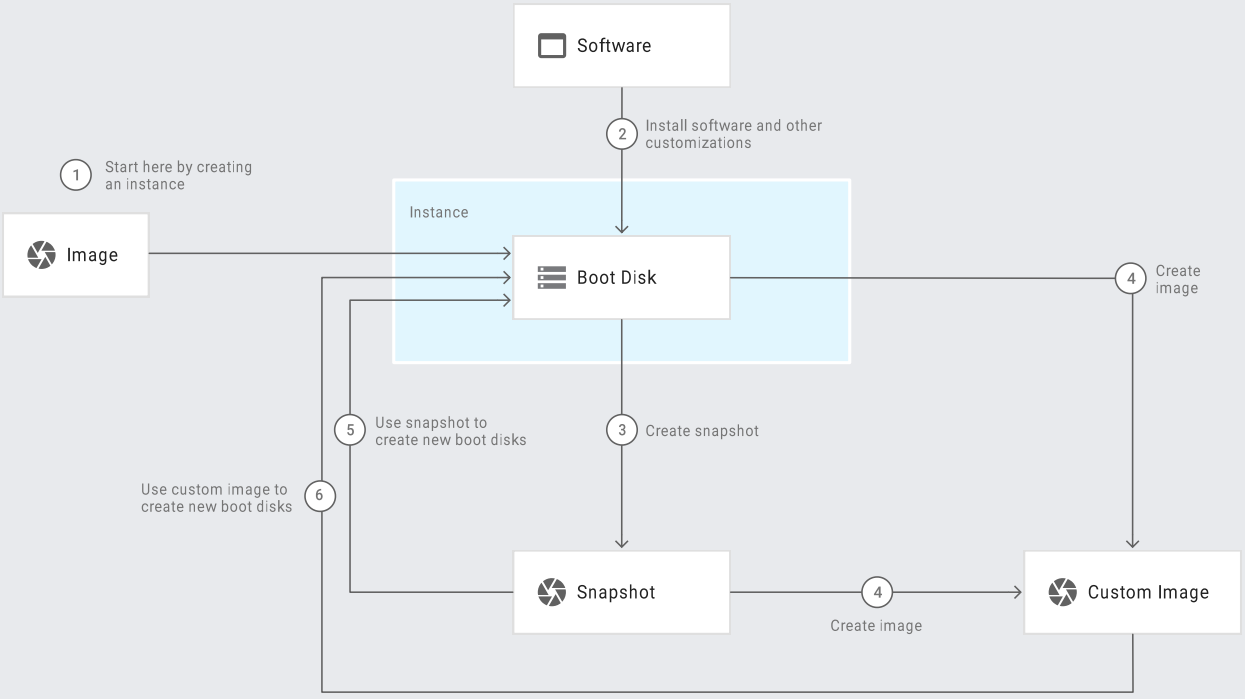
Exporting a custom image to Cloud Storage

If you need to move your Compute Engine boot disk data outside of your Compute Engine project, you can export a boot disk image to Cloud Storage as a `tar.gz` file. If you need to create a persistent disk image to use when you create new persistent disks on Compute Engine, read Creating a custom image (/compute/docs/images/create-delete-deprecate-private-images#creating_a_custom_image).

You can backup or share a custom image by exporting the image to Cloud Storage. This method is ideal for sharing individual images with projects that do not have access to your images. Alternatively, you can share images by granting the Compute Engine image user role (/compute/docs/images/sharing-images-across-projects) on the image or on the project that contains it.

Currently, it is not possible to export a Windows Server image.

The following diagram shows some typical workflows for the creation and reuse of a custom image.



(https://cloud.google.com/compute/images/create-use-custom-image.svg)

Figure 1. Examples of creation and reuse of custom images

Before you begin

- If you want to use the command-line examples in this guide:
  1. Install or update to the latest version of the gcloud command-line tool (/compute/docs/gcloud-compute).
  2. Set a default region and zone (/compute/docs/gcloud-compute#set_default_zone_and_region_in_your_local_client).
- If you want to use the API examples in this guide, set up API access (/compute/docs/api/prereqs).
- Read the images (/compute/docs/images) page.

Enable the Cloud Build API

The virtual appliance export tool uses Cloud Build (/cloud-build/docs).

In most cases, `gcloud compute images export` attempts to grant these permissions to the Cloud Build service account. However, you can manually grant these permissions to ensure that the required permissions are in effect.

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1. In the Google Cloud Console, enable the Cloud Build API.

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

   When you enable the Cloud Build API from the console, Compute Engine grants the Cloud Build service account the following roles so that the Cloud Build service can export instances from Compute Engine:

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

The export tool also uses the default Compute Engine service account. By default, the Compute Engine service account has the IAM project editor role. If this role is removed, the export process might fail. To add the role back to the service account, see Granting access (/iam/docs/granting-changing-revoking-access). For more information about the Compute Engine default service account, see Compute Engine default service account (/compute/docs/access/service-accounts#compute_engine_default_service_account).

Exporting an image with a single command

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1. In the Google Cloud Console, go to the **Images** page.

   Go to the **Images** page (https://console.cloud.google.com/compute/images)

2. Click the name of the image that you want to export to go to the image details page. You can't export public images provided by Google (/compute/docs/images#os-compute-support). You can only export images that you previously created or imported.
3. From the image details page, click **Export** to open the **Export Image** page.
4. From the **Export image** page, choose the **Export format** of the image.
5. Choose the Cloud Storage location to export your image to by clicking **Browse**.
6. Choose an existing Cloud Storage location to export your image. Or, follow the directions to create a new Cloud Storage bucket, and then enter a name for the new Cloud Storage bucket.
7. Once you choose a Cloud Storage, choose a filename for the exported image. You can use the default filename, or you can choose your own filename.
8. After choosing a Cloud Storage, and entering a filename for the image, click **Select**.
9. From the **Export image** page, click **Export**. After choosing **Export**, the Cloud Console displays the **Image export history**, where you can view the image export process. For additional details about the image export process, click the **Cloud Build ID** to go to the **Image export details** page where you can view and download the image export log.
10. Go to the **Storage** page to access your exported image.

    Go to the **Storage** page (https://console.cloud.google.com/storage/browser)

Creating and exporting an image manually

If the `gcloud compute images create` and `gcloud compute images export` commands do not meet your requirements, you can create and export an image manually from a Compute Engine instance. This process has discrete steps to first create an image and then export an image.

In the following example, note the created disk is called **image-disk**.

To create and export an image:

1. Optionally, stop the instance (/compute/docs/instances/stop-start-instance#stopping_an_instance) that the disk is attached to before you create the snapshot. Stopping the instance ensures the integrity of the disk contents in the snapshot. Replace ***`disk-name`*** with the name of the disk that you want to use to create the snapshot.
2. Create a snapshot of the disk. Name the snapshot `image-snapshot`.

```
gcloud compute disks snapshot disk-name \
    --snapshot-names image-snapshot
```

3. Use the `image-snapshot` snapshot to create a new disk named `image-disk` by running the following command:

```
gcloud compute disks create image-disk \
    --source-snapshot image-snapshot
```

4. Create a temporary disk named `temporary-disk` to hold your tar file, and specify the ***`size`*** of the disk to be at least 50% larger than the image disk.

   You can detach and delete the disk afterwards.

```
gcloud compute disks create temporary-disk \
    --size size
```

where ***size*** is the size, in gigabytes or terabytes, of the temporary disk. For example, specify `100GB` to create a 100-gigabyte disk.

5. Create an instance and enable `storage-rw` scope on the instance. Also, attach the `image-disk` and the `temporary-disk` to the instance as secondary disks with specific `device-name` attributes. Replace ***instance-name*** with the name of the instance to create.

```
gcloud compute instances create instance-name \
    --scopes storage-rw \
    --disk name=image-disk,device-name=image-disk \
    --disk name=temporary-disk,device-name=temporary-disk
```

Note that you're passing in service account scopes so that you can upload your file to Cloud Storage in later steps.

Review the details about starting a new instance (/compute/docs/instances/creating-and-starting-an-instance) if necessary.

6. Connect to your instance (/compute/docs/instances/connecting-to-instance). Replace ***instance-name*** with the name of the instance to connect to.

```
gcloud compute ssh instance-name
```

7. Format and mount the temporary disk. Formatting the disk deletes the contents of the temporary disk.

```
sudo mkdir /mnt/tmp
```

```
sudo mkfs.ext4 -F /dev/disk/by-id/google-temporary-disk
```

```
sudo mount -o discard,defaults /dev/disk/by-id/google-temporary-disk /mnt/tmp
```

8. Optionally, you can mount the image disk and make additional changes before you create the tar file. For example, you might want to delete any existing files from the `/home` directory if you do not want them to be part of your image. Mount the disk partitions that you need to modify, modify the files on the disk that you need to change, and then unmount the disk when you are done.

    a. Create a directory where you can mount your disk or partition.

    ```
    sudo mkdir /mnt/image-disk
    ```

    b. Use the `ls` command to determine which disk or disk partition you need to mount.

    ```
    ls /dev/disk/by-id/
    ```

    The command prints a list of disk IDs and partitions. For example, the following disk has a partition table with one partition. The `google-image-disk` ID points to the full disk from which you want to create an image. The `google-image-disk-part1` ID points to the first partition on this disk. Mount the partition if you need to make changes to the disk, then create the image from the full disk.

    ```
    google-image-disk
    google-image-disk-part1
    ```

    c. Mount the disk or the partition. If your disk has a partition table, mount the individual partitions for your disk. For example, mount `google-image-disk-part1`.

    ```
    sudo mount /dev/disk/by-id/google-image-disk-part1 /mnt/image-disk
    ```

    Alternatively, if your disk is raw formatted with no partition table, mount the full `google-image-disk` disk.

    ```
    sudo mount /dev/disk/by-id/google-image-disk /mnt/image-disk
    ```

d. Modify the files in the `/mnt/image-disk` directory to configure the files on the disk. As an example, you might remove the `/mnt/image-disk/home/[USER]/.ssh/authorized_keys` file to protect your SSH keys from being shared.

e. After you have finished modifying files, unmount the disk.

```
sudo umount /mnt/image-disk/
```

9. Create a tar file of your image.

   When you finish customizing the files on the image disk, create a raw disk file on your temporary disk. The name of the raw disk image must be 'disk.raw':

   ```
   sudo dd if=/dev/disk/by-id/google-image-disk of=/mnt/tmp/disk.raw bs=4096
   ```

   Then tar and gzip this file:

   ```
   cd /mnt/tmp
   ```

   ```
   sudo tar czvf myimage.tar.gz disk.raw
   ```

   This command creates an image of the instance in the following location:

   ```
   /mnt/tmp/myimage.tar.gz
   ```

10. Upload the image into Cloud Storage.

    To upload the tar file to Cloud Storage, use the gsutil (/storage/docs/gsutil) command line tool that comes preinstalled on your instance.

    a. Create a bucket using `gsutil`.

Make sure to review the bucket and object naming guidelines (/storage/docs/bucketnaming) before you create your bucket. Then, create your bucket using the following command. Replace ***bucket-name*** with the name of the bucket to create.

```
me@example-instance:~$
gsutil mb gs://bucket-name
```

b. Copy your file to your new bucket. Replace ***bucket-name*** with the name of the bucket to copy the file to.

```
me@example-instance:~$
gsutil cp /mnt/tmp/myimage.tar.gz gs://bucket-name
```

You have exported your file into Cloud Storage. You can now share the image with other people, or use the tar file to add a new image to a Google Cloud Console project.

What's next

- Share images using the image user role (/compute/docs/images/sharing-images-across-projects).
- Learn about the import methods (/compute/docs/import) available for Compute Engine.

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