



# Red Hat Enterprise Linux 10-beta

## Deploying and managing RHEL on Microsoft Azure

Obtaining RHEL system images and creating RHEL instances on Azure



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## Abstract

To use Red Hat Enterprise Linux (RHEL) in a public cloud environment, you can create and deploy RHEL system images on various cloud platforms, including Microsoft Azure. You can also create and configure a Red Hat High Availability (HA) cluster on Azure. The following chapters provide instructions for creating cloud RHEL instances and HA clusters on Azure. These processes include installing the required packages and agents, configuring fencing, and installing network resource agents.

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## RHEL BETA RELEASE

Red Hat provides Red Hat Enterprise Linux Beta access to all subscribed Red Hat accounts. The purpose of Beta access is to:

- Provide an opportunity to customers to test major features and capabilities prior to the general availability release and provide feedback or report issues.
- Provide Beta product documentation as a preview. Beta product documentation is under development and is subject to substantial change.

Note that Red Hat does not support the usage of RHEL Beta releases in production use cases. For more information, see the Red Hat Knowledgebase solution [What does Beta mean in Red Hat Enterprise Linux and can I upgrade a RHEL Beta installation to a General Availability \(GA\) release?](#).

# CHAPTER 1. INTRODUCING RHEL ON PUBLIC CLOUD PLATFORMS

Public cloud platforms provide computing resources as a service. Instead of using on-premises hardware, you can run your IT workloads, including Red Hat Enterprise Linux (RHEL) systems, as public cloud instances.

## 1.1. BENEFITS OF USING RHEL IN A PUBLIC CLOUD

RHEL as a cloud instance located on a public cloud platform has the following benefits over RHEL on-premises physical systems or VMs:

- **Flexible and fine-grained allocation of resources**

A cloud instance of RHEL runs as a VM on a cloud platform, which means a cluster of remote servers maintained by the cloud service provider. Therefore, on the software level, allocating hardware resources to the instance is easily customizable, such as a specific type of CPU or storage.

In comparison to a local RHEL system, you are also not limited by the capabilities of physical host. Instead, you can choose from a variety of features, based on selections offered by the cloud provider.

- **Space and cost efficiency**

You do not need to own any on-premise servers to host cloud workloads. This avoids the space, power, and maintenance requirements associated with physical hardware.

Instead, on public cloud platforms, you pay the cloud provider directly for using a cloud instance. The cost is typically based on the hardware allocated to the instance and the time you spend using it. Therefore, you can optimize your costs based on your requirements.

- **Software-controlled configurations**

The entire configuration of a cloud instance is saved as data on the cloud platform, and is controlled by software. Therefore, you can easily create, remove, clone, or migrate the instance. A cloud instance is also operated remotely in a cloud provider console and is connected to remote storage by default.

In addition, you can back up the current state of a cloud instance as a snapshot at any time. Afterwards, you can load the snapshot to restore the instance to the saved state.

- **Separation from the host and software compatibility**

Similarly to a local VM, the RHEL guest operating system on a cloud instance runs on a virtualized kernel. This kernel is separate from the host operating system and from the *client* system that you use to connect to the instance.

Therefore, any operating system can be installed on the cloud instance. This means that on a RHEL public cloud instance, you can run RHEL-specific applications that cannot be used on your local operating system.

In addition, even if the operating system of the instance becomes unstable or is compromised, your client system is not affected in any way.

### Additional resources

- [What is public cloud?](#)



- [What is a hyperscaler?](#)
- [Types of cloud computing](#)
- [Public cloud use cases for RHEL](#)
- [Obtaining RHEL for public cloud deployments](#)

## 1.2. PUBLIC CLOUD USE CASES FOR RHEL

Deploying on a public cloud provides many benefits, but might not be the most efficient solution in every scenario. If you are evaluating whether to migrate your RHEL deployments to the public cloud, consider whether your use case will benefit from the advantages of the public cloud.

### Beneficial use cases

- Deploying public cloud instances is very effective for flexibly increasing and decreasing the active computing power of your deployments, also known as *scaling up* and *scaling down*. Therefore, using RHEL on public cloud is recommended in the following scenarios:
  - Clusters with high peak workloads and low general performance requirements. Scaling up and down based on your demands can be highly efficient in terms of resource costs.
  - Quickly setting up or expanding your clusters. This avoids high upfront costs of setting up local servers.
- Cloud instances are not affected by what happens in your local environment. Therefore, you can use them for backup and disaster recovery.

### Potentially problematic use cases

- You are running an existing environment that cannot be adjusted. Customizing a cloud instance to fit the specific needs of an existing deployment may not be cost-effective in comparison with your current host platform.
- You are operating with a hard limit on your budget. Maintaining your deployment in a local data center typically provides less flexibility but more control over the maximum resource costs than the public cloud does.

### Next steps

- [Obtaining RHEL for public cloud deployments](#)

### Additional resources

- [Should I migrate my application to the cloud? Here's how to decide.](#)

## 1.3. FREQUENT CONCERNS WHEN MIGRATING TO A PUBLIC CLOUD

Moving your RHEL workloads from a local environment to a public cloud platform might raise concerns about the changes involved. The following are the most commonly asked questions.

### Will my RHEL work differently as a cloud instance than as a local virtual machine?

In most respects, RHEL instances on a public cloud platform work the same as RHEL virtual machines on a local host, such as an on-premises server. Notable exceptions include:

- Instead of private orchestration interfaces, public cloud instances use provider-specific console interfaces for managing your cloud resources.
- Certain features, such as nested virtualization, may not work correctly. If a specific feature is critical for your deployment, check the feature's compatibility in advance with your chosen public cloud provider.

### Will my data stay safe in a public cloud as opposed to a local server?

The data in your RHEL cloud instances is in your ownership, and your public cloud provider does not have any access to it.

In addition, major cloud providers support data encryption in transit, which improves the security of data when migrating your virtual machines to the public cloud.

The general security of RHEL public cloud instances is managed as follows:

- Your public cloud provider is responsible for the security of the cloud hypervisor
- Red Hat provides the security features of the RHEL guest operating systems in your instances
- You manage the specific security settings and practices in your cloud infrastructure

### What effect does my geographic region have on the functionality of RHEL public cloud instances?

You can use RHEL instances on a public cloud platform regardless of your geographical location. Therefore, you can run your instances in the same region as your on-premises server.

However, hosting your instances in a physically distant region might cause high latency when operating them. In addition, depending on the public cloud provider, certain regions may provide additional features or be more cost-efficient. Before creating your RHEL instances, review the properties of the hosting regions available for your chosen cloud provider.

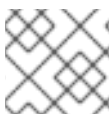
## 1.4. OBTAINING RHEL FOR PUBLIC CLOUD DEPLOYMENTS

To deploy a RHEL system in a public cloud environment, you need to:

1. Select the optimal cloud provider for your use case, based on your requirements and the current offer on the market.

The cloud providers currently certified for running RHEL instances are:

- [Amazon Web Services \(AWS\)](#)
- [Google Cloud Platform \(GCP\)](#)
- [Microsoft Azure](#)



#### NOTE

This document specifically talks about deploying RHEL on Microsoft Azure.

+ . Create a RHEL cloud instance on your chosen cloud platform. For details, see [Methods for creating RHEL cloud instances](#).

1. To keep your RHEL deployment up-to-date, use [Red Hat Update Infrastructure \(RHUI\)](#).

## Additional resources

- [RHUI documentation](#)
- [Red Hat Open Hybrid Cloud](#)

## 1.5. METHODS FOR CREATING RHEL CLOUD INSTANCES

To deploy a RHEL instance on a public cloud platform, you can use one of the following methods:

### Create a RHEL system image and import it to the cloud platform

- To create the system image, you can use the [RHEL image builder](#) or you can build the image manually.
- This method uses your existing RHEL subscription, and is also referred to as *bring your own subscription* (BYOS).
- You pre-pay a yearly subscription, and you can use your Red Hat customer discount.
- Your customer service is provided by Red Hat.
- For creating multiple images effectively, you can use the **cloud-init** tool.

### Purchase a RHEL instance directly from the cloud provider marketplace

- You post-pay an hourly rate for using the service. Therefore, this method is also referred to as *pay as you go* (PAYG).
- Your customer service is provided by the cloud platform provider.



#### NOTE

For detailed instructions on using various methods to deploy RHEL instances  
On Microsoft Azure,  
see the following chapters in this document.

## Additional resources

- [What is a golden image?](#)
- [Configuring and managing cloud-init for RHEL](#)

## CHAPTER 2. DEPLOYING A RHEL IMAGE ON AZURE

To deploy a RHEL image on Microsoft Azure, follow the information below. This chapter:

- Discusses your options for choosing an image
- Lists or refers to system requirements for your host system and virtual machine (VM)
- Provides procedures for creating a custom VM from an ISO image, uploading it to Azure, and launching an Azure VM instance



### IMPORTANT

You can create a custom VM from an ISO image, but Red Hat recommends that you use the *Red Hat Image Builder* product to create customized images for use on specific cloud providers. With Image Builder, you can create and upload an Azure Disk Image (VHD format). See [Composing a Customized {ProductShortName} System Image](#) for more information.

For a list of Red Hat products that you can use securely on Azure, refer to [Red Hat on Microsoft Azure](#).

### Prerequisites

- Sign up for a [Red Hat Customer Portal](#) account.
- Sign up for a [Microsoft Azure](#) account.

## 2.1. IMAGE OPTIONS ON AZURE

The following table lists image choices for RHEL on Microsoft Azure, and notes the differences in the image options.

**Table 2.1. Image options**

Image option	Subscriptions	Sample scenario	Considerations
Deploy a Red Hat Gold Image.	Use your existing Red Hat subscriptions.	Select a Red Hat Gold Image on Azure. For details on Gold Images and how to access them on Azure, see the <a href="#">Red Hat Cloud Access Reference Guide</a> .	The subscription includes the Red Hat product cost; you pay Microsoft for all other instance costs.
Deploy a custom image that you move to Azure.	Use your existing Red Hat subscriptions.	Upload your custom image and attach your subscriptions.	The subscription includes the Red Hat product cost; you pay Microsoft for all other instance costs.

Image option	Subscriptions	Sample scenario	Considerations
Deploy an existing Azure image that includes RHEL.	The Azure images include a Red Hat product.	Choose a RHEL image when you create a VM by using the Azure console, or choose a VM from the <a href="#">Azure Marketplace</a> .	<p>You pay Microsoft hourly on a <i>pay-as-you-go</i> model. Such images are called "on-demand." Azure provides support for on-demand images through a support agreement.</p> <p>Red Hat provides updates to the images. Azure makes the updates available through the Red Hat Update Infrastructure (RHUI).</p>

### Additional resources

- [Using Red Hat Gold Images on Microsoft Azure](#)
- [Azure Marketplace](#)
- [Billing options in the Azure Marketplace](#)
- [Red Hat Enterprise Linux Bring-Your-Own-Subscription Gold Images in Azure](#)
- [Red Hat Cloud Access Reference Guide](#)

## 2.2. UNDERSTANDING BASE IMAGES

To create a base VM from an ISO image, you can use preconfigured base images and their configuration settings.

### 2.2.1. Using a custom base image

To manually configure a virtual machine (VM), first create a base (starter) VM image. Then, you can modify configuration settings and add the packages the VM requires to operate on the cloud. You can make additional configuration changes for your specific application after you upload the image.

To prepare a cloud image of RHEL, follow the instructions in the sections below. To prepare a Hyper-V cloud image of RHEL, see the [Prepare a Red Hat-based virtual machine from Hyper-V Manager](#).

### 2.2.2. Virtual machine configuration settings

Cloud VMs must have the following configuration settings.

**Table 2.2. VM configuration settings**

Setting	Recommendation
ssh	ssh must be enabled to provide remote access to your VMs.
dhcp	The primary virtual adapter should be configured for dhcp.

### 2.2.3. Required system packages

To create and configure a base image of RHEL, your host system must have the following packages installed.

**Table 2.3. System packages**

Package	Repository	Description
libvirt	rhel-{ProductName}-for-x86_64-appstream-rpms	Open source API, daemon, and management tool for managing platform virtualization
virt-install	rhel-{ProductName}-for-x86_64-appstream-rpms	A command-line utility for building VMs
libguestfs	rhel-{ProductName}-for-x86_64-appstream-rpms	A library for accessing and modifying VM file systems
guestfs-tools	rhel-{ProductName}-for-x86_64-appstream-rpms	System administration tools for VMs; includes the <b>virt-customize</b> utility

## 2.3. ADDITIONAL RESOURCES

- [Red Hat in the Public Cloud](#)
- [Red Hat Cloud Access Reference Guide](#)
- [Frequently Asked Questions and Recommended Practices for Microsoft Azure](#)