Managing vRealize Automation

Modified on 20 SEP 2017
vRealize Automation 7.3

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VMware, Inc.
3401 Hillview Ave.
Palo Alto, CA 94304
www.vmware.com

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Managing vRealize Automation provides information about maintaining VMware vRealize ™ Automation, including how to start and stop a deployment, as well as manage certificates and the appliance database. In addition, it contains information on backing up and restoring vRealize Automation.

Intended Audience

This information is intended for anyone who wants to manage a vRealize Automation deployment. The information is written for experienced Windows or Linux system administrators who are familiar with virtual machine technology and datacenter operations.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to http://www.vmware.com/support/pubs.

Updated Information 2

This *Managing vRealize Automation* is updated with each release of the product or when necessary.

This table provides the update history of the *Managing vRealize Automation*.

Revision	Description
20 SEP 2017	■ Updated Backing Up vRealize Automation. ■ Updated Backing Up the vRealize Automation Appliance. ■ Updated Backing Up IaaS Components.
12 SEP 2017	Updated Scenario: Perform Manual vRealize Automation Appliance Database Failover.
30 AUG 2017	■ Added topics for audit logging: Using vRealize Automation Audit Logging and Configure vRealize Automation for Log Insight Audit Logging. ■ Added topics for re-registering vRealize Orchestrator for vRealize Automation certificates: Update Embedded vRealize Orchestrator to Trust vRealize Automation Certificates and Update External vRealize Orchestrator to Trust vRealize Automation Certificates.
EN-002419-02	■ Updated Manually Recover Appliance Database from Catastrophic Failure. ■ Updated Replace Certificates in the vRealize Automation Appliance. ■ Updated Start Up vRealize Automation.
EN-002419-01	Added Manually Recover Appliance Database from Catastrophic Failure.
EN-002419-00	Initial release.

Maintaining and Customizing vRealize Automation Components and Options

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You can manage provisioned machines and other aspects of your vRealize Automation deployment.

This section includes the following topics:

Broadcast a Message on the Message Board Portlet

As the tenant administrator, you use the message board portlet to broadcast a message to all the users who have the portlet on their Home tab.

Any new users that you add to vRealize Automation has the portlet on their Home tab by default. Existing users must add the portlet to receive your messages.

You use the message board portlet to broadcast a text message or a Web page. Depending on the Web page, your users can navigate through the Web site in the message board.

The message board has the following limitations.

Table 3-1. Message Board Portlet Limitations

Option	Limitations
URL message limitations	■ You can only publish content that is hosted on an https site. ■ You cannot use self-signed certificates. The option to accept the certificate does not appear in the message board. ■ The message board URL is embedded in an iframe. Some Web sites do not work in iframe and an error appears. One cause of the failure is the X-Frame-Options DENY or SAMEORIGIN in the header on the target Web site. If your target Web site is one that you control, you can set the X-Frame-Options header to `X-Frame-Options: ALLOW-FROM https://<vRealizeAutomationApplicanceURL>`. ■ Some Web sites have a redirect to a top-level page that might refresh entire vRealize Automation page. This type of Web site does not work in the message board. The refresh is suppressed and a Loading... message appears on the message board. ■ If you display an internal HTML page, the page cannot have the vRealize Automation host as the URL.
Custom message limitations	■ To maintain security, the Custom Message does not support HTML code. For example, you cannot use <href> to link to a Web site. You must use the URL message option.

Prerequisites

Log in to the vRealize Automation console as a **tenant administrator**.

Procedure

1 Select the **Home** tab.

2 Click the **Edit** icon ( ) in the upper right corner.

3 Select **Add Portlets**.

4 Locate Message Board and click **Add**.

5 Click **Close**.

The portlet is added to the top of the Home tab. If you are a user and a message is broadcast, you see the message until the tenant administrator changes it or removes it. If you are the tenant administrator, you configure the message.

6 To configure the message as a tenant administrator, click **Add New Message**.

7 Configure one of the following options.

Option	Description
URL	Enter the page URL.
Custom Message	Enter the plain text message.

8 Click **Publish**.

The message is broadcast to any tenant users who added the message board portlet to their Home tab.

To change or remove the message, you must be logged in as the tenant administrator. To change the message, repeat the same steps. To remove the message, remove the URL or text and publish the blank message.

Starting Up and Shutting Down vRealize Automation

A system administrator performs a controlled shutdown or startup of vRealize Automation to preserve system and data integrity.

You can also use a controlled shutdown and startup to resolve performance or product behavior issues that can result from an incorrect initial startup. Use the restart procedure when only some components of your deployment fail.

Start Up vRealize Automation

When you start vRealize Automation from the beginning, such as after a power outage, a controlled shutdown or after recovery, you must start its components in a specified order.

Prerequisites

Verify that the load balancers that your deployment uses are running.

Procedure

1. Start the MS SQL database machine. If you are using a legacy PostgreSQL standalone database, start that machine as well.
2. (Optional) If you are running a deployment that uses load balancers with health checks, disable the health check before you start the vRealize Automation appliance. Only ping health check should be enabled.
3. Start all instances of vRealize Automation appliance at the same time and wait for approximately 15 minutes for the appliances to startup. Verify that the vRealize Automation appliance services are up and running.

   If you have more than one node and you start only one node, you may have to wait for extra 35 minutes. However, the extra wait time would be canceled out as soon as you start the second node.
4. Start the primary Web node and wait for the startup to finish.
5. (Optional) If you are running a distributed deployment, start all secondary Web nodes and wait 5 minutes.
6. Start the primary Manager Service machine and wait for 2 to 5 minutes, depending on your site configuration.

7 (Optional) If you are running a distributed deployment, start secondary Manager Service machines and wait 2 to 5 minutes.

   On secondary machines, do not start or run the Windows service unless you are configured for automatic Manager Service failover.

8 Start the Distributed Execution Manager Orchestrator and Workers and all vRealize Automation proxy agents.

   You can start these components in any order and you do not need to wait for one startup to finish before you start another.

9 If you disabled health checks for your load balancers, reenable them.

10 Verify that the startup succeeded.

   a Open a Web browser to the vRealize Automation appliance management interface URL.

   b Click the **Services** tab.

   c Click the **Refresh** tab to monitor the progress of service startup.

When all services are listed as registered, the system is ready to use.

Restart vRealize Automation

When you restart more than one vRealize Automation component, you must restart the components in a specified order.

You might need to restart some components in your deployment to resolve anomalous product behavior. If you are using vCenter Server to manage your virtual machines, use the guest `restart` command to restart vRealize Automation.

If you cannot restart a component or service, follow the instructions in Shut Down vRealize Automation and Start Up vRealize Automation.

Prerequisites

Verify that load balancers that your deployment uses are running.

Procedure

1 Restart the all instances of the vRealize Automation appliance at the same time.

2 Restart the primary Web node and wait for startup to finish.

3 If you are running a distributed deployment, restart secondary Web nodes and wait for startup to finish.

4 Restart Manager Service nodes and wait for startup to finish.

   If running automatic Manager Service failover, and you want to keep the active and passive nodes the same, restart in the following order:

   a Stop the passive Manager Service nodes without restarting them.

   b Completely restart the active Manager Service node.

   c Start the passive Manager Service nodes.

5 Restart the Distributed Execution Manager Orchestrator and Workers and all vRealize Automation agents, and wait for startup to finish for all components.

   You can restart these components in any order.

6 Verify that the service you restarted is registered.

   a Open a Web browser to the vRealize Automation appliance management interface URL.

   b Click the **Services** tab.

   c Click the **Refresh** tab to monitor the progress of service startup.

When all services are listed as registered, the system is ready to use.

Shut Down vRealize Automation

To preserve data integrity, you must shut down vRealize Automation in a specified order.

If you are using vCenter Server to manage your virtual machines, use the guest `shutdown` command to shut down vRealize Automation.

Procedure

1 Shut down the Distributed Execution Manager Orchestrator and Workers and all vRealize Automation agents in any order and wait for all components to finish shutting down.

2 Shut down virtual machines that are running the Manager Service and wait for the shutdown to finish.

3 (Optional) For distributed deployments, shut down all secondary Web nodes and wait for the shutdown to finish.

4 Shut down the primary Web node, and wait for the shutdown to finish.

5 (Optional) For distributed deployments, shut down all secondary vRealize Automation appliance instances and wait for the shutdown to finish.

6 Shut down the primary vRealize Automation appliance and wait for the shutdown to finish.

   If applicable, the primary vRealize Automation appliance is the one that contains the master, or writeable, appliance database. Make a note of the name of the primary vRealize Automation appliance. You use this information when you restart vRealize Automation.

7 Shut down the MSSQL virtual machines in any order and wait for the shutdown to finish.

8 If you are using a legacy standalone PostgreSQL database, also shut down that machine.

You shut down your vRealize Automation deployment.

Updating vRealize Automation Certificates

A system administrator can update or replace certificates for vRealize Automation components.

vRealize Automation contains three main components that use SSL certificates in order to facilitate secure communication with each other. These components are as follows:

- vRealize Automation appliance
- IaaS website component
- IaaS manager service component

In addition, your deployment can have certificates for the vRealize Automation appliance management site. Also, each IaaS machine runs a Management Agent that uses a certificate.

With one exception, changes to later components in this list do not affect earlier ones. The exception is that an updated certificate for IaaS components must be registered with vRealize Automation appliance.

Typically, self-signed certificates are generated and applied to these components during product installation. You might need to replace a certificate to switch from self-signed certificates to certificates provided by a certificate authority or when a certificate expires. When you replace a certificate for a vRealize Automation component, trust relationships for other vRealize Automation components are updated automatically.

For instance, in a distributed system with multiple instances of a vRealize Automation appliance, if you update a certificate for one vRealize Automation appliance all other related certificates are updated automatically.

Note vRealize Automation supports SHA2 certificates. The self-signed certificates generated by the system use SHA-256 With RSA Encryption. You may need to update to SHA2 certificates due to operating system or browser requirements.

The vRealize Automation virtual appliance management console provides three options for updating or replacing certificates for existing deployments:

- **Generate certificate** - Use this option to have the system generate a self-signed certificate.
- **Import certificate** - Use this option if you have a certificate that you want to use.
- **Provide certificate thumbprint** - Use this option if you want to provide a certificate thumb print to use a certificate that is already deployed in the certificate store on the IaaS servers. Using this option will not transmit the certificate from the virtual appliance to the IaaS servers. It enables users to deploy existing certificates on IaaS servers without uploading them in the vRealize Automation management console.

Also, you can select the **Keep Existing** option to keep your existing certificate.

Note In a clustered deployment, you must initiate certificate changes from the virtual appliance management interface on the master node.

Certificates for the vRealize Automation appliance management site do not have registration requirements.

Note If your certificate uses a passphrase for encryption and you fail to enter it when replacing your certificate on the virtual appliance, the certificate replacement fails and the message `Unable to load private key` appears.

The vRealize Orchestrator component that is associated with your vRealize Automation deployment has its own certificates, and it must also trust the vRealize Automation certificates. By default, the vRealize Orchestrator component is embedded in vRealize Automation, but you can elect to use an external vRealize Orchestrator. In either case, see the vRealize Orchestrator documentation for information about updating vRealize Orchestrator certificates. If you update or replace the vRealize Automation certificates, you must update vRealize Orchestrator to trust the new certificates.

Note If you use a multi-node vRealize Orchestrator deployment that is behind a load balancer, all vRealize Orchestrator nodes must use the same certificate.

For important information about troubleshooting, supportability, and trust requirements for certificates, see the VMware knowledge base article at http://kb.vmware.com/kb/2106583.

Extracting Certificates and Private Keys

Certificates that you use with the virtual appliances must be in the PEM file format.

The examples in the following table use Gnu `openssl` commands to extract the certificate information you need to configure the virtual appliances.

Table 3-2. Sample Certificate Values and Commands (openssl)

Certificate Authority Provides	Command	Virtual Appliance Entries
RSA Private Key	openssl pkcs12 -in *path _to_.pfx certificate_file* -nocerts -out key.pem	**RSA Private Key**
PEM File	openssl pkcs12 -in *path _to_.pfx certificate_file* -clcerts -nokeys -out cert.pem	**Certificate Chain**
(Optional) Pass Phrase	n/a	**Pass Phrase**

Replace Certificates in the vRealize Automation Appliance

The system administrator can update or replace a self-signed certificate with a trusted one from a certificate authority. You can use Subject Alternative Name (SAN) certificates, wildcard certificates, or any other method of multi-use certification appropriate for your environment as long as you satisfy the trust requirements.

When you update or replace the vRealize Automation appliance certificate, trust with other related components is re-initiated automatically. See Updating vRealize Automation Certificates for more information about updating certificates.

Procedure

1. Open a Web browser to the vRealize Automation appliance management interface URL.
2. Log in with user name **root** and the password you specified when deploying the vRealize Automation appliance.
3. Select **vRA Settings > Host Settings**.
4. Select the certificate type from the **Certificate Action** menu.

   If you are using a PEM-encoded certificate, for example for a distributed environment, select **Import**.

   Certificates that you import must be trusted and must also be applicable to all instances of vRealize Automation appliance and any load balancer through the use of Subject Alternative Name (SAN) certificates.

   If you want to generate a CSR request for a new certificate that you can submit to a certificate authority, select **Generate Signing Request**. A CSR helps your CA create a certificate with the correct values for you to import.

   Note If you use certificate chains, specify the certificates in the following order:

   a Client/server certificate signed by the intermediate CA certificate

   b One or more intermediate certificates

   c A root CA certificate

Option	Action
Keep Existing	Leave the current SSL configuration. Select this option to cancel your changes.
Generate Certificate	a The value displayed in the **Common Name** text box is the Host Name as it appears on the upper part of the page. If any additional instances of the vRealize Automation appliance available, their FQDNs are included in the SAN attribute of the certificate. b Enter your organization name, such as your company name, in the **Organization** text box. c Enter your organizational unit, such as your department name or location, in the **Organizational Unit** text box. d Enter a two-letter ISO 3166 country code, such as **US**, in the **Country** text box.

Option	Action
Generate Signing Request	a Select **Generate Signing Request**. b Review the entries in the **Organization**, **Organization Unit**, **Country Code**, and **Common Name** text boxes. These entries are populated from the existing certificate. You can edit these entries if needed. c Click **Generate CSR** to generate a certificate signing request, and then click the **Download the generated CSR here** link to open a dialog that enables you to save the CSR to a location where you can send it to a certificate authority. d When you receive the prepared certificate, click **Import** and follow instructions for importing a certificate into vRealize Automation.
Import	a Copy the certificate values from BEGIN PRIVATE KEY to END PRIVATE KEY, including the header and footer, and paste them in the **RSA Private Key** text box. b Copy the certificate values from BEGIN CERTIFICATE to END CERTIFICATE, including the header and footer, and paste them in the **Certificate Chain** text box. For multiple certificate values, include a BEGIN CERTIFICATE header and END CERTIFICATE footer for each certificate. **Note** In the case of chained certificates, additional attributes may be available. c (Optional) If your certificate uses a pass phrase to encrypt the certificate key, copy the pass phrase and paste it in the **Passphrase** text box.

5 Click **Save Settings**.

After a few minutes, the certificate details for all applicable instances of the vRealize Automation appliance appear on the page.

6 If required by your network or load balancer, copy the imported or newly created certificate to the virtual appliance load balancer.

You might need to enable root SSH access in order to export the certificate.

a If not already logged in, log in to the vRealize Automation appliance Management Console as root.

b Click the **Admin** tab.

c Click the **Admin** sub menu.

d Select the **SSH service enabled** check box.

Deselect the check box to disable SSH when finished.

e Select the **Administrator SSH login** check box.

Deselect the check box to disable SSH when finished.

f Click **Save Settings**.

7 Confirm that you can log in to vRealize Automation console.

   a Open a browser and navigate to https://*vcac-hostname.domain.name*/vcac/.

   If you are using a load balancer, the host name must be the fully qualified domain name of the load balancer.

   b If prompted, continue past the certificate warnings.

   c Log in with **`administrator@vsphere.local`** and the password you specified when configuring Directories Management.

   The console opens to the **Tenants** page on the **Administration** tab. A single tenant named `vsphere.local` appears in the list.

8 If you are using a load balancer, configure and enable any applicable health checks.

The certificate is updated.

Replace the Infrastructure as a Service Certificate

The system administrator can replace an expired certificate or a self-signed certificate with one from a certificate authority to ensure security in a distributed deployment environment.

You can use a Subject Alternative Name (SAN) certificate on multiple machines. Certificates used for the IaaS components (Website and Manager Service) must be issued with SAN values including FQDNs of all Windows hosts on which the corresponding component is installed and with the Load Balancer FQDN for the same component.

There are three options for replacing a certificate:

- Generate certificate - Use this option to have the system generate a self-signed certificate.
- Import certificate - Use this option if you have a certificate that you want to use.
- Provide certificate thumbprint - If you accept a certificate that is signed by a CA but that certificate is not trusted by your system, you must determine whether to accept the certificate thumbprint. The thumbprint is used to quickly determine if a presented certificate is the same as another certificate, such as the certificate that was accepted previously.

Also, you can use Keep Existing to keep your existing certificate.

Procedure

1 Open a Web browser to the vRealize Automation appliance management interface URL.

2 Log in with user name **`root`** and the password you specified when deploying the vRealize Automation appliance.

3 Select **vRA Settings > Certificates**.

4 Click **IaaS Web** on the **Component Type** menu.

5 Go to the **IaaS Web Certificate** pane.

6 Select the certificate replacement option from the **Certificate Action** menu.

If you are using a PEM-encoded certificate, for example for a distributed environment, select **Import**.

Certificates that you import must be trusted and must also be applicable to all instances of vRealize Automation appliance and any load balancer through the use of Subject Alternative Name (SAN) certificates.

Note If you use certificate chains, specify the certificates in the following order:

a Client/server certificate signed by the intermediate CA certificate

b One or more intermediate certificates

c A root CA certificate

Option	Description
Keep Existing	Leave the current SSL configuration. Choose this option to cancel your changes.
Generate Certificate	a The value displayed in the **Common Name** text box is the Host Name as it appears on the upper part of the page. If any additional instances of the vRealize Automation appliance available, their FQDNs are included in the SAN attribute of the certificate. b Enter your organization name, such as your company name, in the **Organization** text box. c Enter your organizational unit, such as your department name or location, in the **Organizational Unit** text box. d Enter a two-letter ISO 3166 country code, such as **US**, in the **Country** text box.
Import	a Copy the certificate values from BEGIN PRIVATE KEY to END PRIVATE KEY, including the header and footer, and paste them in the **RSA Private Key** text box. b Copy the certificate values from BEGIN CERTIFICATE to END CERTIFICATE, including the header and footer, and paste them in the **Certificate Chain** text box. For multiple certificate values, include a BEGIN CERTIFICATE header and END CERTIFICATE footer for each certificate. **Note** In the case of chained certificates, additional attributes may be available. c (Optional) If your certificate uses a pass phrase to encrypt the certificate key, copy the pass phrase and paste it in the **Passphrase** text box.
Provide Certificate Thumbprint	Use this option if you want to provide a certificate thumbprint to use a certificate that is already deployed in the certificate store on the IaaS servers. Using this option will not transmit the certificate from the virtual appliance to the IaaS servers. It enables users to deploy existing certificates on IaaS servers without uploading them in the management interface.

7 Click Save Settings.

After a few minutes, the certificate details appear on the page.

Replace the IaaS Manager Service Certificate

A system administrator can replace an expired certificate or a self-signed certificate with one from a certificate authority to ensure security in a distributed deployment environment.

You can use a Subject Alternative Name (SAN) certificate on multiple machines. Certificates used for the IaaS components (Website and Manager Service) must be issued with SAN values including FQDNs of all Windows hosts on which the corresponding component is installed and with the Load Balancer FQDN for the same component.

The IaaS Manager Service and the IaaS Web Service share a single certificate.

Procedure

1. Open a Web browser to the vRealize Automation appliance management interface URL.
2. Log in with user name **`root`** and the password you specified when deploying the vRealize Automation appliance.
3. Select **vRA Settings > Certificates**.
4. Click **Manager Service** from the **Certificate Type** menu.
5. Select the certificate type from the **Certificate Action** menu.

   If you are using a PEM-encoded certificate, for example for a distributed environment, select **Import**.

   Certificates that you import must be trusted and must also be applicable to all instances of vRealize Automation appliance and any load balancer through the use of Subject Alternative Name (SAN) certificates.

   Note If you use certificate chains, specify the certificates in the following order:

   a. Client/server certificate signed by the intermediate CA certificate
   b. One or more intermediate certificates
   c. A root CA certificate

Option	Description
Keep Existing	Leave the current SSL configuration. Choose this option to cancel your changes.
Generate Certificate	a. The value displayed in the **Common Name** text box is the Host Name as it appears on the upper part of the page. If any additional instances of the vRealize Automation appliance available, their FQDNs are included in the SAN attribute of the certificate. b. Enter your organization name, such as your company name, in the **Organization** text box. c. Enter your organizational unit, such as your department name or location, in the **Organizational Unit** text box. d. Enter a two-letter ISO 3166 country code, such as **`US`**, in the **Country** text box.

Option	Description
Import	a Copy the certificate values from BEGIN PRIVATE KEY to END PRIVATE KEY, including the header and footer, and paste them in the **RSA Private Key** text box. b Copy the certificate values from BEGIN CERTIFICATE to END CERTIFICATE, including the header and footer, and paste them in the **Certificate Chain** text box. For multiple certificate values, include a BEGIN CERTIFICATE header and END CERTIFICATE footer for each certificate. **Note** In the case of chained certificates, additional attributes may be available. c (Optional) If your certificate uses a pass phrase to encrypt the certificate key, copy the pass phrase and paste it in the **Passphrase** text box.
Provide Certificate Thumbprint	Use this option if you want to provide a certificate thumbprint to use a certificate that is already deployed in the certificate store on the IaaS servers. Using this option will not transmit the certificate from the virtual appliance to the IaaS servers. It enables users to deploy existing certificates on IaaS servers without uploading them in the management interface.

6 Click **Save Settings**.

After a few minutes, the certificate details appear on the page.

7 If required by your network or load balancer, copy the imported or newly created certificate to the load balancer.

8 Open a browser and navigate to `https://managerServiceAdddress/vmpsProvision/` from a server that this running a DEM worker or agent.

If you are using a load balancer, the host name must be the fully qualified domain name of the load balancer.

9 If prompted, continue past the certificate warnings.

10 Validate that the new certificate is provided and is trusted.

11 If you are using a load balancer, configure and enable any applicable health checks.

Update Embedded vRealize Orchestrator to Trust vRealize Automation Certificates

If you update or change vRealize Automation appliance or IaaS certificates, you must update vRealize Orchestrator to trust the new or updated certificates.

This procedure applies to all vRealize Automation deployments that use an embedded vRealize Orchestrator instance. If you use an external vRealize Orchestrator instance, see Update External vRealize Orchestrator to Trust vRealize Automation Certificates.

Note This procedure resets tenant and group authentication back to the default settings. If you have customized your authentication configuration, note your changes so that you can re-configure authentication after completing the procedure.

See the vRealize Orchestrator documentation for information about updating and replacing vRealize Orchestrator certificates.

If you replace or update vRealize Automation certificates without completing this procedure, the vRealize Orchestrator Control Center may be inaccessible, and errors may appear in the vco-server and vco-configurator log files.

Problems with updating certificates can also occur if vRealize Orchestrator is configured to authenticate against a different tenant and group than vRealize Automation. See https://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2147612.

Procedure

1 Stop the vRealize Orchestrator server and Control Center services.

```
service vco-server stop
service vco-configuration stop
```

2 Reset the vRealize Orchestrator authentication provider.

   a Run the `/var/lib/vco/tools/configuration-cli/bin/vro-configure.sh reset-authentication` command.

   b Delete `/etc/vco/app-server/vco-registration-id`.

   c Run `vcac-vami vco-service-reconfigure`

3 Start the vRealize Orchestrator server and control center services.

```
service vco-server start
service vco-configurator start
```

Update External vRealize Orchestrator to Trust vRealize Automation Certificates

If you update or change vRealize Automation appliance or IaaS certificates, you must update vRealize Orchestrator to trust the new or updated certificates.

This procedure applies to vRealize Automation deployments that use an external vRealize Orchestrator instance.

Note This procedure resets tenant and group authentication back to the default settings. If you have customized your authentication configuration, note your changes so that you can re-configure authentication after completing the procedure.

See the vRealize Orchestrator documentation for information about updating and replacing vRealize Orchestrator certificates.

If you replace or update vRealize Automation certificates without completing this procedure, the vRealize Orchestrator Control Center may be inaccessible, and errors may appear in the vco-server and vco-configurator log files.

Problems with updating certificates can also occur if vRealize Orchestrator is configured to authenticate against a different tenant and group than vRealize Automation. See https://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=2147612.

Procedure

1 Stop the vRealize Orchestrator server and Control Center services.

```
service vco-configuration stop
```

2 Reset the vRealize Orchestrator authentication provider.

```
/var/lib/vco/tools/configuration-cli/bin/vro-configure.sh reset-authentication
```

3 Start the vRealize Orchestrator Control Center service.

```
service vco-configurator start
```

4 Log in to the Control Center using virtual appliance management interface root credentials.

5 Unregister and re-register the authentication provider.

Updating the vRealize Automation Appliance Management Site Certificate

The system administrator can replace the SSL certificate of the management site service when it expires or to replace a self-signed certificate with one issued by a certificate authority. You secure the management site service on port 5480.

The vRealize Automation appliance uses lighttpd to run its own management site. When you replace a management site certificate, you must also configure all Management Agents to recognize the new certificate.

If you are running a distributed deployment, you can update management agents automatically or manually. If you are running a minimal deployment, you must update the management agent manually.

See Manually Update Management Agent Certificate Recognition for more information.

Procedure

1 Find the Management Agent Identifier

You use the Management Agent identifier when you create and register a new management site server certificate.

2 Replace the vRealize Automation Appliance Management Site Certificate

The vRealize Automation appliance uses lighttpd to run its own management site. You can replace the SSL certificate of the management site service if your certificate expires or if you are using a self-signed certificate and your company security policy requires you to use its SSL certificates. You secure the management site service on port 5480.

3 Update Management Agent Certificate Recognition

After replacing a vRealize Automation appliance management site certificate, you must update all management agents to recognize the new certificate and to reestablish trusted communications between the virtual appliance management site and management agents on IaaS hosts.

Find the Management Agent Identifier

You use the Management Agent identifier when you create and register a new management site server certificate.

Procedure

1 Open the Management Agent configuration file located at `<vra-installation-dir>\Management Agent\VMware.IaaS.Management.Agent.exe.config`.

2 Record the value from the id attribute of the agentConfiguration element.

```
<agentConfiguration id="0E22046B-9D71-4A2B-BB5D-70817F901B27">
```

Replace the vRealize Automation Appliance Management Site Certificate

The vRealize Automation appliance uses lighttpd to run its own management site. You can replace the SSL certificate of the management site service if your certificate expires or if you are using a self-signed certificate and your company security policy requires you to use its SSL certificates. You secure the management site service on port 5480.

You can choose to install a new certificate or reuse the certificate used by the vRealize Automation service on port 443.

When you request a new certificate to update another CA-issued certificate, it is a best practice to reuse the Common Name from the existing certificate.

Prerequisites

- New certificates must be in PEM format and the private key cannot be encrypted. By default, the vRealize Automation appliance management site SSL certificate and private key are stored in a PEM file located at `/opt/vmware/etc/lighttpd/server.pem`.

  See Extracting Certificates and Private Keys if you require information about exporting a certificate and private key from a Java keystore to a PEM file.

Procedure

1 Log in by using the appliance console or SSH.

2 Back up your current certificate file.

```
cp /opt/vmware/etc/lighttpd/server.pem /opt/vmware/etc/lighttpd/server.pem-bak
```

3 Copy the new certificate to your appliance by replacing the content of the file `/opt/vmware/etc/lighttpd/server.pem` with the new certificate information.

4 Run the following command to restart the lighttpd server.

```
service vami-lighttp restart
```

5 Run the following command to restart the haproxy service.

```
service haproxy restart
```

6 Log in to the management console and validate that the certificate is replaced. You might need to restart your browser.

The new vRealize Automation appliance management site certificate is installed.

What to do next

Update all management agents to recognize the new certificate.

For distributed deployments, you can update management agents manually or automatically. For minimal installations, you must update agents manually.

- For information about automatic update, see Automatically Update Management Agents in a Distributed Environment to Recognize a vRealize Automation Appliance Management Site Certificate.
- For information about manual update, see Manually Update Management Agent Certificate Recognition.

Update Management Agent Certificate Recognition

After replacing a vRealize Automation appliance management site certificate, you must update all management agents to recognize the new certificate and to reestablish trusted communications between the virtual appliance management site and management agents on IaaS hosts.

Each IaaS host runs a management agent and each management agent must be updated. Minimal deployments must be updated manually, while distributed deployments can be updated manually or by using an automated process.

- Manually Update Management Agent Certificate Recognition

  After replacing a vRealize Automation appliance management site certificate, you must update Management Agents manually to recognize the new certificate to reestablish trusted communications between the virtual appliance management site and Management Agents on IaaS hosts.

- Automatically Update Management Agents in a Distributed Environment to Recognize a vRealize Automation Appliance Management Site Certificate

  After the management site certificate is updated in a high-availability deployment, the management agent configuration must also be updated to recognize the new certificate and reestablish trusted communication.

Manually Update Management Agent Certificate Recognition

After replacing a vRealize Automation appliance management site certificate, you must update Management Agents manually to recognize the new certificate to reestablish trusted communications between the virtual appliance management site and Management Agents on IaaS hosts.

Perform these steps for each Management Agent in your deployment after you replace a certificate for the vRealize Automation appliance management site.

For distributed deployments, you can update Management Agents manually or automatically. For information about automatic update, see Automatically Update Management Agents in a Distributed Environment to Recognize a vRealize Automation Appliance Management Site Certificate.

Prerequisites

Obtain the SHA1 thumbprints of the new vRealize Automation appliance management site certificate.

Procedure

1. Stop the VMware vCloud Automation Center Management Agent service.
2. Navigate to the Management Agent configuration file located at `[vcac_installation_folder]\Management Agent\VMware.IaaS.Management.Agent.exe.Config`, typically `C:\Program Files (x86)\VMware\vCAC\Management Agent\VMware.IaaS.Management.Agent.exe.Config`.
3. Open the file for editing and locate the endpoint configuration setting for the old management site certificate. which you can identify by the endpoint address.

   For example:

```
<agentConfiguration id="C816CFBC-4830-4FD2-8951-C17429CEA291" pollingInterval="00:03:00">
  <managementEndpoints>
    <endpoint address="https://vra-va.local:5480"
thumbprint="D1542471C30A9CE694A512C5F0F19E45E6FA32E6" />
  </managementEndpoints>
</agentConfiguration>
```

4. Change the thumbprint to the SHA1 thumbprint of the new certificate.

   For example:

```
<agentConfiguration id="C816CFBC-4830-4FD2-8951-C17429CEA291" pollingInterval="00:03:00">
  <managementEndpoints>
    <endpoint address="https://vra-va.local:5480"
thumbprint="8598B073359BAE7597F04D988AD2F083259F1201" />
  </managementEndpoints>
</agentConfiguration>
```

5. Start the VMware vCloud Automation Center Management Agent service.
6. Login to the virtual appliance management site and go to **vRA Settings > Cluster**.

7 Check the Distributed Deployment Information table to verify that the IaaS server has contacted the virtual appliance recently, which confirms that the update is successful.

Automatically Update Management Agents in a Distributed Environment to Recognize a vRealize Automation Appliance Management Site Certificate

After the management site certificate is updated in a high-availability deployment, the management agent configuration must also be updated to recognize the new certificate and reestablish trusted communication.

You can update vRealize Automation appliance management site certificate information for distributed systems manually or automatically. For information about manually updating management agents, see Manually Update Management Agent Certificate Recognition.

Use this procedure to update the certificate information automatically.

Procedure

1 When Management Agents are running, replace the certificate on a single vRealize Automation appliance management site in your deployment.

2 Wait fifteen minutes for the management agent to synchronize with the new vRealize Automation appliance management site certificate.

3 Replace certificates on other vRealize Automation appliance management sites in your deployment.

Management agents are automatically updated with the new certificate information.

Replace a Management Agent Certificate

The system administrator can replace the Management Agent certificate when it expires or replace a self-signed certificate with one issued by a certificate authority.

Each IaaS host runs its own Management Agent. Repeat this procedure on each IaaS node whose Management Agent you want to update.

Prerequisites

- Copy the Management Agent identifier in the Node ID column before you remove the record. You use this identifier when you create the new Management Agent certificate and when you register it.
- When you request a new certificate, ensure that the Common Name (CN) attribute in the certificate subject field for the new certificate is typed in the following format:

```
VMware Management Agent 00000000-0000-0000-0000-000000000000
```

Use the string VMware Management Agent, followed by a single space and the GUID for the Management Agent in the numerical format shown.

Procedure

1. Stop the Management Agent service from your Windows Services snap-in.
   a. From your Windows machine, click **Start**.
   b. In the Windows Start Search box, enter **`services.msc`** and press Enter.
   c. Right-click **VMware vCloud Automation Center Management Agent** service and click **Stop** to stop the service.
2. Remove the current certificate from the machine. For information about managing certificates on Windows Server 2008 R2, see the Microsoft Knowledge Base article at http://technet.microsoft.com/en-us/library/cc772354.aspx or the Microsoft wiki article at http://social.technet.microsoft.com/wiki/contents/articles/2167.how-to-use-the-certificates-console.aspx.
   a. Open the Microsoft Management Console by entering the command **`mmc.exe`**.
   b. Press Ctrl + M to add a new snap-in to the console or select the option from the File drop-down menu.
   c. Select **Certificates** and click **Add**.
   d. Select **Computer account** and click **Next**.
   e. Select **Local computer: (the computer this console is running on)**.
   f. Click **OK**.
   g. Expand **Certificates (Local Computer)** on the left side of the console.
   h. Expand **Personal** and select the Certificates folder.
   i. Select the current Management Agent certificate and click **Delete**.
   j. Click **Yes** to confirm the delete action.
3. Import the newly generated certificate into the local `computer.personal` store, or do not import anything if you want the system to auto-generate a new self-signed certificate.

4 Register the Management Agent certificate with the vRealize Automation appliance management site.

a Open a command prompt as an administrator and navigate to the Cafe directory on the machine on which the Management Agent is installed at `<vra-installation-dir>\Management Agent\Tools\Cafe`, typically `C:\Program Files (x86)\VMware\vCAC\Management Agent\Tools\Cafe`.

b Enter the `Vcac-Config.exe RegisterNode` command with options to register the Management Agent identifier and certificate in one step. Include the Management Agent identifier you recorded earlier as the value for the `-nd` option.

Table 3-3. Required Options and Arguments for Vcac-Config.exe RegisterNode

Option	Argument	Notes
`-vamih`	"*vra-va-hostname.domain.name*:5480"	The URL of the management site host, including a port specification.
`-cu`	"root"	The user name, which must be the root user.
`-cp`	"*password*"	Password for the root user as a quoted string.
`-hn`	"*machine-hostname.domain.name*"	The machine name of the Management Agent host, including domain information. This value must match the hostname that the current node is registered with in the vRealize Automation appliance. Can be seen with option 1 specified above for the node ID or in the VAMI - Distributed Deployment Information table. If it is not the same value, the following error is returned when the command is executed: Failure: Cannot add duplicate node id 00000000-0000-0000-0000-000000000000.
`-nd`	"*00000000-0000-0000-0000-000000000000*"	Management Agent identifier.
`-tp`	"*0000000000000000000000000000000000000000*"	Thumb print of the SSL certificate of the management site host, as defined in the *-vamih* parameter.

The following example shows the command format:

```
Vcac-Config.exe RegisterNode -v -vamih "vra-va-hostname.domain.name:5480"
-cu "root" -cp "password" -hn "machine-hostname.domain.name"
-nd "00000000-0000-0000-0000-000000000000"
-tp "0000000000000000000000000000000000000000"
```

Example: Command to Register a Management Agent Certificate

```
Vcac-Config.exe RegisterNode -v -vamih "vra-va.eng.mycompany:5480" -cu "root" -cp
"secret" -hn "iaas.eng.mycompany" -nd "C816CFBX-4830-4FD2-8951-C17429CEA291" -tp
"70928851D5B72B206E4B1CF9F6ED953EE1103DED"
```

Change the Polling Method for Certificates

If you use commas in the OU section of the IaaS certificate, you may encounter STOMP WebSocket errors in the Manager Service log files and virtual machine provisioning may fail. You can remove the commas or change the polling method from WebSocket to HTTP to resolve these issues.

See *Installing vRealize Automation 7.3* for more information about the Manager Service.

Procedure

1 Open the Manager Service configuration file in a text editor.

  The Manager Service configuration file is located at `C:\\:Program FIles (x86)\VMware\vCAC\Server\Manager Service.exe.config`.

2 Add the following lines to the `<appSettings>` section of the Manager Service configuration file.

```
<add key="Extensibility.Client.RetrievalMethod" value="Polling"/>
<add key="Extensibility.Client.PollingInterval" value="2000"/>
<add key="Extensibility.Client.PollingMaxEvents" value="128"/>
```

3 Restart the Manager Service.

Managing the vRealize Automation Postgres Appliance Database

vRealize Automation requires the appliance database for system operation. You can manage the appliance database through the vRealize Automation Appliance Virtual Appliance Management Interface.

Note This information applies only to deployments that use an embedded appliance database. It does not apply to deployments that use an external Postgres database.

You can configure the database as a single node or with multiple nodes to facilitate high availability through failover. The vRealize Automation installer includes a database node on each vRealize Automation appliance installation. So if you install three instances of a vRealize Automation appliance, you have three database nodes. Automatic failover is implemented on applicable deployments. The appliance database requires no maintenance unless a machine configuration changes or, if you use a clustered configuration, you promote a different node for the master.

Note The database clustered configuration is set up automatically when you join a virtual appliance to the cluster using the Join cluster operation. The database cluster is not directly dependent upon the virtual appliance cluster. For instance, a virtual machine joined to a cluster can operate normally even if the embedded appliance database is not started or has failed.

A clustered configuration contains one master node and one or more replica nodes. The master node is the vRealize Automation appliance node with the master database that supports system functionality. Replica nodes contain copies of the database that can be pulled into service if the master node fails.

Several high availability appliance database options exist. Selecting the replication mode is the most important database configuration option. The replication mode determines how your vRealize Automation deployment maintains data integrity and, for high availability configurations, how it fails over if the master or primary node fail. There are two available replication modes: synchronous and asynchronous.

Both replication modes support database failover, though each has advantages and disadvantages. To support high availability database failover, asynchronous mode requires at least two nodes, whereas synchronous mode requires at least three nodes. Synchronous mode also invokes automatic failover.

Replication Mode	Advantages	Disadvantages
Synchronous	■ Minimizes chance of data loss. ■ Invokes automatic faiiover.	■ Might affect system performance. ■ Requires at least three nodes.
Asynchronous	■ Requires only two nodes. ■ Affects system performance less than synchronous mode.	Not as robust as synchronous mode in preventing data loss.

vRealize Automation supports both modes, but operates in asynchronous mode by default and provides high availability only if there are at least two appliance database nodes. The **Database** tab on the Virtual Appliance Management Interface enables you to switch synchronization modes and to add database nodes as needed.

When operating in synchronous mode, vRealize Automation invokes automatic failover.

If you begin with one node in a non-high-availability configuration, you can add nodes later as required to enhance high availability. If you have the appropriate hardware and require maximum protection against data loss, consider configuring your deployment to operate in synchronous mode.

Configure the Appliance Database

You can use the Virtual Appliance Management Interface Database page to monitor or update the configuration of the appliance database. You can also use it to change the master node designation and the synchronization mode used by the database.

The appliance database is installed and configured during vRealize Automation system installation and configuration, but you can monitor and change the configuration from the **Database** tab on the Virtual Appliance Management Interface.

The **Connection Status** text box indicates whether the database is connected to the vRealize Automation system and is functioning correctly.

If your appliance database uses multiple nodes to support failover, the table at the bottom of the page displays the nodes, and their status and indicates which node is the master. The **Replication mode** text box shows the currently configured operation mode for the system, either synchronous or asynchronous. Use this page to update appliance database configuration.

The Sync State* column in the database nodes table shows the synchronization method for the cluster. This column works with the Status column to show the state of cluster nodes. Potential status differs depending on whether the cluster uses asynchronous or synchronous replication.

Table 3-4. Sync State for Appliance Database Replication Modes

Mode	Sync State Message
Synchronous replication	Master node - no status Replica node - sync Other nodes - potential
Asynchronous replication	Master node - no status Other nodes - potential

The Valid column indicates whether replicas are synchronized with the master node. The master node is always valid.

The Priority column shows the position of replica nodes in relation to the master node. The master node has no priority value. When promoting a replica to become the master, select the node with the lowest priority value.

When operating in synchronous mode, vRealize Automation invokes automatic failover. In the event of master node failure the next available replica node will automatically become the new master. The failover operation requires 10 to 30 seconds on a typical vRealize Automation deployment.

Prerequisites

- Install and configure vRealize Automation according to appropriate instructions in *Installing vRealize Automation 7.3*.
- Log in to the vRealize Automation management console as **root**.

- Configure an appropriate embedded Postgres appliance database cluster as part of your vRealize Automation deployment.

Procedure

1. On the Virtual Appliance Management Interface, select **vRA Settings > Database**.
2. If your database uses multiple nodes, review the table at the bottom of the page and ensure that the system is operating appropriately.
   - Ensure that all nodes are listed.
   - Ensure that the appropriate node is the designated master node.

   Note Do not click **Sync Mode** to change the synchronization mode of the database unless you are certain that your data is secure. Changing the sync mode without preparation may cause data loss.
3. To promote one of the nodes to be the master, click **Promote** in the appropriate column.
4. Click **Save Settings** to save your configuration if you have made any changes.

Scenario: Perform Manual vRealize Automation Appliance Database Failover

When there is a problem with the vRealize Automation appliance Postgres database, you manually fail over to a replica vRealize Automation appliance node in the cluster.

Follow these steps when the Postgres database on the master vRealize Automation appliance node fails or stops running.

Note Once a node goes into a unhealthy state, do not attempt to use its virtual appliance management interface for any operations including failover.

Prerequisites

- Configure a cluster of vRealize Automation appliance nodes. Each node hosts a copy of the embedded Postgres appliance database.

Procedure

1. Remove the master node IP address from the external load balancer.
2. Log in to the vRealize Automation appliance management interface as root.

   https://*vrealize-automation-appliance-FQDN*:5480
3. Click **vRA Settings > Database**.
4. From the list of database nodes, locate the replica node with the lowest priority.

   Replica nodes appear in ascending priority order.
5. Click **Promote** and wait for the operation to finish.

   When finished, the replica node is listed as the new master node.

6 Correct issues with the former master node and add it back to the cluster:

a Isolate the former master node.

Disconnect the node from its current network, the one that is routing to the remaining vRealize Automation appliance nodes. Select another NIC for management, or manage it directly from the virtual machine management console.

b Recover the former master node.

Power the node on or otherwise correct the issue. For example, you might reset the virtual machine if it is unresponsive.

c From a console session as root, stop the vpostgres service.

```
service vpostgres stop
```

d Add the former master node back to its original network, the one that is routing to the other vRealize Automation appliance nodes.

e From a console session as root, restart the haproxy service.

```
service haproxy restart
```

f Log in to the new vRealize Automation appliance master node management interface as root.

g Click **vRA Settings > Database**.

h Locate the former master node, and click **Reset**.

i After a successful reset, restart the former master node.

j With the former master powered on, verify that the following services are running.

```
haproxy
horizon-workspace
rabbitmq-server
vami-lighttp
vcac-server
vco-server
```

k Re-add the former master node to the external load balancer.

Note If a master node that was demoted to replica is still listed as master, you might need to manually re-join it to the cluster to correct the problem.

Scenario: Perform a Maintenance Database Failover

As a vRealize Automation system administrator, you must perform an appliance database maintenance failover operation.

This scenario assumes that the current master node is up and running normally. There are two database failover maintenance steps: maintenance of the master and maintenance of a replica node. When a master node has been replaced so that it becomes a replica, you should perform maintenance on it so that it is suitable to become the master again should the need arise.

Note Do not stop or restart the HAProxy service on the applicable host machine while performing a maintenance failover.

Prerequisites

- vRealize Automation is installed and configured according to appropriate instructions in the *Installing vRealize Automation 7.3*.
- Log in to the vRealize Automation management console as **root**.
- Install and configure an appropriate embedded Postgres appliance database cluster.
- If your database uses synchronous replication mode, ensure that there are at least three active nodes in the cluster.
-

Procedure

1. Remove the master node IP address from the external load balancer.
2. Isolate the master node.

   Disconnect the node from its current network. This should be the network that is routing to the remaining vRealize Automation appliance nodes.
3. Select another NIC for management, or manage it directly from the Virtual Appliance Management Interface.
4. Select **vRA Settings > Database** on the Virtual Appliance Management Interface.
5. Select the replica node with the lowest priority for promotion to the master, and click **Promote**.

   Replica nodes appear in ascending priority order.

   The old master is demoted to replica status, and the new master is promoted.
6. Perform the appropriate replica maintenance.

7 When the maintenance is complete, ensure that the virtual appliance is running with network connectivity and that its HAProxy service is running.

   a Log in to the vRealize Automation management console as **root**.

   b Ensure that the replica node can be pinged, resolved by name, and has a recent status in the Virtual Appliance Management Console Database tab.

8 Click **Reset** for the replica node.

   This operation resets the database so that it is configured to replicate to the current master and re-synchronizes the replica node with the latest haproxy configuration from the master node.

9 Following successful reset, return the replica virtual appliance node IP address to the external virtual appliance load balancer IP address pool.

10 Ensure that the replica node appears healthy on the Configure Postgres vRA Database table and that it can be pinged and resolved by name.

What to do next

Correct issues with the former master node and add it back to the cluster.

Manually Recover Appliance Database from Catastrophic Failure

If the appliance database fails, and no database nodes are up and running or all replica nodes are out of sync when the master fails, use the following procedure to attempt to recover the database.

This procedure applies to situations in which no database nodes are operational across a cluster that is running in asynchronous mode. In this scenario, you typically see errors similar to the following on the Virtual Appliance Management Interface page when trying to load or refresh the page:

```
Error initializing the database service: Could not open JDBC Connection for transaction; nested
exception is org.postgresql.util.PSQLException: The connection attempt failed.
```

Procedure

1 Try to recover the database using the Virtual Appliance Management Interface from one of the database nodes.

   a If possible, open the Virtual Appliance Management Interface database page of the node with the most recent state. Typically, this node is the one that was the master node before the database failed.

   b If the Virtual Appliance Management Interface for the master node fails to open, try to open the Interface for other replica nodes.

   c If you can find a database node with a working Virtual Appliance Management Interface, try to recover it by performing a manual failover.

      See Scenario: Perform Manual vRealize Automation Appliance Database Failover.

2 If the procedure in step 1 fails, start a shell session and try to determine the node with the most recent state. Start a shell session to all the available cluster nodes and try to start their databases by running the following shell command: `service vpostgres start`

3 Use the following procedure for each node that has a running local database to determine the node with the most recent state.

   a Run the following command to determine the node with the most recent state. If the command returns `f`, then it is the node with most recent state and you can proceed to step 4.

```
su – postgres
psql vcac
vcac=# select pg_is_in_recovery();
 pg_is_in_recovery
```

   - If this command returns an `f`, then this node has the most recent state.
   - If the node returns a `t`, run the following command on the node:

```
SELECT pg_last_xlog_receive_location() as receive_loc, pg_last_xlog_replay_location() as
replay_loc, extract(epoch from pg_last_xact_replay_timestamp()) as replay_timestamp;
```

   This command should return a result similar to the following.

```
vcac=# SELECT pg_last_xlog_receive_location() as receive_loc, pg_last_xlog_replay_location()
as replay_loc, extract(epoch from pg_last_xact_replay_timestamp()) as replay_timestamp;
 receive_loc | replay_loc | replay_timestamp
-------------+------------+------------------
 0/20000000 | 0/203228A0 | 1491577215.68858
(1 row)
```

4 Compare the results for each node to determine which one has the most recent state.

   Select the node with greatest value under the `receive_loc` column. If equal, select the greatest from the `replay_loc` column and then, if again equal, select the node with greatest value of `replay_timestamp`.

5 Run the following command on the node with the most recent state: `vcac-vami psql-promote-master -force`

6 Open the `/etc/haproxy/conf.d/10-psql.cfg` file in a text editor and update the following line.

```
server masterserver sc-rdops-vm06-dhcp-170-156.eng.vmware.com:5432 check on-marked-up shutdown-
backup-sessions
```

   To read as follows with the current node FQDN:

```
server masterserver current-node-fqdn:5432 check on-marked-up shutdown-backup-sessions
```

7 Save the file.

8 Run the `service haproxy restart` command.

9 Open the Virtual Appliance Management Interface database page for the most recent node.

   This node should appear as the master node with the other nodes as invalid replicas. In addition, the **Reset** button for the replicas is enabled.

10 Click **Reset** and **Refresh** for each replica in succession until the cluster state is repaired.

Backup and Recovery for vRealize Automation Installations

To minimize system downtime and data loss in the event of failures, administrators back up the entire vRealize Automation installation on a regular basis. If your system fails, you can recover by restoring the last known working backup and reinstalling some components.

Backing Up vRealize Automation

A system administrator backs up the full vRealize Automation installation on a regular basis.

You can employ several strategies, singly or in combination, to back up vRealize Automation system components. For virtual machines, you can use the Snapshot function to create snapshot images of critical components. If a system failure occurs, you can use these images to restore components to their state when the images were created. You can perform full, differential, and incremental backups and restores of virtual machines. Alternatively, and for non-virtual machine components, you can create copies of critical configuration files for system components, which can be used to restore these components to a customer configured state following reinstallation.

A complete backup includes the following components:

- Infrastructure MS SQL database.
- PostgreSQL database. (Applicable only for legacy installations that do not use an appliance database.)
- Identity management components as applicable.
- vRealize Automation appliance.
- IaaS components.
- (Optional) Software load balancers.
- (Optional) Load balancers that support your distributed deployment. Consult the vendor documentation for your load balancer for information about backup considerations.

Guidelines for Planning Backups

Use these guidelines to plan backups:

- When you back up a complete system, back up all instances of the vRealize Automation appliance, and databases as near simultaneously as possible, preferably within seconds.
- Minimize the number of active transactions before you begin a backup. Schedule your regular backup to when your system is least active.

- Back up all databases at the same time.
- Back up the virtual appliance load balancer at the same time you back up the vRealize Automation appliance.
- When you back up the vRealize Automation appliance and the IaaS components using snapshots, disable in-memory snapshots and quiesced snapshots.
- Create a backup of instances of the vRealize Automation appliance when you update certificates.
- Create a backup of IaaS components when you update certificates.

Backing Up vRealize Automation Certificates

A system administrator backs up certificates and certificate chains at installation time or when a certificate is replaced.

Back up the following certificates:

- vRealize Automation appliance certificates and the entire corresponding certificate chain.
- IaaS certificates and the entire corresponding certificate chain.

Backing Up Load Balancers

Load balancers distribute work among servers in high-availability deployments. The system administrator backs up the load balancers on a regular basis at the same time as other components.

Follow your site policy for backing up load balancers, keeping in mind the preservation of network topology and vRealize Automation backup planning.

Backing Up vRealize Automation Databases

The database administrator backs up the Infrastructure MSSQL Server and vRealize Automation appliance database.

As a best practice, back up the Infrastructure MSSQL and vRealize Automation appliance database or legacy PostgreSQL databases as nearly simultaneously as possible to prevent or minimize data loss. Also, when applicable, back up databases with Point-in-Time enabled. By using Point-in-Time recovery, you ensure that the two databases are consistent with each other. If only one database fails, you must restore the running database to the most recent backup so that the databases are consistent.

Infrastructure MSSQL Database

Follow your in-house procedures to back up the Infrastructure MSSQL database outside of the vRealize Automation framework.

Use the following guidelines when creating a backup:

- If possible, check that all IaaS workflows are complete and that all IaaS services are stopped or that activity is minimized.
- Back up with Point-in-Time enabled.
- Back up the MSSQL database at the same time that you back up the other components.

- Back up the passphrase for your database.

Note Your database is protected by a passphrase. Have the passphrase available when you restore the database. Typically, you record the passphrase in a safe and accessible location at install time.

Appliance Database or Legacy PostgreSQL Database

If you are using an Appliance Database or a legacy PostgreSQL database embedded in a vRealize Automation appliance, you can back up the database by backing up the entire appliance with one of the methods described in vRealize Automation appliance. If you are using a legacy PostgreSQL database, you can also backup the database separately. See the VMware Knowledge Base article *Migrating from external vPostgres appliance to vPostgres instance located in the vCAC appliance (2083562)* at http://kb.vmware.com/kb/2083562 for more information.

A standalone legacy PostgreSQL appliance must be backed up separately. See the VMware Knowledge Base article *Migrating from external vPostgres appliance to vPostgres instance located in the vCAC appliance (2083562)* at http://kb.vmware.com/kb/2083562 for more information.

Backing Up the vRealize Automation Appliance

The system administrator backs up the vRealize Automation appliance by exporting or cloning the appliance. You can also copy configuration files to use to recreate the configuration that was in place at the time of the backup.

Back up appliances by exporting or cloning them.

As a best practice, back up your vRealize Automation appliance and databases on the same schedule.

You can use the following methods to create backups.

- The vSphere Export function.
- Cloning.
- VMware vSphere Data Protection, to create backups of the entire appliance.
- vSphere Replication, to replicate the virtual appliance to another site.
- VMware Recovery Manager, to enable high availability by backing up the appliance to a different data center.

You can use snapshots to backup virtual appliances only if you store or replicate them to a location other than the appliance location. If the snapshot image is accessible after a failure, using it is the most direct way to recover the appliance.

When you back up the vRealize Automation appliance using snapshots, disable in-memory snapshots and quiesced snapshots.

To preserve only the configuration information for the appliance, back up the following files, preserving the owner, group, and permissions for each file. These files are also backed up as part of exporting or cloning an appliance.

- `/etc/vcac/encryption.key`

- /etc/vcac/vcac.keystore
- /etc/vcac/vcac.properties
- /etc/vcac/security.properties
- /etc/vcac/server.xml
- /etc/vcac/solution-users.properties
- /etc/apache2/server.pem
- /etc/vco/app-server/sso.properties
- /etc/vco/app-server/plugins/*
- /etc/vco/app-server/vmo.properties
- /etc/vco/app-server/js-io-rights.conf
- /etc/vco/app-server/security/*
- /etc/vco/app-server/vco-registration-id
- /etc/vco/app-server/vcac-registration.status
- /etc/vco/configuration/passwd.properties
- /var/lib/rabbitmq/.erlang.cookie
- /var/lib/rabbitmq/mnesia/**

Backing Up IaaS Components

The system administrator backs up IaaS components. Use these guidelines to plan backups.

When you back up the IaaS components using snapshots, disable in-memory snapshots and quiesced snapshots.

You can back up IaaS components by taking a snapshot of the VMs in the following order:

- Proxy Agents and DEMs
- Manager Service
- Web sites

For agents, back up the following information:

1 The agent name.

2 The endpoint name. Note that this is different from the endpoint address.

3 The following files located in the Agent's installation folder (*vRA_folder*\Agents*Agent_name*\):

   - VRMAgent.exe.config file

   - RepoUtil.exe.config file

For DEMs, back up the following information:

1 The agent name.

2 The following files located in the DEM's installation folder (*vRA_folder*\Distributed Execution Manager*DEM_name*>\):

- ManagerService.exe.config file

- policy.config file

For Web components, back up the following files:

1 For the primary Web node only, in the Model Manager Data folder (*vRA_folder*\Server)

- ConfigTool folder (applicable only for the primary Web node)

- policy.config file

2 The following files located in the installation folder (*vRA_folder*\Server\Website\):

- Web.config file

3 The following files located in the installation folder (*vRA_folder*\Web API\):

- Web.config file

- policy.config file

4 The name of the IIS instance.

Activate the Failover Manager Service Host

If a system failure occurs on the active Manager Service host, you can promote a passive Manager Service host to replace it. You can configure vRealize Automation to activate a secondary failover server when a system failure occurs on the Manager Service host.

Prerequisites

If you are using F5 Load Balancer, verify that active and passive Manager Service nodes are configured correctly with the load balancer. This configuration is required to avoid Proxy Agent ping failures.

1 Log in to the F5 load balancer and select **Local Traffic > Pools**.

2 Select the Manager Service pool.

3 Click **Advanced** in the Configuration section.

4 Select the **Drop for the Action On Service Down** option.

5 Click **OK** and then **Finished**.

See *Installing vRealize Automation 7.3* for more information.

Procedure

1 Change the startup type of the vCloud Automation Center Manager Service on the active Manager Service host to manual start up, if the system is available.

   a Select **Start > Administrative Tools > Services** on the active server.

   b Select **Manual** as the startup type of the vCloud Automation Center service.

   c Stop the VMware vCloud Automation Center service.

2 Make the passive Manager Service host the active host by changing the startup type of the vRealize Automation Manager Service to automatic start up and then start the service.

   a Select **Start > Administrative Tools > Services** on the active server.

   b Select **Automatic** as the startup type of the vRealize Automation service.

   c Start the VMware vCloud Automation Center service.

3 (Optional) Open a new browser window and verify that you can navigate to the Manager Service health check URL, located at: `https://`*`MS_LB_FQDN`*`/VMPSProvision`, where *MS_LB_FQDN* is your Manager Service Load Balancer FQDN.

vRealize Automation System Recovery

A system administrator uses backups to restore vRealize Automation to a functional state after a system failure. If IaaS components such as Manager Service machines fail, you must reinstall them.

If you restore from a backup, machines that were provisioned after the backup still exist, but are not managed by vRealize Automation. For example, they do not appear in the items list for the owner. Use the Infrastructure Organizer to import virtual machines and bring them back under management.

Perform these steps in order, beginning with the first component that needs to be restored. If a component is functioning normally, you do not need to restore it.

1 Restoring vRealize Automation Databases

   A system administrator restores the IaaS MSSQL database and the PostgreSQL database.

2 Restore the vRealize Automation Appliance and Load Balancer

   If a failure occurs, a system administrator restores the vRealize Automation appliance. If a load balancer is used, the administrator restores the load balancer and the virtual appliances that it manages. If a host name changes during restoration, you must update configuration files appropriately.

3 Restoring the IaaS Website, Manager Services, and Their Load Balancers

   A system administrator restores the IaaS Website and Manager Service and their associated load balancers.

4 Reinstall the DEM Orchestrator and the DEM Workers

   If a failure occurs, a system administrator reinstalls all DEMs.

5 Reinstall the IaaS Agents

The system administrator reinstalls all IaaS agents that need to be restored.

Restoring vRealize Automation Databases

A system administrator restores the IaaS MSSQL database and the PostgreSQL database.

Recover a database in the following situations:

- If both databases fail, restore them from the last known time when both databases were backed up.
- If one database fails, restore it and revert the functional database to the version that was in use when the backup used to restore the failed database was created.

The backup time for each database can differ. The greater the gap between the last working time of the databases, the greater the potential for data loss.

You should back up full VMs of databases, instead of backing up PostgreSQL database directly. For information about how to restore a PostgreSQL database, see the VMware Knowledge Base article Migrating from external vPostgres appliance to a vPostgres instance located in the vCAC appliance (2083562).

Database Passphrases

IaaS MSSQL database security requires a security passphrase to generate an encryption key that protects the data. You specify this passphrase when you install vRealize Automation.

If you lose the passphrase, or want to change the passphrase, consult VMware technical support for more information.

Configure the SQL Database for a New Host Name

On the same host name, you can restore a vRealize Automation SQL database from a backup with no further steps required. If you restored to a different host name, you take additional steps to revise configuration information.

Procedure

1 Update the database entries.

a In SQL Server Management Studio, locate the following table.

`DynamicOps.RepositoryModel.Models`

b In the table, locate the `Data Source` string, and update the SQL Server host name using FQDN format. Update each instance of the connection string.

`Data Source=`*`new-database-server-FQDN`*`;...`

2 On each IaaS Web site host that is not being reinstalled, update the database server host name.

   a Open the following file in a text editor.

   `C:\Program Files (x86)\VMware\vCAC\Server\Model Manager Web\Web.config`

   b Make the following changes.

   - Locate the `Data Source`, and update the SQL Server host name using FQDN format. Update each instance of the connection string.

     `Data Source=`*`new-database-server-FQDN`*

   - If you also changed the database name, update the `Initial Catalog`.

     `Initial Catalog=`*`new-database-name`*`;`

   c Save and close `Web.config`.

3 Open a command prompt as Administrator, and run `iisreset`.

4 On each IaaS Manager Service host that is not being reinstalled, update the database server host name.

   a Open the following file in a text editor.

   `C:\Program Files (x86)\VMware\vCAC\Server\ManagerService.exe.config`

   b Make the following changes.

   - Locate the `Data Source`, and update the SQL Server host name using FQDN format. Update each instance of the connection string.

     `Data Source=`*`new-database-server-FQDN`*

   - If you also changed the database name, update the `Initial Catalog`.

     `Initial Catalog=`*`new-database-name`*`;`

   c Save and close `ManagerService.exe.config`.

5 Restart the Manager Service.

What to do next

Restore the vRealize Automation Appliance and Load Balancer

If a failure occurs, a system administrator restores the vRealize Automation appliance. If a load balancer is used, the administrator restores the load balancer and the virtual appliances that it manages. If a host name changes during restoration, you must update configuration files appropriately.

You might need to restore a failed virtual appliance in the following circumstances:

- You are running a minimal deployment and your only vRealize Automation appliance fails or becomes corrupted.
- You are running a distributed deployment and some, but not all, virtual appliances fail.

- You are running a distributed deployment and all virtual appliances fail.

How you restore a vRealize Automation appliance or virtual appliance load balancer depends on your deployment type and on which appliances failed.

- If you are using a single virtual appliance whose name is unchanged, restore the virtual appliance, or redeploy it and restore a set of backed up files. No further steps are required.
- If you are running a distributed deployment that uses a load balancer, and you change the name of the virtual appliance or the IP address of the load balancer, you must redeploy the appliance and restore its backup files. Also, you must regenerate and copy certificates for your deployment.

If you are redeploying, reconfiguring, or adding virtual appliances to a cluster, see the *Installing vRealize Automation 7.3* documentation for vRealize Automation appliance for more information.

Procedure

1. Redeploy the vRealize Automation appliance.

   You must also configure the appliance database after redeploying the vRealize Automation appliance if it is applicable to your system configuration.
2. Restore all backed up files.
3. Check the file permissions and owners for the restored files.
   a. Verify that the vcac user owns the files in the `vcac` directory and that only the vcac user has read and write permissions. Update any settings that have changed.
   b. Verify that the root user owns the files in the `apache2` directory and that only the owner has read and write permissions. Update any settings that have changed.
   c. Verify that the vco user owns the files in the `vco` directory and that only the owner has read and write permissions. Update any settings that have changed.

   If the hostname or virtual IP address is unchanged, the restore procedure is finished.
4. If you are using a load balancer and its virtual IP address has changed, regenerate and copy certificates for each of the virtual appliances.
   a. Obtain a certificate by using a command of the following form:

   ```
   C:\Program Files (x86)\VMware\vCAC\Server\Model Manager Data\Cafe
   \Vcac-Config.exe GetServerCertificates -url https://VA FQDN
   --FileName .\Vcac-Config-time-stamp.data -v
   ```

   b. Register your solution user certificate by using a command of the following form:

   ```
   C:\Program Files (x86)\VMware\vCAC\Server\Model Manager Data\Cafe
   \Vcac-Config.exe RegisterSolutionUser -url https://VA FQDN --Tenant vsphere.local
   -cu administrator@vsphere.local -cp vmware --FileName .\Vcac-Config-time-stamp.data -v
   ```

c Register the event topics with the new solution user by using a command of the following form:

```
C:\Program Files (x86)\VMware\vCAC\Server\Model Manager Data\Cafe\Vcac-Config.exe
RegisterCatalogTypes -v
```

d Move your solution user certificate information to the database by using a command of the following form:

```
C:\Program Files (x86)\VMware\vCAC\Server\Model Manager Data\Cafe
\Vcac-Config.exe MoveRegistrationDataToDB -d vcac -s localhost
-f .\Vcac-Config-time-stamp.data -v
```

5 Navigate to the vRealize Automation appliance management console and verify that the host, SSL, database, and SSO settings are correct.

6 Update settings that changed.

7 Start the vRealize Automation server service or save the SSO settings page.

8 Configure the load balancer to distribute traffic to the virtual appliances.

What to do next

Restore the IaaS Website Service or Web Load Balancer

Restoring the IaaS Website, Manager Services, and Their Load Balancers

A system administrator restores the IaaS Website and Manager Service and their associated load balancers.

1 Restore the IaaS Website Service or Web Load Balancer

If the server for your IaaS Web site service or Web load balancer fails, a system administrator restores the IaaS Web site components, and reconfigures the load balancer if host names change.

2 Restore the Manager Service or Manager Service Load Balancer

If the server for your Manager Service or load balancer fails, a system administrator restores the Manager Service and reconfigures the load balancer if host names change.

Restore the IaaS Website Service or Web Load Balancer

If the server for your IaaS Web site service or Web load balancer fails, a system administrator restores the IaaS Web site components, and reconfigures the load balancer if host names change.

You can restore the server or load balancer by reinstalling. You can also rename the server or load balancer. If you rename the server, you must edit the configuration files to use the new host name for components that are not being restored.

For more information see the *Installing vRealize Automation 7.3* documentation.

Procedure

1 Install the Web site component by using the custom IaaS installer.

Do not install the ModelManagerData component now.

To avoid losing encrypted data, use the same passphrase as used for the original installation.

2 If you have backups of configuration files, copy the files to the server on which you are installing, verifying that these settings are correct for your current deployment.

3 If you changed the hostname when you reinstalled the Web site machine or load balancer, update the host name in the associated configuration files.

If your deployment does not use a load balancer, the address is the hostname of the machine where the Model Manager Data component is installed. For an environment with a Web load balancer, use the Website load balancer address.

File Path	Machine Type
<*vCAC Folder*>\Server\Website\Web.config	Machines where the Website component is installed.
<*vCAC Folder*>\Server\ManagerService.exe.config	Machines that have a Manager Service Component installed.
<*vCAC Folder*>\Distributed Execution Manager\<*DEM Name*>\DynamicOps.DEM.exe.config	Machines that have DEM Worker or DEM Orchestrator installed.
<*vCAC Folder*>\Agents\<*Agent Name*>\<*Agent Config File*>	All machines and agents that are installed.
<*vCAC Folder*>\Server\Model Manager Data\Cafe\Vcac-Config.exe.config	Machines that have a Model Manager Service component installed.

4 For each file, locate the `key="repositoryAddress"` line, and change the value of the `value` attribute to point to your Web site address.

For example:

```
value="https://myWebsite.myhostname.name:Port/repository/
```

5 If you are reinstalling the primary IaaS Website component and you have a backup of Meta Model data, copy the data to the new Web site.

Do not perform this step if you are reinstalling a secondary Website component.

Copy the following folders from the installation folder at (`<vCAC Folder>\Server\`):

- Model Manager Data folder
- ConfigTool folder

Restore the Manager Service or Manager Service Load Balancer

If the server for your Manager Service or load balancer fails, a system administrator restores the Manager Service and reconfigures the load balancer if host names change.

If the server for your Manager Service or load balancer fails, you can restore it by reinstalling. If you rename the server or load balancer, you must edit the configuration files for components not being restored so that they use the new hostname.

Prerequisites

Restore the IaaS Website Service or Web Load Balancer.

Procedure

1 Reinstall all applicable Manager Service machines.

   a Verify that the fully qualified domain names (FQDNs) for databases are correct for the restore location.

   b Verify that the FQDN for the Manager Server, not the load balancer, matches the FQDN for the local host.

   c Verify that the passphrase is the same as the one used in the original installation.

2 If the Manager Service hostname or load balancer hostname has changed, update all DEM configuration files.

   a On the server that hosts the agent or DEM, open the `DynamicOps.DEM.exe.config` file in an editor.

   The file location is as follows, where *DEO* is the name of the Distributed Execution Manager Orchestrator for the Distributed Execution Manager Worker.

   `C:\Program Files (x86)\VMware\vCAC\Distributed Execution Manager\`*`DEO Name`*`\DynamicOps.`*`DEO`*`.exe.config`

   b Locate the `endpoint` element and change the value of the `address` attribute to the new Manager Service or Manager Service Load Balancer hostname.

   For example, `address="https://MSHostName.domain.name/VMPS`.

   c Repeat this step for each agent or DEM in your deployment.

3 If the Manager Service hostname or load balancer hostname has changed, update all agent configuration files.

   a On the server that hosts the agent, open the `DynamicOps.DEM.exe.config` file in an editor.

      The file location is as follows, where *DEO* is the name of the Distributed Execution Manager Orchestrator for the Distributed Execution Manager Worker.

      `C:\Program Files (x86)\VMware\vCAC\Agents\`*`Agent Name`*`\DynamicOps.`*`Agent Name`*`.exe.config`

   b Locate the `endpoint` element and change the value of the `address` attribute to the new Manager Service or Manager Service Load Balancer hostname.

      For example: `address="https://MSHostName.domain.name/VMPS`

   c Repeat this step for each agent in your deployment.

4 For every `ManagerService.exe.config` file, restart the service.

What to do next

Reinstall the DEM Orchestrator and the DEM Workers

Reinstall the DEM Orchestrator and the DEM Workers

If a failure occurs, a system administrator reinstalls all DEMs.

Follow the instructions in *Installing vRealize Automation 7.3* for installing a DEM orchestrator and DEM workers.

When you reinstall a DEM worker or orchestrator you might want to use the same names as used previously. If you specify names that were used previously, you receive a message similar to the following message.

```
DEM name already exists. Click yes to enter a different name for
this DEM. Click No if you are restoring or reinstalling a DEM with
the same name.
```

Click **No** to reuse the name and continue with the installation.

What to do next

Reinstall the IaaS Agents.

Reinstall the IaaS Agents

The system administrator reinstalls all IaaS agents that need to be restored.

After you reinstall the DEM Orchestrator and the DEM Workers, reinstall IaaS agents. For instructions on installing IaaS agents, see *Installing vRealize Automation 7.3*.

When you reinstall vSphere agents, keep the same endpoint name used at installation time.

The Customer Experience Improvement Program

This product participates in VMware's Customer Experience Improvement Program (CEIP). The CEIP provides VMware with information that enables VMware to improve its products and services, to fix problems, and to advise you on how best to deploy and use our products. You can choose to join or leave the CEIP for vRealize Automation at any time.

Details regarding the data collected through CEIP and the purposes for which it is used by VMware are set forth at the Trust & Assurance Center at http://www.vmware.com/trustvmware/ceip.html.

Join or Leave the Customer Experience Improvement Program for vRealize Automation

You can join or leave the Customer Experience Improvement Program (CEIP) for vRealize Automation at any time.

vRealize Automation gives you the opportunity to join the Customer Experience Improvement Program (CEIP) when you initially install and configure the product. After installation, you can join or leave the CEIP by following these steps.

Procedure

1. Log in as root to the vRealize Automation appliance management interface.

   https://*vrealize-automation-appliance-FQDN*:5480
2. Click the **Telemetry** tab.
3. Check or uncheck the **Join the VMware Customer Experience Improvement Program** option.

   When checked, the option activates the Program and sends data to https://vmware.com.
4. Click **Save Settings**.

Configure Data Collection Time

You can set the day and time when the Customer Experience Improvement Program (CEIP) sends data to VMware.

Procedure

1. Log in to a console session on the vRealize Automation appliance as root.
2. Open the following file in a text editor.

   `/etc/telemetry/telemetry-collector-vami.properties`

3 Edit the properties for day of week (dow) and hour of day (hod).

Property	Description
`frequency.dow=<day-of-week>`	Day when data collection occurs.
`frequency.hod=<hour-of-day>`	Local time of day when data collection occurs. Possible values are 0–23.

4 Save and close `telemetry-collector-vami.properties`.

5 Apply the settings by entering the following command.

```
vcac-config telemetry-config-update --update-info
```

Changes are applied to all nodes in your deployment.

Adjusting System Settings

As a system administrator, you adjust logging and customize IaaS email templates. You can also manage settings that appear as defaults for each tenant, such as email servers to handle notifications. Tenant administrators can choose to override these defaults if their tenant requires different settings.

Modify the All Services Icon in the Service Catalog

You can modify the default icon in the service catalog to display a custom image. When you modify the icon, it changes for all tenants. You cannot configure tenant-specific icons for the catalog.

Commands are provided for Linux or Mac and Windows so that you can run the cURL commands on any of those operating systems.

Prerequisites

- Convert the image to a base64 encoded string. You can use a conversion tool such as www.dailycoding.com/UTILS/CONVERTER/IMAGETOBASE64.ASPX.
- cURL must be installed on the machine where you run the commands.
- You must have the credentials for a vRealize Automation user with the system administrator role.

Procedure

1 Set the VCAC variable in the terminal session for the cURL commands.

Operating System	Command
Linux/Mac	`export VCAC=<VA URL>`
Windows	`set VCAC=<VA URL>`

2 Retrieve the authentication token for the system administrator user.

Operating System	Command
Linux/Mac	`curl https://$VCAC/identity/api/tokens --insecure -H "Accept: application/json" -H 'Content-Type: application/json' --data '{"username":"<Catalog Administrator User>","password":"<password>","tenant":"vsphere.local"}'`
Windows	`curl https://%VCAC%/identity/api/tokens --insecure -H "Accept:application/json" -H "Content-Type:application/json" --data "{\"username\":\"<Catalog Administrator User>\",\"password\":\"<password>\",\"tenant\":\"vsphere.local\"}"`

An authentication token is generated.

3 Set the authentication token variable by replacing <Auth Token> with the token string you generated in the previous step.

Operating System	Command
Linux/Mac	`export AUTH="Bearer <Auth Token>"`
Windows	`set AUTH=Bearer <Auth Token>`

4 Add the base64 encoded string for the image.

Operating System	Command
Linux/Mac	`curl https://$VCAC/catalog-service/api/icons --insecure -H "Accept: application/json" -H 'Content-Type: application/json' -H "Authorization: $AUTH" --data '{"id":"cafe_default_icon_genericAllServices","fileName":"<filename>","contentType":"image/png","image":"<IMAGE DATA as base64 string>"}'`
Windows	`curl https://%VCAC%/catalog-service/api/icons --insecure -H "Accept: application/json" -H "Content-Type: application/json" -H "Authorization: %AUTH%" --data "{\"id\":\"cafe_default_icon_genericAllServices\",\"fileName\":\"<filename>\",\"contentType\":\"image/png\",\"image\":\"<IMAGE DATA as base64 string>\"}"`

The new services icon appears in the service catalog after approximately five minutes.

If you want to revert to the default icon, you can run the following command after you follow steps 1-3..

Operating System	Command
Linux/Mac	`curl https://$VCAC/catalog-service/api/icons/cafe_default_icon_genericAllServices --insecure -H "Authorization: $AUTH" --request DELETE`
Windows	`curl https://%VCAC%/catalog-service/api/icons/cafe_default_icon_genericAllServices --insecure -H "Authorization: %AUTH%" --request DELETE`

Customize Data Rollover Settings

You can enable and configure vRealize Automation data rollover settings to control how your system retains, archives, or deletes legacy data.

Use the data rollover feature to configure the maximum number of days for vRealize Automation to retain data in the IaaS SQL Server database before archiving or deleting it. By default, this feature is disabled.

Configure data rollover settings on the vRealize Automation Global Settings page. When enabled, this feature queries and removes data from the following SQL Server database tables:

- UserLog
- Audit
- CategoryLog
- VirtualMachineHistory
- VirtualMachineHistoryProp
- AuditLogItems
- AuditLogItemsProperties
- TrackingLogItems
- WorkflowHistoryInstances
- WorkflowHistoryResults

If you set `DataRolloverIsArchiveEnabled` to True, archive versions of the tables are created in the dbo schema. For example, the archive version of `UserLog` would be `UserLogArchive`, and the archive version of `VirtualMachineHistory` would be `VirtualMachineHistoryArchive`.

When enabled, the data rollover feature runs once a day at a predetermined time of 3 a.m. according to the vRealize Automation appliance time zone configuration. Using the `DataRollover MaximumAgeInDays` setting, you can set the maximum number of days that you want to retain the data.

If `DataRollover IsArchiveEnabled` is set to True, data older than that specified in the `DataRollover MaximumAgeInDays` is moved to the archive tables. If `DataRollover IsArchiveEnabled` is set to False, data is permanently deleted and no data archiving occurs. Deleted data is not recoverable.

Note Consider existing system data and the potential impact on system performance before enabling data rollover. For example, if you enable this feature one year after vRealize Automation began running in your environment, verify that you have set the value of `DataRollover MaximumAgeInDays` to 300 or greater to ensure that enabling data rollover feature does not impact system performance.

Procedure

1. Log in to the vRealize Automation console as a **system administrator**.
2. Select **Infrastructure > Administration > Global Settings**.

3 On the Global Settings page, locate the Data Rollover section of the table and review and configure settings.

Setting	Description
DataRollover IsArchiveEnabled	Specifies whether to move rollover data to archive tables after the maximum number of days is reached. By default this value is set to True. If you set this value to False, all data older than that specified in the `DataRollover MaximumAgeInDays` setting is permanently deleted.
DataRollover MaximumAgeInDays	Specifies the maximum number of days that the system retains data in the database before moving it to archive or permanently deleting it. By default this value is set to 90 days.
DataRollover Status	Specifies whether to enable data rollover. To enable data rollover, set the value to Enabled. By default this value is set to Disabled. If you disable this workflow while it is running, the current workflow is not impacted, but the next workflow is disabled.

4 Click the **Edit** icon ( ) in the first table column to edit a setting.

The Value field for the applicable setting becomes editable and you can place your cursor within it to change the value.

5 Click the **Save** icon ( ) in the first table column to save your changes.

Adjusting Settings in the Manager Service Configuration File

You can use the manager service configuration file (`managerService.exe.config`) to adjust common settings for machine deployments.

The `managerService.exe.config` file is typically located in the `%System–Drive%\Program Files x86\VMware\vCAC\Server` directory. You should always make a copy of the file before editing it.

You can use the following `managerService.exe.config` file settings to control various aspects of machine deployments. Default values are shown.

- `<add key="ProcessLeaseWorkflowTimerCallbackIntervalMilliseconds" value="600000"/>`
- `<add key="BulkRequestWorkflowTimerCallbackMilliseconds" value="10000"/>`
- `<add key="MachineRequestTimerCallbackMilliseconds" value="10000"/>`
- `<add key="MachineWorkflowCreationTimerCallbackMilliseconds" value="10000"/>`
- `<add key="RepositoryConnectionMaxRetryCount" value="100"/>`
- `<add key="MachineCatalogRegistrationRetryTimerCallbackMilliseconds" value="120000"/>`

- `<add key="MachineCatalogUnregistrationRetryTimerCallbackMilliseconds" value="120000"/>`
- `<add key="MachineCatalogUpdateMaxRetryCount" value="15"/>`

Setting Resource-Intensive Concurrency Limits

To conserve resources, vRealize Automation limits the number of concurrently running instances of machine provisioning and data collection. You can change the limits.

Configuring Concurrent Machine Provisioning

Multiple concurrent requests for machine provisioning can impact the performance of vRealize Automation. You can make some changes to limits placed on proxy agents and workflow activities to alter performance.

Depending on the needs of machine owners at your site, the vRealize Automation server may receive multiple concurrent requests for machine provisioning. This can happen under the following circumstances:

- A single user submits a request for multiple machines
- Many users request machines at the same time
- One or more group managers approve multiple pending machine requests in close succession

The time required for vRealize Automation to provision a machine generally increases with larger numbers of concurrent requests. The increase in provisioning time depends on three important factors:

- The effect on performance of concurrent resource-intensive vRealize Automation workflow activities, including the SetupOS activity (for machines created within the virtualization platform, as in WIM-based provisioning) and the Clone activity (for machines cloned within the virtualization platform).
- The configured vRealize Automation limit on the number of resource-intensive (typically lengthy) provisioning activities that can be executed concurrently. By default this is eight. Concurrent activities beyond the configured limit are queued.
- Any limit within the virtualization platform or cloud service account on the number of vRealize Automation work items (resource-intensive or not) that can be executed concurrently. For example, the default limit in vCenter Server is four, with work items beyond this limit being queued.

By default, vRealize Automation limits concurrent virtual provisioning activities for hypervisors that use proxy agents to eight per endpoint. This ensures that the virtualization platform managed by a particular agent never receives enough resource-intensive work items to prevent execution of other items. Plan to carefully test the effects of changing the limit before making any changes. Determining the best limit for your site may require that you investigate work item execution within the virtualization platform as well as workflow activity execution within vRealize Automation.

If you do increase the configured vRealize Automation per-agent limit, you may have to make additional configuration adjustments in vRealize Automation, as follows:

- The default execution timeout intervals for the SetupOS and Clone workflow activities are two hours for each. If the time required to execute one of these activities exceeds this limit, the activity is cancelled and provisioning fails. To prevent this failure, increase one or both of these execution timeout intervals.
- The default delivery timeout intervals for the SetupOS and Clone workflow activities are 20 hours for each. Once one of these activities is initiated, if the machine resulting from the activity has not been provisioned within 20 hours, the activity is cancelled and provisioning fails. Therefore, if you have increased the limit to the point at which this sometimes occurs, you will want to increase one or both of these delivery timeout intervals.

Configuring Concurrent Data Collections

By default, vRealize Automation limits concurrent data collection activities. If you change this limit, you can avoid unnecessary timeouts by changing the default execution timeout intervals for the different types of data collection.

vRealize Automation regularly collects data from known virtualization compute resources through its proxy agents and from cloud service accounts and physical machines through the endpoints that represent them. Depending on the number of virtualization compute resources, agents, and endpoints in your site, concurrent data collection operations may occur frequently.

Data collection running time depends on the number of objects on endpoints including virtual machines, datastores, templates, and compute resources. Depending on many conditions, a single data collection can require a significant amount of time. As with machine provisioning, concurrency increases the time required to complete data collection.

By default, concurrent data collection activities are limited to two per agent, with those over the limit being queued. This ensures that each data collection completes relatively quickly and that concurrent data collection activities are unlikely to affect IaaS performance.

Depending on the resources and circumstances at your site, however, it may be possible to raise the configured limit while maintaining fast enough performance to take advantage of concurrency in proxy data collection. Although raising the limit can increase the time required for a single data collection, this might be outweighed by the ability to collect more information from more compute resources and machines at one time.

If you do increase the configured per-agent limit, you might have to adjust the default execution timeout intervals for the different types of data collection that use a proxy agent—inventory, performance, state, and WMI. If the time required to execute one of these activities exceeds the configured timeout intervals, the activity is canceled and restarted. To prevent cancellation of the activity, increase one or more of these execution timeout intervals.

Adjust Concurrency Limits and Timeout Intervals

You can change the per-agent limits on concurrent provisioning, data collection activities, and the default timeout intervals.

When typing a time value for these variables, use the format hh:mm:ss (hh=hours, mm=minutes, and ss=seconds).

Prerequisites

Log in as an administrator to the server hosting the IaaS Manager Service. For distributed installations, this is the server on which the Manager Service was installed.

Procedure

1. Open the `ManagerService.exe.config` file in an editor. The file is located in the vRealize Automation server install directory, typically `%SystemDrive%\Program Files x86\VMware\vCAC\Server`.
2. Locate the section called `workflowTimeoutConfigurationSection`.
3. Update the following variables, as required.

Parameter	Description
MaxOutstandingResourceIntensiveWorkItems	Concurrent provisioning limit (default is 8)
CloneExecutionTimeout	Virtual provisioning execution timeout interval
SetupOSExecutionTimeout	Virtual provisioning execution timeout interval
CloneTimeout	Virtual provisioning clone delivery timeout interval
SetupOSTimeout	Virtual provisioning setup OS delivery timeout interval
CloudInitializeProvisioning	Cloud provisioning initialization timeout interval
MaxOutstandingDataCollectionWorkItems	Concurrent data collection limit
InventoryTimeout	Inventory data collection execution timeout interval
PerformanceTimeout	Performance data collection execution timeout interval
StateTimeout	State data collection execution timeout interval

4. Save and close the file.
5. Select **Start > Administrative Tools > Services**.
6. Stop and then restart the vRealize Automation service.
7. (Optional) If vRealize Automation is running in High Availability mode, any changes made to the `ManagerService.exe.config` file after installation must be made on both the primary and failover servers.

Adjust Execution Frequency of Machine Callbacks

You can change the frequency of several callback procedures, including the frequency that the vRealize Automation callback procedure is run for changed machine leases.

vRealize Automation uses a configured time interval to run different callback procedures on the Model Manager service, such as *ProcessLeaseWorkflowTimerCallbackIntervalMiliSeconds* which searches for machines whose leases have changed. You can change these time intervals to check more or less frequently.

When entering a time value for these variables, enter a value in milliseconds. For example, 10000 milliseconds = 10 seconds and 3600000 milliseconds = 60 minutes = 1 hour.

Prerequisites

Log in as an administrator to the server hosting the IaaS Manager Service. For distributed installations, this is the server on which the Manager Service was installed.

Procedure

1. Open the `ManagerService.exe.config` file in an editor. The file is located in the vRealize Automation server install directory, typically `%SystemDrive%\Program Files x86\VMware\vCAC\Server`.
2. Update the following variables, as desired.

Parameter	Description
RepositoryWorkflowTimerCallbackMiliSeconds	Checks the repository service, or Model Manager Web Service, for activity. Default value is 10000.
ProcessLeaseWorkflowTimerCallbackIntervalMiliSeconds	Checks for expired machine leases. Default value is 3600000.
BulkRequestWorkflowTimerCallbackMiliSeconds	Checks for bulk requests. Default value is 10000.
MachineRequestTimerCallbackMiliSeconds	Checks for machine requests. Default value is 10000.
MachineWorkflowCreationTimerCallbackMiliSeconds	Checks for new machines. Default value is 10000.

3. Save and close the file.
4. Select **Start > Administrative Tools > Services**.
5. Stop and then restart the vCloud Automation Center service.
6. (Optional) If vRealize Automation is running in High Availability mode, any changes made to the `ManagerService.exe.config` file after installation must be made on both the primary and failover servers.

Adjust IaaS Log Settings

You can adjust vRealize Automation to log only the information you want to see in the Manager Service log.

If vRealize Automation is running in high availability mode, and you make changes to the `ManagerService.exe.config` file after installation, you must make the changes on the primary and the failover vRealize Automation servers.

Procedure

1. Log in to the vRealize Automation server by using credentials with administrative access.
2. Edit the `ManagerService.exe.config` file in `%SystemDrive%\Program Files x86\VMware\vCAC\Server`, or in the vRealize Automation server install directory, if it is in a different location.
3. Edit the `RepositoryLogSeverity` and `RepositoryLogCategory` keys to configure what types of events get written to your log files.

Option	Description
RepositoryLogSeverity	Specify a severity level to ignore events below that severity. ■ *Error* logs only recoverable errors and higher ■ *Warning* logs noncritical warnings and higher ■ *Information* logs all informative messages and higher ■ *Verbose* logs a debugging trace and can impair performance For example, `<add key="RepositoryLogSeverity" value="Warning" />`.
RepositoryLogCategory	Specify a category to log all events for that category regardless of severity. For example, `<add key="RepositoryLogCategory" value="MissingMachines,UnregisteredMachines,AcceptMachineRequest,RejectMachineRequest" />` logs all events for missing or unregistered machines, and every accepted or rejected machine request.

4. Save and close the file.
5. Select **Start > Administrative Tools > Services** and restart the vCloud Automation Center service.

You can see how your changes effect logging by viewing the Manager Service log file located in `%SystemDrive%\Program Files (x86)\VMware\vCAC\Server\Logs` on the machine where the Manager Service is installed, or in the vRealize Automation server install directory, if you installed it in a different location.

Monitoring vRealize Automation

Depending on your role, you can monitor workflows or services, view event or audit logs, or collect logs for all the hosts in a distributed deployment.

Monitoring Workflows and Viewing Logs

Depending on your role, you can monitor workflows and view activity logs.

Table 3-5. Monitoring and Log Display Options

Objective	Role	Menu Sequence and Description
Display information about actions that have occurred, such as the action type, date and time of the action, and so on.	IaaS administrator	Display default log information or control display content using column and filter options. Select **Infrastructure > Monitoring > Audit Log**. The audit log provides details about the status of managed virtual machines and activities performed on these machines during reconfiguration. The log includes information about machine provisioning, NSX, reclamation, and reconfigure actions.
View the status of scheduled and available Distributed Execution Manager and other workflows.	IaaS administrator	Display workflow status and optionally open a specific workflow to display its details. Select **Infrastructure > Monitoring > DEM Status**.
View and optionally export log data.	IaaS administrator	Display default log information or control display content using column and filter options. Select **Infrastructure > Monitoring > Log**.
View the status and history of executed Distributed Execution Manager and other workflows.	IaaS administrator	Display workflow history and optionally open a specific workflow to display its execution details. Select **Infrastructure > Monitoring > Workflow History**.
Display a list of events, including event type, time, user ID, and so on, and optionally display an event details page.	System administrator	View a list of events and their associated attributes, such as run time, event description, tenant name, target type and ID, and other characteristics. Select **Administration > Events > Event Logs**.
Monitor the status of your requests and view request details.	Tenant administrator or business group manager	Display the status of requests that you are responsible for or own. Click **Requests**.
View information about recent events.	IaaS administrator or Tenant administrator	Display recent events for the currently logged in user. Select **Infrastructure > Recent Events**

Monitoring Event Logs and Services

You can monitor vRealize Automation event logs and services to determine their current and historic states.

For information about clearing logs by customizing data rollover settings, see *Configuring vRealize Automation*.

vRealize Automation Services

A system administrator can view the status of vRealize Automation services from the Event Log on the system administrator console.

Subsets of services are required to run individual product components. For example, identity services and UI core services must be running before you can configure a tenant.

The following tables tell you which services are associated with areas of vRealize Automation functionality.

Table 3-6. Identity Service Group

Service	Description
management-service	Identity Service Group
sts-service	Single Sign-on Appliance
authorization	Authorization Service
authentication	Authentication
eventlog-service	Event log service
licensing-service	Licensing service

Table 3-7. UI Core services

Service	Description
shel-ui-app	Shell Service
branding-service	Branding Service
plugin-service	Extensibility (Plug-in) Service
portal-service	Portal Service

All the following services are required to run the IaaS component.

Table 3-8. Service Catalog Group (Governance Services)

Service	Description
notification-service	Notification service
workitem-service	Work Item service
approval-service	Approval Service
catalog-service	Service Catalog

Table 3-9. IaaS Services Group

Service	Description
iaas-proxy-provider	IaaS Proxy
iaas-server	IaaS Windows machine

Table 3-10. XaaS

Service	Description
vco	vRealize Orchestrator
advanced-designer-service	XaaS blueprints and resource actions

Using vRealize Automation Audit Logging

vRealize Automation offers audit logging to support collection and retention of important system events.

Currently, vRealize Automation supports audit logging as an extension of event logging. This functionality provides basic auditing information, and retention settings are configurable only using the appropriate vRealize Automation REST API event broker service calls. Audit logging is currently available to tenant administrators and system administrators who can log on to tenants. It provides search and filter capabilities for events.

By default, vRealize Automation supports audit logging for workflow subscription, endpoint, and fabric group create, update, and delete events. vRealize Automation also supports audit logging customization for a variety of IaaS events as well.

vRealize Automation audit logging is disabled by default. You can switch it on or off by toggling the **Enabled** check box in the Audit Log Integration section on the **vRA Settings > Logs** page of the virtual appliance management interface.

Audit log information appears on the standard Event Logs page. As a tenant admin, select **Administration > Event Logs** to view this page. Audit events are identified in the event log table with the designation Audit in the Event Type field. Each entry shows an Event Description for each event as well as the Tenant, Time, User, and related Service Name.

Enabling audit logging for any other IaaS events requires a custom configuration file and running the appropriate commands on your IaaS host machine. Contact VMware Professional Services for assistance.

You can configure vRealize Automation to export events to an external syslog server, specifically VMware Log Insight.

Configure vRealize Automation for Log Insight Audit Logging

You can export vRealize Automation audit events to VMware Log Insight to facilitate viewing audit events.

Prerequisites

Procedure

1. Log in to the virtual appliance management interface as a system administrator.
2. Select **vRA Settings > Logs**.
3. Verify that the **Enabled** check box for audit logging is selected under the Audit Log Integration heading.

4 Enter the **Host** machine name for the Log Insight server under the Log Insight Agent Configuration heading.

5 Click **Save Settings**.

vRealize Automation audit log events are visible from the Log Insight interface.

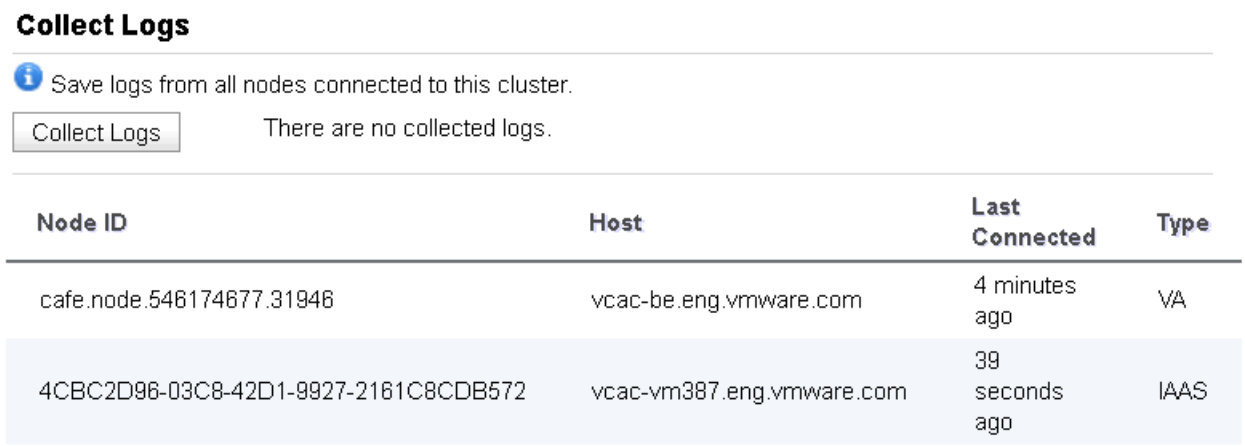
Viewing Host Information for Clusters in Distributed Deployments

You can collect logs for all nodes that are clustered in a distributed deployment from the vRealize Automation appliance management console.

You can also view information for each host in your deployment. The **Cluster** tab on the vRealize Automation management console includes a Distributed Deployment Information table that displays the following information:

- A list of all nodes in your deployment
- The host name for the node. The host name is given as a fully qualified domain name.
- The time since the host last replied to the management console. Nodes for IaaS components report availability every three minutes and nodes for virtual appliances report every nine minutes.
- The vRealize Automation component type. Identifies whether the node is a virtual appliance or an IaaS server.

Figure 3-1. Distributed Deployment Information table



You can use this table to monitor activity in your deployment. For example, if the Last Connected column indicates a host has not connected recently, that can be an indication of a problem with the host server.

Log Collection

You can create a zip file that contains log files for all hosts in your deployment. For more information, see Collect Logs for Clusters and Distributed Deployments.

Removing Nodes from the Table

When you remove a host from your deployment, remove the corresponding node from the Distributed Deployment Information table to optimize log collection times.

Collect Logs for Clusters and Distributed Deployments

You can create a zip file that includes all log files for servers in your deployment.

The Distributed Deployment Information table lists the nodes from which log files are collected.

For related information about vRealize Automation appliance deployment configuration, see *Installing vRealize Automation 7.3*.

Procedure

1. Log in to the vRealize Automation appliance with user name **root** and the password you specified when deploying the appliance.
2. Click **vRA Settings**.
3. Click the **Cluster** tab.

   The Distributed Deployment Information table displays a list of nodes for the distributed deployment.
4. Click **Collect Logs**.

   Log files for each node are collected and copied to a zip file.

Remove a Node from the Distributed Deployment Information Table

You delete the entry for a node from the Distributed Deployment Information table when the node is removed from your deployment cluster or when you are replacing a Management Agent certificate.

Procedure

1. Log in to the vRealize Automation appliance by using the user name **root** and the password you specified when you deployed the appliance.
2. Click **vRA Settings**.
3. Click the **Cluster** tab.

   The Distributed Deployment Information table displays a list of nodes for the distributed deployment.
4. Locate the node ID for the node to be deleted by opening a command prompt and running the following command:

   ```
   ./vcac-config cluster-config-node --action list
   ```
5. Locate the node ID, for example `cafe.node.46686239.17144`, in the JSON output.

6 Open a command prompt and type a command of the following form, using the node ID that you obtained in the previous step.

```
/usr/sbin/vcac-config cluster-config-node
--action delete --id node-UID
```

For example, enter the following command for the example node ID `cafe.node.46686239.17144`:

```
./vcac-config cluster-config-node --action delete --id cafe.node.46686239.17144
```

7 Click **Refresh**.

The node no longer appears in the display.

Monitoring vRealize Automation Health

The vRealize Automation health service assesses the functional health of a selected vRealize Automation virtual machine.

IaaS administrators can configure the health service to run tests that assess the health of a selected vRealize Automation virtual machine. The tests determine if the components are registered and all the necessary resources are available. The following table shows the test suites that the health service provides and some example tests in each suite.

Option	Description
System tests for vRealize Automation	■ SSO/Identity VA Connection Test ■ vRealize Automation License Check - Is License Expired? ■ vRealize Automation Virtual Appliance Root Password Check - Is Password Expiring Soon?
Tenant tests for vRealize Automation	■ Check vSphere Reservation Storage Paths ■ Check Reservation Policy to Reservation Assignments ■ Check the Portal Service Status
Tests for vRealize Orchestrator	■ Check number of active vRO nodes ■ Check the utilization of the java memory heap in the vRO nodes ■ Check the status of the vro-server service in the vRO nodes

After you run a test suite on a virtual machine, the health service provides feedback about the number of tests that passed or failed. For failed tests, the health service provides the following information:

- The cause for the failure.
- A link to information that you can use to remediate the problem.

You can configure the Health Service to run tests on a schedule or only on demand.

Tenant administrators with a Health Consumer role can view test results for their tenancy but cannot configure or run a test.

Run System Tests For vRealize Automation

You can configure the health service to run system tests on a selected vRealize Automation virtual appliance. These tests determine if components, such as the vRealize Automation license, are registered and necessary resources, such as memory, are available on the vRealize Automation virtual appliance.

Prerequisites

Log in to the vRealize Automation console as an **IaaS administrator**.

Procedure

1. Select **Administration > Health**.
2. Click **New Configuration**.
3. On the Configuration Details page, provide the requested information.

Option	Description
Name	Your title for this configuration.
Description	Optional description.
Product	Select vRealize Automation.
Schedule	How often the tests run.

4. Click **Next**.
5. On the Select Test Suites page, select **System Tests for vRealize Automation**.
6. Click **Next**.
7. On the Configure Parameters page, provide the requested information.

Section	Option	Description
vRealize Automation Virtual Appliance		
	Public Web Server Address	Base URL for the vRealize Automation load balancer. For example, https://*load-balancer-host.domain*/.
	SSH Console Address	Fully qualified domain name of the vRealize Automation appliance. For example,*va-host.domain*.
	SSH Console User	root
	SSH Console Password	The root password.
vRealize Automation System Tenant		
	System Tenant Administrator	administrator
	System Tenant Password	The administrator password.
vRealize Automation Disk Space Monitoring		

Section	Option	Description
	Warning Threshold Percent	Acceptable percent of virtual appliance disk space that is used before the warning test fails.
	Critical Threshold Percent	Acceptable percent of virtual appliance disk space that is used before the critical test fails.

8 Click **Next**.

9 On the Summary page, review the information.

10 Click **Finish**.

Tests run according to the selected schedule.

What to do next

View the vRealize Automation Health Service Test Suite Results

Run Tenant Tests For vRealize Automation

You can configure the health service to run tenant tests on a selected vRealize Automation virtual appliance. These tests determine if tenant-related components, such as software-service, are registered and necessary resources, such as vSphere virtual machines, are available.

Prerequisites

Log in to the vRealize Automation console as an **IaaS administrator**.

Procedure

1 Select **Administration > Health**.

2 Click **New Configuration**.

3 On the Configuration Details page, provide the requested information.

Option	Description
Name	Your title for this configuration.
Description	Optional description.
Product	Select vRealize Automation.
Schedule	How often the tests run.

4 Click **Next**.

5 On the Select Test Suites page, select **Tenant Tests for vRealize Automation**.

6 Click **Next**.

7 On the Configure Parameters page, provide the requested information.

Section	Option	Description
vRealize Automation Virtual Appliance		
	vRealize Automation Web Address	Base URL for vRealize Automation. For example, https://*va-host.domain*/.
	SSH Console Address	Fully qualified domain name of the SSH host. For example, *ssh-host.domain*.
	SSH Console User	root
	SSH Console Password	Password for root.
vRealize Automation Tenant		
	Tenant Under Test	Tenant selected for testing.
	Fabric Administrator Username	Fabric administrator user name.
	Fabric Administrator Password	Password for fabric administrator.
vRealize Automation System Tenant		
	System Tenant Administrator	administrator
	System Tenant Password	Password for administrator.

8 Click **Next**.

9 On the Summary page, review the information.

10 Click **Finish**.

Tests run according to the selected schedule.

What to do next

View the vRealize Automation Health Service Test Suite Results

Run Tests For vRealize Orchestrator

You can configure the health service to run tests for vRealize Orchestrator on the vRealize Orchestrator host. These tests confirm that components, such as the vro-server service, are registered and necessary resources, such as sufficient Java memory heap, are available.

Prerequisites

Log in to the vRealize Automation console as an **IaaS administrator**.

Procedure

1 Select **Administration > Health**.

2 Click **New Configuration**.

3 On the Configuration Details page, provide the requested information.

Option	Description
Name	Your title for this configuration.
Description	Optional description.
Product	Select vRealize Orchestrator.
Schedule	How often the tests run.

4 Click **Next**.

5 On the Select Test Suites page, select **Tests for vRealize Orchestrator**.

6 Click **Next**.

7 On the Configure Parameters page, provide the requested information.

Section	Option	Description
vRealize Orchestrator Host/Load Balancer		
	Client Address	Fully qualified domain name of the vRealize Orchestrator host. For example, *vro-host.domain*, or the base URL for the vRealize Orchestrator load balancer, https://*load-balancer-host.domain*/.
	Client Username	administrator
	Client Password	The administrator password.
	SSH Console Username	root
	SSH Console Password	The root password.
	Heap Utilization Threshold	Acceptable percent of heap space that is used before the warning test fails.
vRealize Orchestrator Instances behind Load Balancer		
	SSH Console Address	IP address or URL of the vRealize Orchestrator instance behind the load balancer.
	SSH Console Username	User name with access to this instance.
	SSH Console Password	The user name password.

Click **ADD** to add another vRealize Orchestrator instance to the list. Click **REMOVE** to remove a selected vRealize Orchestrator instance from the list of instances behind the load balancer.

8 Click **Next**.

9 On the Summary page, review the information.

10 Click **Finish**.

Tests run according to the selected schedule.

What to do next

View the vRealize Automation Health Service Test Suite Results

View the vRealize Automation Health Service Test Suite Results

You can view the health service test results for a virtual machine after you run the tests.

The Health page displays each configured test suite as a test card. When a test suite runs, the result appears in the middle of the test card.

The test cards that you see on the Health page are filtered according to your privilege.

- IaaS administrators can see all test cards.
- Tenant administrators with the Health Consumer role can see only the test card for their tenancy.

Prerequisites

- The configured test suite has run on schedule or on demand.
- Log in to the vRealize Automation console as an **IaaS administrator** or as a **tenant administrator**.

Procedure

1 Select **Administration > Health**.

2 Click the center of a test card.

A list appears that shows the status of each test. For each failed test, click **Cause** to see why the test failed. If a **Remediation** link is available, click the link to open a topic that explains how you can fix the problem.

Troubleshooting the Health Service

The Health Service troubleshooting topics provide solutions to problems you might experience when you use the Health Service.

Service Status Test Fails

You can fix a failed service test by changing the test schedule setting.

Problem

If a service status test fails and you click **Cause**, you see this message: `Cannot establish SSH connection ; Exception message:[Auth fail]`.

Cause

When the test suite is scheduled to run every 15 minutes, the system login locks the root user account.

Solution

- Change the test schedule to **None**, wait 15 minutes, and run the test suite again.

After Upgrade the Health Page in the Appliance Console Is Empty

After you upgrade vRealize Automation, the Health page in the appliance console is empty.

Problem

The health service does not start after upgrade.

Solution

- Open a command prompt and run these commands on each vRealize Automation virtual appliance.
  a To configure the health service to start automatically, run this command.

    ```
    chkconfig vrhb-service on
    ```

  b To start the health service on this virtual appliance, run this command.

    ```
    service vrhb-service start
    ```

Monitoring and Managing Resources

Different vRealize Automation roles monitor resource usage and manage infrastructure in different ways.

Choosing a Resource Monitoring Scenario

Fabric administrators, tenant administrators, and business group managers have different concerns when it comes to resource monitoring. Because of this, vRealize Automation allows you to monitor different facets of resource usage.

For example, a fabric administrator is concerned with monitoring the resource consumption of reservations and compute resources, whereas a tenant administrator is concerned with the resource usage of the provisioning groups within a tenant. Depending on your role and the specific resource usage you want to monitor, vRealize Automation allows you different ways to track resource consumption.

Table 3-11. Choose a Resource Monitoring Scenario

Resource Monitoring Scenario	Privileges Required	Location
Monitor the amount of physical storage and memory on your compute resources that is currently being consumed and determine what amount remains free. You can also monitor the number of reserved and allocated machines provisioned on each compute resource.	**Fabric Administrator** (monitor resource usage on compute resources in your fabric group)	**Infrastructure > Compute Resources > Compute Resources**
Monitor machines that are currently provisioned and under vRealize Automation management.	**Fabric Administrator**	**Infrastructure > Machines > Managed Machines**

Table 3-11. Choose a Resource Monitoring Scenario (Continued)

Resource Monitoring Scenario	Privileges Required	Location
Monitor the amount of storage, memory, and machine quota of your reservation that is currently allocated and determine the capacity that remains available to the reservation.	**Fabric Administrator** (monitor resource usage for reservations on your compute resources and physical machines)	**Infrastructure > Reservations > Reservations**
Monitor the amount of storage, memory, and the machine quota that your business groups are currently consuming and determine the capacity that remains on reserve for them.	■ **Tenant Administrator** (monitor resource usage for all groups in your tenant) ■ **Business Group Manager** (monitor resource usage for groups that you manage)	**Administration > Users & Groups > Business Groups**

You can also add resource monitoring portlets to your vRealize Automation homepage to monitor different resource usage statistics.

Managing Resource Reports

You can add real-time resource reports to your Home page to monitor virtual, physical, and cloud resource usage, change their layout, and export their data to other applications.

Add Reports to the Home Page

You can add one or more IaaS reports to your Home page. These real-time reports list your most recent open tasks, catalog requests, provisioned items, and provisioned machines broken down by user, blueprint, compute resource, and business group. Two reports also display updated summaries of reclamation savings.

Prerequisites

Log in to the vRealize Automation console.

Procedure

1 Navigate to the **Home** page.

2 Click the Edit  icon in the upper-right corner of the page and click **Add Portlets** in the drop-down menu.

3 Click **Add** for each report to add to your Home page.

A disabled **Add** button indicates an already added report.

4 Click **Close**.

What to do next

Configure the Report Layout.

Configure the Report Layout

You can configure your Home page to display reports in one, two, three, or four columns. You can move a report from one column to another.

Prerequisites

Log in to the vRealize Automation console.

Procedure

1 Navigate to the **Home** page.

2 Click the Edit icon () in the upper-right corner of the page and click **Change Layout** in the drop-down menu.

3 Select a report layout.

Option	Description
1 Column	Lay out reports in one column.
2 Columns	Lay out reports in two columns of equal or unequal widths.
3 Columns	Lay out reports in three columns of equal or unequal widths.
4 Columns	Lay out reports in four equal columns.

4 Click **Submit**.

5 Point to the title bar of a report.

The cursor changes to a four-headed cursor.

6 Drag the report to its new location.

The width of the report changes to fit the new location.

Export Report Data

You can save IaaS reports located on your Home page to CSV files where you can customize the data.

Prerequisites

- Log in to the vRealize Automation console.
- Add Reports to the Home Page.

Procedure

1 Navigate to the **Home** page.

2 Click **Export as CSV** in the report to save.

Some browsers save the file immediately. With Firefox, a dialog box appears with selections for opening or saving the report with Microsoft Excel or another application.

3 (Optional) Select whether to open or save the report data, and which application to use.

Resource Reports

Resource reports display data about machines and resources used and reclaimed according to owner, compute resource, and group.

Name	Description
My Inbox	Displays a list of the most recent open tasks in your inbox. Click a row to view the detail page of a task. Click **More** to open the complete list of inbox tasks.
My Open Requests	Displays a list of your most recent catalog requests. Click a row to view the detail page of a request. Click **More** to open the complete list of requests.
My Recent Requests	Displays a list of your most recent catalog requests regardless of status. Click a row to view the detail page of a request. Click **More** to open the complete list of requests.
My Items	Displays a list of your most recently provisioned items. Click a row to view the detail page of an item. Click **More** to open the complete list of items.
My Group Requests	Displays a list of the most recent catalog requests for users in groups that you manage. Click a row to view the detail page of a request. Click **More** to open the complete list of requests.
My Groups Items	Displays a list of the most recently provisioned items for users in groups that you manage. Click a row to view the detail page of an item. Click **More** to open the complete list of items.
New & Noteworthy	Highlights catalog items that were recently made available in the catalog.
Calendar of Events	Displays a calendar view of important events for catalog items that you own, such as lease expiration and machine destruction.
Business Groups Resource Allocation	Displays the resource allocations for business groups in a tenant. If you are a tenant administrator, the portlet displays the resource allocations for all the tenant business groups. If you are business group manager, the portlet displays the resource allocation for your business groups.
IaaS Capacity Usage by Blueprint	Displays the number of machines provisioned from each blueprint and the total resources that those machines used.
IaaS Capacity Usage by Group	Displays the number of machines that users own in each business group and the total resources that those machines use.
IaaS Capacity Usage by Owner	Displays the number of machines that each user owns and the total resources that those machines use.
IaaS Capacity Usage by Compute Resource	Displays the number of machines provisioned on each compute resource and the total resources that those machines use.
My Trips	Displays a sample consumer report.

Add the Business Groups Resource Allocation Portlet to the Home Tab

The Business Group Resource Allocation Portlet is a dashboard portlet that you add to your **Home** tab to monitor resources for business groups.

If you are a tenant administrator, the portlet displays the resource allocations for all the tenant business groups. If you are business group manager, the portlet displays the resource allocation for your business groups.

If you are not a tenant administrator or business group manager, the portlet is not available to install on your **Home** tab.

Prerequisites

Log in to the vRealize Automation console as a **tenant administrator** or **business group manager**.

Procedure

1 Select **Home**.

2 Click the **Edit** icon ( ) in the upper right corner.

3 Select **Add Portlets**.

4 Locate Business Groups Resource Allocation and click **Add**.

5 Click **Close**.

The portlet is added to the top of the Home tab.

6 Click and drag to portlet title bar to move to a different location.

Resource Usage Terminology

vRealize Automation uses explicit terminology to distinguish between resources that are available, resources that have been set aside for specific usages, and resources that are actively being consumed by provisioned machines.

The Resource Usage Terminology table explains the terminology vRealize Automation uses to display resource usage.

Table 3-12. Resource Usage Terminology

Term	Description
Physical	Indicates the actual memory or storage capacity of a compute resource.
Reserved	Indicates the machine quota, memory, and storage capacity set aside for a reservation. For example, if a compute resource has a physical capacity of 600 GB and there are three reservations on it for 100 GB each, then the reserved storage of the compute resource is 300 GB and the storage reserved is 50 percent.
Managed	Indicates that the machine is provisioned and currently under vRealize Automation management.
Allocated	Indicates the machine quota, memory, or storage resources actively being consumed by provisioned machines. For example, consider a reservation with a machine quota of 10. If there are 15 provisioned machines on it, but only 6 of them are currently powered on, the machine quota is 60 percent allocated.
Used	The **Used** column value always equals the **Allocated** column value.
Free	Indicates the unused physical capacity on a storage path.

Connecting to a Cloud Machine

The first time you connect to a cloud machine you must log in as Administrator.

You can then add the credentials under which you log in to the vRealize Automation console as a user on the machine, and log in under your vRealize Automation credentials from that point on.

Important If you are using Amazon Web Services, RDP, or SSH must be enabled on the Amazon machine instance and the machines must be in a security group in which the correct ports are open.

Collect User Credentials for an Amazon Machine

To log in to an Amazon machine as an administrator, you must discover the machine's administrator password.

The administrator password is available on the Machine Information Details page. If the Amazon machine image from which the machine was provisioned is not configured to generate the administrator password on every boot, you will need to find the password using an alternate technique. For information about otherwise obtaining the administrator password, search on *Connect to Your Amazon EC2 Instance* topics in Amazon documentation.

If needed, you can create the necessary vRealize Automation user credentials. The user credentials are then valid for subsequent logins to that machine.

Prerequisites

- The Amazon machine has already been provisioned.
- Log in to the vRealize Automation console as a machine owner, **business group manager**, or **support user**.
- RDP or SSH is active on the Amazon machine image that will be used for provisioning
- The machines are in a security group in which the correct ports are open.

Procedure

1. Navigate to the **Items** page and filter on the groups you manage or a specific group.
2. Select the Amazon machine in the list of machines.

   You can click **View Details** on the **Actions** drop-down menu to display details such as machine type.
3. Select **Edit** in the **Actions** drop-down menu.
4. Click **Show Administrator Password** to obtain the administrator password of the machine.

   Alternatively, you can obtain the password using an external Amazon procedure.
5. Click **Connect Using RDP** from the **Actions** drop-down menu.
6. Click **User another account** when prompted for the login credentials.
7. Type **`LOCAL\Administrator`** when prompted for the user name.

8 Type the administrator password when prompted.

9 Click **OK**.

You are now logged in to the machine as an administrator.

10 Add your vRealize Automation credentials as appropriate. For example, on a Windows server machine, open the server manager and select **Configuration > Local Users and Groups** and add your credentials, using a **`DOMAIN\username`** format, to the **Remote Desktop Users** group.

Your vRealize Automation user name and password are now valid credentials for subsequent login to this machine.

11 Log out of the Amazon machine.

12 Click **Connect Using RDP** from the **Actions** drop-down menu.

13 When prompted to log in, type your vRealize Automation user name and password credentials to log in to the machine.

Machine owners can now log in to the machine using their vRealize Automation credentials.

Collect User Credentials for a vCloud Machine

To log in to an vCloud Air or vCloud Director machine as an administrator, you must discover the machine's administrator password.

The administrator password is available on the Machine Information Details page. If the machine image from which the machine was provisioned is not configured to generate the administrator password on every boot, you can find the password using an alternate technique. For information about otherwise obtaining the administrator password, see vCloud Air or vCloud Director documentation.

If needed, you can create the necessary vRealize Automation user credentials. The user credentials are then valid for subsequent logins to that machine.

Prerequisites

- The vCloud Air or vCloud Director machine has already been provisioned.
- Log in to the vRealize Automation console as a machine owner, **business group manager**, or **support user**.
- RDP or SSH is active on the vCloud Air or vCloud Director machine image that will be used for provisioning
- The machines are in a security group in which the correct ports are open.

Procedure

1 Navigate to the **Items** page and filter on the groups you manage or a specific group.

2 Select the vCloud Air or vCloud Director machine in the list of machines.

You can click **View Details** on the **Actions** drop-down menu to display details such as machine type.

3 Select **Edit** in the **Actions** drop-down menu.

4 Click **Show Administrator Password** to obtain the administrator password of the machine.

   Alternatively, you can obtain the password using an external vCloud Air or vCloud Director procedure.

5 Click **Connect Using RDP** from the **Actions** drop-down menu.

6 Click **User another account** when prompted for the login credentials.

7 Type **`LOCAL\Administrator`** when prompted for the user name.

8 Type the administrator password when prompted.

9 Click **OK**.

   You are now logged in to the machine as an administrator.

10 Add your vRealize Automation credentials as appropriate. For example, on a Windows server machine, open the server manager and select **Configuration > Local Users and Groups** and add your credentials, using a **`DOMAIN\username`** format, to the **Remote Desktop Users** group.

   Your vRealize Automation user name and password are now valid credentials for subsequent login to this machine.

11 Log out of the vCloud Air or vCloud Director machine.

12 Click **Connect Using RDP** from the **Actions** drop-down menu.

13 When prompted to log in, type your vRealize Automation user name and password credentials to log in to the machine.

Machine owners can now log in to the machine using their vRealize Automation credentials.

Reducing Reservation Usage by Attrition

Fabric administrators can reduce the number of machines on a particular reservation over the long term while keeping the reservation and the existing machines provisioned on it active.

You can reduce the reserved machine quota, memory, and storage of a virtual reservation below the amount currently allocated. This allows management of existing machines to continue without change while preventing provisioning of new machines until allocation falls below the new reserved amount.

Note Because virtual machines that are powered off are not included in allocated memory and machine quota totals, reducing the memory or machine allocation of a reservation might prevent machines that are currently powered off from being powered back on.

For example, consider a business group with a reservation that contains 20 provisioned machines that are set to expire over the next 90 days. If you want to reduce this reservation by attrition to no more than 15 machines, you can edit the reservation to reduce the quota from 20 machines to 15. No further machines can be provisioned on the reservation until the number of machines on the reservation is naturally reduced by the upcoming expirations.

Decommissioning a Storage Path

If you are decommissioning a storage path and moving machines to a new one, a fabric administrator must disable the storage path in vRealize Automation.

The following is a high-level overview of the sequence of steps required to decommission a storage path:

1 A fabric administrator disables the storage path on all reservations that use it. See Disable a Storage Path.

2 Move the machines to a new storage path outside of vRealize Automation.

3 Wait for vRealize Automation to automatically run inventory data collection or initiate inventory data collection manually. See Configure Compute Resource Data Collection.

Disable a Storage Path

Fabric administrators can disable storage paths on reservations when storage paths are decommissioned.

Note For each reservation where you disable a storage path, verify that there is sufficient space remaining on other enabled storage paths.

Prerequisites

Log in to the vRealize Automation console as a **fabric administrator**.

Procedure

1 Select **Infrastructure > Reservations > Reservations**.

2 Point to the reservation on which the storage path you are decommissioning is used and click **Edit**.

3 Click the **Resouces** tab.

4 Locate the storage path you are decommissioning.

5 Click the **Edit** icon ().

6 Select the check box in the Disabled column to disable this storage path.

7 Click the **Save** icon ().

8 Click **OK**.

9 Repeat this procedure for all reservations that use the storage path you are decommissioning.

Data Collection

vRealize Automation collects data from infrastructure source endpoints and their compute resources.

Data collection occurs at regular intervals. Each type of data collection has a default interval that you can override or modify. Each type of data collection also has a default timeout interval that you can override or modify.

IaaS administrators can manually initiate data collection for infrastructure source endpoints and fabric administrators can manually initiate data collection for compute resources.

Table 3-13. Data Collection Types

Data Collection Type	Description
Infrastructure Source Endpoint Data Collection	Updates information about virtualization hosts, templates, and ISO images for virtualization environments. Updates virtual datacenters and templates for vCloud Director. Updates Amazon regions and machines provisioned on Amazon regions. Endpoint data collection runs every 4 hours.
Inventory Data Collection	Updates the record of the virtual machines whose resource use is tied to a specific compute resource, including detailed information about the networks, storage, and virtual machines. This record also includes information about unmanaged virtual machines, which are machines provisioned outside of vRealize Automation. Inventory data collection runs every 24 hours. The default timeout interval for inventory data collection is 2 hours.
State Data Collection	Updates the record of the power state of each machine discovered through inventory data collection. State data collection also records missing machines that vRealize Automation manages but cannot be detected on the virtualization compute resource or cloud endpoint. State data collection runs every 15 minutes. The default timeout interval for state data collection is 1 hour.
Performance Data Collection (vSphere compute resources only)	Updates the record of the average CPU, storage, memory, and network usage for each virtual machine discovered through inventory data collection. Performance data collection runs every 24 hours. The default timeout interval for performance data collection is 2 hours.
Network and security inventory data collection (vSphere compute resources only)	Updates the record of network and security data related to vCloud Networking and Security and NSX, particularly information about security groups and load balancing, for each machine following inventory data collection.
WMI data collection (Windows compute resources only)	Updates the record of the management data for each Windows machine. A WMI agent must be installed, typically on the Manager Service host, and enabled to collect data from Windows machines.

Start Endpoint Data Collection Manually

Endpoint data collection runs automatically every 4 hours, but IaaS administrators can manually start endpoint data collection at any time for endpoints that do not require proxy agents.

The **Data Collection** page provides information on the status and age of data collections and allows you to manually start a new endpoint data collection.

Prerequisites

Log in to the vRealize Automation console as an **IaaS administrator**.

Procedure

1. Select **Infrastructure > Endpoints > Endpoints**.
2. Point to the endpoint for which you want to run data collection and click **Data Collection**.
3. Click **Start**.
4. (Optional) Click **Refresh** to receive an updated message about the status of the data collection you initiated.
5. Click **Cancel** to return to the **Endpoints** page.

Configure Compute Resource Data Collection

You can enable or disable data collection, configure the frequency of data collection, or manually request data collection.

The **Data Collection** page provides information on the status and age of data collections. It also allows you to configure data collection for your compute resources.

Prerequisites

Log in to the vRealize Automation console as a **fabric administrator**.

Procedure

1. Select **Infrastructure > Compute Resources > Compute Resources**.
2. Point to the compute resource for which to configure data collection and click **Data Collection**.
3. Configure **Compute Resource** data collection specifications.
   - Select **On** to enable data collection.
   - Select **Off** to disable data collection.
4. Configure **Inventory** data collection.
   - Select **On** to enable data collection.
   - Select **Off** to disable data collection.
   - Enter a number in the **Frequency** text box to configure the time interval (in hours) between inventory data collections.
   - Click **Request Now** to manually start data collection.
5. Configure **State** data collection.
   - Select **On** to enable data collection.
   - Select **Off** to disable data collection.

- Enter a number in the **Frequency** text box to configure the time interval (in minutes) between state data collections.
- Click **Request Now** to manually start data collection.

6 Configure **Performance** data collection.

This is available only for vSphere integrations.

- Select **On** to enable data collection.
- Select **Off** to disable data collection.
- Enter a number in the **Frequency** text box to configure the time interval (in hours) between performance data collections.
- Click **Request Now** to manually start data collection.

7 Configure **Snapshot Inventory** data collection.

This is option is available for compute resources managed by vRealize Business for Cloud.

- Select **On** to enable data collection.
- Select **Off** to disable data collection.
- Enter a number in the **Frequency** text box to configure the time interval (in hours) between snapshot data collections.
- Click **Request Now** to manually start data collection.

8 Click **OK**.

Update Cost Data for All Compute Resources

Fabric administrators can manually update cost information for all compute resources managed by vRealize Business for Cloud.

Prerequisites

Log in to the vRealize Automation console as a **fabric administrator**.

Procedure

1 Select **Infrastructure > Compute Resources > Compute Resources**.

2 Click **Update Cost**.

3 Click **Request Now**.

When the cost update is complete, the status changes to successful.

Understanding vSwap Allocation Checking for vCenter Server Endpoints

You can use vSwap to determine swap space availability for the maximum size swap file on a target machine. The vSwap check occurs when you create or reconfigure a virtual machine from vRealize Automation. vSwap allocation checking is only available for vCenter Server endpoints.

vRealize Automation storage allocation checks if there is sufficient space available on the datastore to accommodate virtual machine disks during a create or reconfigure request. However, when the machine is powered on, if enough space is not available to create swap files on the vCenter Server endpoint, the machine fails to power on. When the power on operation fails, any customizations that depend on the machine also fail. The machine may also be disposed of. Depending on the size of the request, feedback that the machine is not powering on or not provisioning is not immediately obvious.

You can use the vSwap allocation check to help overcome these limitations by checking swap space availability for the maximum size swap file as part of the vRealize Automation create and reconfigure process for vCenter Server endpoints. To enable the vSwap allocation check, set the custom property `VirtualMachine.Storage.ReserveMemory` to True in the machine component or overall blueprint.

Consider the following behaviors for vSwap allocation checks:

- The swap file is located on the datastore that contains the virtual machine. Alternate vCenter Server configurations for locating swap files on a dedicated or different datastore are not supported.
- Swap size is considered when creating or reconfiguring a virtual machine . The maximum swap size is the size of the virtual machine's memory.
- Reserved values for vRealize Automation storage reservations in a host must not exceed the physical capacity of the compute resource.
- When creating a reservation, the sum of the reserved values must not exceed the available storage space.
- Resource pool or host level or virtual machine level memory reservations on vSphere are not collected from the vSphere endpoint and not considered during the calculations on vRealize Automation.
- vSwap does not validate the swap space that is available during power on operations for existing machines.
- You must re-run data collection to capture any changes made to the vSphere endpoint relative to vSwap.

Removing Datacenter Locations

To remove a datacenter location from a user menu, a system administrator must remove the location information from the locations file and a fabric administrator must remove location information from the compute resource.

For example, if you add London to the locations file, associate ten compute resources with that location, and then remove London from the file, the compute resources are still associated with the location London and London is still included in the location drop-down list on the Confirm Machine Request page. To remove the location from the drop-down list, a fabric administrator must edit the compute resource and reset the Location to blank for all compute resources that are associated with the location.

The following is a high-level overview of the sequence of steps required to remove a datacenter location:

1 A system administrator removes the datacenter location information from the locations file.

2 A fabric administrator removes all the compute resource associations to the location by editing the locations of each associated compute resource.

Monitoring Containers

You can monitor the status of a container that you create in Containers for vRealize Automation.

After you create your containers based on a template, you can monitor their state. By clicking **Details** on a container, you can monitor the network bandwidth, CPU and memory usage, logs, and properties of that container.

Bulk Import, Update, or Migrate Virtual Machines

You can use the Bulk Imports feature to import, update, or migrate virtual machines to vRealize Automation. Bulk Imports streamlines the management of multiple machines in multiple environments.

The Bulk Imports feature imports virtual machines intact with defining data such as reservation, storage path, blueprint, owner, and any custom properties. Bulk Imports supports the following administrative tasks:

- Import one or more unmanaged virtual machines so that they can be managed in a vRealize Automation environment.
- Make a global change to a virtual machine property, such as a storage path.
- Migrate a virtual machine from one environment to another.

You can execute the Bulk Imports feature commands using either the vRealize Automation console or the CloudUtil command-line interface. For more information about using the CloudUtil command-line interface, see the *Life Cycle Extensibility* documentation.

Prerequisites

- Log in to the vRealize Automation console as a **fabric administrator** and as a **business group manager**.
- If you are importing virtual machines that use static IP addresses, prepare a properly configured address pool.

Import a Virtual Machine to a vRealize Automation Environment

You can import an unmanaged virtual machine to a vRealize Automation environment.

An unmanaged virtual machine exists in a hypervisor but is not managed in a vRealize Automation environment and cannot be viewed in the console. After you import an unmanaged virtual machine, the virtual machine is managed using the vRealize Automation management interface. Depending on your privileges, you can see the virtual machine on the **Managed Machines** tab or the **Items** tab.

The bulk import option does not support deployments that are provisioned from a blueprint that contains an NSX network and security component or a software component.

Prerequisites

- Log in to the vRealize Automation console as a **fabric administrator** and as a **business group manager**.
- If you are importing virtual machines that use static IP addresses, prepare a properly configured address pool. For more information about using a network profile to control IP address ranges, see *Configuring vRealize Automation*.

Procedure

1. Generate a virtual machine CSV data file.
   a. Select **Infrastructure > Administration > Bulk Imports**.
   b. Click **Generate CSV File**.
   c. Select **Unmanaged** from the **Machines** drop-down menu.
   d. Select the **Business group** default value from the drop-down menu.
   e. Enter the **Owner** default value.
   f. Select the **Blueprint** default value from the drop-down menu.

      The blueprint must be published and added to an entitlement for the import to be successful.

g Select the **Component machine** default value from the drop-down menu.

If you select a value for **Business group** and **Blueprint**, you might see the following results in the CSV data file:

- `Host Reservation (Name or ID) = INVALID_RESERVATION`
- `Host To Storage (Name or ID) = INVALID_HOST_RESERVATION_TO_STORAGE`

These messages appear if you do not have a reservation in the selected business group for the host virtual machine that also hosts the unmanaged virtual machine. If you have a reservation in that business group for the unmanaged virtual machine host, the Host Reservation and Host to Storage values fill in properly.

h Select one of the available resource types from the **Resource** drop-down menu.

Menu Item	Description
Endpoint	Information required to access a virtualization host.
Compute Resource	Information required to access a group of virtual machines performing a similar function.

i Select the name of the virtual machine resource from the **Name** drop-down menu.

j Click **OK**.

2 Edit your virtual machine CSV data file.

a Open the CSV file, and edit the data categories to match existing categories in the target vRealize Automation environment.

To import virtual machines contained in a CSV data file, each virtual machine must be associated with the following items:

- Reservation
- Storage location
- Blueprint
- Virtual machine component
- Owner that exists in the target deployment

All the values for each virtual machine must be present in the target vRealize Automation environment for the import to succeed. You can change the values for reservation, storage location, blueprint, and owner, or add a static IP address value to individual virtual machines by editing the CSV file.

Heading	Comment
# Import--Yes or No	Change to No to prevent a particular virtual machine from being imported.
Virtual Machine Name	Do not change.
Virtual Machine ID	Do not change.
Host Reservation (Name or ID)	Enter the name or ID of a reservation in the target vRealize Automation environment.
Host To Storage (Name or ID)	Enter the name or ID of a storage location in the target vRealize Automation environment.
Deployment Name	Enter a new name for the deployment, for example, the virtual machine name, you are creating in the target vRealize Automation environment. **Note** Each virtual machine must be imported to its own deployment. You cannot import a single virtual machine to an existing deployment. You cannot import multiple virtual machines to a single deployment.
Blueprint ID	Enter the ID of the blueprint in the target vRealize Automation environment that you use to import the virtual machine. **Note** Make sure that you enter only the blueprint ID. Do not enter the blueprint name. You must select a blueprint that contains only a single virtual machine component. The blueprint must be published and added to an entitlement.
Component Machine ID	Enter the name of a virtual machine component that is contained in the blueprint you selected. You cannot import a virtual machine into a blueprint that has more than one component.
Owner Name	Enter a user in the target vRealize Automation environment who is entitled to the blueprint.

b If you are importing a virtual machine with a static IP address, append a command in the following form to the CSV file.

```
,VirtualMachine.Network#.Address, w.x.y.z, HOP
```

Configure the command with the appropriate information for your virtual machine.

- Change the # to the number of the network interface being configured with this static IP address. For example, `VirtualMachineNetwork0.Address`.
- Change *w.x.y.z* to be the static IP address for the virtual machine. For example, `11.27.42.57`.
- The *HOP* string, Hidden, Not encrypted, Not runtime, sets the visibility of the property. This default property is removed from the virtual machine after a successful import.

For a successful import, the IP address must be available in a properly configured address pool. If the address cannot be found or is already in use, the import succeeds without the static IP address definition, and an error is logged.

c Save the CSV file.

3 Use the vRealize Automation management interface to import your virtual machine to a vRealize Automation environment.

a Select **Infrastructure > Administration > Bulk Imports**.

b Click **New**.

c Enter a unique name for this task in the **Name** text box, for example, unmanaged import 10.

d Enter the CSV filename in the **CSV file** text box by browsing to the CSV filename.

e Select import options.

Option	Description
Start time	Schedule a future start date. The chosen start time is the local server time and not the local time of the user workstation.
Now	Begin the import process immediately.
Delay (seconds)	If you are importing many virtual machines, select the number of seconds to delay each virtual machine registration. Selecting this menu item slows the import process. Leave blank to select no delay.
Batch size	If you are importing many virtual machines, select the total number of virtual machines to register at a given time. Selecting this menu item slows the import process. Leave blank to select no limit.
Ignore managed machines	Leave unselected.
Skip user validation	Selecting this menu item sets the virtual machine owner to the value listed in the Owner column of the CSV data file without verifying that the user exists. Selecting this menu item can decrease the import time.
Test import	Test the import process without importing the virtual machines so you can test your CSV file for errors.

f Click **OK**.

The progress of the operation appears on the Bulk Imports page.

Update a Virtual Machine in a vRealize Automation Environment

You can make a change to a virtual machine property, such as a storage path, to update one or more managed virtual machines in a vRealize Automation environment.

A managed virtual machine is a machine that is managed in a vRealize Automation environment and can be viewed in the console.

Prerequisites

- Log in to the vRealize Automation console as a **fabric administrator** and as a **business group manager**.

Procedure

1 Generate a virtual machine CSV data file.

   a Select **Infrastructure > Administration > Bulk Imports**.

   b Click **Generate CSV File**.

   c Select **Managed** from the **Machines** drop-down menu.

   d Select one of the available resource types from the **Resource** drop-down menu.

Option	Description
Endpoint	Information required to access a virtualization host.
Compute Resource	Information required to access a group of virtual machines performing a similar function.

   e Select the name of the virtual machine resource from the **Name** drop-down menu.

   f (Optional) Select **Include custom properties** if you want to migrate the virtual machine custom properties.

   g Click **OK**.

2 Edit your virtual machine CSV data file.

a Open the CSV file with a text editor and edit the data categories that you want to change globally.

To update virtual machines contained in a CSV data file, each machine must be associated with the following items:

- Reservation
- Storage location
- Blueprint
- Machine component
- Owner that exists in the target deployment

All of the values for each machine must be present in the target vRealize Automation environment for the update to succeed. You can change the values for reservation, storage location, blueprint, and owner, or add a static IP address value to individual machines by editing the CSV file.

b If you are changing a virtual machine static IP address, append a command in the following form to the CSV file.

`,VirtualMachine.Network#.Address, w.x.y.z, HOP`

Configure the command with the appropriate information for your virtual machine.

- Change the # to the number of the network interface being configured with this static IP address. For example, `VirtualMachineNetwork0.Address`.
- Change *w.x.y.z* to be the static IP address for the virtual machine. For example, `11.27.42.57`.
- The *HOP* string, Hidden, Not encrypted, Not runtime, sets the visibility of the property. This default property is removed from the virtual machine after a successful import.

For a successful update, the IP address must be available in a properly configured address pool. If the address cannot be found or is already in use, the update succeeds without the static IP address definition, and an error is logged.

c Save the CSV file and close your text editor.

3 Use the vRealize Automation management interface to update one or more virtual machines in a vRealize Automation environment.

a Select **Infrastructure > Administration > Bulk Imports**.

b Click **New**.

c Enter a unique name for this task in the **Name** text box, for example, managed global update 10.

d Enter the CSV file name in the **CSV file** text box by browsing to the CSV file name.

e Select import options.

Option	Description
Start time	Schedule a future start date. The specified start time is the local server time and not the local time of the user workstation.
Now	Begin the import process immediately.
Delay (seconds)	If you are updating a large number of virtual machines, select the number of seconds to delay each virtual machine update. Selecting this option slows the update process. Leave blank to specify no delay.
Batch size	If you are updating a large number of virtual machines, select the total number of machines to update at a given time. Selecting this option slows the update process. Leave blank to specify no limit.
Ignore managed machines	Leave unselected.
Skip user validation	Selecting this option sets the machine owner to the value listed in the Owner column of the CSV data file without verifying that the user exists. Selecting this option can decrease the update time.
Test import	Leave unselected.

f Click **OK**.

The progress of the operation appears on the Bulk Imports page.

Migrate a Virtual Machine to a Different vRealize Automation Environment

You can migrate one or more managed virtual machines in a VMware vRealize ™ Automation environment to a different vRealize Automation environment.

A managed virtual machine is a virtual machine that is managed in a vRealize Automation environment and can be viewed in the console.

Prerequisites

- Log in to the vRealize Automation console as a **fabric administrator** and as a **business group manager**.
- If you are importing virtual machines that use static IP addresses, prepare a properly configured address pool. For more information about using a network profile to control IP address ranges, see *Configuring vRealize Automation*.

Procedure

1 Generate a virtual machine CSV data file.

a Select **Infrastructure > Administration > Bulk Imports**.

b Click **Generate CSV File**.

c Select **Managed** from the **Machines** drop-down menu.

d Select one of the available resource types from the **Resource** drop-down menu.

Option	Description
Endpoint	Information required to access a virtualization host.
Compute Resource	Information required to access a group of virtual machines performing a similar function.

e Select the name of the virtual machine resource from the **Name** drop-down menu.

f (Optional) Select **Include custom properties**.

You include custom properties when you import a virtual machine into a new deployment with the same properties.

g Click **OK**.

2 Edit your virtual machine CSV data file.

Whether you must edit the CSV data file depends on the similarity of the source and target environments. If the configuration values in the source environment do not match the values in the target environment, you must edit the CSV data file so that the values match before you begin migration.

a Open the CSV file, and edit the data categories to match existing categories in the target vRealize Automation environment.

To migrate virtual machines contained in a CSV data file, each virtual machine must be associated with a reservation, storage location, blueprint, machine component, and owner that exists in the target vRealize Automation environment. All the values for each virtual machine must be present in the target vRealize Automation environment for migration to succeed. You can change the values for reservation, storage location, blueprint, and owner, or add a static IP address value to individual virtual machines by editing the CSV file.

Heading	Comment	Example
# Import--Yes or No	Change to No to prevent a particular virtual machine from being imported.	Yes
Virtual Machine Name	Do not change.	MyMachine
Virtual Machine ID	Do not change.	a6e05812-0b06-4d4e-a84a-fed242340426a
Host Reservation (Name or ID)	Enter the name or ID of a reservation in the target vRealize Automation environment.	DevReservation
Host To Storage (Name or ID)	Enter the name or ID of a storage location in the target vRealize Automation environment.	ce-san-1:custom-nfs-2
Deployment Name	Enter a new name for the deployment you are creating in the target vRealize Automation environment. Each virtual machine must be migrated to its own deployment. You cannot import a single virtual machine to an existing deployment. You cannot import multiple virtual machines to a single environment.	ImportedDeployment0001
Converged Blueprint ID	Enter the ID of the blueprint in the target vRealize Automation environment that you use to import the virtual machine. Make sure that you enter only the blueprint ID. Do not enter the blueprint name. You must select a blueprint that contains only a single virtual machine component. The blueprint must be published and added to an entitlement.	ImportBlueprint
Component Blueprint ID	Enter the name of a virtual machine component that is contained in the blueprint you selected. You cannot import a virtual machine into a blueprint that has more than one component.	ImportedMachine
Owner Name	Enter a user in the target vRealize Automation environment.	user@tenant

Example of a complete, properly formatted CSV line: Yes, MyMachine, a6e05812-0b06-4d4e-a84a-fed242340426, DevReservation, ce-san-1:custom-nfs-2, Imported Deployment 0001, ImportBlueprint, ImportedMachine, user@tenant

b If you are migrating a virtual machine with a static IP address, append a command in the following form to the CSV file.

```
,VirtualMachine.Network#.Address, w.x.y.z, HOP
```

Configure the command with the appropriate information for your virtual machine.

- Change the # to the number of the network interface being configured with this static IP address. For example, `VirtualMachineNetwork0.Address`.
- Change *w.x.y.z* to be the static IP address for the virtual machine. For example, `11.27.42.57`.
- The *HOP* string, Hidden, Not encrypted, Not runtime, sets the visibility of the property. This default property is removed from the virtual machine after a successful import.

For a successful migration, the IP address must be available in a properly configured address pool. If the address cannot be found or is already in use, the migration succeeds without the static IP address definition, and an error is logged.

c Save the CSV file.

3 Use the vRealize Automation management interface to migrate your virtual machine to a vRealize Automation environment.

a Select **Infrastructure > Administration > Bulk Imports**.

b Click **New**.

c Enter a unique name for this task in the **Name** text box, for example, managed migration 10.

d Enter the CSV filename in the **CSV file** text box by browsing to the CSV filename.

e Select import options.

Option	Description
Start time	Schedule a future start date. The chosen start time is the local server time and not the local time of the user workstation.
Now	Begin the migration process immediately.
Delay (seconds)	If you are migrating many virtual machines, select the number of seconds to delay each virtual machine registration. Selecting this option slows the migration process. Leave blank to select no delay.
Batch size	If you are migrating many virtual machines, select the total number of virtual machines to register at a given time. Selecting this option slows the migration process. Leave blank to select no limit.
Ignore managed machines	Leave unselected.
Skip user validation	Selecting this option sets the virtual machine' owner to the value listed in the Owner column of the CSV data file without verifying that the user exists. Selecting this option can decrease the migration time.
Test import	Test the migration process without migrating the virtual machines so you can test your CSV file for errors.

f Click **OK**.

The progress of the operation appears on the Bulk Imports page.