

# Cloud-hosted model quickstart

This quickstart walks you through the process of:

- Copying a set of images into Google Cloud Storage.
- Creating a CSV listing the images and their labels.
- Using AutoML Vision to create your dataset, and train and deploy your model.

## Before you begin

### Set up your project

1. [Sign in](https://accounts.google.com/Login) (https://accounts.google.com/Login) to your Google Account.

If you don't already have one, [sign up for a new account](https://accounts.google.com/SignUp) (https://accounts.google.com/SignUp).

2. In the Cloud Console, on the project selector page, select or create a Google Cloud project.

★ **Note:** If you don't plan to keep the resources that you create in this procedure, create a project instead of selecting an existing project. After you finish these steps, you can delete the project, removing all resources associated with the project.

[GO TO THE PROJECT SELECTOR PAGE](https://console.cloud.google.com/projectselector) (HTTPS://CONSOLE.CLOUD.GOOGLE.COM/PROJECTSELECTOR)

3. Make sure that billing is enabled for your Google Cloud project. [Learn how to confirm billing is enabled for your project](https://cloud.google.com/billing/docs/how-to/modify-project) (https://cloud.google.com/billing/docs/how-to/modify-project).

4. Enable the AutoML and Cloud Storage APIs.

[ENABLE THE APIS](https://console.cloud.google.com/flows/enableapi?apiid=storage) (HTTPS://CONSOLE.CLOUD.GOOGLE.COM/FLOWS/ENABLEAPI?APIID=STORAGE-APIS)

5. [Install the gcloud command line tool](https://cloud.google.com/sdk/downloads#interactive) (https://cloud.google.com/sdk/downloads#interactive).

6. Follow the instructions to [create a service account and download a key file](https://cloud.google.com/iam/docs/creating-managing-service-accounts#creating_a_service_account)

(https://cloud.google.com/iam/docs/creating-managing-service-accounts#creating\_a\_service\_account)

for that account.

★ Service accounts are the only authentication option available with the AutoML API.

7. Set the `GOOGLE_APPLICATION_CREDENTIALS` environment variable to the path to the service account key file that you downloaded when you created the service account.

```
export GOOGLE_APPLICATION_CREDENTIALS=key-file
```



8. Set the `PROJECT_ID` environment variable to your Project ID ([https://cloud.google.com/resource-manager/docs/creating-managing-projects#identifying\\_projects](https://cloud.google.com/resource-manager/docs/creating-managing-projects#identifying_projects))

```
export PROJECT_ID=your-project-id
```



The AutoML API calls and resource names include your Project ID in them. The `PROJECT_ID` environment variable provides a convenient way to specify the ID.

9. If you are an owner for your project, add your service account to the **AutoML Editor** IAM role, replacing **`service-account-name`** with the name of your new service account. For example, `service-account1@myproject.iam.gserviceaccount.com`.

```
gcloud auth login
gcloud projects add-iam-policy-binding $PROJECT_ID \
  --member="serviceAccount:service-account-name" \
  --role="roles/automl.editor"
```



10. Otherwise (if you are not a project owner), ask a project owner to add both your user ID and your service account to the **AutoML Editor** IAM role.

## Create a Cloud Storage bucket

Use Cloud Shell, a browser-based Linux command line connected to your Cloud Console project, to create your Cloud Storage bucket:

1. Open Cloud Shell (<http://console.cloud.google.com/?cloudshell=true>).
2. Create a Google Cloud Storage bucket. The bucket name must be in the format: **`project-id-vc`**. The following command creates a storage bucket in the `us-central1`

region named `project-id-vc`. For a complete list of available regions, see the [Bucket Locations page](https://cloud.google.com/storage/docs/locations#available_locations) ([https://cloud.google.com/storage/docs/locations#available\\_locations](https://cloud.google.com/storage/docs/locations#available_locations)).

```
gsutil mb -p project-id -c regional -l us-central1 gs://project-id-vc/
```

Recommended file structure for your Cloud Storage files:

```
gs://project-id-vc/dataset-name/documents/document-name.txt
```

## Copy the sample images into your bucket

Next, copy the flower dataset used in [this Tensorflow blog post](https://cloud.google.com/blog/big-data/2016/12/how-to-classify-images-with-tensorflow-using-google-cloud-machine-learning-and-cloud-dataflow)

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. The images are stored in a public Cloud Storage bucket, so you can copy them directly from there to your own bucket.

1. In your Cloud Shell session, enter:

```
gsutil -m cp -R gs://cloud-ml-data/img/flower_photos/ gs://{BUCKET}/img/
```

The file copying takes about 20 minutes to complete.

## Create the CSV file

The sample dataset contains a CSV file with all of the image locations and the labels for each image. You'll use that to create your own CSV file:

1. Update the CSV file to point to the files in your own bucket:

```
gsutil cat gs://{BUCKET}/img/flower_photos/all_data.csv | sed "s:cloud-ml-data
```

2. Copy the CSV file into your bucket:

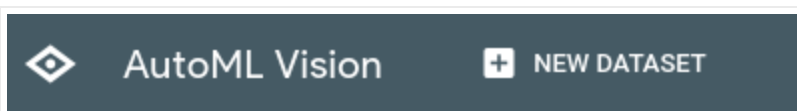
```
gsutil cp all_data.csv gs://{BUCKET}/csv/
```

## Create your dataset

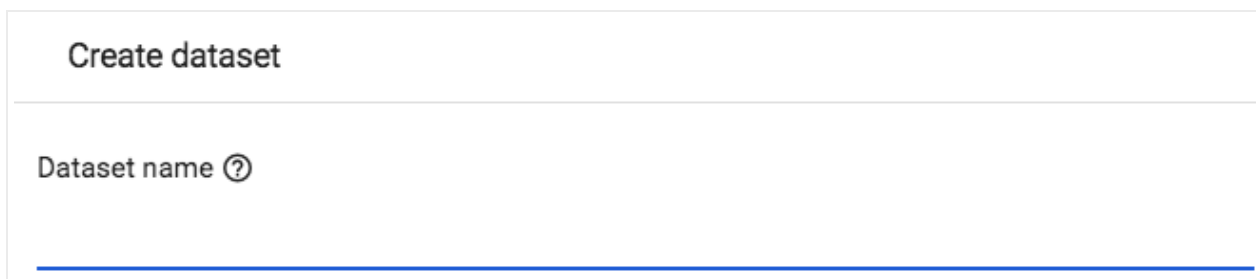
Visit the [AutoML Vision UI](https://console.cloud.google.com/vision) (<https://console.cloud.google.com/vision>) to begin the process of creating your dataset and training your model.

When prompted, make sure to select the project that you used for your Cloud Storage bucket.

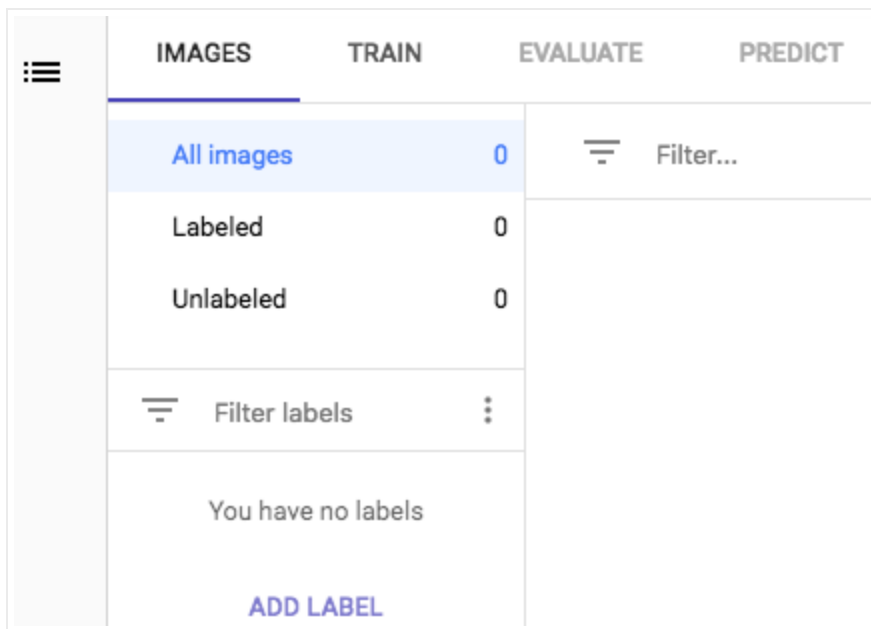
1. From the AutoML Vision page, click **New Dataset**:



2. Specify a name for this dataset. Click the + sign to continue.

A screenshot of the 'Create dataset' form. The form has a title 'Create dataset' at the top. Below the title is a text input field labeled 'Dataset name' with a question mark icon to its right. A blue horizontal line is visible below the input field.

3. Specify the Cloud Storage URI of your CSV file. For this quickstart, the CSV file is at `gs://your-project-123-vcn/csv/all_data.csv`. Make sure to replace `your-project-123` with your specific project ID.
4. Click **Create Dataset**. The import process takes a few minutes. When it completes, you are taken to the next page which has details on all of the images identified for your dataset, both labeled and unlabeled images. You can filter images by label by selecting a label under **Filter labels**. If you are using the flower dataset, you will see a warning alert which will notify you of repeated images or images with multiple labels (if multi-label is not enabled).



IMAGES	TRAIN	EVALUATE	PREDICT
All images	0	Filter...	
Labeled	0		
Unlabeled	0		
Filter labels			
You have no labels			
ADD LABEL			

- You can add additional images and update labels for new and existing images after you have imported a CSV file.

## Train your model

Once your dataset has been created and processed, click the **Train** tab to initiate model training.

Click **Train New Model** to continue.

Training is initiated for your model. Training your model should take about 10 minutes for this dataset. The service will email you once training has completed, or if any errors occur.

Once training is complete, your model is automatically deployed.

You can click the **Evaluate** tab to get more details on F1, Precision, and Recall scores. Click on each label under **Filter labels** to get details on true positives, false negatives and false positives.

## Use the custom model

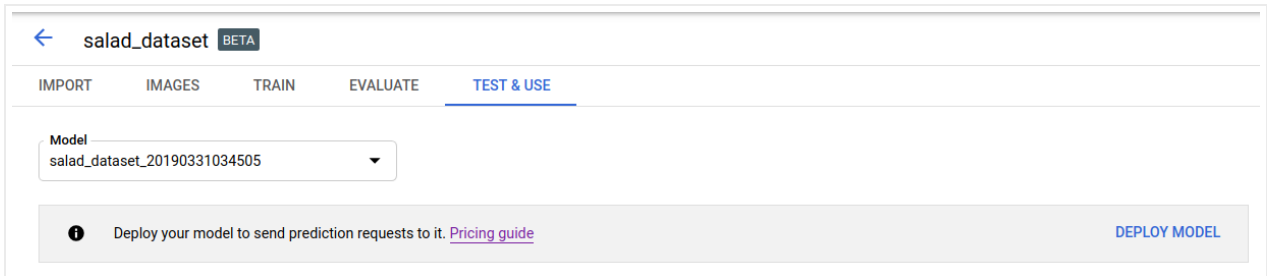
After your model has been successfully trained, you can use it to label images using your custom model. Select the **Test and Use** tab.

If you didn't opt-in for auto-deploy you will be prompted to deploy your model before you can make predictions.

## ☑ Manually deploy model

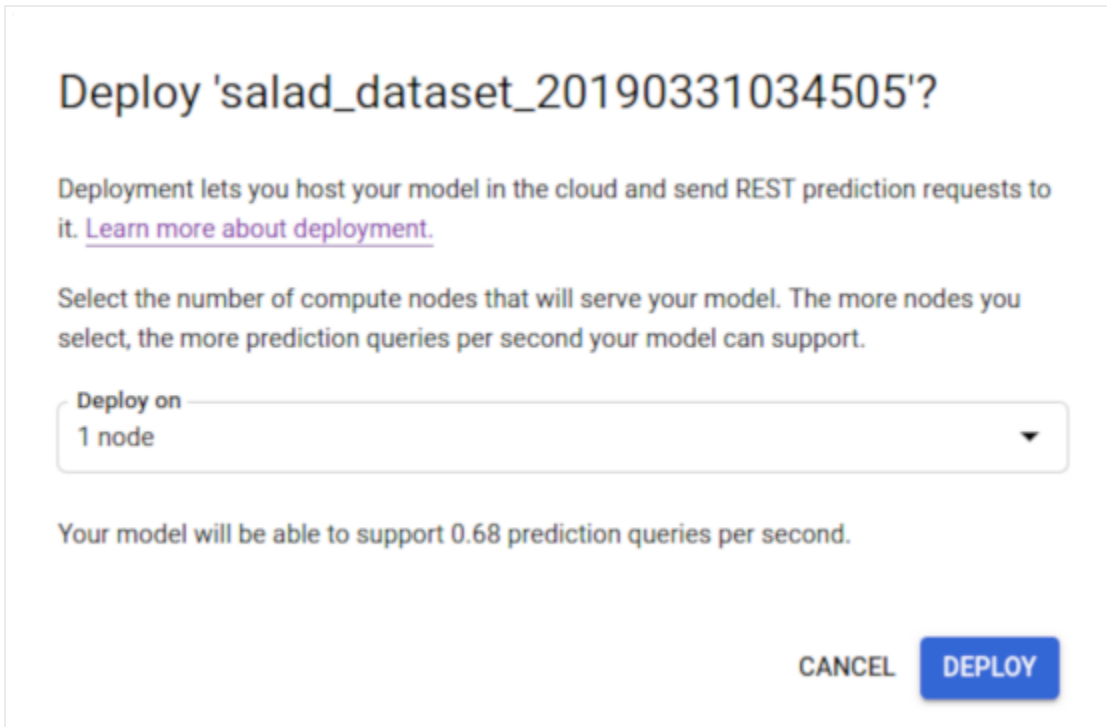
AutoML Vision requires you to deploy your trained model before you can send prediction requests to it.

1. In the **Test and Use** tab manually deploy your model by selecting the **Deploy Model** option from the banner beneath your model name.

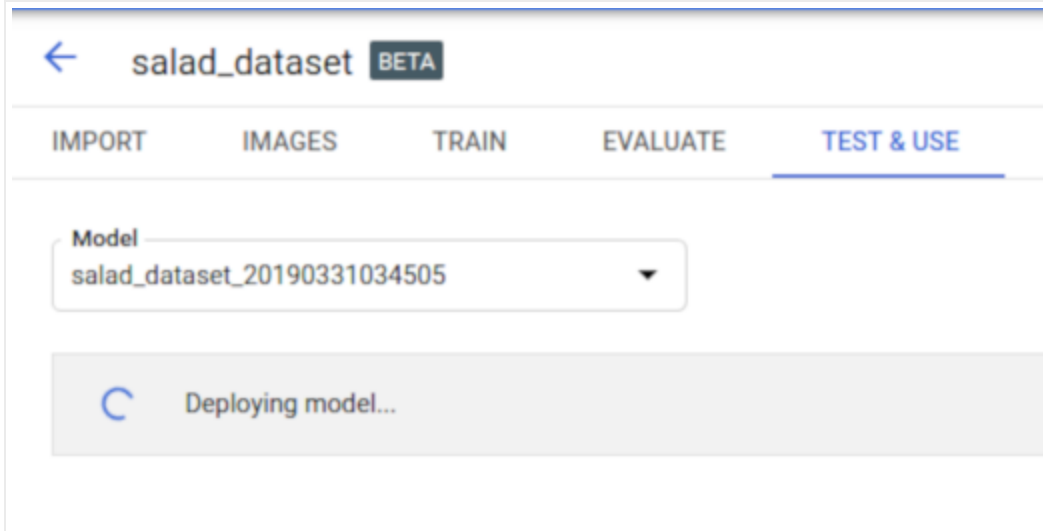


Selecting **Deploy Model** opens the model deployment option window

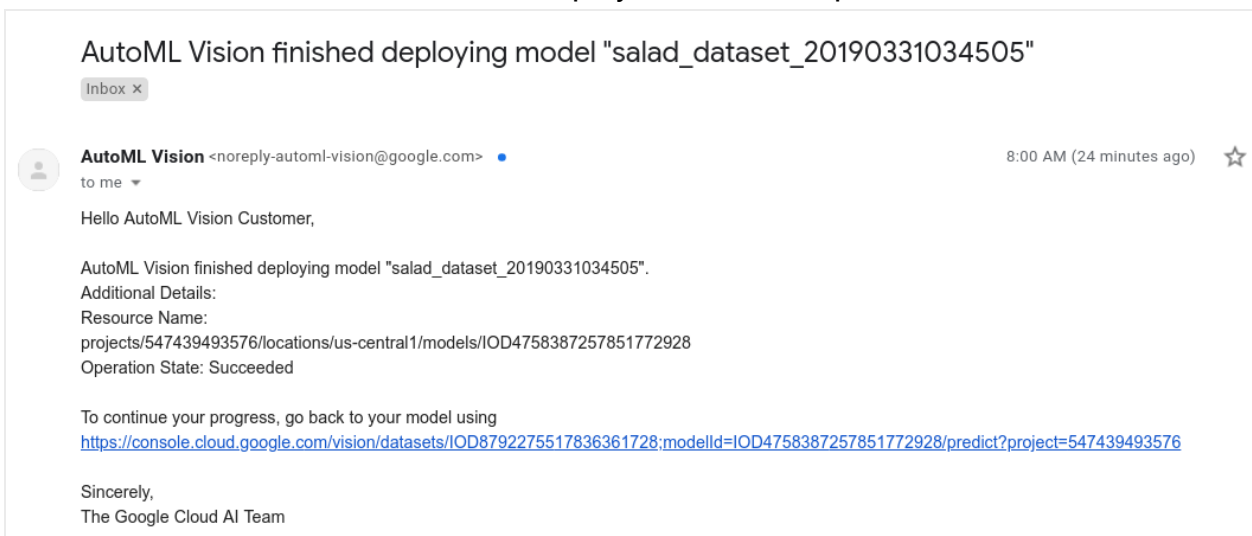
2. In the model deployment option window you can select the number of nodes to deploy on and view the available prediction queries per second (QPS).



### 3. Select **Deploy** to begin model deployment.



### 4. You will receive an email when model deployment has completed.



**Note:** You can also use the UI to update the node count of a deployed model.

## Make a Prediction

Click the **Predict** tab for instructions on sending an image to your model for a prediction. You can also refer to [Making an online prediction](https://cloud.google.com/vision/automl/docs/predict) (https://cloud.google.com/vision/automl/docs/predict) or [Making batch predictions](https://cloud.google.com/vision/automl/docs/predict-batch) (https://cloud.google.com/vision/automl/docs/predict-batch) for examples.

Batch prediction often offers a lower cost per inference and higher throughput than synchronous (online) prediction. However, batch prediction produces a long-running operation (LRO), meaning that results are only available once the LRO has completed.

## Cleanup

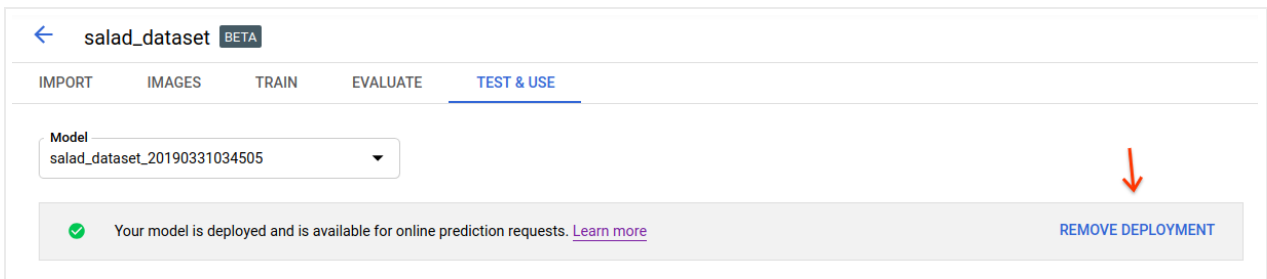
If you no longer need your custom model or dataset, you can delete them.

To avoid unnecessary Google Cloud Platform charges, use the [GCP Console](https://console.cloud.google.com/vision) (<https://console.cloud.google.com/vision>) to delete your project if you do not need it.

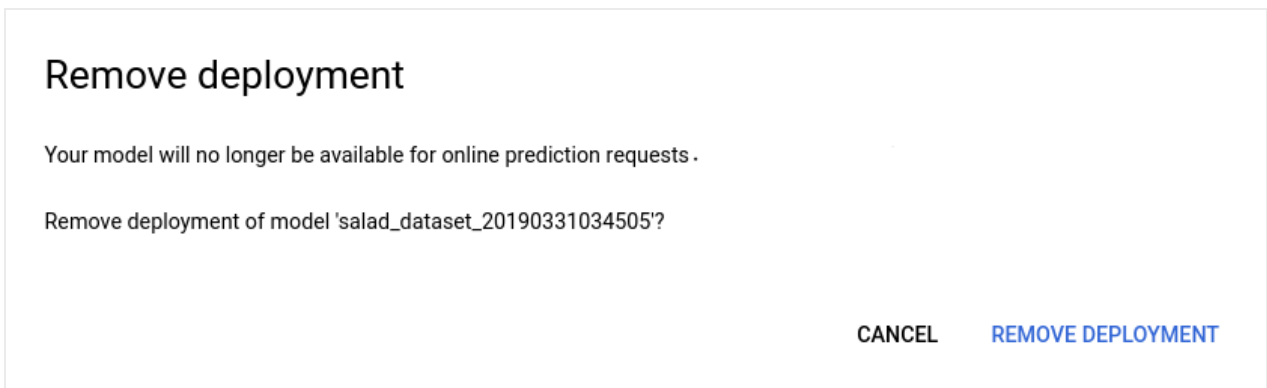
### Undeploy your model

Your model incurs charges while it is deployed.

1. Select the **Test & Use** tab just below the title bar.
2. Select **Remove deployment** from the banner beneath your model name to open the undeploy option window.

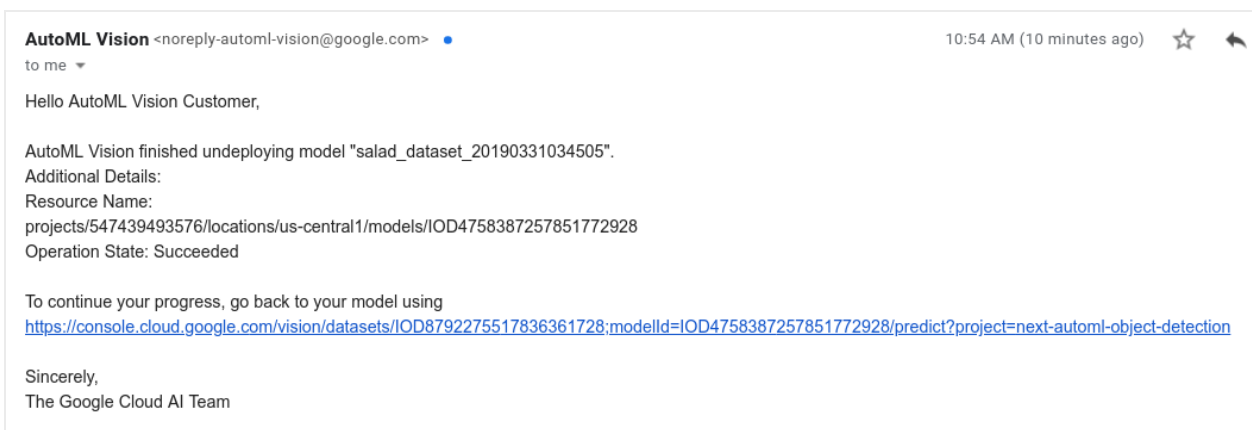


3. Select **Remove deployment** to undeploy the model.



4. You will receive an email when model undeployment has completed.





## Delete your project (optional)

To avoid unnecessary Google Cloud Platform charges, use the [Cloud Console](https://console.cloud.google.com/) (<https://console.cloud.google.com/>) to delete your project if you do not need it.

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