Deploying and managing RHEL systems in hybrid clouds

Deploying and managing your customized RHEL system images in hybrid clouds
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Abstract

Red Hat Insights enables you to perform and manage multiple services as part of one larger, connected workflow. You can define your third-party content source, create customized images, use your preferred system by setting customizations in the image, and launch the image to the target public or private cloud environments, such as Amazon Web Services and Microsoft Azure. You can monitor the system infrastructure you have created, and create and apply patches when needed. You can also report and audit any issues you find in your system infrastructure to improve security and stability.
# Table of Contents

MAKING OPEN SOURCE MORE INCLUSIVE ................................................................. 3

CHAPTER 1. WORKFLOW FOR DEPLOYING AND MANAGING RHEL SYSTEMS IN OPEN HYBRID CLOUD ENVIRONMENTS ......................................................... 4

CHAPTER 2. MANAGING REPOSITORIES TO BUILD YOUR CUSTOMIZED OPERATING SYSTEMS ......................................................... 5
  2.1. ADDING A CUSTOM REPOSITORY .......................................................... 5
  2.2. MODIFYING A CUSTOM REPOSITORY ............................................... 6
  2.3. REMOVING A CUSTOM REPOSITORY ............................................... 6
  2.4. ADDING EXISTING REPOSITORIES FROM POPULAR REPOSITORIES TO CUSTOM REPOSITORIES .................................................. 6
  2.5. UPDATING CUSTOM REPOSITORY AFTER CHANGES ....................... 7
  2.6. REPOSITORY STATUS IN THE RED HAT HYBRID CLOUD CONSOLE .... 7
  2.7. CONFIGURING CUSTOM REPOSITORY NOTIFICATIONS .................... 8

CHAPTER 3. CONFIGURING INTEGRATIONS TO LAUNCH RHEL IMAGES ................................................................. 9
  3.1. CONNECTING AN AWS ACCOUNT TO THE RED HAT HYBRID CLOUD CONSOLE ................................................................. 9
  3.2. CONNECTING MICROSOFT AZURE ACCOUNT TO THE RED HAT HYBRID CLOUD CONSOLE ................................................................. 10
  3.3. CONNECTING GCP PROJECT TO THE RED HAT HYBRID CLOUD CONSOLE ................................................................. 11

CHAPTER 4. BUILDING CUSTOMIZED RHEL IMAGES ......................................................... 12
  4.1. ABOUT BUILDING CUSTOMIZED IMAGES ...................................... 12
  4.2. CREATING CUSTOMIZED RHEL IMAGES FOR THE AWS ENVIRONMENT ................................................................. 12
  4.3. AUTHORIZING IMAGE BUILDER TO PUSH IMAGES TO MICROSOFT AZURE CLOUD ................................................................. 16
  4.4. CREATING CUSTOMIZED RHEL IMAGES FOR THE MICROSOFT AZURE ENVIRONMENT ................................................................. 17
  4.5. CREATING CUSTOMIZED IMAGES FOR THE GCP ENVIRONMENT ........ 21
  4.6. CREATING CUSTOMIZED RHEL VMDK SYSTEM IMAGES ................ 24
  4.7. CREATING CUSTOMIZED RHEL GUEST SYSTEM IMAGES ............... 27
  4.8. CREATING CUSTOMIZED RHEL ISO SYSTEM IMAGES .................... 29
  4.9. CREATING CUSTOMIZED IMAGES FOR THE OCI ENVIRONMENT ....... 32
  4.10. CREATING A NEW IMAGE FROM AN EXISTING BUILD ................... 35
  4.11. SHARING AWS IMAGES TO OTHER REGIONS ................................ 36
  4.12. DOWNLOADING THE JSON COMPOSE REQUEST ............................ 37

CHAPTER 5. LAUNCHING CUSTOMIZED RHEL IMAGES TO THE CLOUD PLATFORMS WITH INSIGHTS IMAGE BUILDER ................................................................. 38
  5.1. LAUNCHING A CUSTOMIZED RHEL IMAGE ON AWS ....................... 38
  5.2. LAUNCHING A CUSTOMIZED RHEL IMAGE ON MICROSOFT AZURE .... 39
  5.3. LAUNCHING A CUSTOMIZED RHEL IMAGE ON THE GOOGLE CLOUD PLATFORM ................................................................. 40
  5.4. CONFIGURING LAUNCH NOTIFICATIONS ....................................... 41

CHAPTER 6. DEPLOYING YOUR CUSTOMIZED IMAGES ......................................................... 43
  6.1. UPLOADING VMDK IMAGES AND CREATING A RHEL VIRTUAL MACHINE IN VSphere ................................................................. 43
  6.2. DEPLOYING OVA VMDK IMAGES TO THE VSphere GUI ................... 44
  6.3. CREATING A VIRTUAL MACHINE FROM THE CUSTOMIZED RHEL GUEST SYSTEM IMAGE ................................................................. 45
  6.4. INSTALLING A CUSTOMIZED RHEL ISO SYSTEM IMAGE TO A BARE METAL SYSTEM ................................................................. 47
  6.5. IMPORTING AND RUNNING QCOW2 IMAGES ON OCI ................. 47

PROVIDING FEEDBACK ON RED HAT DOCUMENTATION ......................................................... 49

OPENING A SUPPORT CASE AT RED HAT SUPPORT ......................................................... 50
MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright’s message.
CHAPTER 1. WORKFLOW FOR DEPLOYING AND MANAGING RHEL SYSTEMS IN OPEN HYBRID CLOUD ENVIRONMENTS

Use Red Hat Insights to launch and manage your customized RHEL systems images in the open hybrid cloud environments. Currently, you can use Red Hat Insights to deploy and manage the RHEL systems in the following cloud:

- Amazon Web Services
- Microsoft Azure
- Google Cloud Platform

You can access the Red Hat Insights with your Red Hat account, a RHEL subscription, and an activation key. No additional SKUs are required. See Creating an activation key.

As part of the deployment, by using Red Hat Insights, you can follow an end-to-end workflow to:

1. Define or use existing repositories.
2. Configure integrations to launch your images.
4. Launch the images in your preferred cloud.

In addition, you can manage your systems by granting users access, monitoring the inventory of your system infrastructure, and applying patches to improve security and stability.
You can define your customized repositories with third-party content without having to manage their lifecycle. You can use your third-party content to build an image, and when you launch that image to the public cloud environment, you can use those repositories with the **dnf** tool.

### 2.1. ADDING A CUSTOM REPOSITORY

Define your repository to be able to add packages from this repository to your customized images.

**Prerequisites**

- You have a RHEL subscription.
- You have administrator access to the Red Hat Hybrid Cloud Console web user interface or repository administrator role.
- You have the URL link to your repository content.

**Procedure**

1. Access Hybrid Cloud Console.
2. Click **Services > Observe > RHEL > Repositories**
3. Click **Add repositories**. The **Add custom repositories** wizard opens.
4. Enter the following information:
   a. **NAME** - mandatory.
   b. **URL** - mandatory.
   c. In the **Restrict architecture** drop-down menu, select an architecture. You can allow all the architectures or restrict one to your system architecture to prevent incorrect repositories availability.
   d. In the **Restrict OS version** drop-down menu select an operating system (OS). You can allow all the RHEL versions or select one for your system version to prevent incorrect repositories being available.
   e. **GPG key** - upload the .txt file with a GPG key or paste the URL or value of an existing GPG key. The GPG key verifies the signed packages of a repository. If you do not provide the GPG key for a repository, your system cannot perform the verification.
5. If you want to add another repository, click the **+ Add another repository** button and repeat step 3.
6. Click **Save**. The Red Hat Hybrid Cloud Console validates the project status. If your repository is marked as **Invalid**, check the repository URL that you added. For details about the repository status, see **Repository status** section.

**Verification**
2.2. MODIFYING A CUSTOM REPOSITORY

You can modify a custom repository when you need to update information for that repository.

Prerequisites

- You have a RHEL subscription.
- You have administrator access to the Red Hat Hybrid Cloud Console web user interface or repository administrator role.

Procedure

1. Access Hybrid Cloud Console.
2. Click Services > Observe > RHEL > Repositories
3. Find a repository you want to modify and click Edit in the Options menu.
4. In the Edit custom repository wizard, modify the information you need. Click Save changes.

2.3. REMOVING A CUSTOM REPOSITORY

When you no longer need a custom repository you can delete it.

Prerequisites

- You have a RHEL subscription.
- You have administrator access to the Red Hat Hybrid Cloud Console web user interface or repository administrator role.

Procedure

1. Access Hybrid Cloud Console.
2. Click Services > Observe > RHEL > Repositories
3. Find a repository to delete and click Delete in the Options menu.

Verification

- Open the list of custom repositories, and verify that the repository no longer exists.

2.4. ADDING EXISTING REPOSITORIES FROM POPULAR REPOSITORIES TO CUSTOM REPOSITORIES

The Red Hat Hybrid Cloud Console has pre-configured repositories that you can use to build your customized RHEL image.

Prerequisites
• You have a RHEL subscription.

• You have administrator access to the Red Hat Hybrid Cloud Console web user interface or repository administrator role.

Procedure

1. Access Hybrid Cloud Console.

2. Click Services > Observe > RHEL > Repositories

3. On the Custom repositories page click the Popular repositories tab.

4. Search for the repository you want to add and click Add.

Verification

• Select the Your repositories tab and verify that the new repository is displayed in the list of custom repositories.

2.5. UPDATING CUSTOM REPOSITORY AFTER CHANGES

When you make changes to your repository you can trigger a refresh of that repository in the Red Hat Hybrid Cloud Console.

Prerequisites

• You have a RHEL subscription.

• You have administrator access to the Red Hat Hybrid Cloud Console web user interface or repository administrator role.

• You updated your custom repository.

Procedure

1. Access Hybrid Cloud Console.

2. Click Services > Observe > RHEL > Repositories

3. Find a repository you want to modify and click Introspect Now in the Options menu.

4. The status of that repository changes to In progress that indicates the Hybrid Cloud Console is connecting to the repository and checking for changes. The Red Hat Hybrid Cloud Console checks the status of the repositories every 24 hours and again every 8 hours if the status check fails.

2.6. REPOSITORY STATUS IN THE RED HAT HYBRID CLOUD CONSOLE

The repository status shows if the repository is available. The Red Hat Hybrid Cloud Console checks the repository status periodically and can change it. The following table describes the repository status in the Red Hat Hybrid Cloud Console.

Table 2.1. Repository status
<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>The Red Hat Hybrid Cloud Console has validated the repository and you can use it.</td>
</tr>
<tr>
<td>Invalid</td>
<td>The Red Hat Hybrid Cloud Console never validated this repository. You cannot use it.</td>
</tr>
<tr>
<td>Unavailable</td>
<td>The repository was valid at least once. The Red Hat Hybrid Console cannot reach this repository at the moment. You cannot use it.</td>
</tr>
<tr>
<td>In progress</td>
<td>The repository validation is in progress.</td>
</tr>
</tbody>
</table>

### 2.7. CONFIGURING CUSTOM REPOSITORY NOTIFICATIONS

You can configure notifications for custom repositories in the Red Hat Hybrid Cloud Console. For information on how to configure notifications in the Red Hat Hybrid Cloud Console, see [Configuring notifications on the Red Hat Hybrid Cloud Console](#).

**Custom repository events**

- **Repository Created**
  - When a custom repository is added to the Red Hat Hybrid Cloud Console, a notification is sent.

- **Repository Introspected**
  - When the introspection of a custom repository completes successfully, a notification is sent.

- **Repository Introspection Failure**
  - When the introspection of a custom repository fails, a notification is sent.

- **Repository Updated**
  - When an introspection detects changes in a custom repository, a notification is sent.

- **Repository Deleted**
  - When a custom repository is deleted, a notification is sent.
CHAPTER 3. CONFIGURING INTEGRATIONS TO LAUNCH RHEL IMAGES

You can launch your customized RHEL images in a public cloud environment. To do so you must connect your public cloud account with the Hybrid Cloud Console by adding your account to Integrations. While adding your public cloud account, you may need to log in to that account and perform some actions depending on your cloud provider.

3.1. CONNECTING AN AWS ACCOUNT TO THE RED HAT HYBRID CLOUD CONSOLE

You can add your Amazon Web Services (AWS) account to the Red Hat Hybrid Cloud and configure it to launch your RHEL images in the AWS environment.

Prerequisites

- You have a RHEL subscription.
- You are an Organization Administrator or you have a non-admin user with the “Launch administrator” and the “Sources administrator” roles assigned. See how to assign a role to a user.
- You installed the `awscli` and the `jq` packages.

Procedure

1. Access Hybrid Cloud Console.
2. Click the Settings icon, then click Settings > Integrations.
3. Click Add integration. The Add integrations wizard opens.
4. Select Amazon Web Service in the Select integration type page and click Next.
5. On the Integration name page, name the integration for your AWS account in the Name field and click Next.
6. On the Select configuration page, choose between the following two options:
   a. If you select Account authorization, provide your Access key ID and Secret access key for your ID from your AWS account. Click Next and complete the following steps:
      i. On the Select application page, select the Launch images option. Click Next.
      ii. On the Review details page, verify the details about your AWS account and click Add. The console connects to your AWS account with the credentials you provided and creates an Identity and Access Management (IAM) role with necessary permissions in your AWS account.
   b. If you select Manual configuration, click Next and complete the following steps:
      i. On the Select application page, select the Launch images option. Click Next.
      ii. On the Create IAM policy page in Enable account access copy the command with the Copy to clipboard and run it in your terminal. Click Next.
iii. On the Create IAM role page in Enable account access, follow the instructions on the wizard window. Click Next.

iv. On the Enter ARN page in Enable account access, fill the ARN into the text field. Click Next.

7. On the Review details page, verify the details about your AWS account and click Add to finish adding it to the Integrations.

3.2. CONNECTING MICROSOFT AZURE ACCOUNT TO THE RED HAT HYBRID CLOUD CONSOLE

You can add your Microsoft Azure account to the Red Hat Hybrid Cloud Console and configure it to launch your RHEL images in the Azure environment.

Prerequisites

- You have a RHEL subscription.
- You are an Organization Administrator or you have a non-admin user with the "Launch administrator" and the "Sources administrator" roles assigned. See how to assign a role to a user.
- You have a Microsoft Azure account.
- You have registered the following resource providers in your Microsoft Azure subscription:
  - Microsoft.Compute;
  - Microsoft.Storage;
  - Microsoft.Network.

Procedure

1. Access Hybrid Cloud Console.

2. Click the Settings icon, then click Settings > Integrations.

3. Click Add Integration. The Add integration wizard opens.

4. Select Microsoft Azure in the Select integration type page and click Next.

5. On the Name integration page, name the integration for your Microsoft Azure account in the Integration name field and click Next.

6. On the Select application page, select the Launch images option and click Next.

7. On the Configure Azure Lighthouse page, click Take me to Lighthouse and complete configuration steps in Azure Lighthouse according to the Microsoft instructions. Return to the Add integration wizard and click Next.

8. On the Set subscription ID page, fill in the Subscription ID field and click Next.

9. On the Review details page, verify the details about your Microsoft Azure account and click Add to finish adding it to the Integrations.
3.3. CONNECTING GCP PROJECT TO THE RED HAT HYBRID CLOUD CONSOLE

You can add your Google Cloud Platform (GCP) project to the Red Hat Hybrid Cloud and configure it to launch your RHEL images in the AWS environment.

Prerequisites

- You have a RHEL subscription.
- You are an Organization Administrator or you have a non-admin user with the "Launch administrator" and the "Sources administrator" roles assigned. See how to assign a role to a user.
- You have a GCP project with a default network.

Procedure

1. Access Hybrid Cloud Console.
2. Click the Settings icon, then click Settings > Integrations.
3. Click Add integration. The Add integration wizard opens.
4. Select Google Cloud in the Select integration type page and click Next.
5. On the Integration name page, name the integration for your GCP project in the Name field and click Next.
6. On the Select application page, select the Launch images option and click Next.
7. On the Enable account access page:
   a. On the Enter Project ID page, fill in your GCP project name that you want to add in the Project field. Click Next.
   b. On the Create custom role page, follow the instructions on the page. Click Next.
8. On the Review details page, verify the details about your GCP project and click Add to finish adding it to the Integrations.

Verification

- The console validates the data for your GCP project and shows a message Configuration successful.
CHAPTER 4. BUILDING CUSTOMIZED RHEL IMAGES

You can build customized RHEL images for a variety of deployment types by using Insights image builder. You can build Conventional (RPM-DNF) images or Immutable (OSTree) images.

4.1. ABOUT BUILDING CUSTOMIZED IMAGES

You can build either Conventional (RPM-DNF) images or Immutable (OSTree) images.

- **The Conventional (RPM-DNF)** enables you to manage or modify the system software by using the DNF package manager and updated RPM packages.

- **The Immutable (OSTree) images** contain a complete operating system ready to be remotely installed and allows you to manage the system software by referencing a central image repository. For more details, see Create RHEL for Edge images and configure automated management.

When building the images, you can perform any of the following customizations:

- Select the cloud target environment to launch the instances.

- Choose to automatically register and enable advanced capabilities to the system images, such as:
  - Red Hat Insights, to identify and address operational and vulnerability risks.
  - Remote host configuration (rhc), to enable remote remediations and system management with automation.
  - Optionally, you can manually register your systems later, with rhc. See Remote Host Configuration and Management.

- Define the system images with a specific file system customization.

- Select packages from Red Hat and third-parties.

The image artifacts are saved for 14 days and expire after that. To avoid losing the image, transfer the image to your account before the expiration date. If an image has already expired, you can and it is expired, you can also re-create the exact image based on an existing build to reuse the previous configuration.

You can share an existing AWS image to a new region to run on your AWS account so that all regions can launch with the same configuration.

You can also download the compose request of your image and use the image builder API to automate your image building tasks.

4.2. CREATING CUSTOMIZED RHEL IMAGES FOR THE AWS ENVIRONMENT

To push a RHEL image to the Amazon Web Services (AWS) target environment, first create a customized image. For that, complete the following steps:

**Prerequisites**
You have a RHEL subscription.

You have Organization Administrator permissions.

For AWS target environments, you have created an AWS account.

**Procedure**

1. Access Hybrid Cloud Console.

2. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

3. Click Create image.
   The Create image dialog wizard opens.

4. On the **Image output** page, select the following:
   a. From the **Release** list, select the release that you want to use.
   b. From the **Select target environments** option, select Amazon Web Services.
   c. Click **Next**.

5. On the **Target Environment - Amazon Web Service** page, perform the following actions:
   a. Select one of the share methods to share your Red Hat image with your AWS account:
      
      - Use an account configured from Integrations
      - Manually enter an account ID
   b. For the Use an account configured from Integrations sharing method:
      
      i. From the **Integration Name** dropdown menu, select the integration you want.
      
      ii. The Default region fields and Associated Account ID are filled automatically after you select the integration. If the integration is unavailable, you can enter the AWS account ID manually or try again later.
   c. Click **Next**.
   d. For the Manually enter an account ID sharing method:
      
      i. Enter the **AWS account ID**. The Default region is **us-east-1** and you can copy the image to different regions later. See Sharing AWS images to other regions.
      
      ii. Click **Next**.

6. On the **Register** page, select one of the registration methods: Automatically register and enable advanced capabilities or Register later.
   If you choose the Automatically register and enable advanced capabilities option, customize it further.
   
   a. Click the Show additional connection options button.
      
      The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
- Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.

- Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.

b. Check or uncheck the checkboxes according to your preferences.

c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.

d. Click Next.

7. On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.

a. To configure your partitions manually, click the Manually configure partitioning radio button.

The Configure partitions section opens, showing the configuration based on Red Hat standards and security guides.

b. From the drop-down menu, provide details to configure the partitions:

c. For the Mount point field, select one mount point type option
You can also add an additional path to the Mount point, such as /tmp. For example: /var as a prefix and /tmp as an additional path results in /var/tmp.

NOTE

Depending on the Mount point type you choose, the file system type changes to xfs, and so on.

d. For the Minimum size partition field of the file system, enter the desired minimum partition size. In the Minimum size drop-down menu, you can use common size units such as GiB, MiB, or KiB. The default unit is GiB.

e. To add more partitions, click Add partition and repeat the steps for each added partition. Click Next.

8. Optional: On the Content page, complete the following steps to add additional packages to your image:

a. On the Additional Red Hat packages step:

i. On the Available packages search field, enter the package name and click the button.

ii. Click the >> button to add all packages shown in the package search results to the Chosen packages dual list box. Optionally, you can click the > button to add only one selected package at a time.

b. On the Custom repositories page, click Repositories.

The Custom Repositories page opens in a new browser tab. Go to the new page.

i. Click Add repositories. Enter the following information:
A. Name

B. URL

C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.

**NOTE**
If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

F. Click **Save** to validate the repository status.

c. Return to the Create image dashboard and click **Next**.

9. Optional: On the **Name image** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.

10. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

Insights image builder starts to compose a RHEL image for the **x86_64** architecture. After the image is ready, you can see it in the **Inventory**.

**Verification**

- Verify that on the dashboard, you can see details such as:
  - Image name
  - The creation or update date
  - Image OS Release
  - The cloud **Target** environment
  - The image creation **Status**
  - The **Instance** details.

**Additional resources**

- Connecting an AWS account to the Red Hat Hybrid Cloud Console
- Possible statuses for your custom repository
Sharing AWS images to other regions

Launching a customized RHEL image to AWS

4.3. AUTHORIZING IMAGE BUILDER TO PUSH IMAGES TO MICROSOFT AZURE CLOUD

To push a RHEL image to the Microsoft Azure target environment, you must authorize Insights image builder to push images to the Microsoft Azure cloud. The authorization consists of the following steps:

- Configure Insights image builder as an authorized application for your tenant GUID
- Give it the role of Contributor to at least one resource group.

To authorize Insights image builder as an authorized application, follow the steps:

Prerequisites

- You have an existing Resource Group in Microsoft Azure portal.
- You have the User Access Administrator role rights.
- Your Microsoft Azure subscription has Microsoft.Storage and Microsoft.Compute as a resource provider.

Procedure

1. Access Hybrid Cloud Console.

2. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

3. Click Create image.
   The Create image dialog wizard opens.

On the Image output page, complete the following steps:

a. From the Release list, select the release that you want to use.

b. From the Select target environments option, select Microsoft Azure.
   Click Next.
      1. On the Target Environment - Microsoft Azure window, to add Insights image builder as an authorized application, complete the following steps:

   c. Insert your Tenant GUID.
      Image builder checks if your Tenant GUID is correctly formatted and the Authorize image builder button becomes available.

   d. Click Authorize image builder to authorize Insights image builder to push images to the Microsoft Azure cloud.
      This redirects you to the Microsoft Azure portal.
         i. Login with your credentials.

         ii. Click Accept the Permission requested.
e. Confirm that Insights image builder is authorized for your tenant.
   i. Search for Azure Active Directory and choose Enterprise applications, from the left menu.
   ii. Search for Insights image builder and confirm it is authorized.

f. Add the Enterprise application as a contributor to your Resource Group.
   i. In the search bar, type Resource Groups and select the first entry under Services. This redirects you to the Resource Groups dashboard.
   ii. Select your Resource Group.
   iii. On the left menu, click Access control (IAM) to add a permission so the Insights image builder application can access your resource group.
   iv. From the menu, click the tab Role assignments.
   v. Click +Add.
   vi. From the dropdown menu, choose Add role assignment. A menu appears on the left side.
   vii. Enter the following details:
      A. Role: Assign the Contributor role
      B. Assign access to: User, group, service principal. Add members: Click +Select members and type Red Hat in the search bar. Click enter.
      C. Select: Insights image builder application

The Insights image builder application is now authorized to push images to Microsoft Azure cloud.

NOTE
Even though any user can add an application to the resources group, the application is not able to locate any resource unless the account administrator adds the shared application as a contributor under the IAM section of the resource group.

Verification
- From the menu, click the tab Role assignments.
  You can see Insights image builder set as a Contributor of the Resource Group you selected.

Additional resources
- Manage Microsoft Azure Resource Manager resources group by using the Microsoft Azure portal

4.4. CREATING CUSTOMIZED RHEL IMAGES FOR THE MICROSOFT AZURE ENVIRONMENT

To push a RHEL image to the Microsoft Azure target environment, first create a customized image. For the, complete the following steps:
Prerequisites

- You have a RHEL subscription.
- You have Organization Administrator permissions.
- For Azure target environments:
  - You have an Azure Tenant ID.
  - You have an existing Resource Group in Microsoft Azure portal.
  - You have an Azure Subscription ID.

Procedure

1. Access Hybrid Cloud Console.

2. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

3. Click Create image.
   The Create image dialog wizard opens.

On the Image output page, complete the following steps:

a. From the Release list, select the release that you want to use.

b. From the Select target environments option, select the target environment you want.

c. Click Next.

d. From the Target Environment - Microsoft Azure page, complete the following steps:

e. Select one of the share methods to share your Red Hat image with your Azure account:

   Use an account configured from Integrationsto import the account directly from the cloud provider.
   Manually enter an account IDto enter the account manually.

f. For the Use an account configured from Integrationssharing method:

   i. From the Integration Name drop-down menu, select the integration you want.
      The Azure Tenant GUID and your Subscription ID are filled automatically. Insights image builder checks if your Azure Tenant GUID is correct and the Authorize Image Builder button becomes available.

   ii. Click Authorize Image Builder to authorize Insights image builder to push images to the Microsoft Azure portal. See Authorizing image builder to push images to Microsoft Azure Cloud to learn how to authorize Insights image builder as a tenant.

   iii. From the dropdown menu, select your Resource group.

   iv. Click Next.

  g. For the Manually enter an account IDsharing method:
i. Enter your **Azure Tenant GUID**. You can find your Tenant ID in the Azure Active Directory application in Microsoft Azure Portal. Insights image builder checks if your **Azure Tenant GUID** is correct and the **Authorize Image Builder** button becomes available.

ii. Click **Authorize Image Builder** to authorize Insights image builder to push images to the Microsoft Azure portal. See **Authorizing image builder to push images to Microsoft Azure Cloud** to learn how to authorize Insights image builder as a tenant.

iii. Enter your **Subscription ID**: you can find your **Subscription ID** account by accessing the Microsoft Azure console.

iv. Enter your **Resource group**: it is the name of your **Resource Group** in Microsoft Azure Portal.

**NOTE**

By default, image builder creates Microsoft Azure images with support to generation 1 VMs. See **Support for generation 2 VMs on Azure**.

h. Click **Next**.

1. On the **Register** page, select one of the registration methods: **Automatically register and enable advanced capabilities** or **Register later**.
   If you choose the **Automatically register and enable advanced capabilities** option, customize it further.

i. Click the **Show additional connection options** button.
   The **Monitor & manage subscriptions and access to Red Hat content** radio button enables the following option:
   - Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.
   - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.

j. Check or uncheck the checkboxes according to your preferences.

k. From the dropdown menu, choose an activation key to use for the image. See **Creating an activation key**.

l. Click **Next**.

1. On the **File system configuration** page, select the recommended **Use automatic partitioning** or **Manually configure partitions** for your image file system.

m. To configure your partitions manually, click the **Manually configure partitioning** radio button.
   The **Configure partitions** section opens, showing the configuration based on Red Hat standards and security guides.

n. From the drop-down menu, provide details to configure the partitions:

   o. For the **Mount point** field, select one mount point type option
You can also add an additional path to the **Mount point**, such as `/tmp`. For example: `/var` as a prefix and `/tmp` as an additional path results in `/var/tmp`.

**NOTE**

Depending on the **Mount point** type you choose, the file system type changes to **xfs**, and so on.

p. For the **Minimum size** partition field of the file system, enter the desired minimum partition size. In the **Minimum size** drop-down menu, you can use common size units such as **GiB**, **MiB**, or **KiB**. The default unit is **GiB**.

q. To add more partitions, click **Add partition** and repeat the steps for each added partition. Click **Next**.

1. Optional: On the **Content** page, complete the following steps to add additional packages to your image:

r. On the **Additional Red Hat packages** step:

   i. On the **Available packages** search field, enter the package name and click the → button.

   ii. Click the >> button to add all packages shown in the package search results to the **Chosen packages** dual list box. Optionally, you can click the > button to add only one selected package at a time.

s. On the **Custom repositories** page, click **Repositories**. The **Custom Repositories** page opens in a new browser tab. Go to the new page.

   i. Click **Add repositories**. Enter the following information:

      A. **Name**

      B. **URL**

      C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

      D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

      E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.

         **NOTE**

         If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

   F. Click **Save** to validate the repository status.

   t. Return to the **Create image** dashboard and click **Next**.

      1. Optional: On the **Name image** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.
2. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

Insights image builder starts to compose a RHEL image for the **x86_64** architecture. After the image is ready, you can see it in the **Inventory**.

**Verification**

- Verify that on the dashboard, you can see details such as:
  - Image name
  - The **creation or update** date
  - Image OS **Release**
  - The cloud **Target** environment
  - The image creation **Status**
  - The **Instance** details.

**Additional resources**

- **Connecting Microsoft Azure account to the Red Hat Hybrid Cloud Console**
- **Possible statuses for your custom repository**
- **Launching a customized RHEL image to Microsoft Azure**

### 4.5. CREATING CUSTOMIZED IMAGES FOR THE GCP ENVIRONMENT

You can create customized system images by using Insights image builder and upload those images to Google Cloud Platform. Then, you can start an instance from the image you uploaded.

**Prerequisites**

- You have a RHEL subscription.
- You have Organization Administrator permissions.
- You have a valid Google account to share your image.
- You have a Red Hat account. Access **Portal**.
- You have access to the **Insights image builder**.

**Procedure**

1. Access **Hybrid Cloud Console**.

2. Click **Red Hat Insights > RHEL > Inventory > Images**
   - The Insights image builder dashboard appears.
3. Click Create image. The Create image dialog wizard opens.

4. On the Image output page, complete the following steps:
   a. From the dropdown menu, select the Release: Red Hat Enterprise Linux (RHEL).
   b. From the Select target environments option, select Google Cloud Platform. Click Next.

5. On the Target environment - Google Cloud Platform page, select a valid account type to share your image with:
   - Google account: A Google account which interacts with Google Cloud, for example: user@gmail.com.
   - Service account: An application account, for example: myapp@appspot.gserviceaccount.com.
   - Google group: A named collection of Google accounts and service accounts, for example: admins@example.com.
   - Google workspace domain/Cloud identity domain: A virtual group of all the Google accounts in a named organization. For example, the domain name mycompany.com.

6. Enter the account email address or domain name, depending on the type of target environment you chose. Click Next.

7. On the Register page, select one of the registration methods: Automatically register and enable advanced capabilities or Register later. If you choose the Automatically register and enable advanced capabilities option, customize it further.
   a. Click the Show additional connection options button.
      The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
      - Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.
      - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.
   b. Check or uncheck the checkboxes according to your preferences.
   c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.
   d. Click Next.

8. On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.
a. To configure your partitions manually, click the **Manually configure partitioning** radio button. The **Configure partitions** section opens, showing the configuration based on Red Hat standards and security guides.

b. From the drop-down menu, provide details to configure the partitions:

c. For the **Mount point** field, select one mount point type option. You can also add an additional path to the **Mount point**, such as `/tmp`. For example: `/var` as a prefix and `/tmp` as an additional path results in `/var/tmp`.

**NOTE**

Depending on the **Mount point** type you choose, the file system type changes to **xfs**, and so on.

d. For the **Minimum size** partition field of the file system, enter the desired minimum partition size. In the **Minimum size** drop-down menu, you can use common size units such as **GiB**, **MiB**, or **KiB**. The default unit is **GiB**.

e. To add more partitions, click **Add partition** and repeat the steps for each added partition. Click **Next**.

9. Optional: On the **Content** page, complete the following steps to add additional packages to your image:

a. On the **Additional Red Hat packages** step:

i. On the **Available packages** search field, enter the package name and click the → button.

ii. Click the >> button to add all packages shown in the package search results to the **Chosen packages** dual list box. Optionally, you can click the > button to add only one selected package at a time.

b. On the **Custom repositories** page, click **Repositories**.
The **Custom Repositories** page opens in a new browser tab. Go to the new page.

i. Click **Add repositories**. Enter the following information:

   A. **Name**

   B. **URL**

   C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

   D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

   E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.
NOTE

If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

F. Click **Save** to validate the repository status.

c. Return to the **Create image** dashboard and click **Next**.

10. Optional: On the **Details** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.

11. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

Insights image builder starts to compose a RHEL image for the x86_64 architecture. After the image is ready, you can see it in the **Inventory**.

**Verification**

- Verify that on the dashboard, you can see details such as:
  - Image name
  - The **creation or update** date
  - Image OS **Release**
  - The cloud **Target** environment
  - The image creation **Status**
  - The **Instance** details.

**Additional resources**

- The **Possible statuses for your custom repository** section.

### 4.6. CREATING CUSTOMIZED RHEL VMDK SYSTEM IMAGES

With Insights image builder, you can create customized system images in the Open virtualization format (.ova) or in the Virtual disk (.vmdk) format. You can upload these images to VMware vSphere.

You can import the Virtual disk (.vmdk) format only with the **govc** client. As for the Open virtualization format (.ova), you can import it by using both the vSphere GUI and **govc** clients.

The Open virtualization format (.ova) is a .vmdk image with additional metadata about the virtual hardware, when you import to vSphere, it creates a VM. After importing the .ova image into vSphere, you can configure the VM with any additional hardware, such as network, disks, and CD-ROM.
NOTE

The `.vmdk` images are available for 6 hours and expire after that. Ensure to download the image to avoid losing it.

Procedure

1. Access Hybrid Cloud Console.

2. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

3. Click Create image.
   The Create image dialog wizard opens.

4. On the Image output page, complete the following steps:
   a. From the Release list, select the Release that you want to use: for example, choose Red Hat Enterprise Linux (RHEL).
   b. From the Select target environments option, select VMWare vSphere.
   c. Select one of the options:
      - Open virtualization format (.ova)
      - Virtual disk (.vmdk) format
      Click Next.

5. On the Register page, select one of the registration methods: Automatically register and enable advanced capabilities or Register later.
   If you choose the Automatically register and enable advanced capabilities option, customize it further.
   a. Click the Show additional connection options button.
      The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
      - Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.
      - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.
   b. Check or uncheck the checkboxes according to your preferences.
   c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.
   d. Click Next.

6. On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.
a. To configure your partitions manually, click the **Manually configure partitioning** radio button. The **Configure partitions** section opens, showing the configuration based on Red Hat standards and security guides.

b. From the drop-down menu, provide details to configure the partitions:

c. For the **Mount point** field, select one mount point type option. You can also add an additional path to the **Mount point**, such as `/tmp`. For example: `/var` as a prefix and `/tmp` as an additional path results in `/var/tmp`.

**NOTE**
Depending on the **Mount point** type you choose, the file system type changes to **xfs**, and so on.

d. For the **Minimum size** partition field of the file system, enter the desired minimum partition size. In the **Minimum size** drop-down menu, you can use common size units such as **GiB**, **MiB**, or **KiB**. The default unit is **GiB**.

e. To add more partitions, click **Add partition** and repeat the steps for each added partition. Click **Next**.

7. Optional: On the **Content** page, complete the following steps to add additional packages to your image:

a. On the **Additional Red Hat packages** step:

   i. On the **Available packages** search field, enter the package name and click the → button.

   ii. Click the >> button to add all packages shown in the package search results to the **Chosen packages** dual list box. Optionally, you can click the > button to add only one selected package at a time.

b. On the **Custom repositories** page, click **Repositories**. The **Custom Repositories** page opens in a new browser tab. Go to the new page.

   i. Click **Add repositories**. Enter the following information:

   A. **Name**

   B. **URL**

   C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

   D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

   E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.
NOTE

If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

F. Click **Save** to validate the repository status.

c. Return to the **Create image** dashboard and click **Next**.

8. Optional: On the **Details** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.

9. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

Insights image builder starts to compose a RHEL image for the **x86_64** architecture. After the image is ready, you can see it in the **Inventory**.

**Additional resource**

- Creating a new image from an existing build

### 4.7. CREATING CUSTOMIZED RHEL GUEST SYSTEM IMAGES

Complete the following steps to create customized RHEL guest .qcow2 images by using Insights image builder.

**Prerequisites**

- You have a RHEL subscription.
- You have Organization Administrator permissions.

**Procedure**

1. Access **Hybrid Cloud Console**.

2. Click **Red Hat Insights > RHEL > Inventory > Images**
   The Insights image builder dashboard appears.

3. Click **Create image**.
   The **Create image** dialog wizard opens.

4. On the Image output page, complete the following steps:
   a. From the **Releases** list, select the release of Red Hat Enterprise Linux (RHEL) that you want to use to create the image.
   
   b. From the **Select target environments** options, select **Virtualization - Guest image** (.qcow2).

5. Click **Next**.
6. On the Register page, select one of the registration methods: Automatically register and enable advanced capabilities or Register later.
   If you choose the Automatically register and enable advanced capabilities option, customize it further.
   
a. Click the Show additional connection options button.
   The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
   
   - Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.
   
   - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.
   
b. Check or uncheck the checkboxes according to your preferences.
   
c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.
   
d. Click Next.

7. On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.

   a. To configure your partitions manually, click the Manually configure partitioning button.
   The Configure partitions section opens, showing the configuration based on Red Hat standards and security guides.
   
b. From the drop-down menu, provide details to configure the partitions:
   
c. For the Mount point field, select one mount point type option
   You can also add an additional path to the Mount point, such as /tmp. For example: /var as a prefix and /tmp as an additional path results in /var/tmp.

   NOTE
   Depending on the Mount point type you choose, the file system type changes to xfs, and so on.
   
d. For the Minimum size partition field of the file system, enter the desired minimum partition size. In the Minimum size drop-down menu, you can use common size units such as GiB, MiB, or KiB. The default unit is GiB.
   
e. To add more partitions, click Add partition and repeat the steps for each added partition. Click Next.

8. Optional: On the Content page, complete the following steps to add additional packages to your image:

   a. On the Additional Red Hat packages step:
i. On the **Available packages** search field, enter the package name and click the → button.

ii. Click the >> button to add all packages shown in the package search results to the **Chosen packages** dual list box. Optionally, you can click the > button to add only one selected package at a time.

b. On the **Custom repositories** page, click **Repositories**. The **Custom Repositories** page opens in a new browser tab. Go to the new page.

   i. Click **Add repositories**. Enter the following information:

      A. **Name**

      B. **URL**

      C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

      D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

      E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.

      \[\text{NOTE}\]

      If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

      F. Click **Save** to validate the repository status.

   c. Return to the **Create image** dashboard and click **Next**.

9. Optional: On the **Name image** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.

10. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

\[\text{NOTE}\]

The .qcow2 images are available for 6 hours and expire after that. Ensure to download the image to avoid losing it.

### 4.8. CREATING CUSTOMIZED RHEL ISO SYSTEM IMAGES

Complete the following steps to create customized RHEL ISO images by using the Insights image builder.

**Prerequisites**
You have a RHEL subscription.

You have Organization Administrator permissions.

Procedure

1. Access Hybrid Cloud Console.

2. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

3. Click Create image.
   The Create image dialog wizard opens.

4. On the Image output page, select the release. Then, click Next
   a. From the Release list, select the release that you want to use.
   b. From the Select target environments option, select Bare metal - Installer (.iso)
   c. Click Next.

5. On the Register page, select one of the registration methods: Automatically register and enable advanced capabilities or Register later.
   If you choose the Automatically register and enable advanced capabilities option, customize it further.
   a. Click the Show additional connection options button.
      The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
      - Enable predictive analytics and management capabilities - to provide actionable intelligence about your Red Hat Enterprise Linux environments, helping to identify and address operational and vulnerability risks before an issue results in downtime.
      - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables Red Hat Enterprise Linux hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.
   b. Check or uncheck the checkboxes according to your preferences.
   c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.
   d. Click Next.

6. On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.
   a. To configure your partitions manually, click the Manually configure partitioning radio button.
      The Configure partitions section opens, showing the configuration based on Red Hat standards and security guides.
   b. From the drop-down menu, provide details to configure the partitions:
   c. For the Mount point field, select one mount point type option
You can also add an additional path to the **Mount point**, such as `/tmp`. For example: `/var` as a prefix and `/tmp` as an additional path results in `/var/tmp`.

**NOTE**

Depending on the **Mount point** type you choose, the file system type changes to **xfs**, and so on.

d. For the **Minimum size** partition field of the file system, enter the desired minimum partition size. In the **Minimum size** drop-down menu, you can use common size units such as **GiB**, **MiB**, or **KiB**. The default unit is **GiB**.

e. To add more partitions, click **Add partition** and repeat the steps for each added partition. Click **Next**.

7. Optional: On the **Content** page, complete the following steps to add additional packages to your image:

a. On the **Additional Red Hat packages** step:

   i. On the **Available packages** search field, enter the package name and click the → button.

   ii. Click the >> button to add all packages shown in the package search results to the **Chosen packages** dual list box. Optionally, you can click the > button to add only one selected package at a time.

b. On the **Custom repositories** page, click **Repositories**.

   The **Custom Repositories** page opens in a new browser tab. Go to the new page.

   i. Click **Add repositories**. Enter the following information:

      A. **Name**

      B. **URL**

      C. **Restrict architecture**: from the drop-down menu, select an architecture. Either mark all the architectures or select one to restrict to your system architecture to prevent incorrect repositories availability.

      D. **Restrict OS version**: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.

      E. **GPG key**: Either upload a file with a GPG key or paste the URL of an existing GPG key.

   **NOTE**

   If you do not provide the GPG key for a repository, your system cannot perform the GPG key verification for signed packages in a repository.

   F. Click **Save** to validate the repository status.

c. Return to the **Create image** dashboard and click **Next**.
8. Optional: On the **Details** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID). Click **Next**.

9. On the **Review** page, verify the image details about the image creation and click **Create image**. The system verifies the build manifest of the image. After it reaches 100%, the image is added to the build queue.

   Insights image builder starts to compose a RHEL image for the **x86_64** architecture. After the image is ready, you can see it in the **Inventory**.

**Verification**

- Verify that on the dashboard, you can see details such as:
  - Image name
  - The **creation or update** date
  - Image OS **Release**
  - The cloud **Target** environment
  - The image creation **Status**
  - The **Instance** details.

**Additional resources**

- The **Possible statuses for your custom repository** section.

### 4.9. CREATING CUSTOMIZED IMAGES FOR THE OCI ENVIRONMENT

You can create customized system images by using Insights image builder and upload those images to Oracle Cloud Infrastructure (OCI). Then, you can run an instance from the `.qcow2` image you uploaded to your OCI bucket.

**NOTE**

Creating a custom image and pushing it to Oracle Cloud Infrastructure environments is available on the **Preview** mode.

**Prerequisites**

- You have a RHEL subscription.
- You have Organization Administrator permissions.
- You have an **Oracle Cloud** account.
- You must be granted security access in an **OCI policy**.
- You have a Red Hat account. Access **Portal**.
- You have access to the **Insights image builder**.
Procedure

1. Log in to the Hybrid Cloud Console and turn on Preview mode by switching the Preview toggle to On in the menu bar.

2. Access Hybrid Cloud Console and log in.

3. Click Red Hat Insights > RHEL > Inventory > Images
   The Insights image builder dashboard appears.

4. Click Create image.
   The Create image dialog wizard opens.

5. On the Image output page, complete the following steps:
   a. From the dropdown menu, select the Release: Red Hat Enterprise Linux (RHEL).
   b. From the Select target environments option, select Oracle Cloud Infrastructure.
   c. Click Next.

6. On the Target environment - Oracle Cloud Infrastructure page, enter the following mandatory details.
   a. User OCID: you can find it in the OCI console user details page.
   b. Private key.

7. Click Next.

8. On the Register page, select one of the registration methods:
   - Automatically register and enable advanced capabilities
   - Register later.
     If you choose the Automatically register and enable advanced capabilities option, customize it further.
     a. Click Show additional connection options.
        The Monitor & manage subscriptions and access to Red Hat content radio button enables the following option:
        - Enable predictive analytics and management capabilities - provides actionable intelligence about your Red Hat Enterprise Linux environments. This helps to identify and address operational and vulnerability risks before an issue results in downtime.
        - Enable remote remediations and system management with automation - Red Hat connector (rhc) enables RHEL hosts to connect to Red Hat Insights to use Red Hat Insights Remediations service.
     b. Select the checkboxes according to your preferences.
     c. From the dropdown menu, choose an activation key to use for the image. See Creating an activation key.
     d. Click Next.
On the File system configuration page, select the recommended Use automatic partitioning or Manually configure partitions for your image file system.

a. To configure your partitions manually, click the Manually configure partitioning radio button.
   The Configure partitions section opens and shows the configuration based on Red Hat standards and security guides.

b. From the drop-down menu, provide details to configure the partitions:

c. For the Mount point field, select one mount point type option.
   You can also add an additional path to the Mount point, such as /tmp. For example: /var as a prefix and /tmp as an additional path results in /var/tmp.

   **NOTE**
   Depending on the Mount point type you choose, the file system type changes accordingly.

d. For the Minimum size partition field of the file system, configure the minimum partition size.
   In the Minimum size drop-down menu, you can use common size units such as GiB, MiB, or KiB. The default unit is GiB.

e. To add more partitions, click Add partition and repeat the steps for each added partition.
   Click Next.

10. Optional: On the Content page, complete the following steps to add additional packages to your image:

a. From the Additional Red Hat packages step:
   i. On the Available packages search field, enter the package name and click the → button.
   ii. Click >> to add all packages shown in the package search results to the Chosen packages dual list box. Alternatively, you can click the > button to add only one selected package at a time.

b. On the Custom repositories page, click Repositories.
   The Custom Repositories page opens in a new browser tab. Go to the new page.

   i. Click Add repositories and enter the following information:

   A. Name

   B. URL

   C. Restrict architecture: from the drop-down menu, select an architecture. Either mark all the architectures or select one for your system to prevent incorrect repositories availability.

   D. Restrict OS version: from the drop-down menu, select an operating system (OS). Either allow all RHEL versions or select a version for your system, to prevent incorrect repositories availability.
E. **GPG key:** Either upload a file with a GPG key or paste the URL of an existing GPG key.

**NOTE**
Without a GPG key, your system cannot perform the verification for signed packages.

F. Click **Save** to validate the repository status.

c. Return to the **Create image** dashboard and click **Next**.

11. Optional: On the **Details** page, enter a name for the image. Each image has a unique Universally Unique Identifier (UUID).

12. Click **Next**.

13. On the **Review** page, verify the image details about the image creation.

14. Click **Create image**.

The system verifies the build manifest of the image. After it reaches 100%, the image transfers to the build queue.

Insights image builder starts to compose a RHEL image for the **x86_64** architecture. After the image is ready, you can see it in the **Insights Image Builder dashboard**.

**Next step**
- Import and run the image in the OCI environment. See **Importing and running QCOW2 images on OCI**.

### 4.10. CREATING A NEW IMAGE FROM AN EXISTING BUILD

You can create a new image from an existing customized RHEL image by using Insights image builder. The Insights image builder re-creates the exact image, with a different UUID, which you can use to identify the image in the Hybrid Cloud Console. The new image also fetches package updates and refreshes the content with those updates. You can customize this new image to fit your requirements.

**NOTE**
You can re-create images from failed builds.

**Prerequisites**
- You created an AWS image with Insights image builder.

**Procedure**

1. From the **Image Builder** dashboard, select the image from which you want to create your customized image.

2. Click the **Node options** menu ( ), and select **Re-create image**. The **Create image** wizard opens.
NOTE
If the image status is Expired, click the Re-create image button.

a. Optional: You can customize the new image by using the Navigation panel to open a step and making changes. Click Next.

b. On the Review page, click Create image.

The Insights image builder dashboard opens. The image build starts to re-create the image and lists the following information:

- Image name
- UUID
- Cloud target environment
- Image operating system release
- Status of the image creation

Verification

- From the Status column, check if the image is Ready.
- Optional: Click Image details to display additional information about the re-created image.

4.11. SHARING AWS IMAGES TO OTHER REGIONS

You can share an existing AWS image to a new region. Sharing the image configures it for the new regions to run on your AWS account. After configuring new regions, all these regions launch with the same configuration as the original AWS image.

Prerequisites

- You created an AWS image.

Procedure

1. From the Image Builder table, select the image you want to share with other regions.

2. From the Node options menu (●), select Share to new region. The Share to new region wizard opens.

3. From the Select region dropdown menu, select the region to share the image. You can choose more than one region to share your image with.

4. Click Share.
   Your image is built, uploaded to AWS, and shared to the regions you selected.

NOTE
The shared image expires in 14 days.
5. To ensure that you can access the image permanently, copy the Red Hat image to your own AWS account.

4.12. DOWNLOADING THE JSON COMPOSE REQUEST

If you download the .json compose request of your image, you can use the image builder API to automate your image building tasks, such as:

- Customizing the image with extra packages
- Customizing the partition layout
- Embedding an activation key.

Prerequisites

- You created an image with Insights image builder.

Procedure

1. From the Image Builder table, select the image that you want to download as a .json compose request.

2. Click the Node options ( ) menu and select Download compose request (.json).
   The .json compose request is now saved to your host server. To use the image builder API, see Using hosted image builder via its API.
CHAPTER 5. LAUNCHING CUSTOMIZED RHEL IMAGES TO THE CLOUD PLATFORMS WITH INSIGHTS IMAGE BUILDER

5.1. LAUNCHING A CUSTOMIZED RHEL IMAGE ON AWS

You can launch a customized RHEL image on the AWS cloud environment.

Prerequisites

- You have a RHEL subscription.
- You have an AWS account created.
- You successfully built a customized RHEL image and shared it with the region you want to launch the new instance in.
- The customized RHEL image you built was shared with the same AWS integration account.
- You added an AWS integration account to the Hybrid Cloud Console.
- You have the "Launch on AWS User" role assigned. See how to assign a role to a user.

Procedure

1. Access Hybrid Cloud Console.
2. Click Red Hat Insights > RHEL > Inventory > Images
3. Find an image you want to launch in the public cloud environment and click Launch in the Instance column. The Launch wizard opens.
4. On the Account and customization page, complete the following steps:
   a. From the Select account drop-down menu, select the account you want to use.
   b. From the Select region drop-down menu, select the region to run the instance.
   c. Optionally: From the Select template drop-down menu, select the template you want to use.
      If you do not specify the template, you launch the image under the default security group.
      Ensure that the default security group allows SSH traffic.
   d. From the Select instance type drop-down menu, select the instance type configuration.
   e. In the Count field, select the number of images you want to launch. Click Next.
      The wizard notifies you if you try to launch too many images. Make sure you have enough resources in your AWS account.

NOTE

You must have the default Virtual Private Cloud (VPC) and Security Group on your AWS account. If you do not have them, contact the AWS support to re-create them.
5. On the **SSH key authentication** page, select one of the options:
   
   a. **Select existing SSH public key.** From the **Select public key** drop-down menu, add an existing SSH public key.
   
   b. **Add and save a new SSH public key** Enter a name for your new SSH public key and drag or upload a new SSH public key file. Click **Next**.

6. On the **Review** page, review the details about the image launch process and click **Launch**.

**Verification**

1. The **Launch** wizard shows the green checkmark with a message **System launched successfully**.

2. To verify the instance is running, copy the **ssh** command displayed on the screen to your terminal and connect to the instance.

To stop the running instance, see the AWS console documentation.

**5.2. LAUNCHING A CUSTOMIZED RHEL IMAGE ON MICROSOFT AZURE**

**Prerequisites**

- You have a RHEL subscription.
- You have a Microsoft Azure account created.
- You successfully built a customized RHEL image.
- The customized RHEL image you built was shared with the same Microsoft Azure integration account.
- You added a Microsoft Azure integration account to the Hybrid Cloud Console.
- You have the “Launch on Azure User” role assigned. See [how to assign a role to a user](#).

**Procedure**

1. Access **Hybrid Cloud Console**.

2. Click **Red Hat Insights > RHEL > Inventory > Images**

3. Find an image you want to launch in the public cloud environment and click **Launch** in the **Instance** column. The **Launch** wizard opens.

4. On the **Account and customization** page, complete the following steps:
   
   a. From the **Select account** drop-down menu, select the account you want to use.

   b. From the **Azure resource group** drop-down menu, select the resource group in which you want to run your instance.
      
      This creates the resources in the same region that this resource group is located. You can leave this field empty to run the instance in the same resource group as the image.

   c. From the **Select instance size** drop-down menu, select the instance type configuration.
d. In the **Count** field, select the number of images you want to launch. Click **Next**. The wizard notifies you if you try to launch too many images. Make sure you have enough quotas in your Microsoft Azure subscription when you are launching a large set of images.

5. On the **SSH key authentication** page, choose to use an existing SSH key or add a new SSH key:

   **To select an existing SSH public key, follow the steps**
   a. From the **Select public key** drop-down menu, choose an existing SSH public key.
   b. Click **Next**.

   **To Add and save a new SSH public key, follow the steps**
   a. In the **Name** field, enter a name for your new SSH public key.
   b. In the SSH public key, drag or upload a new SSH public key file.
   c. Click **Next**.

   **NOTE**
   Microsoft Azure does not support the **ed25519** SSH keys.

6. On the **Review** page, review the details about the image launch process and click **Launch**. The launching process takes a few minutes to start an instance on the Microsoft Azure cloud platform.

**Verification**

1. The **Launch** wizard shows the green checkmark with a message **System launched successfully**.

2. To verify the instance is running, copy the **ssh** command displayed on the screen to your terminal and connect to the instance.

### 5.3 LAUNCHING A CUSTOMIZED RHEL IMAGE ON THE GOOGLE CLOUD PLATFORM

**Prerequisites**

- You have a RHEL subscription.
- You have a **Google Cloud Platform (GCP)** project created.
- You successfully built a customized RHEL image.
- The customized RHEL image you built is shared with the same GCP project.
- You have the "Launch on Google User" role assigned. See [how to assign a role to a user](#).
- You added a **GCP project** to the Hybrid Cloud Console.
- You have enabled the following APIs in your GCP project:
- Compute Engine API;
- Identity and Access Management API.

**Procedure**

1. Access **Hybrid Cloud Console**.

2. Click **Red Hat Insights > RHEL > Inventory > Images**

3. Find the image you want to launch in the public cloud environment and click **Launch** in the **Instance** column. The **Launch** wizard opens.

4. On the **Account and customization** page, complete the following steps:
   a. From the **Select account** drop-down menu, select the account you want to use.
   b. Optionally: From the **Select template** drop-down menu, select the template you want to use.
      - If you do not specify the template, you launch the image to the default Virtual Private Cloud (VPC) with its firewall rules.
   c. From the **Select machine type** drop-down menu, select the machine configuration.
   d. In the **Count** field, select the number of images you want to launch and click **Next**.

5. On the **SSH key authentication** page, select one of the options:
   a. **Select existing SSH public key**. From the **Select public key** drop-down menu, choose an existing SSH public key. Click **Next**.
   b. **Add and save a new SSH public key**. Enter a name for your new SSH public key and drag or upload a new SSH public key file. Click **Next**.

6. On the **Review** page, review the details about the image launch process and click **Launch**.

**Verification**

1. The **Launch** wizard shows the green checkmark with a message **System launched successfully**.

2. To verify the instance is running, copy the **ssh** command displayed on the screen to your terminal and connect to the instance.

**5.4. CONFIGURING LAUNCH NOTIFICATIONS**

You can configure notifications for various events of the launching process. For information on how to configure notifications in the Red Hat Hybrid Cloud Console, see Configuring notifications on the Red Hat Hybrid Cloud Console.

**Launch events**

**Launch failed**
- If an image launch fails, a notification is sent.

**Launch completed**
- If an image launch is successful, a notification is sent.
Note, if you choose email notifications, these notifications contain detailed information about the event. For example, if the **Launch completed** event is triggered, the email notification contains the list of the launched instances.
CHAPTER 6. DEPLOYING YOUR CUSTOMIZED IMAGES

After creating customized images for the VMWare vSphere private cloud, you can deploy the images to VMware vSphere. For the Guest image (.qcow2), and Installer (.iso), you can then download these images and deploy them to virtual machines.

6.1. UPLOADING VMDK IMAGES AND CREATING A RHEL VIRTUAL MACHINE IN VSPHERE

After creating your image, you can deploy it to VMware vSphere by using the CLI. Then, you can create a VM and login into it.

Prerequisites

- You configured the `govc` VMware CLI tool client.
  - To use the `govc` VMware CLI tool client, you must set the following values in the environment:
    - `GOVC_URL`
    - `GOVC_DATACENTER`
    - `GOVC_FOLDER`
    - `GOVC_DATASTORE`
    - `GOVC_RESOURCE_POOL`
    - `GOVC_NETWORK`

Procedure

1. Access the directory where you downloaded your .vmdk image.

2. Create a file named `metadata.yaml`. Add the following information to this file:

   ```yaml
   instance-id: cloud-vm
   local-hostname: vmname
   ```

3. Create a file named `userdata.yaml`. Add the following information to the file:

   ```yaml
   #cloud-config
   users:
   - name: admin
     sudo: "ALL=(ALL) NOPASSWD:ALL"
   ssh AuthorizedKeys:
   - ssh-rsa AAA...fhHQ== your.email@example.com
   
   ssh AuthorizedKeys is your SSH public key. You can find your SSH public key in `~/.ssh/id_rsa.pub`.

4. Export the `metadata.yaml` and `userdata.yaml` files to the environment, compressed with `gzip`, encoded in `base64` as follows. They will be used in further steps.

   ```bash
   export METADATA=$(gzip -c9 <metadata.yaml | { base64 -w0 2>/dev/null || base64; }) \
   USERDATA=$(gzip -c9 <userdata.yaml | { base64 -w0 2>/dev/null || base64; })
   ```
5. Launch the image on vSphere with the metadata.yaml and userdata.yaml files:
   a. Import the .vmdk image in to vSphere:
      
      ```bash
      $ govc import.vmdk ./composer-api.vmdk foldername
      ```
   b. Create the VM in vSphere without powering it on:
      
      ```bash
      govc vm.create \
      -net.adapter=vmxnet3 \
      -m=4096 -c=2 -g=rhel8_64Guest \
      -firmware=bios -disk="foldername/composer-api.vmdk" \
      -disk.controller=ide -on=false \
      vmname
      ```
   c. Change the VM to add ExtraConfig variables, the cloud-init config:
      
      ```bash
      govc vm.change -vm vmname \n      -e guestinfo.metadata="${METADATA}" \n      -e guestinfo.metadata.encoding="gzip+base64" \n      -e guestinfo.userdata="${USERDATA}" \n      -e guestinfo.userdata.encoding="gzip+base64"
      ```
   d. Power-on the VM:
      
      ```bash
      govc vm.power -on vmname
      ```
   e. Retrieve the VM IP address:
      
      ```bash
      HOST=$(govc vm.ip vmname)
      ```
   f. Use SSH to log in to the VM, using the user-data specified in cloud-init file configuration:
      
      ```bash
      $ ssh admin@HOST
      ```

Additional resources

- The govc documentation
- The VMware - cloud init 22.2 documentation

### 6.2. DEPLOYING OVA VMDK IMAGES TO THE VSPHERE GUI

After creating your .vmdk image in the open virtualization format (.ova), you can deploy it to VMware vSphere by using the vSphere GUI client. It will create a VM which can be customized further before booting.

**Prerequsite**

- You logged in to the vSphere UI in a browser.
- You downloaded your (.ova) image.
**Procedure**

1. In the vSphere Client, from the Actions menu, select Deploy OVF Template.

2. On the Deploy OVF Template page, complete the settings for each configuration option and click Next.

3. Click Finish. The .ova image starts to be deployed.
   After the image deployment is complete, you have a new virtual machine (VM) from the .ova image.

4. In the deployed image page, perform the following steps:
   
   a. From the Actions menu, select Edit Setting.

   b. On the Virtual Hardware tab, configure resources such as CPU, memory, add a new network adapter, between others of your choice.

   i. On the CD/DVD drive 1 option, attach a CD or DVD Drive that contains a cloud-init.iso, to provision a user on startup.
   The VM is now ready to boot with the username and password from the cloud-init.iso file.

**Additional resources**

- Deploy an OVF or OVA Template
- The govc documentation
- The VMware - cloud init 22.2 documentation

### 6.3. CREATING A VIRTUAL MACHINE FROM THE CUSTOMIZED RHEL GUEST SYSTEM IMAGE

You can create a virtual machine (VM) from the QCOW2 image that you created by using Insights image builder.

**Prerequisites**

- You created and downloaded a QCOW2 image by using Insights image builder.

**Procedure**

1. Access the directory where you downloaded your QCOW2 image.

2. Create a file named meta-data. Add the following information to this file:

   ```
   instance-id: nocloud
   local-hostname: vmname
   ```

3. Create a file named user-data. Add the following information to the file:

   ```
   #cloud-config
   user: admin
   password: password
   ```
chpasswd: {expire: False}
ssh_pwauth: True
ssh_authorized_keys:
  - ssh-rsa AAA...fhHQ== your.email@example.com

- **ssh_authorized_keys** is your SSH public key. You can find your SSH public key in
  ~/.ssh/id_rsa.pub.

4. Use the **genisoimage** command to create an ISO image that includes the **user-data** and **meta-data** files.

```bash
# genisoimage -output cloud-init.iso -volid cidata -joliet -rock user-data meta-data
```

I: -input-charset not specified, using utf-8 (detected in locale settings)
Total translation table size: 0
Total rockridge attributes bytes: 331
Total directory bytes: 0
Path table size(bytes): 10
Max brk space used 0
183 extents written (0 MB)

5. Create a new VM from the KVM Guest Image using the **virt-install** command. Include the ISO image you created on step 4 as an attachment to the VM image.

```bash
# virt-install 
  --memory 4096 
  --vcpus 4 
  --name myvm 
  --disk composer-api.qcow2,device=disk,bus=virtio,format=qcow2 
  --disk cloud-init.iso,device=cdrom 
  --os-variant rhel2023 
  --virt-type kvm 
  --graphics none 
  --import
```

Where,

- **--graphics none** - indicates that it is a headless RHEL Virtual Machine.
- **--vcpus 4** - indicates that it uses 4 virtual CPUs.
- **--memory 4096** - indicates that it uses 4096 MB RAM.

6. The VM installation starts:

Starting install...
Connected to domain myvm
...
[ OK ] Started Execute cloud user/final scripts.

Red Hat Enterprise Linux 2023 (Ootpa)
Kernel 4.18.0-221.el8.x86_64 on an x86_64

Additional resources
Creating virtual machines using the command-line interface

6.4. INSTALLING A CUSTOMIZED RHEL ISO SYSTEM IMAGE TO A BARE METAL SYSTEM

You can create a virtual machine (VM) from the ISO image that you created using the Insights image builder.

Prerequisites
- You created and downloaded an ISO image by using Insights image builder.
- A 8 GB USB flash drive.

Procedure
1. Access the directory where you downloaded your ISO image.
2. Place the bootable ISO image file on a USB flash drive.
3. Connect the USB flash drive to the port of the computer you want to boot.
4. Boot the ISO image from the USB flash drive.
5. Perform the steps to install the customized bootable ISO image.
   The boot screen shows you the following options:
   - Install Red Hat Enterprise Linux 2023
   - Test this media & install Red Hat Enterprise Linux 2023

Additional resources
- Booting the installation

6.5. IMPORTING AND RUNNING QCOW2 IMAGES ON OCI

You can import your customized .qcow2 image to the Oracle Cloud Infrastructure (OCI). Then, you can launch the customized .qcow2 image on a virtual machine.

Prerequisites
- You logged in to the Oracle Cloud UI in a browser.
- You downloaded your .qcow2 image.
- You have copied the .qcow2 image Image Link URL from Insights Instance column, in the Image Builder dashboard.

Procedure
1. In the Oracle Cloud UI dashboard, click Compute > Custom Images
2. On the Custom Images dashboard, click Import image.
3. On the **Import image** window, set the following configuration:
   a. Select the **Import from an object storage URL** option.
   b. In the **Object Storage URL** field, paste the URL given by Insights image builder into it.
   c. Choose the **QCOW2** image type.
   d. Under **Launch mode**, select the **Paravirtualized mode** option.

4. Click **Import Image**.

Once the system finishes importing the image, you can run the customized image in the OCI environment.
PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

We appreciate your feedback on our documentation. To provide feedback, highlight text in a document and add comments.

Prerequisites

- You are logged in to the Red Hat Customer Portal.
- In the Red Hat Customer Portal, the document is in the Multi-page HTML viewing format.

Procedure

To provide your feedback, perform the following steps:

1. Click the Feedback button in the top-right corner of the document to see existing feedback.

   NOTE

   The feedback feature is enabled only in the Multi-page HTML format.

2. Highlight the section of the document where you want to provide feedback.

3. Click the Add Feedback pop-up that appears near the highlighted text.
   A text box appears in the feedback section on the right side of the page.

4. Enter your feedback in the text box and click Submit.
   A documentation issue is created.

5. To view the issue, click the issue link in the feedback view.
OPENING A SUPPORT CASE AT RED HAT SUPPORT

Create a support case from Red Hat Insights at Red Hat Support by performing the following steps:

Prerequisites

- You are logged in to the Red Hat Customer Portal.

Procedure

1. Access the Red Hat Hybrid Cloud Console:

2. Click Help ? and select Open a support case.
   You are redirect to the Customer support page.

3. From the Get Support page, select the type of issue that you want to report and click Continue.

4. From the Summarize page, perform the following steps:
   a. On the Summary field, describe the issue.

      
      **NOTE**

      If Red Hat Insights is not auto-selected, you must manually select the product.

   b. From the Product dropdown menu, select Red Hat Insights.

   c. From the Version dropdown menu, select the component you have issues with.

   d. From the Review page, click Submit.
      A support case is created.