
Service	HTTP, HTTPS

- d Click the **Add** icon to add another firewall rule with following information, click **OK**, and click **Finish**.

Name	Allow incoming Web
Source	Any
Destination	Policy's Security Groups
Service	HTTP, HTTPS

- e Click **OK** and click **Finish**.

# Managing Virtual Machine Lease and Ownership in Region A



VMware vRealize Automation supports several workflows for changing virtual machine ownership and lease. This includes changing the lease and ownership by changing the entitlement on a blueprint, changing lease and ownership on a provisioned virtual machine, and extending the lease of a provisioned virtual machine.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#)

This chapter includes the following topics:

- [Configure Lease and Ownership on the Blueprint in Region A](#)
- [Set a Lease and Change the Ownership of the Provisioned Machine in Region A](#)
- [Extend the Lease of a Provisioned Machine in Region A](#)

## Configure Lease and Ownership on the Blueprint in Region A

As a tenant administrator, you can set up a blueprint with Owner and Lease entitled actions. The users you associate with the entitlement can then change the lease and ownership of the provisioned VMs.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Settings	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select the **Administration** tab and navigate to **Catalog Management > Entitlement**.
- 3 In the **Entitlements** pane, select **Prod-SingleVM-Entitlement** and click **Edit**.
- 4 Type **Change Owner** in the **Entitled Actions** text box and select **Change Owner (Deployment)** from the drop-down menu.
- 5 Type **Change Lease** in the **Entitled Actions** text box and select **Change Lease (Deployment)** from the drop-down menu.
- 6 Click **Finish**.

## Set a Lease and Change the Ownership of the Provisioned Machine in Region A

As a business group manager, you can request an entitled virtual machine and configure the provisioned machine. After configuration, you can set the lease and change the ownership of the virtual machine to one of the business users.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Settings	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Click **Items** tab and under **Deployments** select the **Windows Server 2012 R2 - SFO Prod-xxx** virtual machine.
- 3 Select **Change Lease** from the **Actions** menu.
- 4 In the **Change Lease** dialog box, set the lease expiration date and time, click **Submit**, and click **OK**.

- 5 Select **Change Owner** from the **Actions** menu.
- 6 In the **Change Owner** dialog box, type **architect** in the **New Owner** text box and click the search glass, select **ITAC-TenantArchitect**, click **Submit**, and click **OK**.

The ITAC-TenantArchitect is now the owner of that virtual machine.

## Extend the Lease of a Provisioned Machine in Region A

As a business user, you can extend the lease of a provisioned machine.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Settings	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Click the **Items** tab and under **Deployments** select the **Windows Server 2012 R2 - SFO Prod-xxx** virtual machine.
- 3 Select **Change Lease** from the **Actions** menu.
- 4 In the **Change Lease** dialog box, set the lease expiration date and time, click **Submit**, and click **OK**.

# Modeling and Monitoring Cost with vRealize Business in Region A

## 9

vRealize Business is an IT financial management tool that provides transparency and control over the costs and quality of IT services, enabling alignment with the business and acceleration of IT transformation. This scenario explains how to set up a cost model.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

---

**Note** You have to select one strategy, per-blueprint pricing or per-reservation pricing. If you later want to change strategy, you reset the cost model. Decide on the strategy before setting up the cost model.

---

### Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#)
- 2 Install vRealize Business and integrate it with vRealize Automation

This chapter includes the following topics:

- [Set up Pricing on a Per-Blueprint Basis in Region A](#)
- [Set Up Pricing on a Per-Reservation Basis in Region A](#)

## Set up Pricing on a Per-Blueprint Basis in Region A

As a business management administrator, you can set up a cost model for a blueprint and monitor the cost. Every machine that is deployed using the blueprint is assigned the cost that is predefined in the blueprint. You can set up the cost model to charge customers on a per-blueprint basis.

### Prerequisites

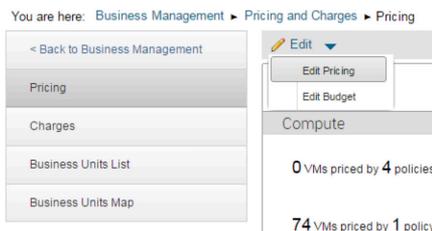
If you set up pricing on a per-blueprint basis, you must create a single-machine blueprint first.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Select the **Business Management** tab and, under **Consumption**, select **Pricing and Charges > Pricing**.
- 3 Select **Edit > Edit Pricing**.



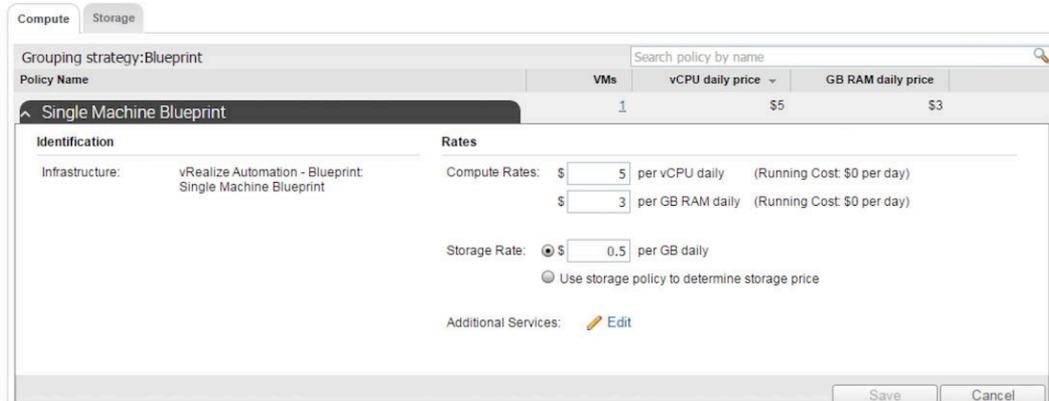
- 4 Under **vRealize Automation**, click the pencil icon to edit



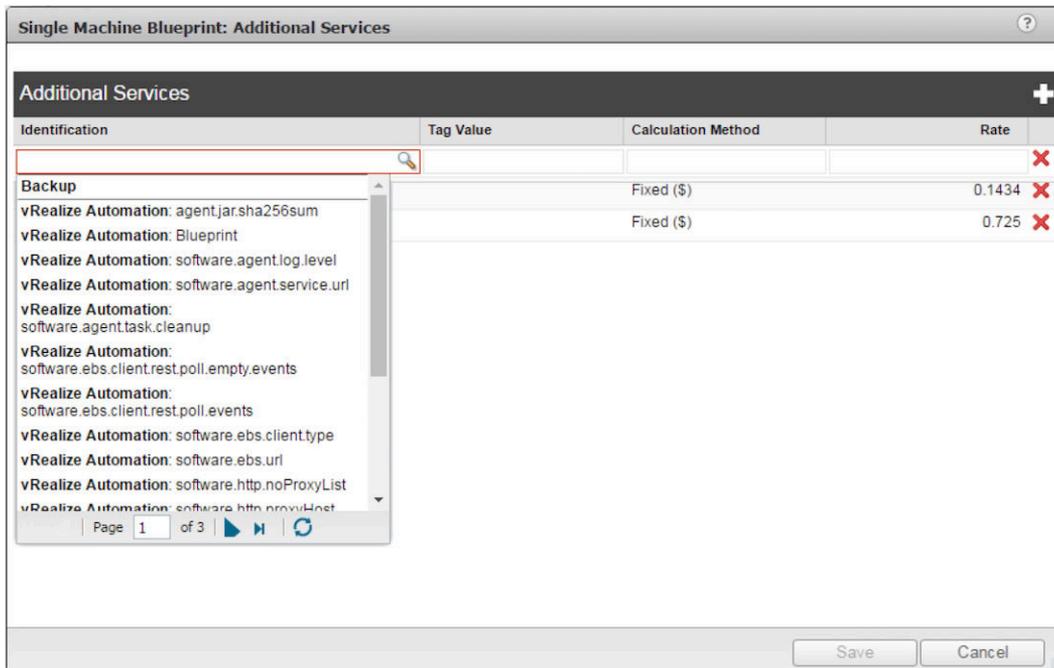
- 5 Among the price grouping strategy, select **vRealize Automation Blueprint** as the **Compute grouping strategy** and click **Save**.



- 6 Set pricing for the Compute Rates for vCPU and per GB RAM and Storage Rates.



7 Under **Additional Services**, click **Edit** and select a service with its associated preset rate.

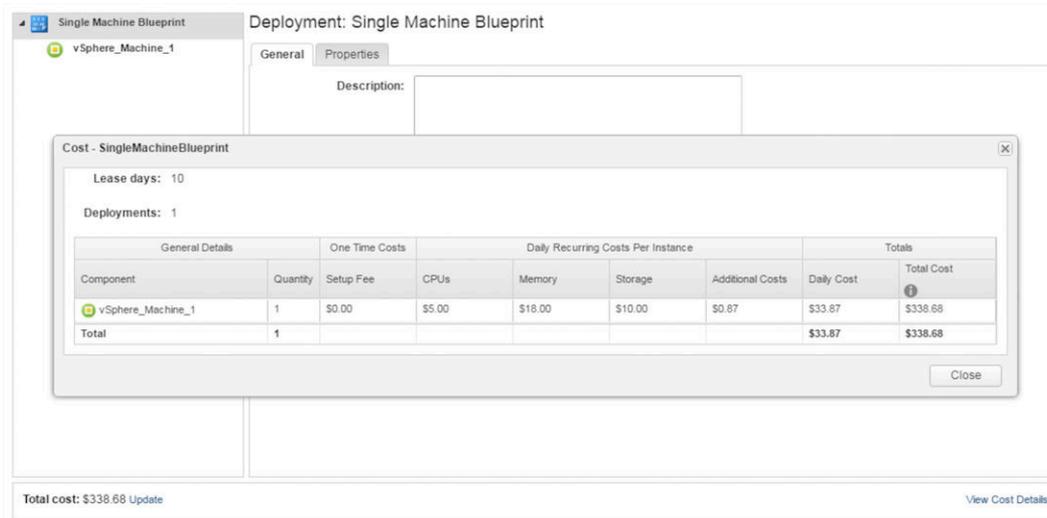


8 Add more services if you want and click **Save**.

9 On the grouping strategy page, click **Save** to finalize the changes for the blueprint.

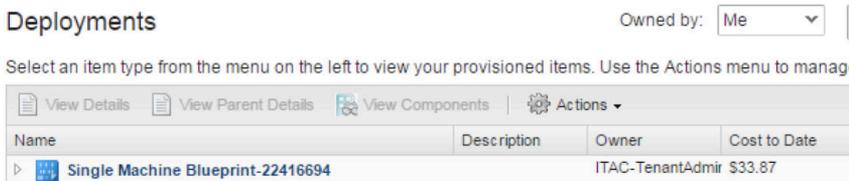
10 Select the **Catalog** tab and click **Request** to request the blueprint whose pricing was set up in the previous step.

11 At the bottom of the request notice the Total Cost and the View Cost Details fields, click **Update** to calculate the current costs, and click **Submit** to send the request.



12 Once the deployment is successful, select the **Items** tab and see the costs under **Deployments**.

The system calculates costs dynamically. When you add more virtual machines or more CPUs, the system updates the cost. The system updates the per-day cost every 24 hours.



## Set Up Pricing on a Per-Reservation Basis in Region A

As a business administrator, you can set up a cost model for a particular reservation and monitor the cost. The cost of the machines deployed using this reservation policy is calculated based on the cost setup.

### Prerequisites

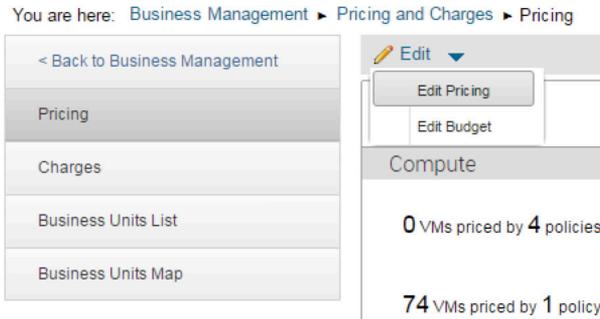
If you set up pricing on a per-reservation basis, you must first configure reservation policies.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

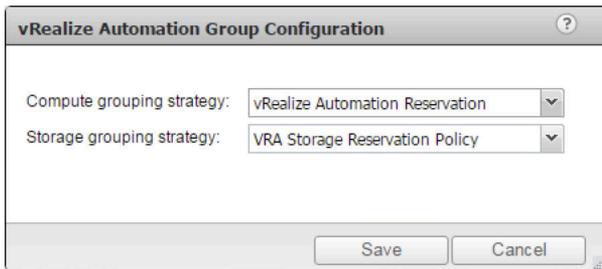
- 2 Select the **Business Management** tab and, under **Consumption**, select **Pricing and Charges > Pricing**.
- 3 Select **Edit > Edit Pricing**.



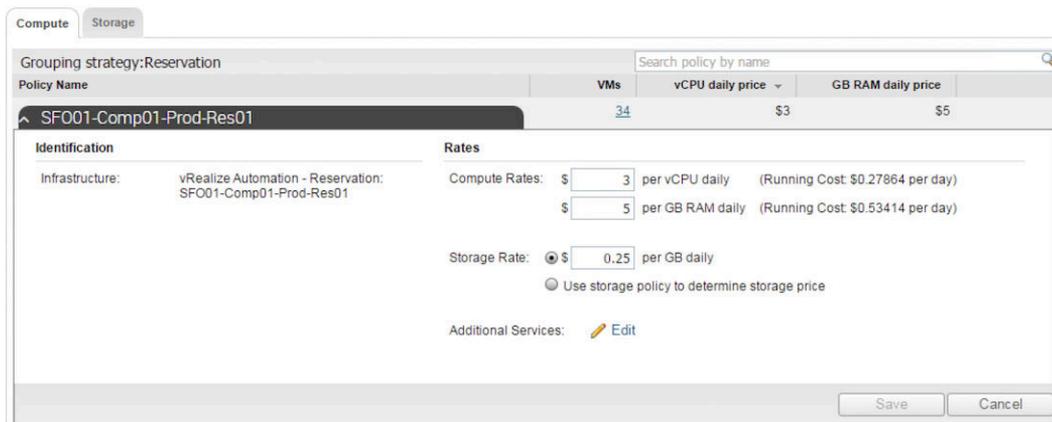
- 4 Under **vRealize Automation**, click the pencil icon to edit.



- 5 Set the **Compute grouping strategy** to **vRealize Automation Reservation** and click **Save**.

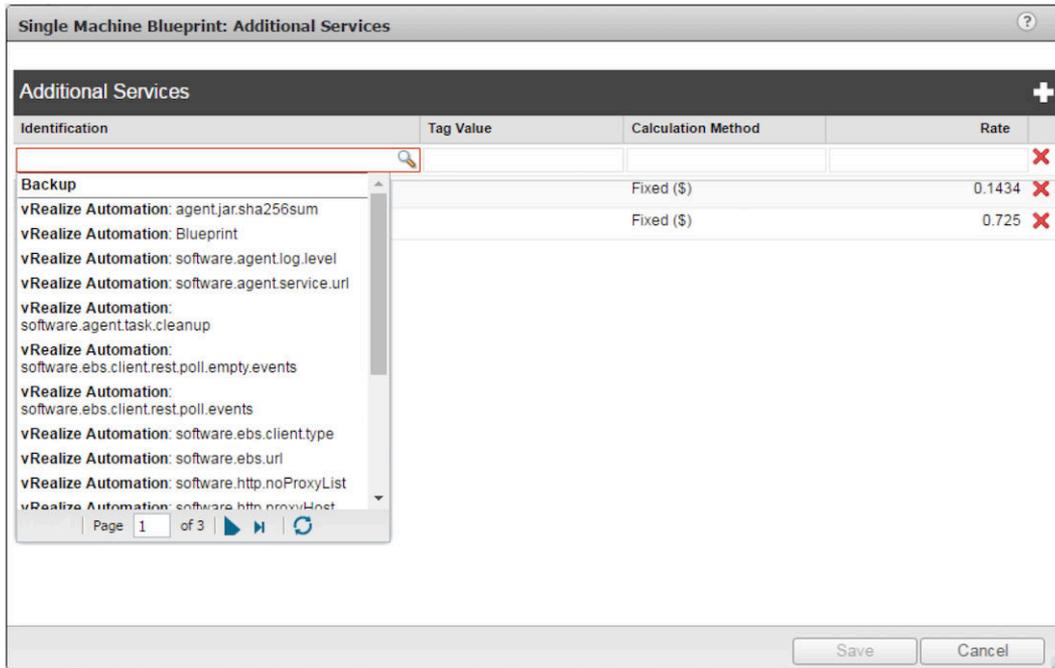


- 6 Set pricing for the Compute Rates per vCPU, per GB RAM and for the Storage Rate.

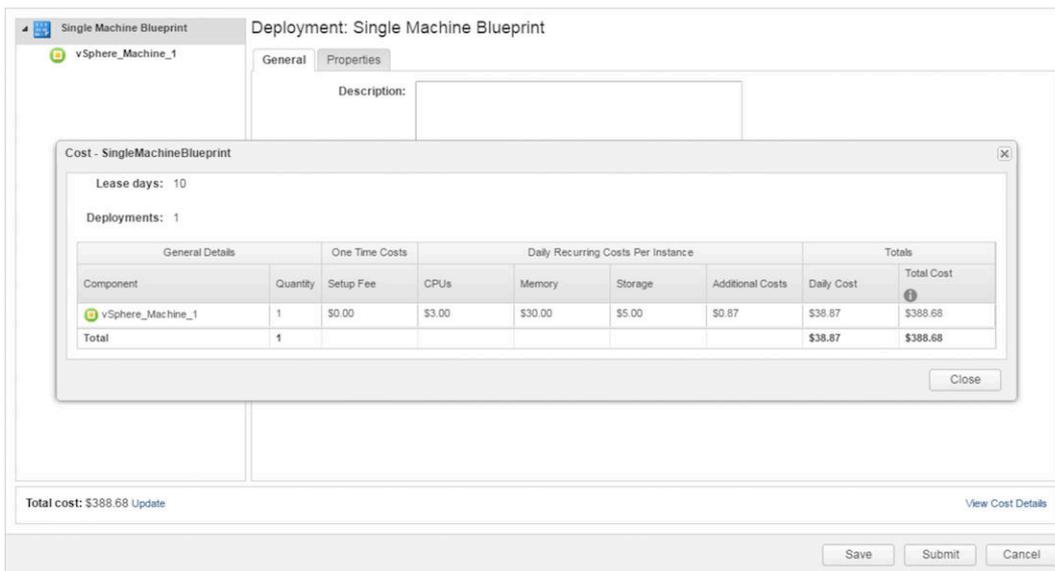


- 7 Under **Additional Services**, click **Edit**

- Select an available service, set rates, and click **Save** after adding all services that you want to make available.



- On the grouping strategy page, click **Save** to finalize the changes for the blueprint.
- Select the vRealize Automation **Catalog** tab and click **Request** for the blueprint whose pricing you set up.
- At the bottom of the request notice the Total Cost and the View Cost Details, then click **Update** to calculate the current costs and click **Submit** to send the request.



- 12 Once the deployment is successful, select the **Items** tab and check the cost under **Deployments**.

The system calculates costs dynamically. When you add more virtual machines or more CPUs, the system updates the cost. The system updates the per-day cost every 24 hours.

Name	Description	Owner	Cost to Date
▶  Single Machine Blueprint-70637228		ITAC-TenantAdmin	\$38.87

# Forwarding Log Events to vRealize Log Insight in Region A

# 10

vRealize Log Insight delivers heterogeneous and highly scalable log management that includes actionable dashboards and analytics. It provides operational visibility and faster troubleshooting across physical, virtual and cloud environments.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

This scenario illustrates how to set up vRealize Log Insight for a Windows virtual machine and a Linux virtual machine.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).

This chapter includes the following topics:

- [Install the vRealize Log Insight Agent in Region A](#)
- [Configure a Linux Virtual Machine to Forward Events to vRealize Log Insight in Region A](#)

## Install the vRealize Log Insight Agent in Region A

The first task of the scenario is installing vRealize Log Insight and the vRealize Log Insight Content Pack for Windows on the Windows machine.

### Procedure

- 1 Open a Remote Desktop Protocol (RDP) connection to the Windows VM.

- 2 Log in to vRealize Log Insight.
  - a Open a Web browser and go to **https://vrli-cluster-01.sfo01.rainpole.local**.
  - b Log in using the following credentials.

Settings	Value
User name	itac-tenantadmin
Password	itac-tenantadmin_password
Domain	Rainpole.local

- 3 Click the configuration drop-down menu  and select **Administration**.
- 4 Under **Management**, click **Agents**.
- 5 On the **Agents** page, scroll down to the bottom of the page and click the **Download Log Insight Agent x.x.x** link.
- 6 In the **Download Log Insight Agent** dialog box, click **Windows MSI (32-bit/64-bit)** and save the .msi file on your computer.
- 7 Install the agent.
  - a Double-click the file to run the installer and click **Run** in the **Open File - Security Warning** dialog.
  - b In the **VMware vRealize Log Insight Agent Setup** wizard, accept the license agreement and click **Next**.
  - c With the Log Insight host name (vrli-cluster-01.sfo01.rainpole.local) shown in the **Host** text box, click **Install**.
  - d When installation is complete, click **Finish**.
- 8 Install the vRealize Log Insight Content Pack for Windows.
  - a In the vRealize Log Insight user interface, click the configuration drop-down menu  icon and select **Content Packs**.
  - b Under **Content Pack Marketplace**, select **Marketplace**.
  - c In the list of content packs, locate the **Microsoft - Windows** content pack and click its icon, and click **Install**.

## Configure a Linux Virtual Machine to Forward Events to vRealize Log Insight in Region A

As the second task in the scenario, you configure a Linux VM to receive all event logs in the vRealize Log Insight Server. You can then explore the events in the vRealize Log Insight dashboards.

### Prerequisites

Enable SSH on the Linux virtual machine that you want to forward logs from.

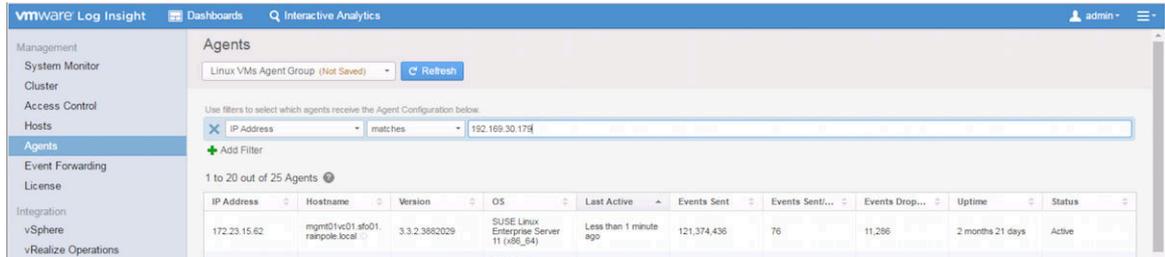
**Procedure**

- 1 Download the Log Insight Agent for Linux to a jump host.
  - a Click the configuration drop-down menu  and select **Administration**.
  - b Under **Management**, click **Agents**.
  - c On the **Agents** page, click the **Download Log Insight Agent** link.
  - d In the **Download Log Insight Agent** dialog box, click the link for the Linux distribution of your VM.
- 2 Copy the Log Insight Agent for Linux file from your jump host to the Linux VM.
- 3 Install the Log Insight Agent on the Linux virtual machine
  - a Open an SSH connection to the Linux VM.
  - b Install the Log Insight Agent package using the command for your Linux distribution.  
For example,  

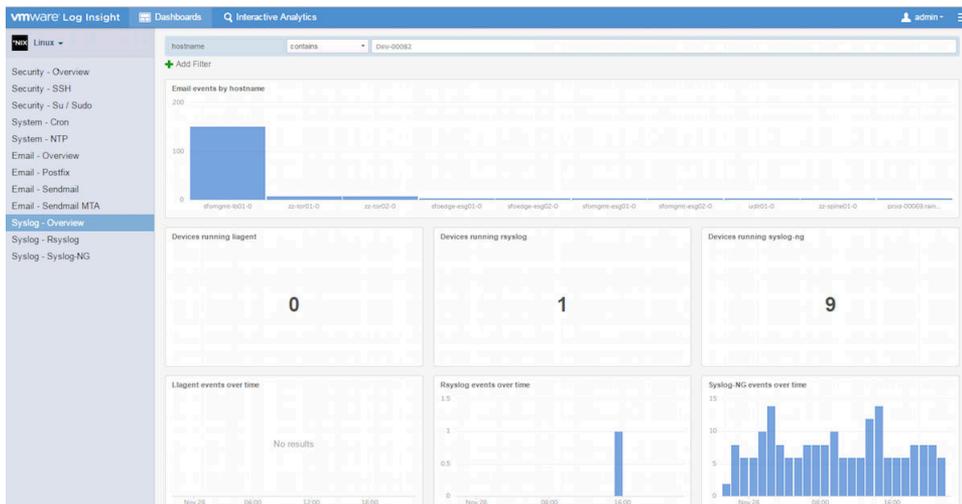
```
rpm -ivh VMware-Log-Insight-Agent-3.3.2-3882029.noarch_192.168.31.10.rpm.
```
- 4 Install the vRealize Log Insight Content Pack for Linux.
  - a In the vRealize Log Insight user interface, click the configuration drop-down menu  and select **Content Packs**.
  - b Under **Content Pack Marketplace**, select **Marketplace**.
  - c In the list of content packs, locate the **Linux** content pack and click its icon.
  - d In the **Install Content Pack** dialog box, click **Install**.
- 5 Configure Log Insight Linux Agents from the vRealize Log Insight Web user interface.
  - a On the Log Insight Web user interface, click the configuration  icon and select **Administration**.
  - b Under **Management**, click **Agents**.
  - c From the drop-down on the top, select **Linux** from the **Available Templates** section.
  - d Click **Copy Template**.

- e In the **Copy Agent Group** dialog box, enter **Linux Agent Group** in the name text box and click **Copy**.
- f In the agent filter text boxes, use the following selections and click **SAVE NEW GROUP**.

Filter	Operator	Value
OS	starts with	CentOS



- 6 Verify that the vRealize Log Insight server is getting the log events from the Linux VM.
  - a Click **Dashboards**.
  - b In the vRealize Log Insight user interface, select **Linux** from the **Content Pack Dashboards** drop-down menu.
  - c Click **Syslog - Overview** in the left pane
  - d (Optional) Generate specific host events by selecting hostname and criteria starts with. Enter the hostname.
- 7 Reboot the virtual machine to generate few log events and refresh the dashboard to verify that you can see the reboot event.



# Monitoring Workload Health and Capacity with vRealize Hyperic in Region A

11

vRealize Hyperic is a vRealize Operations component. With vRealize Hyperic, you can get a detailed view of your environment by using the vRealize Operations management interface. You can examine your environment all the way down to services, processes, and the application layer. You can create customized dashboards to monitor the health, capacity, and risk of the workload that is running in your SDDC deployment.

This scenario gives detailed information on the procedures for a single-region deployment. You can also use these procedures for Region A of a dual-region deployment. If you want to use the procedures for Region B in a dual-region deployment, you have to use different IP address and machine names and might have to make some other changes.

This scenario explains how to monitor workload virtual machines from vRealize Operations.

## Prerequisites

- 1 Prepare for the deployment. See [Chapter 2 Preparing for Region A Scenario Deployment](#).
- 2 Perform the tasks in [Configuring Reservation Policies and Network Policies in Region A](#).
- 3 Perform the tasks in [Chapter 3 Creating and Publishing Single Machine Blueprints in Region A](#).

This chapter includes the following topics:

- [Install the End Point Operations Monitoring Agent in Region A](#)
- [Configure Workload Monitoring in Region A](#)
- [Configure Monitoring for Windows Services in Region A](#)

## Install the End Point Operations Monitoring Agent in Region A

As the first task, you create a Windows Server 2012 R2 virtual machine from the blueprint and install End Point Operations (EPO) monitoring agent in the virtual machine.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Request a catalog item.
  - a Navigate to **Catalog**.
  - b Click **Request** under **Windows Server 2012 R2 - SFO Prod**.
- 3 Navigate to **Requests**, monitor the status of the request, and wait until the status changes to **Successful**.
- 4 Navigate to **Items**, expand the new deployment, and click the name of the provisioned virtual machine.
- 5 Click **Connect using RDP** to log in to the virtual machine as local administrator.

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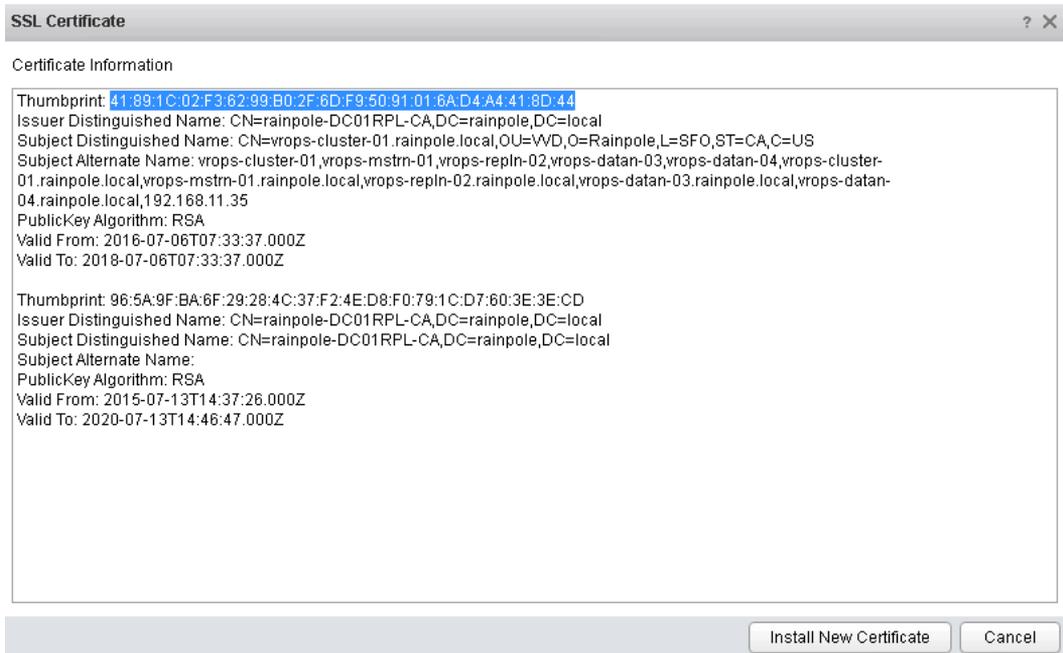
**Note** If you have problems connecting to the virtual machine, verify that RDP is enabled in the template.

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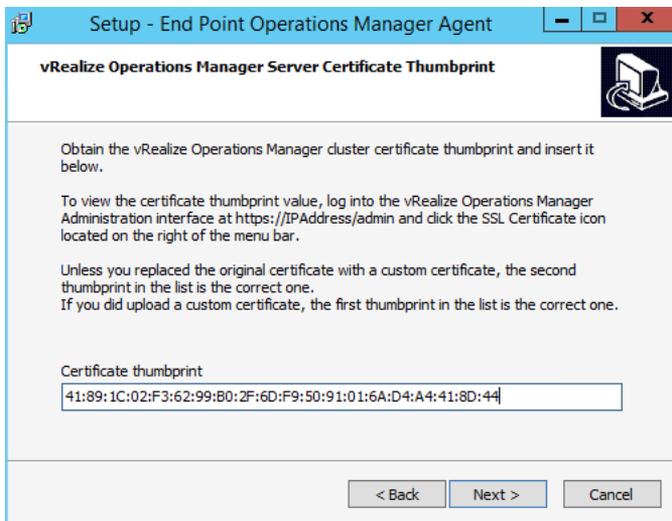
- 6 Download vRealize Operations Manager.
  - a From a Web browser, go to [VMware.com](https://www.vmware.com).
  - b Select **Downloads > All Downloads > Infrastructure & Operations Management > VMware vRealize Operations > Download Product**.
  - c Select **6.4**.
  - d Click **Go to Downloads**.
  - e Find the **End Point Operations Windows Agent - 64 bit EXE** file and download it to the virtual machine.
- 7 Double-click the file to run the installer and click **Next**.
- 8 In the **Server Address** text box, enter **vrops-cluster-01** and click **Next**.

9 Enter the certificate thumbprint.

- a Obtain the vRealize Operations Manager cluster certificate thumbprint as instructed.



- b Insert the thumbprint in the **Certificate thumbprint** text box, and click **Next**.



10 Enter the following credential and click **Next**.

Options	Description
User Name	admin
Password	vrops_admin_password

- 11 Accept the license agreement, click **Next**, and click **Next** again to let the installation start and complete.

## Configure Workload Monitoring in Region A

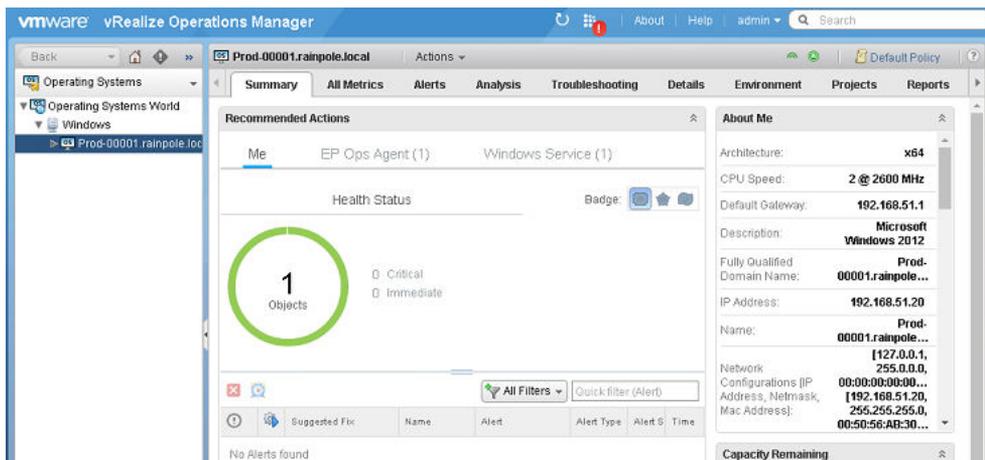
vRealize Operations Manager allows you to create a dashboard for checking the overall health, risk, and efficiency of workloads and to monitor CPU and memory use.

### Procedure

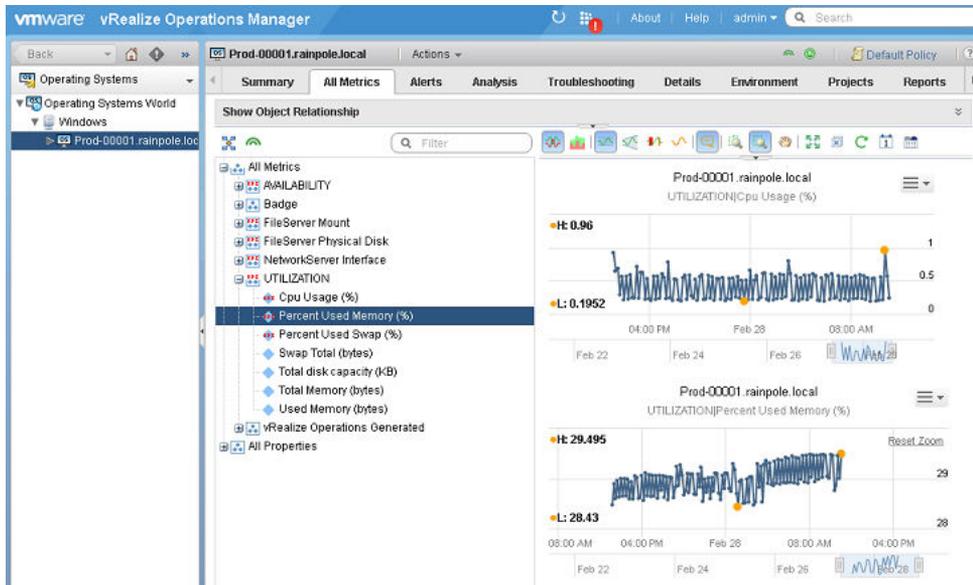
- 1 Log in to vRealize Operations Manager.
  - a Open a Web browser and go to **https://vrops-cluster-01.rainpole.local**.
  - b Log in using the following credentials.

Setting	Value
Authentication Source	Local Users
User name	admin
Password	<i>vrops_admin_password</i>

- 2 Navigate to **Environment > Operating Systems > Operating Systems World > Windows** and select the virtual machine you want to monitor.
- 3 Click the **Summary** tab, click the **Badge** icons, and verify that all badges are green.  
If all badges are green, there are no issues or alerts with **Health**, **Risk**, and **Efficiency**.

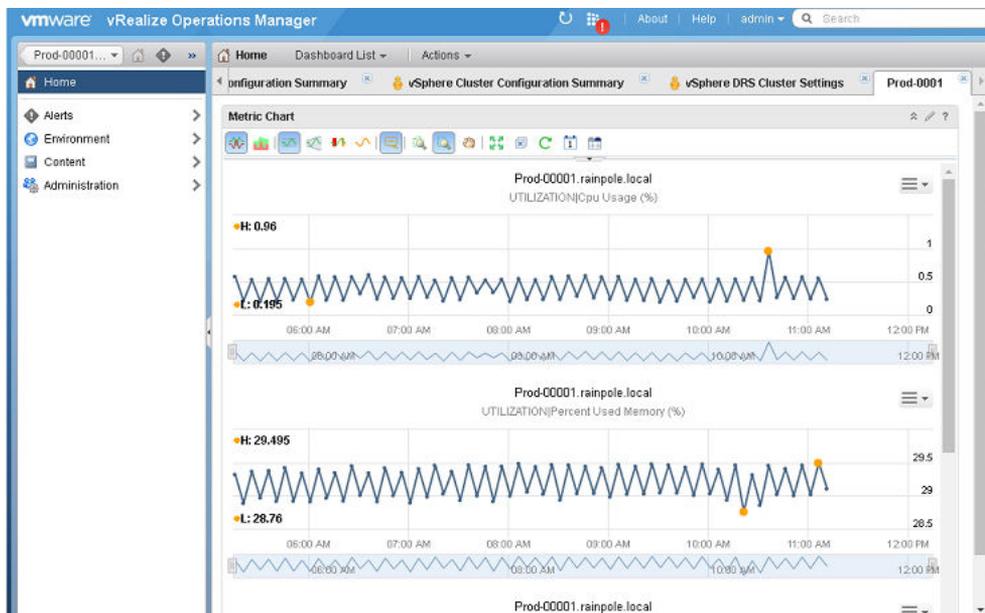


- 4 Click the **All Metrics** tab, expand **All Metrics**, expand **UTILIZATION**, and click **Cpu Usage (%)** and **Percent Userd Memory (%)**.



- 5 Click the **Generate Dashboard** icon (the last icon at the top), enter the virtual machine name as the name of the dashboard and click **OK**.
- 6 Click the **Home** icon to navigate to the **Home** page and click the name of the dashboard you just created.

The dashboard shows the information about the virtual machine that you selected.



## Configure Monitoring for Windows Services in Region A

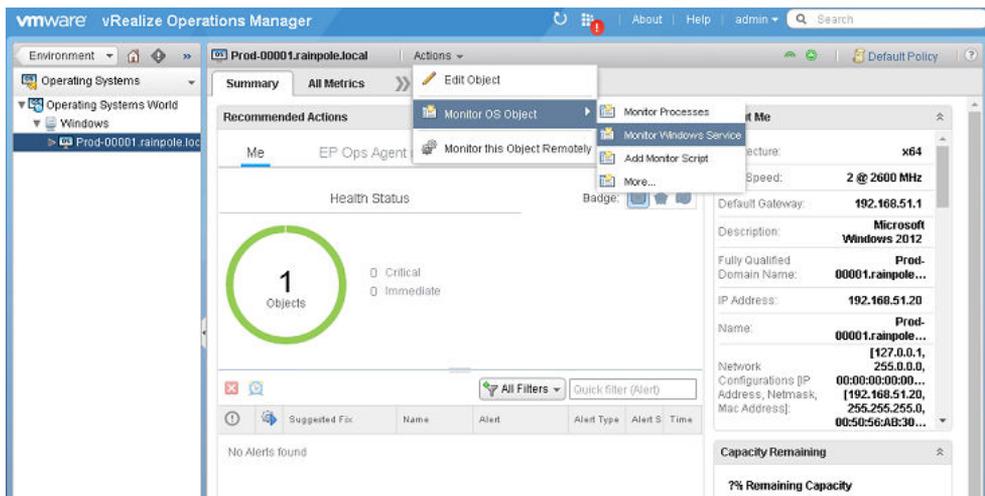
vRealize Operations supports monitoring any service running inside a Windows virtual machine. In this task, we use the End Point Operations Management Agent as an example.

**Procedure**

- 1 Log in to vRealize Operations Manager.
  - a Open a Web browser and go to **https://vrops-cluster-01.rainpole.local**.
  - b Log in using the following credentials.

Setting	Value
Authentication Source	Local Users
User name	admin
Password	vrops_admin_password

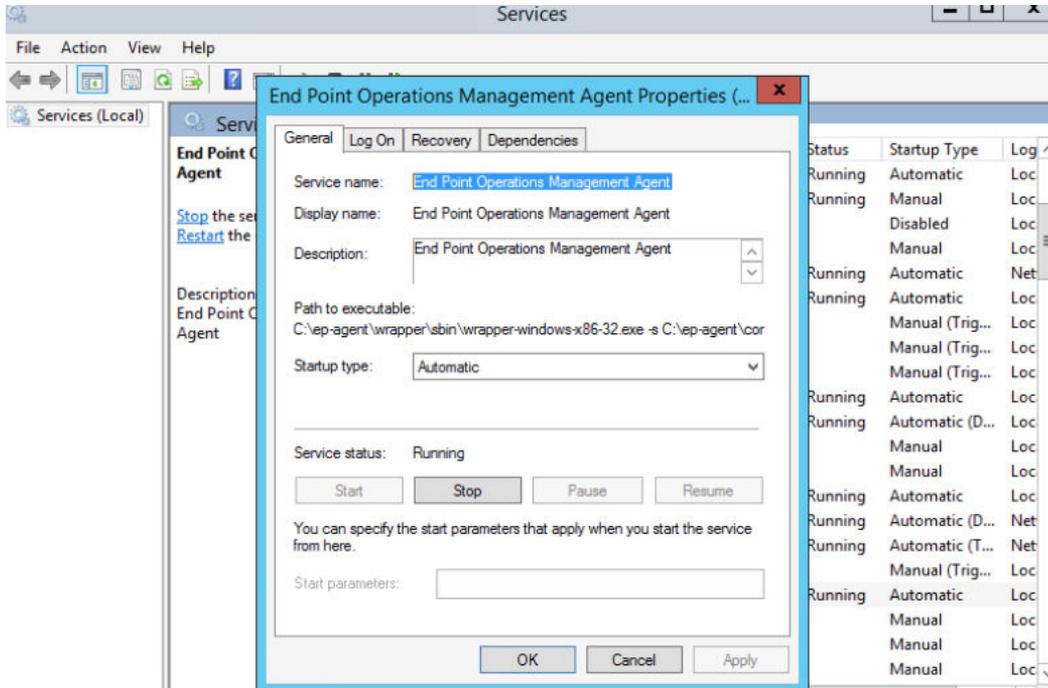
- 2 Navigate to **Environment > Operating Systems > Operating Systems World > Windows** and select the virtual machine you want to monitor.
- 3 Click **Actions**, click **Monitor OS Object**, and click **Monitor Windows Service** .



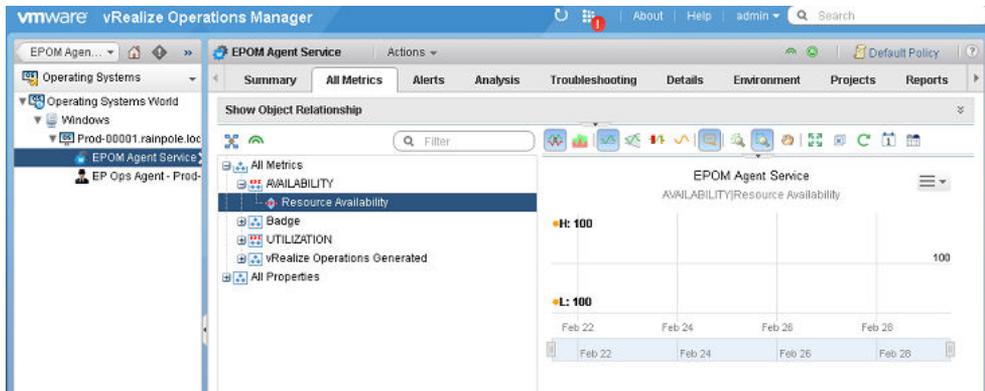
- 4 Enter the following information and click **OK**.

Setting	Value
Display Name	EPOM Agent Service
service_name	End Point Operations Management Agent

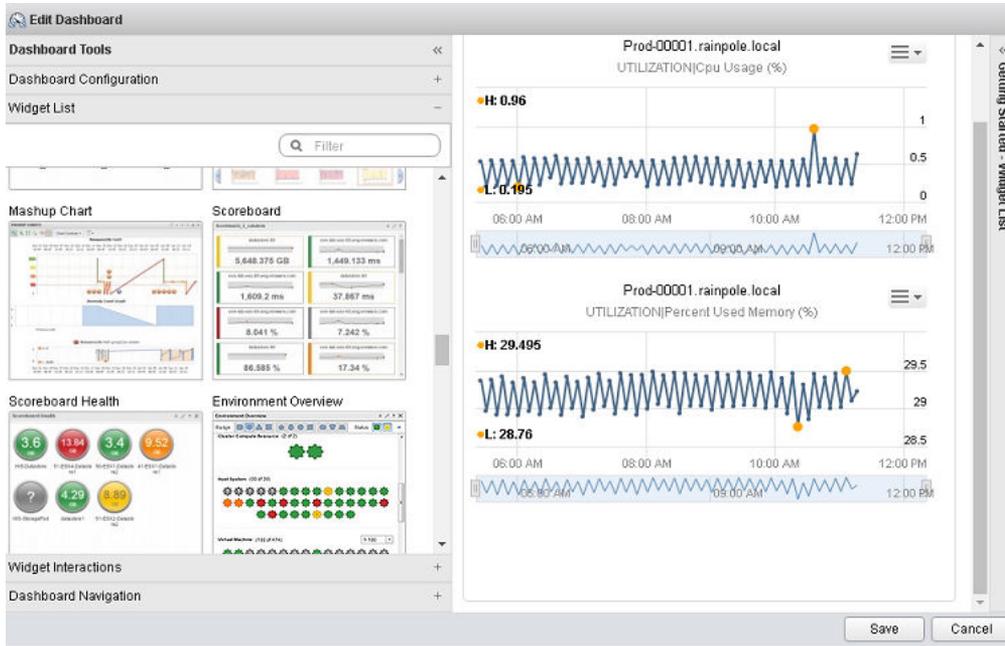
To obtain the service name, you can open the service in the Windows virtual machine.



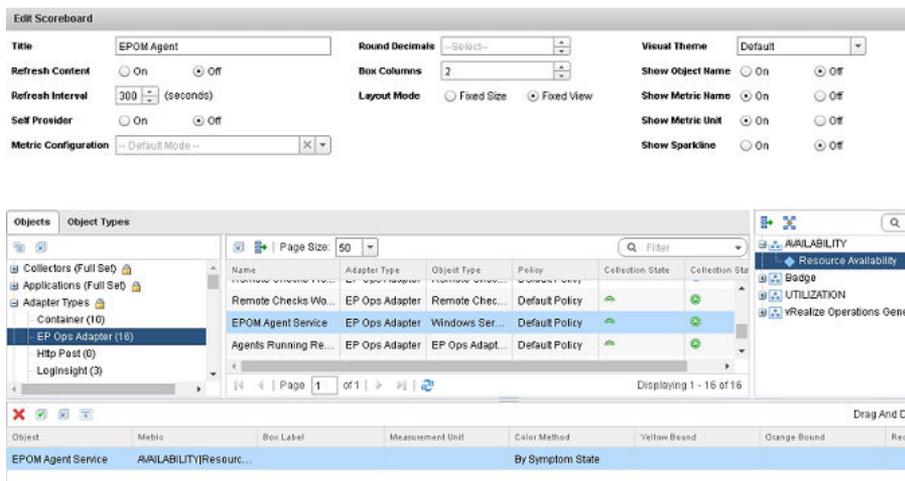
- 5 Expand the virtual machine and select **EPOM Agent Service**.
- 6 Select **Troubleshooting > All Metrics > Resource Availability**  
If you see no data, click the **Refresh** button until you see them.



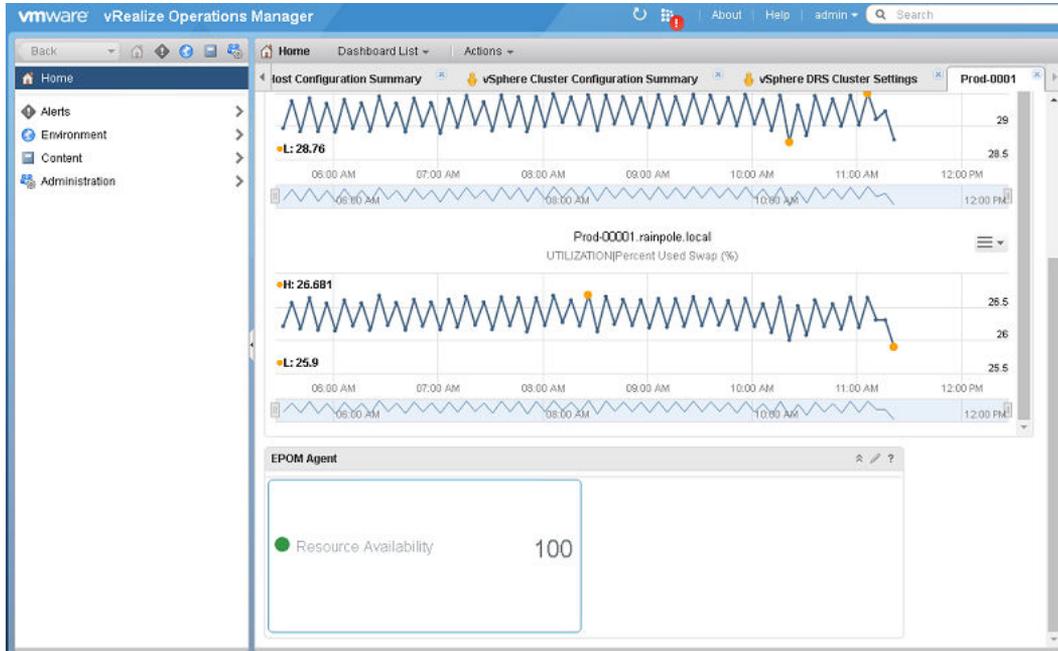
- 7 Go back to the home page, click the dashboard for the virtual machine in **Dashboard List**, click **Actions**, and click **Edit Dashboard**.
- 8 Expand the **Widget List** in the left pane, drag and drop a **Scoreboard** widget onto the dashboard, and click **Save**.



- 9 Click the **Edit** button for the Scoreboard widget and edit the widget as follows.
  - a Enter **EPOM Agent** in the **Title** text box.
  - b Select **Adapter types > EP Ops Adapter**, look for **EPOM Agent Service** and select it.
  - c Expand **Availability**, double-click **Resource Availability**, and click **Save**.



- 10 Click the Home icon, click the dashboard for the virtual machine in the **Dashboard List**, and expand the scoreboard to see the availability status of the service.



# Preparing for Region B Scenario Deployment

# 12

Most of the scenarios in the *Scenarios* documentation for the VMware Validated Design for IT Automating IT are region agnostic. Each vRealize Automation deployment can only provision blueprints in its region. You can, set up a dual region environment using a DLR or a UDLR.

If you want to deploy to Region B using a DLR, you follow these steps:

- 1 Perform all tasks in *Region B Virtual Infrastructure Implementation* in the *Deployment for Region B* document of the VMware Validated Design for the Software-Defined Data Center.
- 2 Perform all tasks in *Region B Cloud Management Platform Implementation* in the *Deployment for Region B* document of the VMware Validated Design for the Software-Defined Data Center.
- 3 Depending on your scenario, you might have perform some tasks in Region B Operations Implementation. For example, some scenarios use vRealize Log Insight.
- 4 Follow the instructions in this section, *Preparing for Region B Deployment*.

You can find the documents on the [VMware Validated Design Documentation](#) page.

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**Note** This set of scenario preparation procedures uses a DLR that is associated with the NSX Manager in Region B. Virtual machines that are created from one of the blueprints cannot migrate to region A. See [Chapter 1 Scenarios Solution Paths](#) for a discussion of the advantages and disadvantages of using a DLR or a UDLR.

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This chapter includes the following topics:

- [Create Virtual Machine Templates from a Content Library](#)
- [Create Customization Specifications in Compute vCenter Server in Region B](#)
- [Create a vSphere Endpoint in vRealize Automation in Region B](#)
- [Create Fabric Groups in Region B](#)
- [Add Compute Resources to a Fabric Group in Region B](#)
- [Create Logical Switches in Region B](#)
- [Create External Network Profiles in Region B](#)
- [Configuring Reservation Policies and Network Policies in Region B](#)

## Create Virtual Machine Templates from a Content Library

You use virtual machine templates to create machine blueprints and publish them in a service catalog in vRealize Automation. You can use the predefined Linux and Windows virtual machine template that are available in the vCenter Server content library after you deploy the VMware Validated Design for the Software-Defined Data Center.

Creating virtual machine templates from a content library includes several tasks. At a high level, you first create a virtual machine by importing it from the content library. Then you convert the virtual machine to a virtual machine template.

### Prerequisites

Verify that you have performed the content library configuration for Region B according to the *VMware Validated Design Deployment Guide for Region B*.

- *Configure a Content Library in the First Compute vCenter Server Instance*
- *Import the Virtual Machine Template OVF Files*

## Create Virtual Machines Using Content Library VM Templates in Region B

When you implement scenarios for region B, vRealize Automation cannot directly access virtual machine templates in the content library. You must create a virtual machine using the virtual machine templates, then convert the template in vCenter Server.

Perform this procedure on all vCenter Server compute instances that you add to vRealize Automation, including the first vCenter Server compute instance.

Create virtual machines from the following Linux and Windows VM templates in the content library.

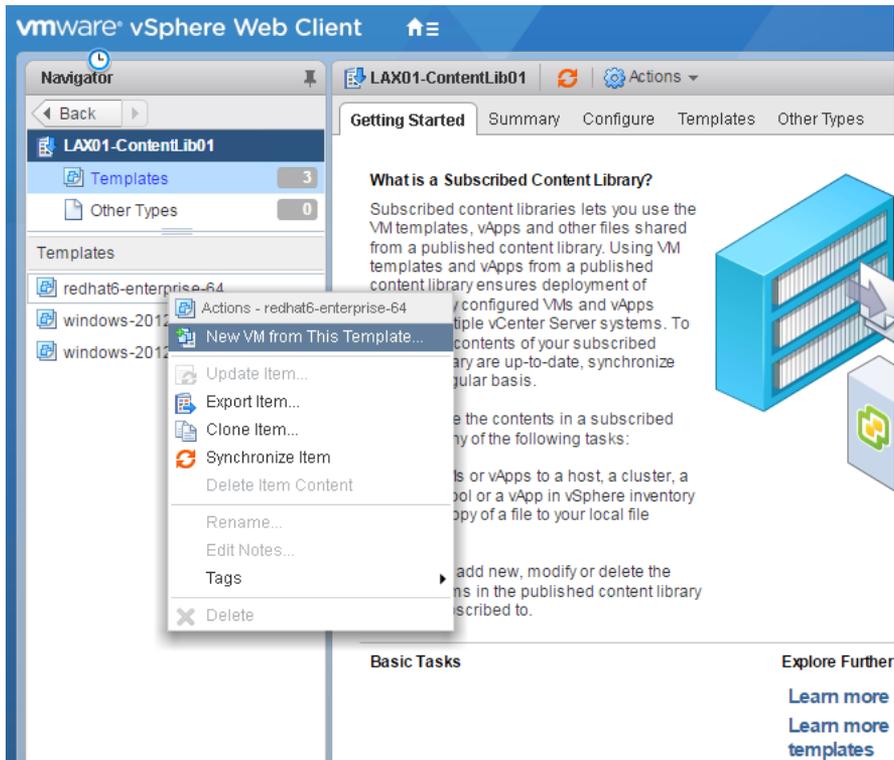
VM Template Name	Guest OS
redhat6-enterprise-64	Red Hat Enterprise Server 6 (64-bit)
windows-2012r2-64	Windows Server 2012 R2 (64-bit)

### Procedure

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc51.lax01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > VMs and Templates** and expand the comp01vc51.lax01.rainpole.local vCenter Server.
- 3 Right-click the **LAX01** data center tree and select **New Folder > New VM and Template Folder**.
- 4 Create a new folder and label it **VM Templates**.
- 5 Navigate to **Home > Content Libraries** and click **LAX01-ContentLib01 > Templates**.
- 6 Right-click the VM template and click **New VM from This Template**.



The **New Virtual Machine from Content Library** wizard opens.

- 7 On the **Select name and location** page, use the same template name.

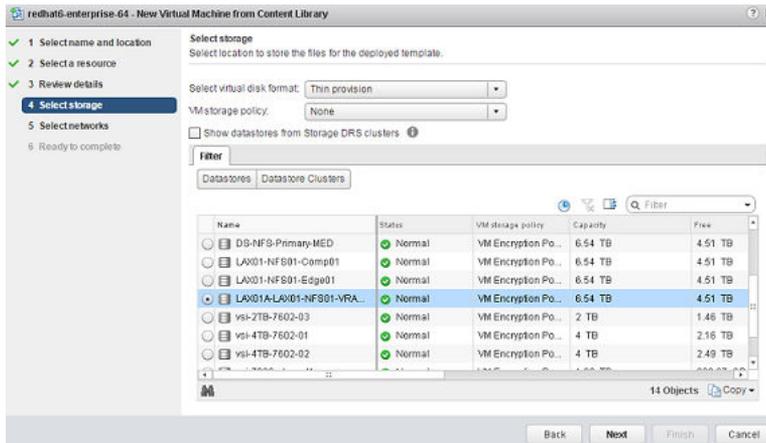
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**Note** Use the same template name to create a common service catalog that works across different vCenter Server instances within your data center environment.

---

- 8 Select **VM Templates** as the folder for this virtual machine, and click **Next**.
- 9 On the **Select a resource** page, select the compute cluster that you want to deploy the virtual machine to.
- 10 On the **Review details** page, verify the template details and click **Next**.

- On the **Select storage** page, select the **LAX01A-LAX01-NFS01-VRALIB01** datastore and select **Thin Provision** from the **Select virtual disk format** drop-down menu.



- On the **Select networks** page, select **VM Network** for the Destination Network, and click **Next**.

**Note** vRealize Automation changes the network according to the blueprint configuration.

- On the **Ready to complete** page, review the virtual machine configuration and click **Finish**.

A new task for creating the virtual machine appears in the **Recent Tasks** pane. After the task is complete, the new virtual machine is created.

- Repeat this procedure for the other VM Templates in the content library.

## Convert the Virtual Machine to a VM Template in Region B

If your scenario includes Region B, you can convert a virtual machine directly to a template instead of making a copy by cloning.

Repeat this procedure for each of the VM templates in the content library. The table below lists the VM templates and the guest OS that each template uses to create a virtual machine.

VM Template Name	Guest OS
redhat6-enterprise-64	Red Hat Enterprise Server 6 (64-bit)
windows-2012r2-64	Windows Server 2012 R2 (64-bit)

**Procedure**

- 1 Log in to vCenter Server using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc51.lax01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > VMs and Templates**.
- 3 In the **Navigator** pane, expand **comp01vc51.lax01.rainpole.local > LAX01 > VM Templates**.
- 4 Right-click the **redhat6-enterprise-64** virtual machine located in the VM Templates folder, and click **Template > Convert to Template**.
- 5 Click **Yes** to confirm the template conversion.
- 6 Repeat this procedure for all of the VM Templates in the content library, verifying that each VM Template appears in the VM Templates folder.

## Create Customization Specifications in Compute vCenter Server in Region B

As part of the Region B scenario implementation you create two customization specifications for use on the virtual machines you deploy from vRealize Automation. One specification is for a Linux guest operating system and one is for a Windows guest operating system. When you apply a specification to a guest operating system during virtual machine cloning or deployment, you prevent conflicts that might result if you deploy virtual machines with identical settings, such as duplicate computer names.

You later use the customization specifications when you create blueprints for use with vRealize Automation.

### Create a Customization Specification for Linux in Region B

When you implement scenarios for region B, you have to create a Linux guest operating system specification that you can apply when you create blueprints for use with vRealize Automation. You can use this customization specification when provisioning new virtual machines from vRealize Automation.

**Procedure**

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://mgmt01vc51.lax01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > Operations and Policies > Customization Specification Manager**.
- 3 Select the vCenter Server **comp01vc51.lax01.rainpole.local** from the drop-down menu.
- 4 Click the **Create a new specification** icon.
- 5 On the **Specify Properties** page, select **Linux** from the **Target VM Operating System** drop-down menu, enter **itac-linux-custom-spec** for the specification name, and click **Next**.
- 6 On the **Set Computer Name** page, select **Use the virtual machine name**, enter **lax01.rainpole.local** in the **Domain Name** text box, and click **Next**.
- 7 On the **Time Zone** page, specify the time zone for the virtual machine, and click **Next**.

Setting	Value
Area	America
Location	Los Angeles
Hardware Clock Set To	Local Time

- 8 On the **Configure Network** page, click **Next**.
- 9 On the **Enter DNS and domain settings** page, leave the default settings, and click **Next**.
- 10 Click **Finish** to save your changes.

The customization specification that you created is listed in the Customization Specification Manager.

## Create a Customization Specification for Windows in Region B

When you implement scenarios for region b, you have to create a Windows guest operating system specification. You can apply the specification when you create blueprints for use with vRealize Automation. This customization specification can be used to customize virtual machine guest operating systems when provisioning new virtual machines from vRealize Automation.

## Procedure

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://mgmt01vc51.lax01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Navigate to **Home > Operations and Policies > Customization Specification Manager**.
- 3 Select the vCenter Server `comp01vc51.lax01.rainpole.local` from the drop-down menu.
- 4 Click the **Create a new specification** icon.  
The **Guest Customization** wizard appears.
- 5 On the **Specify Properties** page.
  - a Select **Windows** from the **Target VM Operating System** drop-down menu.
  - b Enter `itac-windows-joindomain-custom-spec` for the specification name, and click **Next**.
- 6 On the **Set Registration Information** page, enter **RainpoLe** for the virtual machine owner's name and organization, and click **Next**.
- 7 On the **Set Computer Name** page, select **Use the virtual machine name**, and click **Next**.  
The operating system uses this name to identify itself on the network.
- 8 On the **Enter Windows License** page, provide licensing information for the Windows operating system, enter the `volume_license_key`, and click **Next**.
- 9 Specify the administrator password for use with the virtual machine, and click **Next**.
- 10 On the **Time Zone** page, select **(GMT-08:00) Pacific Time(US & Canada)**, and click **Next**.
- 11 On the **Run Once** page, click **Next**.
- 12 On the **Configure Network** page, click **Next**.
- 13 On the **Set Workgroup or Domain** page, select **Windows Server Domain**, configure the following settings, and click **Next**.

Setting	Value
Domain	lax01.rainpole.local
User name	RAINPOLE\administrator
Password	admin_pwd

- 14 On the **Set Operating System Options** page, select **Generate New Security ID (SID)**, and click **Next**.

- 15 Click **Finish** to save your changes.

The customization specification that you created is listed in the Customization Specification Manager.

## Create a vSphere Endpoint in vRealize Automation in Region B

As part of scenario implementation, you create endpoints and configure user credentials for those endpoints to allow vRealize Automation to manage the infrastructure. When you create a vSphere Endpoint, vRealize Automation can communicate with the vSphere environment. vRealize Automation can discover compute resources that are managed by vCenter Server, collect data, and provision virtual machines.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Endpoints > Credentials** and click **New**.
- 3 On the **Credentials** page, configure the vRealize Automation credential for the administrator of `comp01vc51.lax01.rainpole.local` with the following settings, and click **Save**.

Setting	Value
Name	comp01vc51lax01 admin
Description	Administrator of comp01vc51.lax01.rainpole.local
User Name	svc-vra@rainpole.local
Password	<i>svc_vra_password</i>

- 4 Remain on the **Credentials** page and click **New** again.
- 5 Configure the NSX administrator credentials of `comp01nsxm51.lax01.rainpole.local` with the following settings, and click **Save**.

Setting	Value
Name	comp01nsxm51lax01 admin
Description	Administrator of NSX Manager comp01nsxm51.lax01.rainpole.local
User Name	svc-vra@rainpole.local
Password	<i>svc_vra_password</i>

- 6 Navigate to **Infrastructure > Endpoints > Endpoints** and click **New Virtual > vSphere (vCenter)**.
- 7 On the **New Endpoint - vSphere (vCenter)** page, create a vSphere Endpoint with the following settings, and click **OK**.

Setting	Value
Name	comp01vc51.lax01.rainpole.local
Address	https://comp01vc51.lax01.rainpole.local/sdk
Credentials	comp01vc51lax01 admin
Specify manager for network and security platform	Selected
Address	https://comp01nsxm51.lax01.rainpole.local
Credentials	comp01nsxm51lax01 admin

## Create Fabric Groups in Region B

In your IT Automating IT deployment, IaaS administrators can organize virtualization compute resources and cloud endpoints into fabric groups by type and intent. One or more fabric administrators manage the resources in each fabric group.

Fabric administrators are responsible for creating reservations on the compute resources in their groups to allocate fabric resources to specific business groups. Fabric groups are created in a specific tenant, but their resources can be made available to users who belong to business groups in all tenants.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select **Infrastructure > Endpoints > Fabric Groups**.
- 3 Click **New Fabric Group**, enter the following settings and click **OK**.

Setting	Value
Name	LAX Fabric Group
Fabric administrators	ug-ITAC-TenantAdmins@rainpole.local

- 4 Log out of the vRealize Automation portal.

## Add Compute Resources to a Fabric Group in Region B

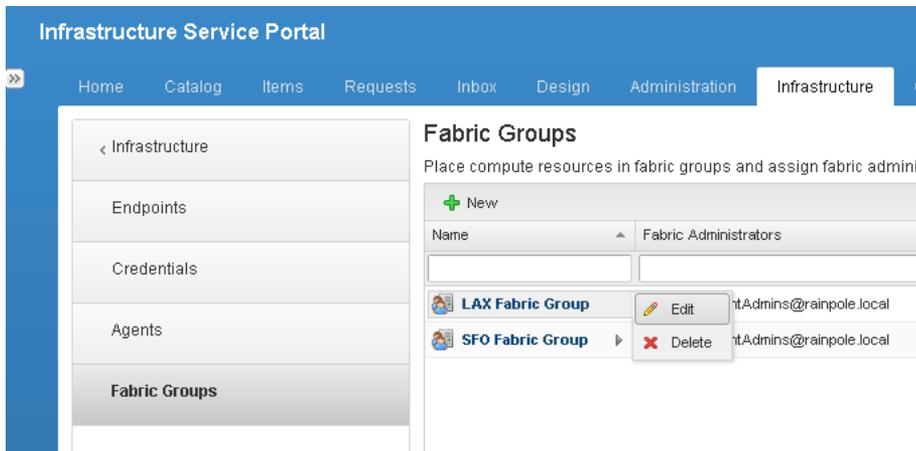
As part of scenario implementation, you allocate compute resources to fabric groups so that vRealize Automation can use the resources in that compute resource for that fabric group when provisioning virtual machines.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > End Points > Fabric Groups**.
- 3 In the **Name** column, hover the mouse pointer over the fabric group name **LAX Fabric Group**, and click **Edit**.

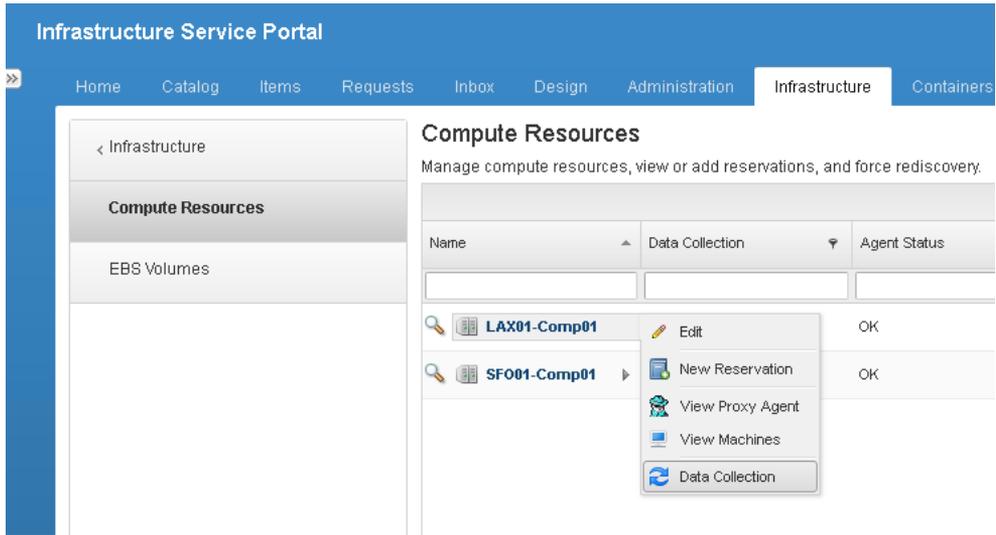


- 4 On the **Edit Fabric Group** page, select **LAX01-Comp01** (compute cluster) from the **Compute Resources** table, and click **OK**.

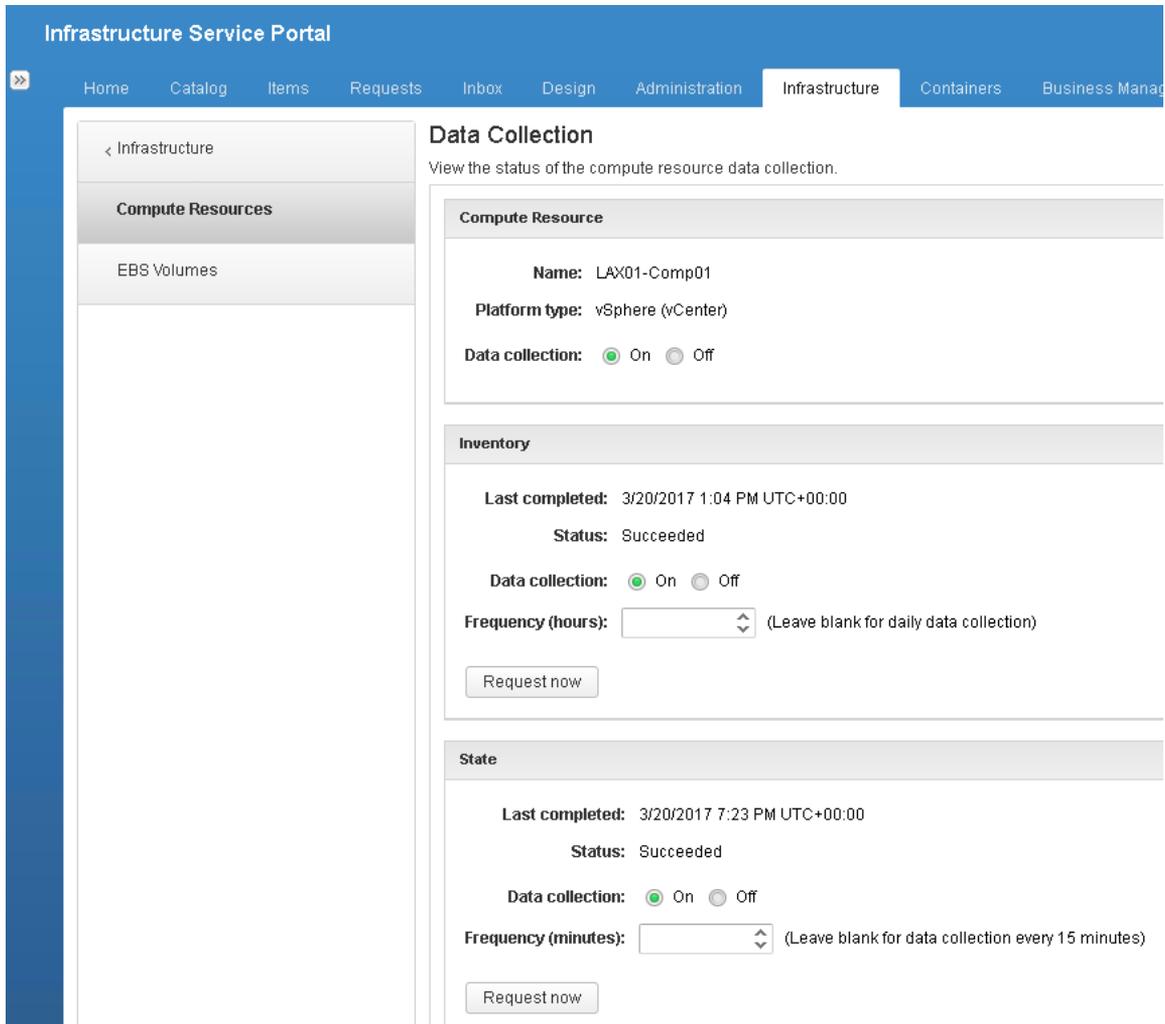
**Note** It might take several minutes for vRealize Automation to connect to the Compute vCenter Server system and associated clusters. If you are still not able to see the compute cluster after sufficient time has passed, try to restart both proxy agent services in the virtual machines `vra01ias51.lax01.rainpole.local` and `vra01ias52.lax01.rainpole.local`.

- 5 Navigate to **Infrastructure > Compute Resources > Compute Resources**.

- In the **Compute Resource** column, hover the mouse pointer over the compute cluster LAX01-Comp01, and click **Data Collection**.



- Wait for the data collection process to complete and verify that the Status for both **Inventory** and **Network and Security Inventory** shows Succeeded.



## Create Logical Switches in Region B

Before you can start with scenarios, you have to create logical switches for business groups. Several scenarios require a logical switch for the Production business group.

This procedure creates and configures the following logical switch.

Logical Switch Name	Description
Production-VXLAN	Logical switch for the Production business group

**Note** You can connect the switch for production workloads to either the Distributed Logical Router (DLR) or the Universal Distributed Logical Router (UDLR). However, if you connect the switch to the UDLR, workload deployment in region B fails because only the primary NSX Manager can create and manage universal objects. The NSX manager in region B is not the primary NSX Manager. For a dual-region deployment, you therefore connect the switch to the DLR. However, as a result of this decision, deployed workloads can no longer move between region A and region B.

**Procedure**

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc51.lax01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Create a logical switch.
  - a Click **Networking & Security**.
  - b In the Navigator, select **Logical Switches**.
  - c From the **NSX Manager** drop-down menu, select **172.17.11.66** as the NSX Manager.
  - d Click the **New Logical Switch** icon.

The **New Logical Switch** dialog box appears.

- e In the **New Logical Switch** dialog box, enter the following settings, and click **OK**.

Setting	Value
Name	Production-VXLAN
Description	Logical switch for Production Business Group
Transport Zone	Comp Global Transport Zone
Replication Mode	Hybrid
Enable IP Discovery	Selected
Enable MAC Learning	Deselected

- 3 Connect Production-VXLAN to the Distributed Logical Router.
  - a On the **Logical Switches** page, select the **Production-VXLAN** Logical Switch.
  - b Click the **Connect Edge** icon.
  - c On the **Connect an Edge** page, select **LAXCOMP-DLR01** and click **Next**.

- d On the **Edit NSX Edge Interface** page, enter the following settings and click **Next**.

Option	Settings
Name	Production-VXLAN
Type	Internal
Connectivity Status	Connected
Primary IP Address	192.168.151.1
Subnet Prefix Length	24

- e On the **Ready to Complete** page, click **Finish**.

## Create External Network Profiles in Region B

In your scenario implementation, fabric administrators must create network profiles before members of a business group can request virtual machines. The network profiles define the subnet and routing configuration for the virtual machines.

Each network profile is configured for a specific network port group or virtual network. The network profile specifies the IP address and routing configuration for virtual machines that are provisioned to that network.

### Prerequisites

Create logical switches for business groups. See [Create Logical Switches in Region A](#).

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Network Profiles** and click **New > External**.

- 3 On the **New Network Profile - External** page, specify the network profiles on the **General** tab.
  - a Add the values for the Production Group External network profile.

Setting	Production Value
Name	Ext-Net-Profile-Production-B
Description	External Network profile for Production Business Group
IPAM endpoint	vRealize Automation IPAM
Subnet mask	255.255.255.0
Gateway	192.168.151.1

- 4 Click the **DNS** tab and enter the following values.

Setting	Value
Primary DNS	172.17.11.4
Secondary DNS	172.17.11.5
DNS Suffix	rainpole.local
DNS search suffixes	rainpole.local

- 5 Click the **Network Ranges** tab and follow these steps.
  - a Click the **New** button.
  - b Enter the following values for the Production Business IP Range profile.
  - c Click **OK**.

Setting	Production Value
Name	Production
Description	Static IP range for Production Group
Starting IP address	192.168.151.20
Ending IP address	192.168.151.250

- 6 Verify that all the static IP addresses are added to the profile and click **OK**.

## Configuring Reservation Policies and Network Policies in Region B

vRealize Automation reservation policies allow you to group similar reservations. That means, for example, that you can assign different resources to a production environment than to a development environment. Create the reservation policy tag first, then assign the policy to reservations to allow a tenant administrator or business group manager to use the reservation policy in a blueprint.

### Prerequisites

Prepare for the deployment. See [Chapter 12 Preparing for Region B Scenario Deployment](#).

## Create Reservation Policies in Region B

In your scenario implementation, you use reservation policies to group similar reservations together. Create the reservation policy tag first so that you can assign the policy to reservations. A tenant administrator or business group manager to use the reservation policy in a blueprint.

You create a reservation policy for virtual machine provisioning in a production environment.

When you request a machine, it can be provisioned on any reservation of the appropriate type that has sufficient capacity for the machine.

- You can apply a reservation policy to a blueprint to restrict the machines provisioned from that blueprint to a subset of available reservations.
- You can use a reservation policy to collect resources into groups for different service levels, or to make a specific type of resource easily available for a particular purpose.
- You can add multiple reservations to a reservation policy. However, a reservation can belong to only one policy.
- You can assign a single reservation policy to more than one blueprint. However, each blueprint can have only one reservation policy.
- A reservation policy can include reservations of different types, but only reservations that match the blueprint type are considered when selecting a reservation for a particular request.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservation > Reservation Policies**.
- 3 Click the **New** icon, configure the following settings, and click **Save**.

Setting	Value
Name	LAX-Production-Policy
Description	Reservation policy for Production Business Group in LAX

- Click the **New** icon, configure the following settings, and click **Save**.

Setting	Value
Name	LAX-Edge-Policy
Description	Reservation policy for Tenant Edge resources in LAX

## Create Reservations for the Compute Cluster in Region B

In your scenario implementation, a fabric administrator must allocate resources to them by creating a reservation. After that, members of a business group can request virtual machines. You can configure each reservation for a specific business group to grant the users in that group access to request machines on a specified compute resource.

### Prerequisites

Before you can perform this procedure you must configure the datastore for the shared compute cluster.

### Procedure

- Log in to the vRealize Automation Rainpole portal.
  - Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- Navigate to **Infrastructure > Reservations > Reservations** and click **New > vSphere**.
- On the **New Reservation - vSphere (vCenter)** page, click the **General** tab and configure the following values.

Setting	Production Group Value
Name	LAX01-Comp01-Prod-Res01
Tenant	rainpole
Business Group	Production
Reservation Policy	LAX-Production-Policy
Priority	100
Enable This Reservation	Selected

- 4 On the **New Reservation - vSphere (vCenter)** page, click the **Resources** tab.
  - a Select **LAX01-Comp01(comp01vc51.lax01.rainpole.local)** from the **Compute resource** drop-down menu.
  - b In the **This Reservation** column of the **Memory** table, enter **200**.
  - c In the **Storage** table, select the **vsanDatastore** check box and enter the following values.

Text box	Value
This Reservation Reserved	2000
Priority	1

- d Click **OK**.
  - e Select **User-VMRP01** from the **Resource pool** drop-down menu.
- 5 On the **New Reservation - vSphere (vCenter)** page, click the **Network** tab.
- 6 On the **Network** tab, select the network path check boxes listed in the table below from the **Network Paths** list, and select the corresponding network profile from the **Network Profile** drop-down menu for the Production business group whose reservation you are configuring.

Production Network Path	Production Group Network Profile
vxx-dvs-xxxxx-Production-VXLAN	Ext-Net-Profile-Production

- 7 If a network path is not listed, re-synchronize data collection from the NSX objects in the Compute vCenter Server inventory.
  - a Go back to **Infrastructure > Compute Resources** .
  - b Highlight **LAX01-Comp01**, select **Data Collection**, scroll down to **Network and Security Inventory**, and click **Request now**.
  - c Wait for synchronization to complete.
- 8 Click **OK** to save the reservation.

## Create Reservations for the User Edge Resources in Region B

In your scenario implementation, fabric administrators must allocate resources to that business group by creating a reservation. Members of a business group can then request virtual machines. Each reservation is configured for a specific business group to grant members of that group access to request virtual machines on a specified compute resource.

Perform this procedure to create Edge reservations for the Production business groups.

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservations**, and click **New > vSphere (vCenter)**.
- 3 On the **New Reservation - vSphere (vCenter)** page, click the **General** tab, and configure the following values for your business group.

Setting	Production Group Value
Name	LAX01-Edge01-Prod-Res01
Tenant	rainpole
Business Group	Production
Reservation Policy	LAX-Edge-Policy
Priority	100
Enable This Reservation	Selected

- 4 On the **New Reservation - vSphere (vCenter)** page, click the **Resources** tab.
  - a Select **LAX01-Comp01(comp01vc51.lax01.rainpole.local)** from the **Compute resource** drop-down menu.
  - b Enter **200** in the **This Reservation** column of the **Memory (GB)** table.
  - c In the **Storage (GB)** table, select the check box for datastore **LAX01A-VSAN01-COMP01**, enter **2000** in the **This Reservation Reserved** text box, enter **1** in the **Priority** text box, and click **OK**.
  - d Select **User-EdgeRP51** from the **Resource pool** drop-down menu.
- 5 On the **New Reservation - vSphere (vCenter)** page, click the **Network** tab.
- 6 On the **Network** tab, map the network path to the network profile for the business group.
  - a Select the network path check boxes listed in the table below from the **Network Paths** list.
  - b Select the corresponding network profile from the **Network Profile** drop-down menu

Production Network Path	Production Group Network Profile
vxx-dvs-xxxxx-Production-VXLAN	Ext-Net-Profile-Production

- 7 If a network path is not listed, resynchronize data collection from the NSX objects in the Compute vCenter Server inventory.
  - a Go back to **Infrastructure > Compute Resources**.
  - b Highlight **LAX01-Comp01**, select **Data Collection**, scroll down to **Network and Security Inventory**, and click **Request now**.
  - c Wait for synchronization to complete.
- 8 Click **OK** to save the reservation.

# Creating Single-Machine Blueprints and Self-Service Catalogues in Region B

# 13

After you prepare your scenario environment for region B, the task workflows are very similar to the region A tasks. In all cases, you use the region B specific IP addresses and the names of region B components.

The two examples show creating blueprints and self-service catalogues, but you can implement other scenarios, such as integrating with IPAM, as well.

This chapter includes the following topics:

- [Creating and Publishing Single Machine Blueprints in Region B](#)
- [Creating Self Service Catalogues in Region B](#)

## Creating and Publishing Single Machine Blueprints in Region B

A blueprint specifies the workflow that is used to provision a virtual machine and includes information such as CPU, memory, and storage. In your scenario, you can create a blueprint for provisioning the Linux and Windows virtual machines using resources specified on the Compute vCenter Server. Tenants can later use this blueprint for automatic provisioning.

This scenario explains how to publish blueprints for the Production business group in Region B.

Machine blueprints include additional provisioning information such as the locations of required disk images or virtualization platform objects. Blueprints also specify policies such as the lease period and can include networking and security components such as security groups, policies, or tags.

A blueprint is the complete specification for a virtual, cloud, or physical machine. Blueprints determine a machine's attributes, the manner in which it is provisioned, and its policy and management settings.

Repeat this procedure to create the following blueprints.

Blueprint Name	VM Template	Customization Specification
Windows Server 2012 R2 - LAX Prod	windows-2012r2-64	itac-windows-joindomain-custom-spec
Redhat Enterprise Linux 6 - LAX Prod	redhat6-enterprise-64	itac-linux-custom-spec

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Design > Blueprints**.
- 3 Click **New**.
- 4 In the **New Blueprint** dialog box, configure the following settings on the **General** tab and click **OK**.

Setting	Value
Name	Windows Server 2012 R2 - LAX Prod
Archive (days)	15
Minimum	30
Maximum	270

- 5 Select and drag the **vSphere Machine** icon to the design canvas.
- 6 Click the **General** tab, configure the following settings, and click **Save**.

Setting	Default
ID	Default setting (vSphere_Machine_1)
Description	Default setting (blank)
Display location on request	Deselected
Reservation policy	LAX-Production-Policy
Machine prefix	Prod-
Minimum	Default setting
Maximum	Default setting

- 7 Click the **Build Information** tab, configure the following settings, and click **Save**.

Setting	Value for Windows
Blueprint type	Server
Action	Clone
Provisioning workflow	CloneWorkflow

Setting	Value for Windows
Clone from	windows-2012r2-64 (Endpoint comp01vc51.lax01.rainpole.local)
Customization spec	itac-windows-joindomain-custom-spec

8 Click the **Machine Resources** tab, configure the following settings, and click **Save**.

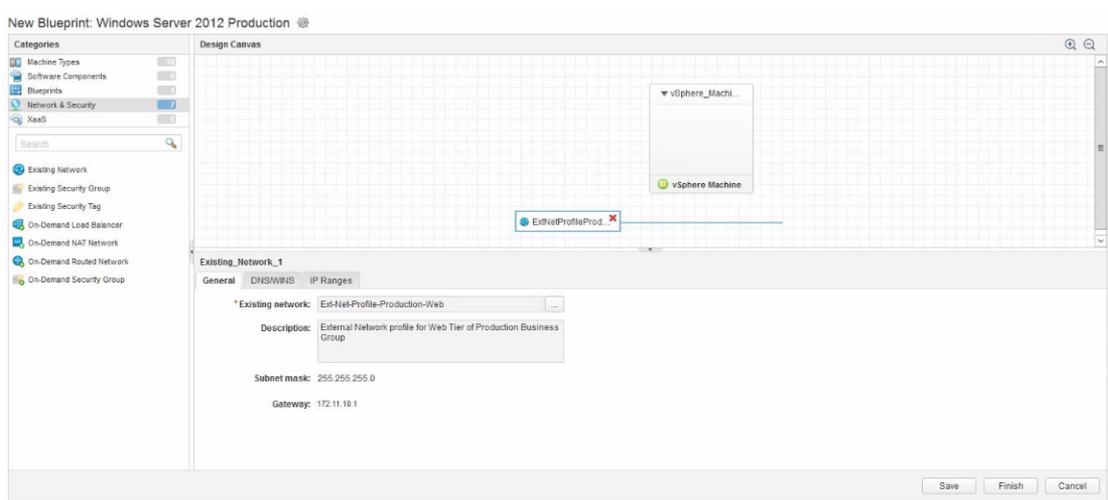
Setting	Minimum	Maximum
CPU	2	4
Memory (MB):	4096	16384
Storage	Default setting	Default setting

9 Set the network.

- a Click the **Network** tab.
- b Select **Network & Security** in the **Categories** section to display the list of available network and security components.
- c Select the **Existing Network** component and drag it onto the design canvas.
- d Click in the **Existing network** text box and select the **Ext-Net-Profile-Production-B** network profile.

Blueprint Name	Existing network
Windows Server 2012 R2 - LAX Prod	Ext-Net-Profile-Production-B
Redhat Enterprise Linux 6 - LAX Prod	Ext-Net-Profile-Production-B

e Click **Save**.



f Select **vSphere\_machine** properties from the design canvas.

- g Select the **Network** tab, click **New**, and configure the following settings.

For Existing Network	Network Setting	Assignment Type Setting	Address Setting
Ext-Net-Profile-Production-B	ExtNetProfileProduction	Static IP	Leave blank

- h Click **Save**.
- i Click **Finish** to save the blueprint.

- 10 Select the blueprint and click **Publish**.

- 11 Repeat this procedure to create the blueprint for Linux.

Setting	Value for Linux
Blueprint type	Server
Action	Clone
Provisioning workflow	CloneWorkflow
Clone from	redhat6-enterprise-64
Customization spec	itac-linux-custom-spec

## Creating Self Service Catalogues in Region B

A service catalog provides a common interface for consumers of IT services to request services, track their requests, and manage their provisioned service items. Service architects and administrators can define new services and publish them to the common catalog. When defining a service, the architect can specify the kind of item that can be requested, and what options are available to the consumer as part of submitting the request.

Users who are responsible for managing the catalog, such as tenant administrators and service architects, can manage the presentation of catalog items to the consumers of IT services. For example, catalog managers can group items into service categories for easier navigation and highlight new services to consumers on the portal home page.

### Prerequisites

- 1 Prepare for the deployment. See [Chapter 12 Preparing for Region B Scenario Deployment](#).
- 2 Perform the tasks in [Creating and Publishing Single Machine Blueprints in Region B](#).

## Create a Catalog Service

The first step in creating a service catalog is creating a service. After that, administrators can associate entitlements and blueprints with the service to complete service catalog configuration.

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to the **Administration** tab, click **Catalog Management > Services**, and click **New**.  
The **New Service** page appears.
- 3 On the **New Service** page, configure the following settings and click **OK**.

**Configure Entitlements of Blueprints in Region B**

You entitle users to the actions and items that belong to the service catalog by associating each blueprint with an entitlement. In this scenario, you associate an entitlement with each blueprint.

Repeat this procedure to associate the following blueprints with their entitlement.

Blueprint Name	VM Template	Reservation Policy	Service Catalog	Add to Entitlement
Windows Server 2012 R2 - LAX Prod	windows-2012r2-64 (comp01vc51.lax01.rainpole.local)	LAX-Production-Policy	LAX Service Catalog	Prod-SingleVM-Entitlement
Redhat Enterprise Linux 6 - LAX Prod	redhat6- enterprise-64(comp01vc51.lax01.rainpole.local)	LAX-Production-Policy	LAX Service Catalog	Prod-SingleVM-Entitlement

**Procedure**

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select the **Administration** tab and navigate to **Catalog Management > Catalog Items**.
- 3 On the **Configure Catalog Items** pane, select the **Windows Server 2012 R2 - LAX Prod** blueprint in the Catalog Items list and click **Configure**.

- 4 On the **General** tab of the **Configure Catalog Items** wizard, select **LAX Service Catalog** from the **Service** drop-down menu, and click **OK**.
- 5 Associate the blueprint with the Prod-SingleVM-Entitlement entitlement.
  - a Click **Entitlements** and select **Prod-SingleVM-Entitlement**.
  - b Click the **Items & Approvals** tab and add the Windows Server 2012 R2 - LAX Prod blueprint to the **Entitled Items** list and click **OK**.
  - c Click **Finish**.
- 6 Click the **Catalog** tab and verify that the blueprint is listed in the Service Catalog.
- 7 Repeat this procedure to associate the other blueprint with its entitlement.

## Provision Blueprints and Validate the Configuration

After the blueprints have been created, you can associate them with the service catalog and perform optional customization. After provisioning is complete, you verify that the naming prefixes and IP addresses are correct.

Because entitlements are already in place, the correct set of users can use the service catalog item.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to the **Catalog** tab and click **LAX-Service-Catalog**.
- 3 Click **Request** for the blueprint named **Windows Server 2012 R2 - LAX Prod** and, optionally, customize the blueprint.
  - a (Optional) Select **Windows Server 2012 R2 - LAX Prod** and, under **General**, enter values for **Description**, **Reason for Request**, and **Lease days**.
  - b (Optional) Select **vSphere\_Machine\_1** and, under **General**, enter values for the CPUs and Memory options.
  - c (Optional) Select **vSphere\_Machine\_1** and under **Storage**, click **Edit** and select the **Storage Reservation Policy** option available from the drop-down menu.
- 4 Click **Submit** and click **OK**.
- 5 Repeat the steps to deploy the blueprint named **Redhat Enterprise Linux 6 - LAX Prod**.

- 6 Click the **Requests** tab and check the status of the new requests until **Status** is Successful.  
Provisioning might take some time.
- 7 Once provisioning is complete, click the **Infrastructure** tab, click **Reservations**, and click **Network Profiles**.
- 8 Click **Ext-Net-Profile-Production-B**, click the **IP Addresses** tab to verify that the blueprints are deployed correctly.
  - a Verify that two virtual machines exist with the machine name pattern Prod-xxxxx.
  - b Verify that the two virtual machines are using the IP addresses defined on [Create External Network Profiles in Region B](#).
  - c Click **Cancel** when verification is complete.

# Configure Unified Single Machine Blueprints for Cross-Region Deployment

# 14

If you want to provision machine blueprints across multiple regions you can use a universal transport zone and a Universal Distributed Logical Router (UDLR). You set up the UDLR as part of the deployment of the VMware Validated Design for the Software-Defined Data Center, and can then use it in the scenarios.

If you use a UDLR, you cannot select one of the on-demand networking options during blueprint creation. You must set up networking in your environment first, and can then select the existing network when you create the blueprint.

You can instead use a DLR in conjunction with on-demand networking. However, each blueprint is tied to one region in that case. See [Chapter 1 Scenarios Solution Paths](#) for background on the benefits and limitations of each solution path.

See the [Checklist for Preparing NSX and Security Configuration](#), which is part of the vRealize Automation 7.2 documentation set, for details.

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**Note** This scenario illustrates how to use a UDLR with a scenario. To use a UDLR with other scenarios, follow the steps for Region A but change the networking information.

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This chapter includes the following topics:

- [Create Logical Switches for Cross-Region Deployment](#)
- [Create External Network Profiles for Cross-Region Deployment](#)
- [Create Fabric Groups for Cross-Region Deployment](#)
- [Add Data Center Locations to the Compute Resource Menu](#)
- [Associate Compute Resources with a Location](#)
- [Add a Property Group and a Property Definition for Data Center Location](#)
- [Create a Reservation Policy for the Unified Blueprint](#)
- [Specify Reservation Information for the Unified Blueprint](#)
- [Create a Service Catalog for the Unified Blueprint](#)
- [Create Unified Single Machine Blueprints](#)
- [Configure Entitlements for Blueprints in the Cross-Region Deployment](#)

- [Test the Cross-Region Deployment of the Single Machine Blueprints](#)

## Create Logical Switches for Cross-Region Deployment

Before you can start with scenarios, you have to create logical switches for business groups. Several scenarios require a logical switch for the Production business group. For cross-region deployment of virtual machine, logical switches are based on the Universal Transport Zone and use a Universal Distributed Router (UDLR).

This procedure creates and configures the following logical switch.

Logical Switch Name	Description
Production-Unified-VXLAN	Logical switch for the Production business group

This scenario uses a Universal Distributed Logical Router (UDLR). In scenarios that use a UDLR, the single-machine blueprints that are used to provision virtual machines cannot use NSX constructs such as NSX firewalls or NSX security policies. If the blueprint does use NSX constructs, and you use a UDLR, you can no longer move the deployed workloads between Region A and Region B. In that case, using a Distributed Logical Router (DLR) is a better solution.

### Procedure

- 1 Log in to vCenter Server by using the vSphere Web Client.
  - a Open a Web browser and go to `https://comp01vc01.sfo01.rainpole.local/vsphere-client`.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vsphere_admin_password

- 2 Create a logical switch.
  - a Click **Networking & Security**.
  - b In the Navigator, select **Logical Switches**.
  - c From the **NSX Manager** drop-down menu, select **172.16.11.66** as the NSX Manager.

- d Click the **New Logical Switch** icon.
- e In the **New Logical Switch** dialog box, enter the following settings, and click **OK**.

Setting	Value
Name	Production-Unified-VXLAN
Description	Logical switch for Production Business Group
Transport Zone	Comp Universal Transport Zone
Replication Mode	Hybrid
Enable IP Discovery	Selected
Enable MAC Learning	Deselected

- 3 Connect the Production-Unified-VXLAN to the Universal Distributed Logical Router.
  - a On the **Logical Switches** page, select the **Production-Unified-VXLAN** Logical Switch.
  - b Click the **Connect Edge** icon.
  - c On the **Connect an Edge** page, select **SFOCOMP-UDLR01** and click **Next**.
  - d On the **Edit NSX Edge Interface** page, enter the following settings and click **Next**.

Option	Settings
Name	Production-Unified-VXLAN
Type	Internal
Connectivity Status	Connected
Primary IP Address	192.168.80.1
Subnet Prefix Length	24

- e On the **Ready to Complete** page, click **Finish**.

## Create External Network Profiles for Cross-Region Deployment

Before members of a business group can request virtual machines, fabric administrators must create network profiles. The network profiles define the subnet and routing configuration for the virtual machines.

Each network profile is configured for a specific network port group or virtual network. The network profile specifies the IP address and routing configuration for virtual machines that are provisioned to that network.

### Prerequisites

Create logical switches for business groups. See [Create Logical Switches in Region A](#).

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Network Profiles** and click **New > External**.
- 3 On the **New Network Profile - External** page, specify the network profiles on the **General** tab.
  - a Add the values for the Production Group External network profile.

Setting	Production Value
Name	Ext-Net-Profile-Production-Unified
Description	External Network profile for Production Business Group
IPAM endpoint	vRealize Automation IPAM
Subnet mask	255.255.255.0
Gateway	192.168.80.1

- 4 Click the **DNS** tab and enter the following values.

Setting	Value
Primary DNS	172.16.11.4
Secondary DNS	172.17.11.5
DNS Suffix	rainpole.local
DNS search suffixes	rainpole.local

- 5 Click the **Network Ranges** tab and follow these steps.
  - a Click the **New** button.
  - b Enter the following values for the Production Business IP Range profile and click **OK**.

Setting	Production Value
Name	Production
Description	Static IP range for Production Group
Starting IP address	192.168.80.20
Ending IP address	192.168.80.250

- 6 Verify that all the static IP addresses are added to the profile and click **OK**.

# Create Fabric Groups for Cross-Region Deployment

IaaS administrators can organize virtualization compute resources and cloud endpoints into fabric groups by type and intent. One or more fabric administrators manage the resources in each fabric group.

Fabric administrators are responsible for creating reservations on the compute resources in their groups to allocate fabric resources to specific business groups. Fabric groups are created in a specific tenant, but their resources can be made available to users who belong to business groups in all tenants.

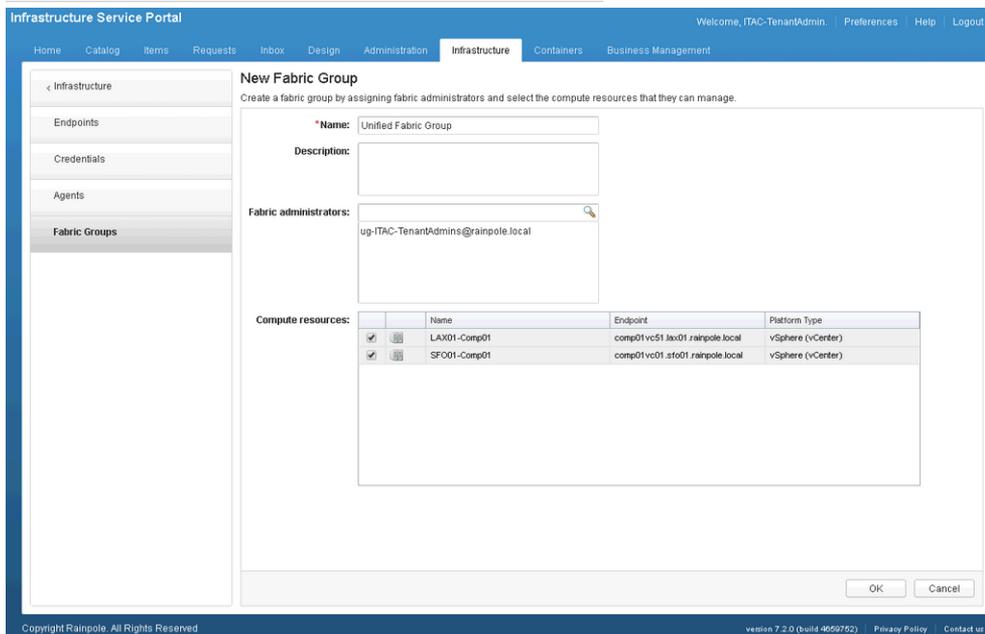
## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to `https://vra01svr01.rainpole.local/vcac/org/rainpole`.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select **Infrastructure > Endpoints > Fabric Groups**.
- 3 Click **New Fabric Group**, enter the following settings, and click **OK**.

Setting	Value
Name	Unified Fabric Group
Fabric administrators	ug-ITAC-TenantAdmins@rainpole.local
Compute resources	SFO01-Comp01, LAX01-Comp01



- 4 Log out of the vRealize Automation portal.

## Add Data Center Locations to the Compute Resource Menu

In your cross-region deployment, you can configure new data center locations and resources in the Compute Resource menu of the vRealize Automation deployment selection screen. Users can then more easily select new compute resources for deployment.

To add a new location to the Compute Resource menu, you edit an XML file on the vRealize Automation server.

Perform this procedure for the two IaaS Web server virtual machines `vra01iws01a` and `vra01iws01b`, which are part of the initial Region A vRealize Automation deployment.

### Procedure

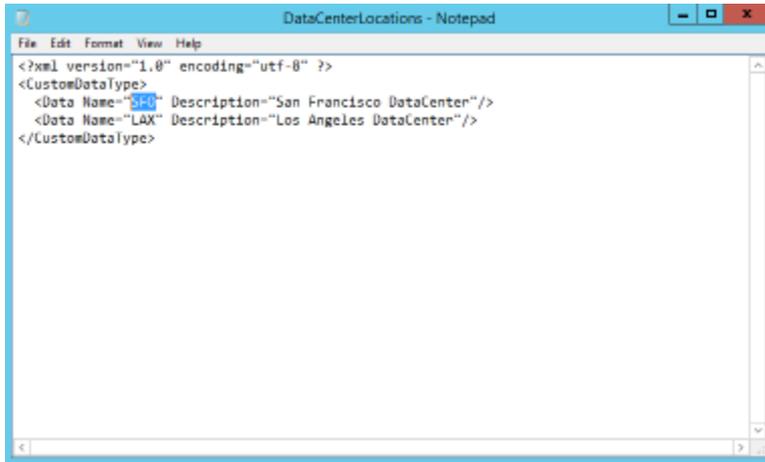
- 1 Log in to the vSphere Web Client.
  - a Open a Web browser and go to **`https://mgmt01vc01.sfo01.rainpole.local/vsphere-client`**.
  - b Log in using the following credentials.

Setting	Value
User name	administrator@vsphere.local
Password	vcenter_admin_password

- 2 Edit the `DataCenterLocations.xml` file to add the data center locations.
  - a Open a VM console to the IaaS Web server virtual machine `vra01iws01a`.
  - b Log in using administrator credentials.
  - c Open the file `C:\Program Files (x86)\VMware\VCAC\Server\Website\XmlData\DataCenterLocations.xml` in a text editor.

- d Update the Data Name and Description attributes to use the following settings.

Data Name	Description
SFO	San Francisco DataCenter
LAX	Los Angeles DataCenter



- e Save and close the file.
- Restart the IaaS Web server virtual machine vra01iws01a.  
Wait until the virtual machine restarts and is successfully running.
  - Repeat this procedure for the IaaS Web server virtual machine vra01iws01b.

## Associate Compute Resources with a Location

In your cross-region deployment, each data center location has its own compute resources, which you associate with that site for its dedicated use.

Repeat this procedure twice, once for each vCenter Server compute cluster.

Location	vCenter Server Compute Cluster
SFO	SFO01-Comp01
LAX	LAX01-Comp01

### Prerequisites

You can perform this procedure only if you added the locations explicitly. See [Add Data Center Locations to the Compute Resource Menu](#).

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

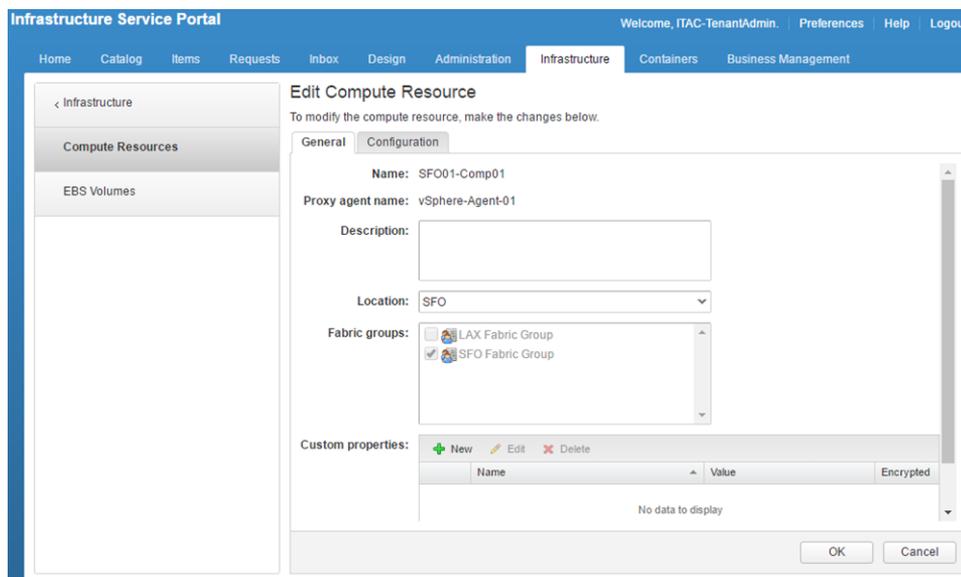
Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Select **Infrastructure > Compute Resources > Compute Resources**.

- 3 Select the compute resource **SFO01-Comp01** and click **Edit**.

- 4 Select the **SFO** data center location from the **Locations** drop-down menu.

This will be the data center location for the **SFO01-Comp01** compute cluster.



- 5 Click **OK**.
- 6 Repeat this procedure to set the data center location for **LAX01-Comp01** compute cluster.

## Add a Property Group and a Property Definition for Data Center Location

In your cross-region deployment scenario, you use property definitions to more easily control where a blueprint is deployed. The location of the blueprint determines storage and network resources to use with that blueprint.

## Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Select **Administration > Property Dictionary > Property Definitions**.
- 3 Click **New** to create a property definition and follow these steps.
  - a Enter **Vrm.DataCenter.Location** in the **Name** text box.

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**Note** The property definition name is case sensitive, and must exactly match the property name that is used in the blueprint or the build profile.

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- b Enter **Select a Region** in the **Label** text box.
- c In the **Visibility** section, select the **All Tenants** radio button and specify to which tenant the property is available.
- d (Optional) Enter a property description in the **Description** text box.  
Describe the intent of the property and any information that might help the consumer best use the property.
- e Leave default setting for **Display order**.
- f Select **String** from the **Data type** drop-down menu.
- g Select **Yes** from the **Required** drop-down menu.
- h Select **Dropdown** from the **Display as** drop-down menu.
- i Select **Static list** from the **Values** radio button.
- j Deselect **Enable custom value entry**.
- k Click **New** in the **Static list** area and enter a property name and value from the following table.

Name	Value
San Francisco	SFO
Los Angeles	LAX

- l Click **OK** to save both predefined values.
- m Click **OK** to save the property definition.  
The property is created and available on the **Property Definitions** page.

- 4 Select **Administration > Property Dictionary > Property Groups** and click **New**.
- 5 Enter **Select Location** in the **Name** text box.
- 6 If you enter the **Name** value first, the **ID** text box is populated with the same value.
- 7 In the **Visibility** section, select the **All Tenants** radio button to specify with which tenant the property is to be available.
- 8 (Optional) Enter a description of the property group.
- 9 Add a property to the group by using the **Properties** box.
  - a Click **New**.
  - b Select **Vrm.DataCenter.Location** as the property name.
  - c Deselect the **Encrypted** check box.
  - d Select the **Show in Request** check box.
  - e Click **OK** to add the property to the group.
- 10 Click **OK** to save the property group.

## Create a Reservation Policy for the Unified Blueprint

When tenant administrators and business group managers create a blueprint, they can add the reservation policy during blueprint creation. To add a reservation policy to an existing blueprint in your cross-region deployment, you can edit the blueprint.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservation Policies**.
- 3 Click **New**.
- 4 Type **Unified-Production-Policy** in the **Name** text box.
- 5 Select **Reservation Policy** from the **Type** drop-down menu.
- 6 Type **Reservation policy for Unified Blueprint** in the **Description** text box.
- 7 Click **OK**.

## Specify Reservation Information for the Unified Blueprint

In your cross-region deployment, each reservation is configured for a specific business group to grant them access to request specific physical machines.

Before members of a business group can request virtual machines, fabric administrators must allocate resources for them by creating a reservation. Each reservation is configured for a specific business group, and grants access to request machines on a specified compute resource.

Repeat this procedure twice to create reservations on the Region A Compute vCenter Cluster and the Region B Compute vCenter Cluster. In this scenario, you create reservations only for the Production business group.

Region	Business Group	Reservation Name	Reservation Policy	Compute Resource
Region A	Production	SFO01-Comp01-Prod-Unified01	Unified-Production-Policy	SFO01-Comp01(comp01vc01.sfo01.rainpole.local)
Region B	Production	LAX01-Comp01-Prod-Unified01	Unified-Production-Policy	LAX01-Comp01(comp01vc51.lax01.rainpole.local)

### Procedure

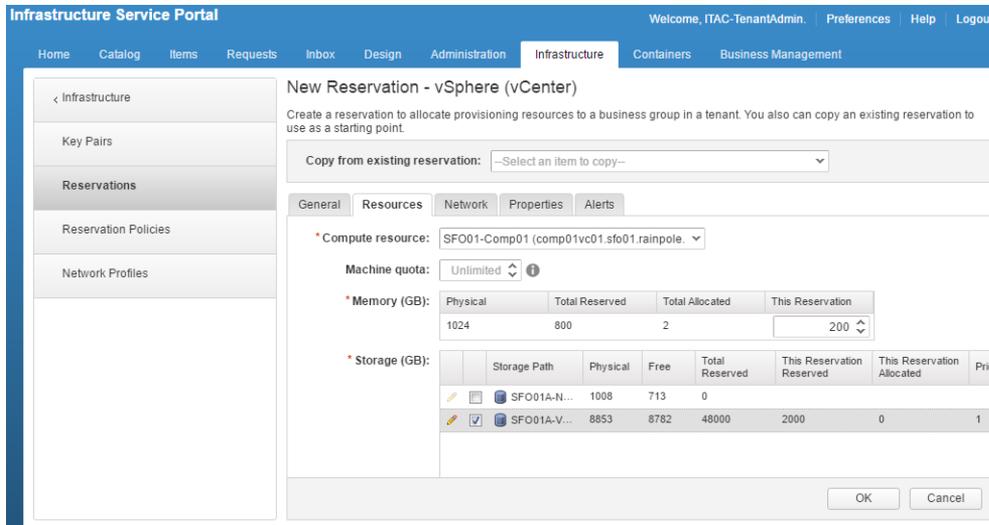
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Navigate to **Infrastructure > Reservations > Reservations** and click **New > vSphere**.
- 3 On the **New Reservation - vSphere (vCenter)** page, click the **General** tab, and specify the following values.

Setting	Production Group Value
Name	SFO01-Comp01-Prod-Unified01
Tenant	rainpole
Business Group	Production
Reservation Policy	Unified-Production-Policy
Priority	100
Enable This Reservation	Selected

- 4 On the **New Reservation - vSphere** page, click the **Resources** tab and specify the reservation.
  - a Select **SFO01-Comp01(comp01vc01.sfo01.rainpole.local)** from the **Compute Resource** drop-down menu.
  - b Enter **200** in the **This Reservation** column of the **Memory (GB)** table.
  - c In the **Storage (GB)** table, select the check box for datastore **SFO01A-VSAN01-COMP01**, enter **4000** in the **This Reservation Reserved** text box, enter **1** in the **Priority** text box, and click **OK**.
  - d Select **User-VMRP01** from the **Resource Pool** drop-down menu.



- 5 On the **New Reservation - vSphere (vCenter)** page, click the **Network** tab.
- 6 On the **Network** tab, specify the network information.
  - a Select the following network path check boxes listed from the **Network Paths** list.

Production Network Path	Production Group Network Profile
<input type="checkbox"/> vxw-dvs-xxxx-Production-Unified-VXLAN	<input type="checkbox"/> Ext-Net-Profile-Production-Unified

- b Select the corresponding network profile from the **Network Profile** drop-down menu for the business group whose reservation you are configuring.
- 7 Click **OK** to save the reservation.
- 8 Repeat the procedure to create the reservation for Region B.

## Create a Service Catalog for the Unified Blueprint

The service catalog provides a common interface for consumers of IT services to request and manage the services and resources they need. Users can browse the catalog to request services, track their requests, and manage their provisioned service items.

After the service catalog is created, business group managers can create entitlements for services, catalog items, and resource actions to groups of users. The entitlement allows members of a particular business group, for example, the Production business group, to use the blueprint. Without an entitlement, users cannot use the blueprint.

### Procedure

- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

- 2 Click the **Administration** tab, and select **Catalog Management > Services** .
- 3 Click **New** and create the service catalog.
  - a In the **New Service** dialog box type **Unified Single Machine Catalog** in the **Name** text box.
  - b Select **Active** from the **Status** drop-down menu.
  - c Click **OK**.

## Create Unified Single Machine Blueprints

A blueprint is the complete specification for a virtual, cloud, or physical machine. Blueprints determine a machine's attributes, the manner in which it is provisioned, and its policy and management settings. Tenants use these blueprints to provision virtual machines automatically.

This procedure creates cross-region blueprints for the virtual machine. The procedure uses pre-configured resources on the vCenter Server compute cluster in both Region A and Region B.

Repeat this procedure to create one unified single machine blueprint for each blueprint name listed in the following table.

Blueprint Name	VM Template	Customization Specification
Windows Server 2012 R2 - Unified	windows-2012r2-64	itac-windows-joindomain-custom-spec
Redhat Enterprise Linux 6 - Unified	redhat6-enterprise-64	itac-linux-custom-spec

**Procedure**

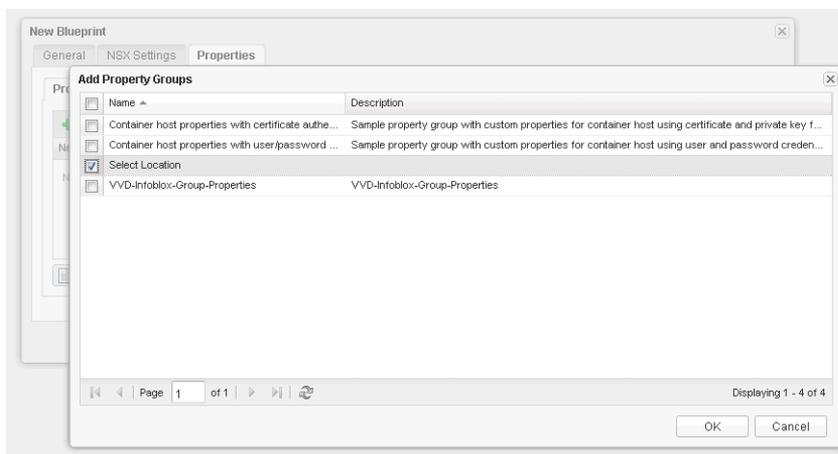
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	rainpole.local

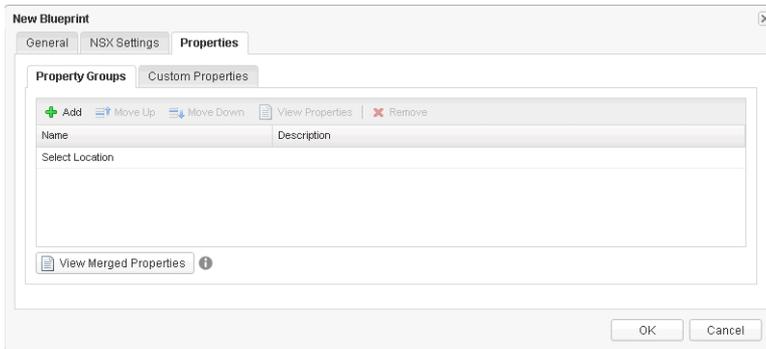
- 2 Navigate to **Design > Blueprints**.
- 3 Click **New**.
- 4 In the **New Blueprint** dialog box, configure the following settings on the **General** tab.

Setting	Value
Name	Windows Server 2012 R2 - Unified
Archive (days)	15
Deployment limit	Default setting (blank)
Minimum	30
Maximum	270

- 5 Click the **Properties** tab.
  - a Click **Add** on the **Property Groups** subtab.
  - b Select the property group **Select Location** and click **OK**.



6 Click **OK**.



7 Select and drag the **vSphere Machine** icon onto the design canvas.

8 Click the **General** tab, configure the following settings, and click **Save**.

Setting	Value
ID	Unified_Win2012R2_VM
Reservation Policy	Unified-Production-Policy
Machine Prefix	Prod-
Minimum	Default setting
Maximum	Default setting

9 Click the **Build Information** tab, configure the following settings, and click **Save**.

Setting	Value
Blueprint Type	Server
Action	Clone
Provisioning Workflow	CloneWorkflow
Clone from	windows-2012r2-64
Customization spec	itac-windows-joindomain-custom-spec

10 Click the **Machine Resources** tab, configure the following settings, and click **Save**.

Setting	Minimum	Maximum
CPU	2	4
Memory (MB):	4096	16384
Storage	Default setting	Default setting

11 Click the **Network** tab.

- a Select **Network & Security** in the **Categories** section to display the list of available network and security components.
- b Select the **Existing Network** component and drag it onto the design canvas.

- c Click in the **Existing network** text box and select the **Ext-Net-Profile-Production-Unified** network profile.
- d Click **Save**.
- e Select **vSphere\_Machine** properties from the design canvas.
- f Select the **Network** tab, click **New**, configure the following settings, and click **OK**.

Setting	Value
Network	ExtNetProfileProductionUnified
Assignment Type	Static IP
Address	Default setting (blank)

- 12 Click **Save** and click **Finish**.
- 13 Select the blueprint and click **Publish**.
- 14 Repeat this procedure to create the blueprint for Linux.

## Configure Entitlements for Blueprints in the Cross-Region Deployment

You entitle users to the actions and items that belong to the service catalog by associating each blueprint with an entitlement.

Repeat this procedure to associate the following blueprints with their entitlement.

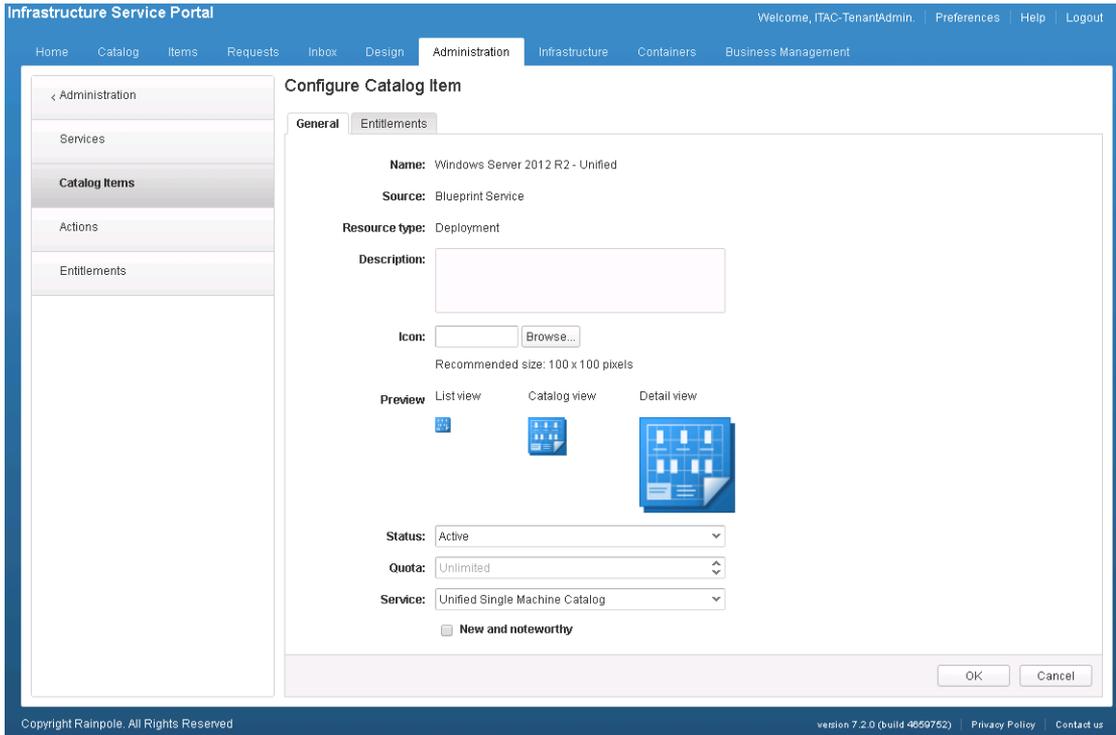
Blueprint Name	VM Template	Reservation Policy	Service Catalog	Add to Entitlement
Windows Server 2012 R2 -Unified	windows-2012r2-64 (comp01vc01.sfo01.rainpole.local)	Production- Unified-Policy	Unified Single Machine Catalog	Prod-SingleVM- Entitlement
Redhat Enterprise Linux 6 - Unified	redhat6- enterprise-64(comp01vc01.sfo01.rainpole.local)	Production- Unified-Policy	Unified Single Machine Catalog	Prod-SingleVM- Entitlement

### Procedure

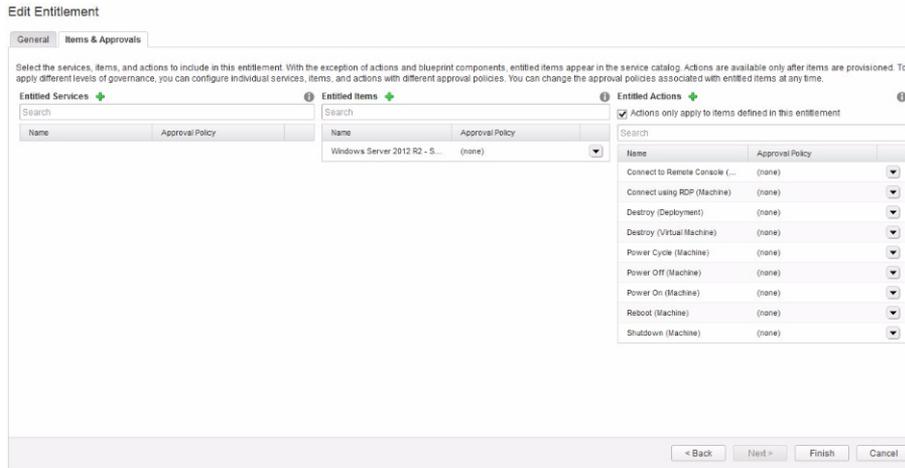
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to <https://vra01svr01.rainpole.local/vcac/org/rainpole>.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select the **Administration** tab and navigate to **Catalog Management > Catalog Items**.
- 3 On the **Configure Catalog Items** pane, select the **Windows Server 2012 R2 - Unified** blueprint in the Catalog Items list and click **Configure**.
- 4 On the **General** tab of the **Configure Catalog Items** wizard, select **Unified Single Machine Blueprint Catalog** from the **Service** drop-down menu, and click **OK**.



- 5 Associate the blueprint with the Prod-SingleVM-Entitlement entitlement.
  - a Click **Entitlements** and select **Prod-SingleVM-Entitlement**.
  - b Click the **Items & Approvals** tab, add the Windows Server 2012 R2 - Unified blueprint to the **Entitled Items** list, and click **OK**.
  - c Click **Finish**.



- 6 Click the **Catalog** tab and verify that the blueprint is listed in the Service Catalog.
- 7 Repeat this procedure to associate the other blueprint with its entitlement.

Blueprint Name	VM Template	Reservation Policy	Service Catalog	Add to Entitlement
Redhat Enterprise Linux 6 - Unified	redhat6-enterprise-64(comp01vc01.sfo01.rainpole.local)	Production- Unified-Policy	Unified Single Machine Catalog	Prod-SingleVM-Entitlement

## Test the Cross-Region Deployment of the Single Machine Blueprints

The data center environment is now ready for the multi-site deployment of virtual machines using vRealize Automation. Test your environment and confirm the successful provisioning to both Region A and Region B of virtual machines using the blueprints you created .

Repeat this procedure twice to provision virtual machines in both the Region A and Region B Compute vCenter Server instances.

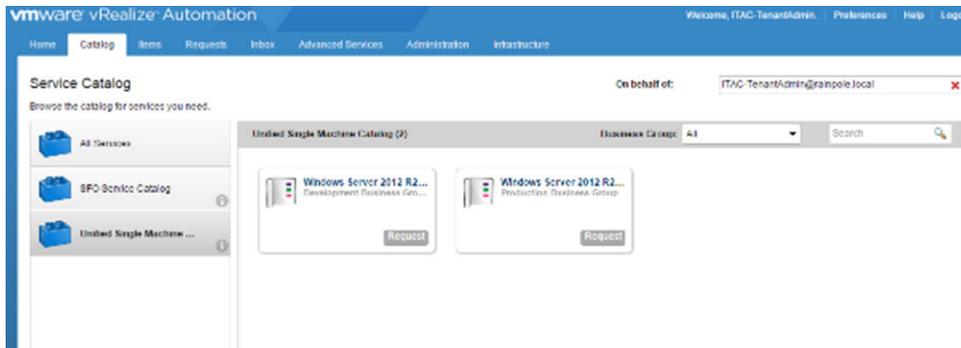
Region	Compute vCenter Server
San Francisco	comp01vc01.sfo01.rainpole.local
Los Angeles	comp01vc51.lax01.rainpole.local

**Procedure**

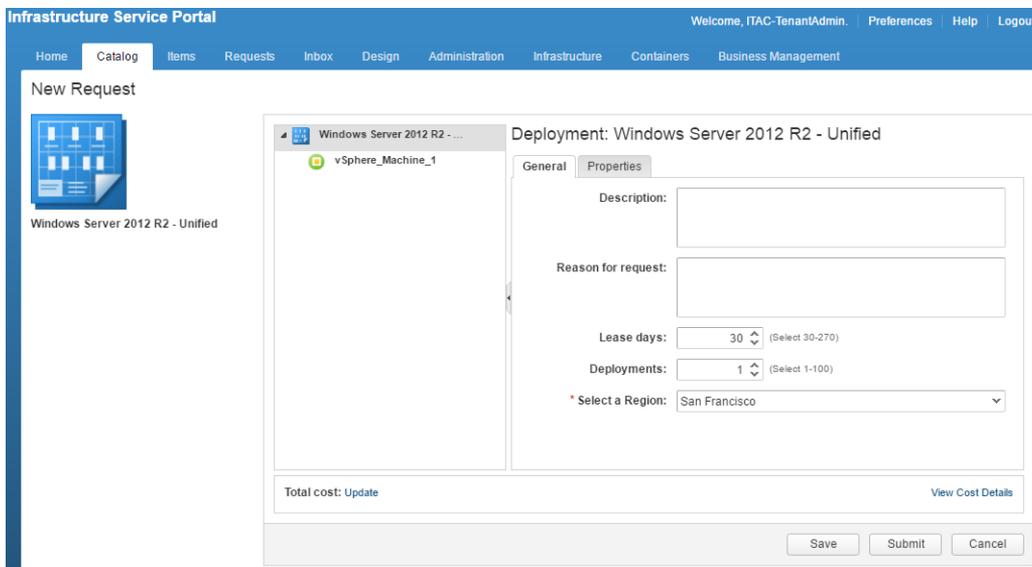
- 1 Log in to the vRealize Automation Rainpole portal.
  - a Open a Web browser and go to **https://vra01svr01.rainpole.local/vcac/org/rainpole**.
  - b Log in using the following credentials.

Setting	Value
User name	itac-tenantadmin
Password	<i>itac-tenantadmin_password</i>
Domain	Rainpole.local

- 2 Select the **Catalog** tab and select **Unified Single Machine Catalog** from the catalog of available services.



- 3 Click the **Request** button for the Windows Server 2012 R2 - Unified blueprint.
- 4 Select **San Francisco** from the **Select a Region** drop-down menu, and click **Submit**.



- 5 Verify the request finishes successfully.
  - a Select the **Requests** tab.
  - b Select the request you submitted and wait several minutes for the request to complete.  
Click the **Refresh** icon every few minutes until a **Successful** message appears under **Status**.
  - c Click **View Details**.
  - d Under **Status Details**, verify that the virtual machine successfully provisioned.
- 6 Verify the virtual machine provisions in the Region A vCenter Server compute cluster.
  - a Open a Web browser and go to **https://comp01vc01.sfo01.rainpole.local/vsphere-client**.
  - b Log in as the vCenter Server administrator using the following credentials.
 

Setting	Value
User name	administrator@vsphere.local
Password	vcenter_admin_password
  - c Select **Home > VMs and Templates**.
  - d In the **Navigator** panel, expand the vCenter Server compute cluster **comp01vc01.sfo01.rainpole.local > SFO01 > VRM**, and verify that the virtual machine exists.
- 7 Repeat the procedure for Region B.
  - a Provision virtual machines to the Region B vCenter Server compute cluster.
  - b Verify that the request finishes successfully and that the virtual machine is provisioned in the Region B vCenter Server compute cluster.

You have successfully performed a cross-region deployment of vRealize Automation single machine blueprints, and have provisioned virtual machines in both Region A and Region B.