Compute Engine offers the ability to bring your own license (BYOL) using sole-tenant nodes to support licensing requirements that limit physical hardware usage. Specifically, you can use sole-tenant nodes to import a custom image into Compute Engine, use the image to start a VM, and enable in-place restarts so the VM restarts on the same physical server whenever possible. By using sole-tenant nodes to host your VMs, you ensure your VMs run on hardware fully dedicated to your use while limiting physical core usage. Compute Engine also offers server usage reporting (/compute/docs/instances/windows/bring-your-own-license/determining-server-usage) so you can track physical hardware information for license usage.

For an overview of this feature, including requirements and workload considerations, read the Overview (/compute/docs/instances/windows/bring-your-own-license/) page.

VMs using BYOL with the in-place restart function might experience downtime each month for host maintenance events. T last roughly 60 minutes each. Google recommends using development or test workloads, or workloads that can withstan tion with this feature. See Workload considerations pute/docs/instances/windows/bring-your-own-license/#workload_considerations) for more information.

Before you start this process, make sure your OS is compatible (/compute/docs/instances/windows/bring-your-own-license/#compatible_os_versions) and that you have reviewed the Licensing and activation (/compute/docs/instances/windows/bring-your-own-license/#licensing_and_activation) section. You are responsible for ensuring your licensing agreements permit the use of software in the BYOL environment as described in this documentation. Also, you must prepare your guest image for BYOL according to your agreements.

If you have questions or need additional support, please contact your licensing reseller for licensing questions and Google Cloud Support (/support) for questions about this feature.

This feature is only available in certain regions. See Pricing and availability (/compute/docs/instances/windows/bring-your-own-license/#pricing_and_availability) for the full list.

Certain workloads are better suited for this feature than others. Review the Workload considerations (/compute/docs/instances/windows/bring-your-own-license/#workload_considerations) for general recommendations.

VMs using BYOL with the in-place restart function might experience downtime each month for host maintenance events. T last roughly 60 minutes each. We recommend using development or test workloads, or workloads that can withstand the tion with this feature. See Workload considerations pute/docs/instances/windows/bring-your-own-license/#workload_considerations) for more information.

If you don't already have a project, create a new project (/resource-manager/docs/creating-managing-projects#creating_a_project).

CPU quota for the new projects is restricted to 100 CPUs. This might not be enough for your needs. If you need more quota (/compute/quotas) for your project, you can request quota adjustments through the Quotas page (https://console.cloud.google.com/iam-admin/quotas) in the Cloud Console. You might also need quota increases for other resources such as IP addresses, depending on your setup.

This feature uses the Cloud Build service to import and create Compute Engine images. You must enable the Cloud Build API to use this feature.

Enable the Cloud Build API (https://console.cloud.google.com/apis/api/cloudbuild.googleapis.com/overview)

Compute Engine also grants the Cloud Build service account the following roles so it can import images into Compute Engine:

- `roles/iam.serviceAccountTokenCreator`
- `roles/compute.admin`
- `roles/iam.serviceAccountUser`

If reporting physical server usage is required for licensing, enable the Stackdriver Logging API before launching VMs onto sole-tenant nodes. This gives you the ability to import and view server usage information using BigQuery (strongly recommended).

Enable the Stackdriver Logging API (https://console.cloud.google.com/apis/api/logging.googleapis.com/overview)

By setting up logging, you can take advantage of BigQuery to track relevant information, such as physical core count usage, for your licensing needs. For more details, see Determining server usage (/compute/docs/instances/windows/bring-your-own-license/determining-server-usage).

You must have an existing virtual disk file (VMDK, VHD) to import the image into Compute Engine. You can't install an operating system directly to a VM from an installation image, such as iso, img, DVD, USB, and so on. You also can't do an in-place OS upgrade on a Compute Engine VM.

Steps to creating a virtual disk file differ depending on your environment; consult the appropriate documentation for your operating system.

To start a VM with your own license, import a virtual disk that contains the OS you want to use. Use the `gcloud` command-line tool to import your file; the `gcloud` tool supports importing VHD or VMDK from a Cloud Storage (/storage/docs) bucket or from a local workstation. If the virtual disk is hosted on your local machine, the import process first uploads the file to a Cloud Storage bucket before importing the image into Compute Engine.

Before you import your virtual machine's disk, download and run our precheck tool (/compute/docs/import/importing-virtual-disks#precheck) inside your virtual machine. This precheck tool helps verifies that there are no incompatibilities (https://googlecloudplatform.github.io/compute-image-tools/image-import.html#compatibility-and-known-limitations) when migrating over to Google Cloud.

For a full explanation of the image import tool, review Importing Virtual Disk (/compute/docs/images/importing-virtual-disks#precheck).

When you are ready, run the following `gcloud` command to import your virtual disk:

where:

- `[IMAGE_NAME]` is the name you want to give this image.
- `[SOURCE_FILE]` is a virtual disk file, either hosted locally or stored in Cloud Storage. If your virtual disk is a local file, you can use an absolute or relative path. If your virtual disk file is already stored in Cloud Storage, the file must exist in a storage bucket in the same project that's being used for the import process, and you must specify the full path of the file in the `gs://[BUCKET_NAME]/[OBJECT_NAME]` format.
- `[OS]` is the Windows operating system of the `SOURCE_FILE`. The following Windows OSes are supported:
  - `windows-2008r2-byol`
  - `windows-2012-byol`
  - `windows-2012r2-byol`
  - `windows-2016-byol`
  - `windows-2019-byol`
  - `windows-7-x64-byol`
  - `windows-7-x86-byol`
  - `windows-8-x64-byol`
  - `windows-8-x86-byol`
  - `windows-10-x64-byol`
  - `windows-10-x86-byol`

Note that files stored on Cloud Storage and images in Compute Engine incur charges. After you verify that the image is imported correctly and that it boots correctly as a Compute Engine instance, you can delete the virtual disk file from Cloud Storage.

If a local file is specified for the `--source-file`, the upload operation can take tens of minutes to run, depending on the size of the virtual disk and the speed of the network connection.

After the image is created, you can share the image (/compute/docs/images/sharing-images-across-projects) with users outside of your project or organization by using IAM roles or permissions.

In this case, `[PROJECT_ID]` is the project that owns the image for which you want to grant access.

Then, the user can access this image by specifying the project ID where the image lives in their requests. For example:

After an image is imported, you can start a VM instance on a sole-tenant node by using the imported image, and enable the in-place restart feature by specifying the `restart-node-on-minimal-servers` property. This property ensures that if a maintenance event (/compute/docs/instances/setting-instance-scheduling-options#maintenanceevents) occurs, the VM restarts on the same physical server if possible. If the same physical server is not available, a new physical server is created and added to the node group. Compute Engine reports the server ID of the new server.

For BYOL workloads that aren't concerned with physical core or socket usage based on the nature of the licensing and product terms, you can use sole-tenant nodes and omit the in-place restart feature. This ensures your VM instances land on dedicated hardware but doesn't minimize the number of physical underlying servers used.

Follow these steps to start your VM instance (described in detail below):

1. Create a node template and enable in-place restart, if required, using the Google Cloud Console, the `gcloud` command-line tool, or the API.
2. Create a node group with the new template.

3. Lastly, create VMs in the node group with your imported image.

★ **Note:** These steps are also described in the sole-tenant nodes documentation. If you are unfamiliar with this process, review the documentation (/compute/docs/nodes).

After VMs are scheduled on a node, they adhere to the same physical affinity labels through restarts and maintenance events. This means that although the underlying physical server can change, you can use label selectors to ensure certain VMs are always on the same nodes (with corresponding node affinity (/compute/docs/nodes/create-nodes#affinity)), or that certain VMs never share the same node (node anti-affinity).

For your convenience, an additional affinity label, similar to the node name and the node group name, is automatically added to all sole tenant nodes configured with the `restart-node-on-minimal-servers` option. You can include this label in your affinity file to ensure that your VMs only start on nodes with the `restart-node-on-minimal-server` feature enabled. The label looks like the following:

- Key: `compute.googleapis.com/node-server-binding-type`
- Value: `restart-node-on-minimal-server`

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last roughly 60 minutes each. We recommend using development or test workloads, or workloads that can withstand the
tion with this feature. See Workload considerations
pute/docs/instances/windows/bring-your-own-license/#workload_considerations) for more information.

- Learn more about sole tenant nodes (/compute/docs/nodes).
- Learn how to determine server usage for reporting (/compute/docs/instances/windows/bring-your-own-license/determining-server-usage).
- See the frequently asked questions (/compute/docs/instances/windows/bring-your-own-license/frequently-asked-questions) for bringing your own license.
- Review documentation for creating and starting an instance (/compute/docs/instances/create-start-instance).
- Review the Images (/compute/docs/images) documentation.