Custom Model Building with AutoML

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01	Why AutoML?
02	AutoML Vision
03	AutoML Natural Language
04	AutoML Tables

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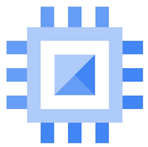
Create and deploy custom models with AutoML

Cloud TPUs



Compute Engine

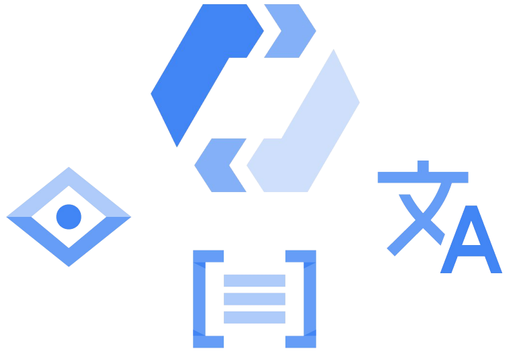
Dataproc

Google Kubernetes Engine

Vertex AI

BigQuery ML

AutoML



Cloud Translation API

Vision API

Speech-to-Text API

Video Intelligence API

Data Loss Prevention API

Text-to-Speech API

Cloud Natural Language API

Dialogflow

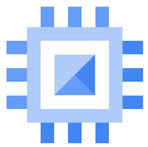
Build a Custom Model

Build Custom Model (codeless)

Call a Pretrained Model

Create and deploy custom models with AutoML

Cloud TPUs



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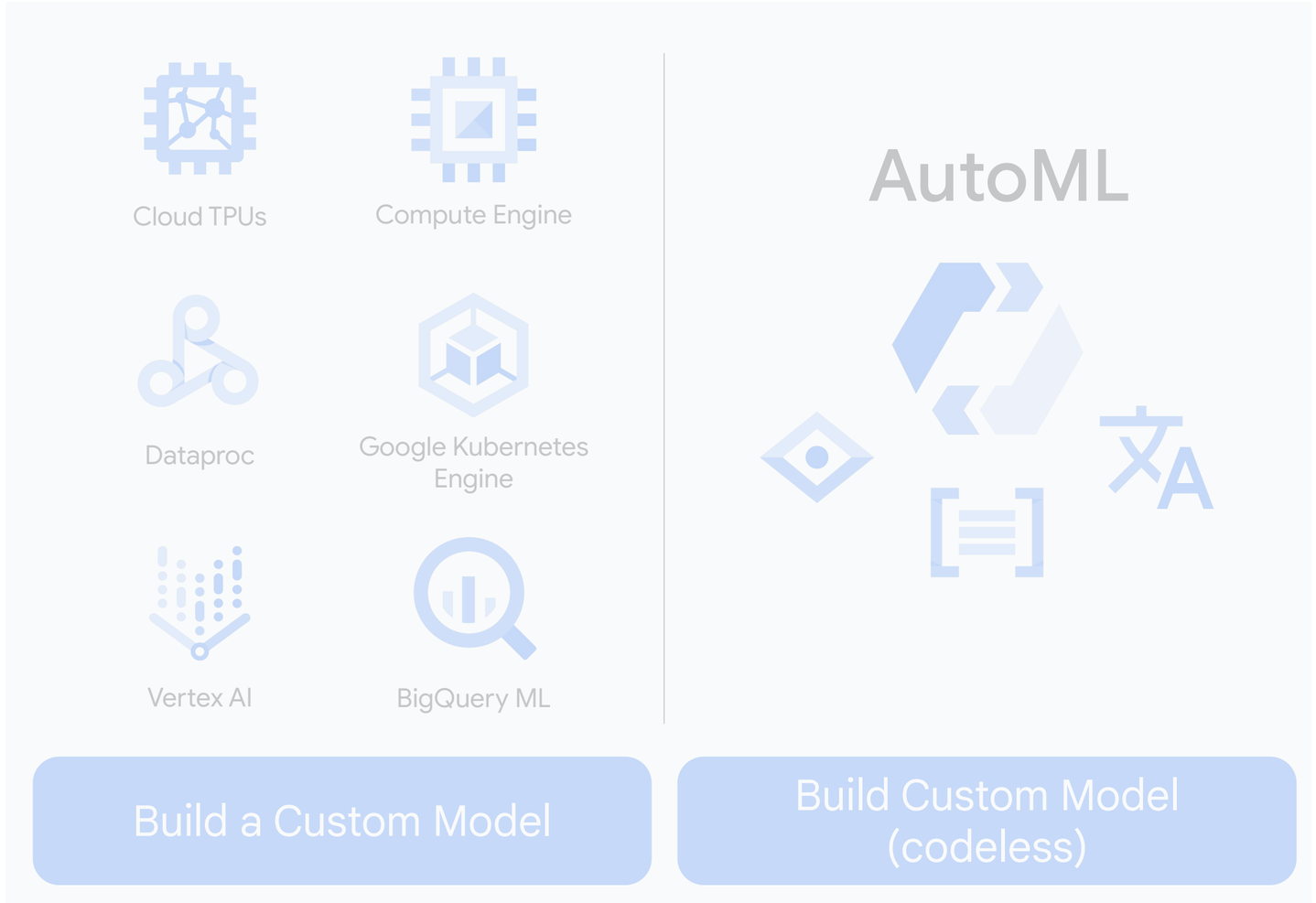

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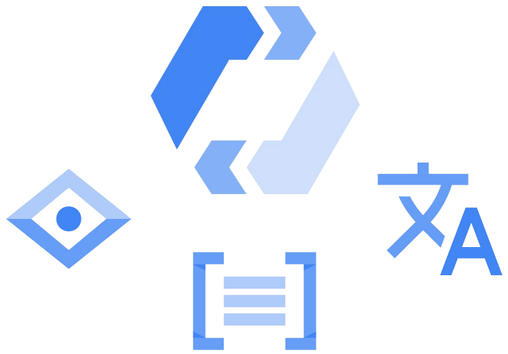
Build a Custom Model

AutoML



Build Custom Model (codeless)

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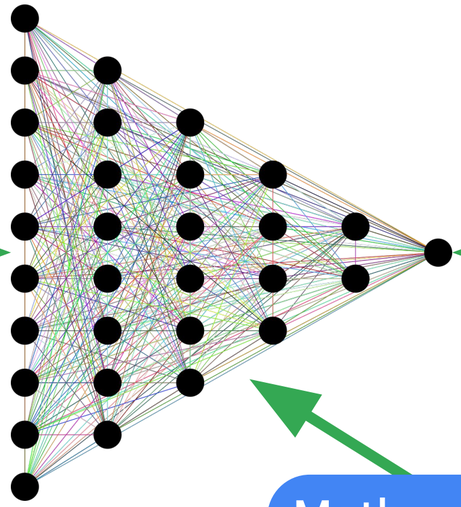
Call a Pretrained Model

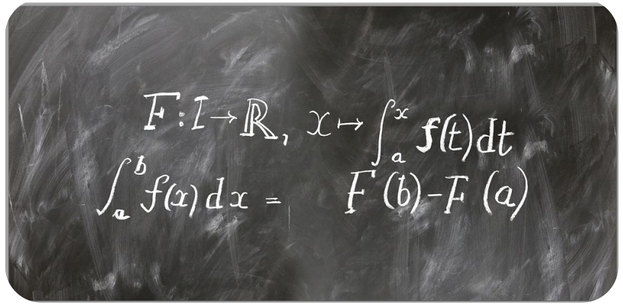
Training high-quality, custom ML models requires a lot of effort and expertise

Time

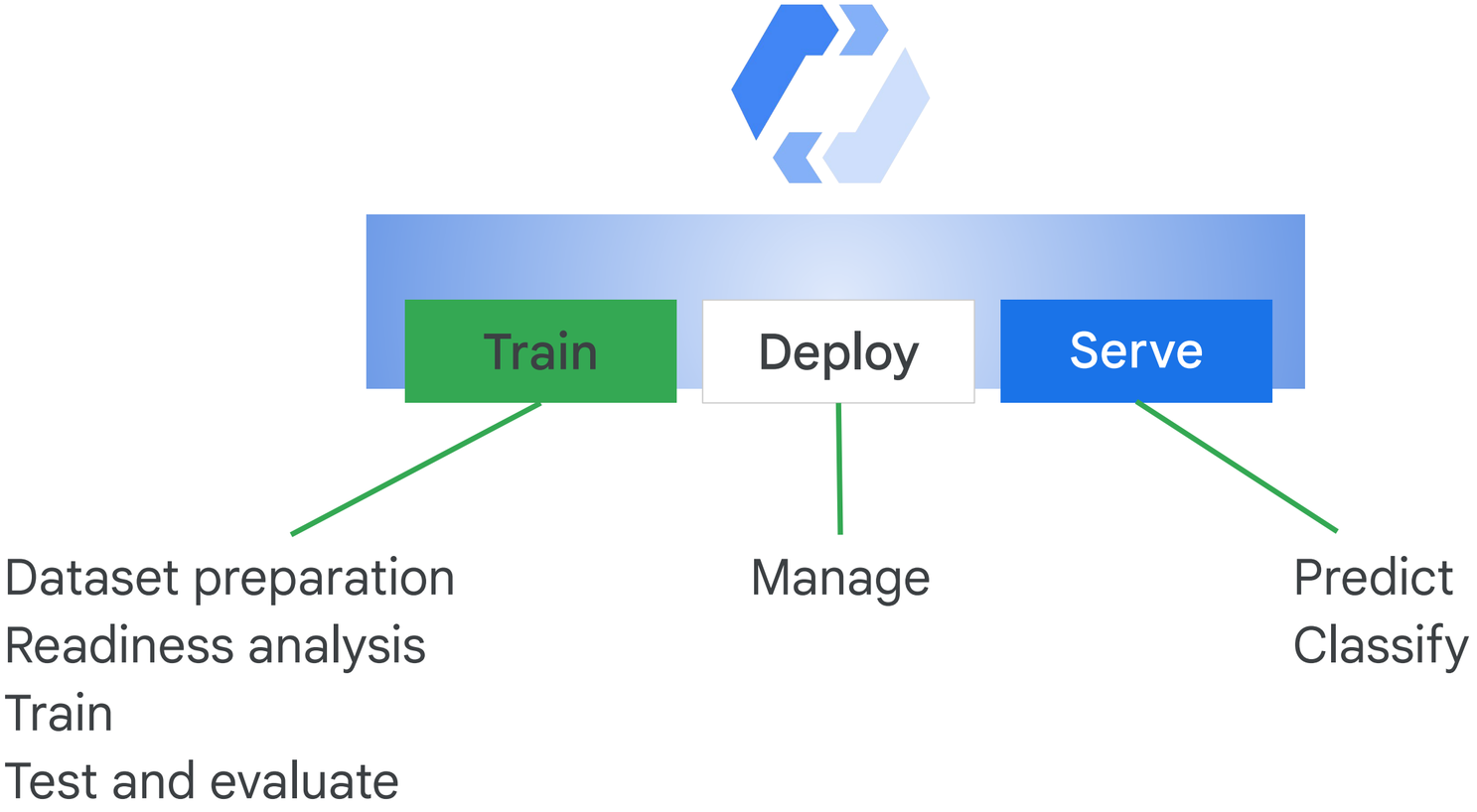


Expertise

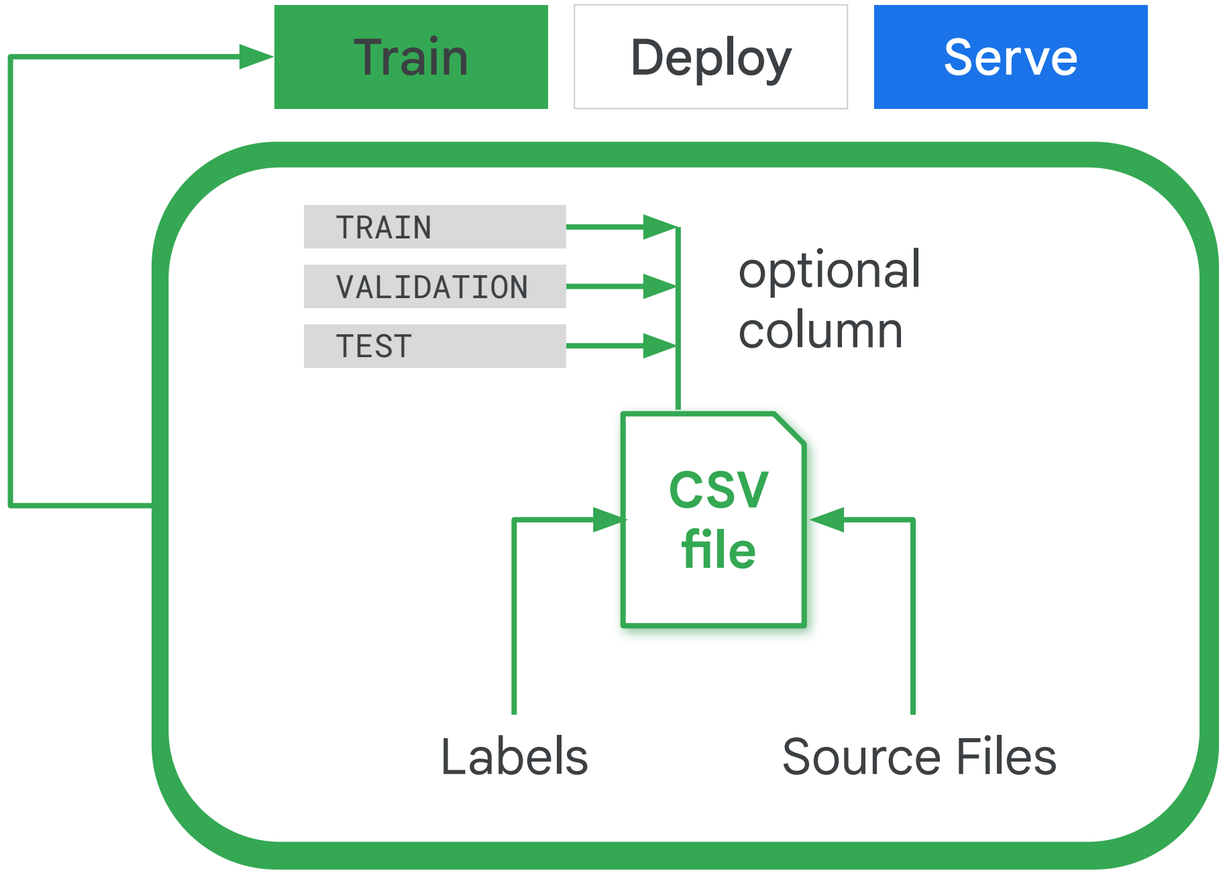
Math



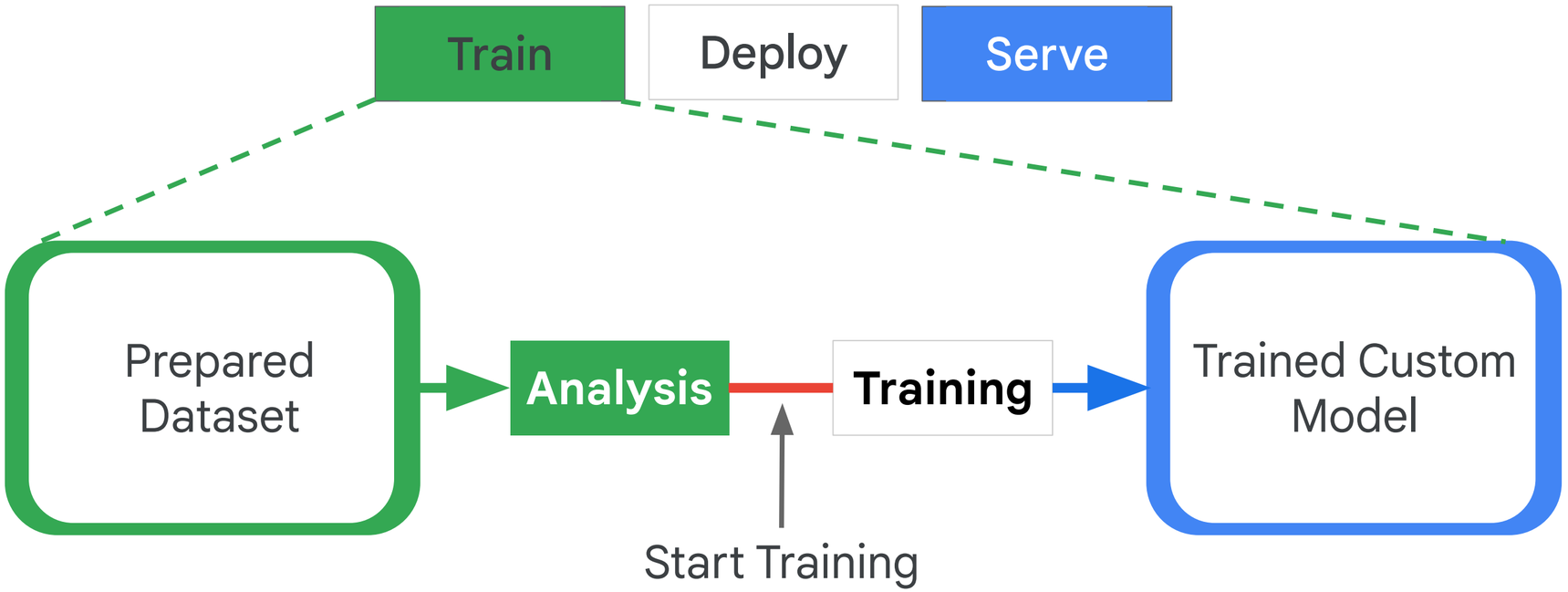
AutoML follows a standard procedure that is divided into train, deploy, and serve phases



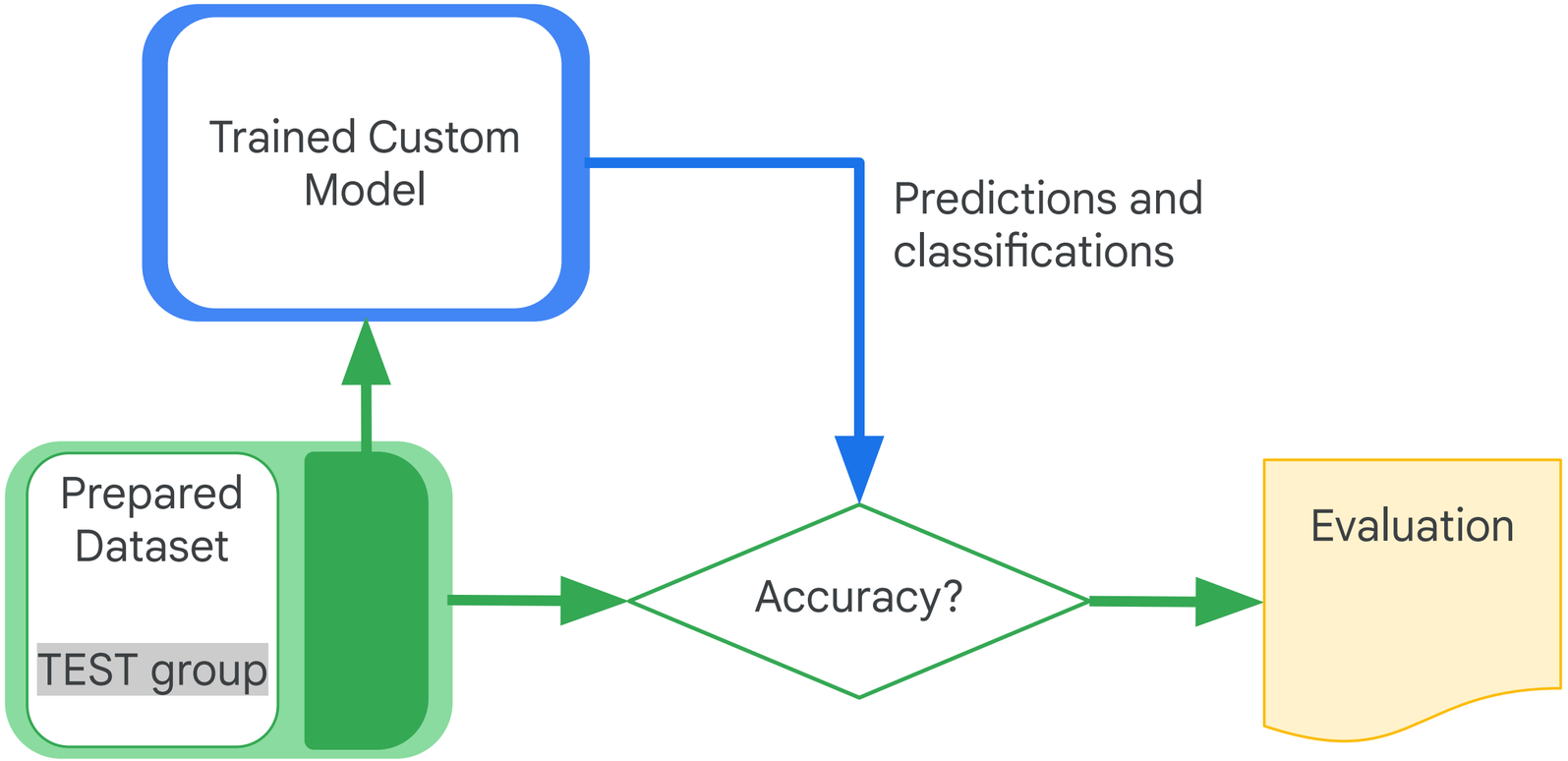
AutoML uses a Prepared Dataset to train a Custom Model



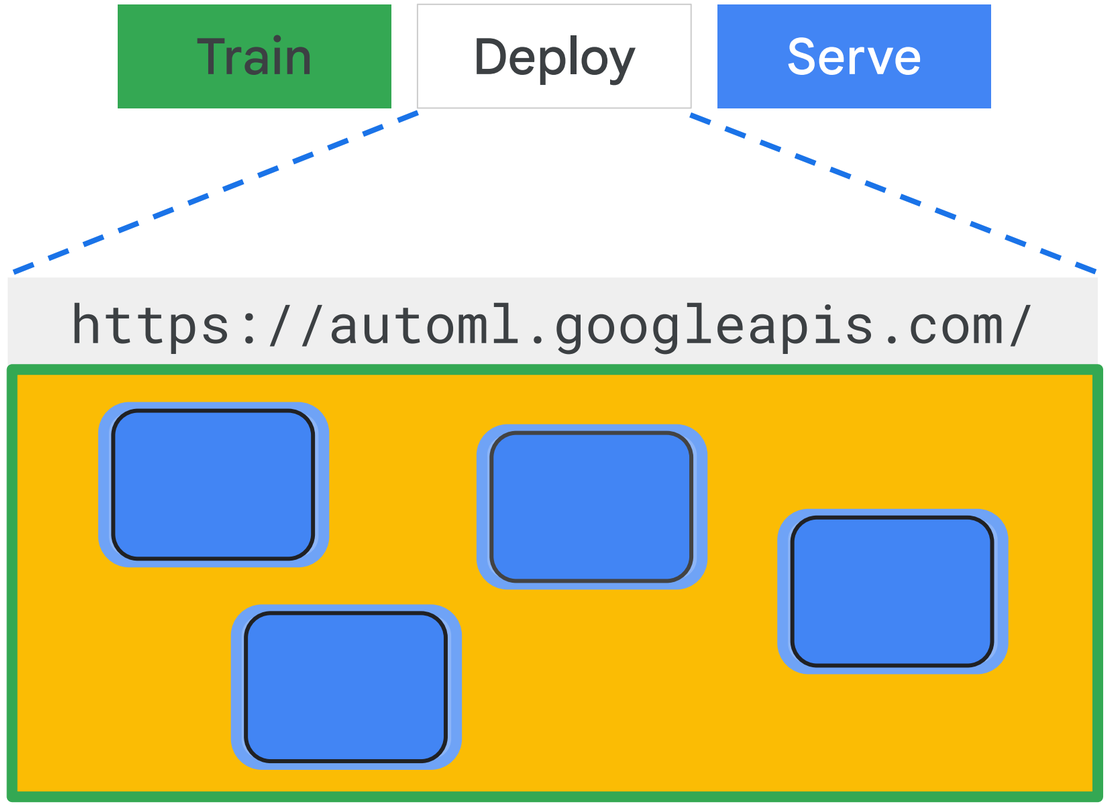
AutoML performs basic checks and a preliminary analysis of the Prepared Dataset to determine if there is enough information and if it is properly organized



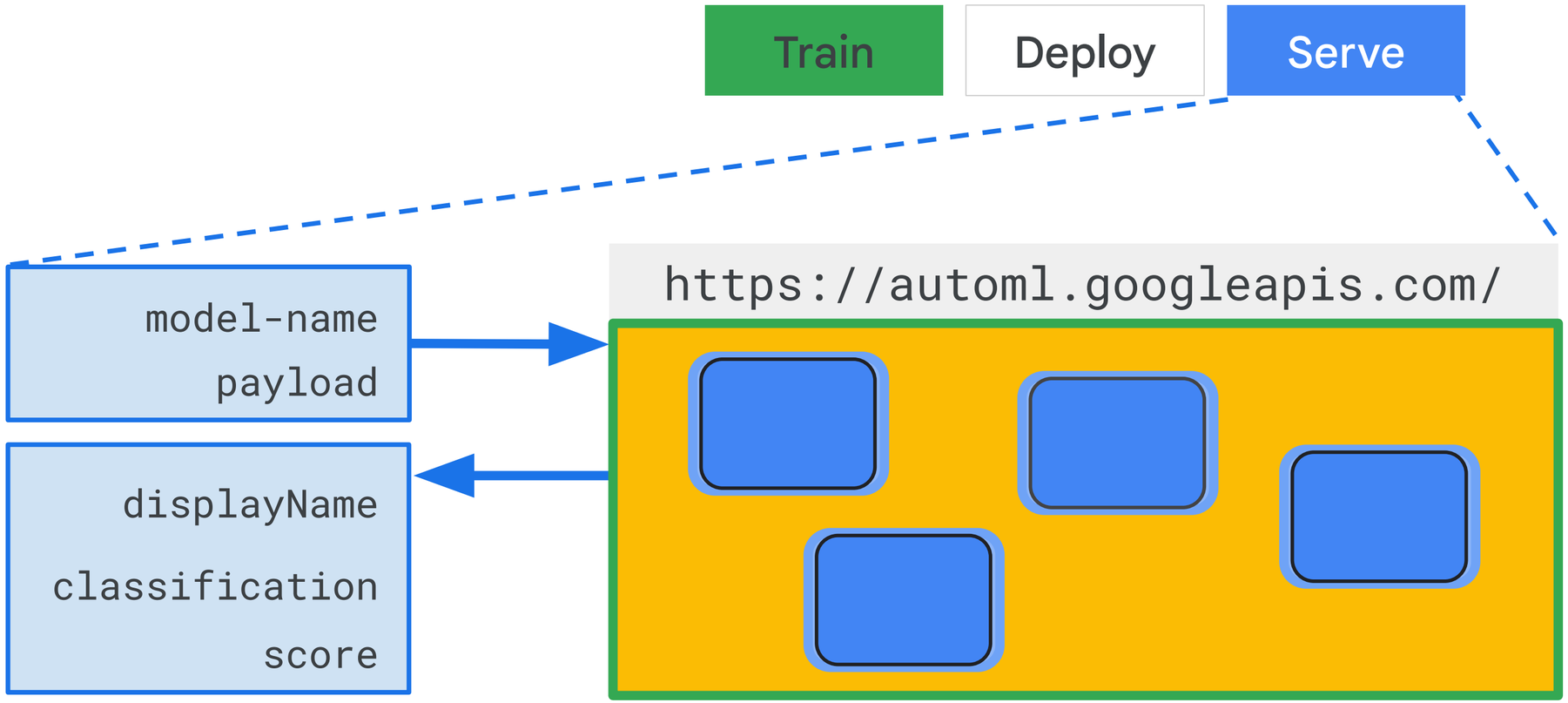
Data from the TEST group is used to evaluate the Custom Model and to remove bias from the evaluation



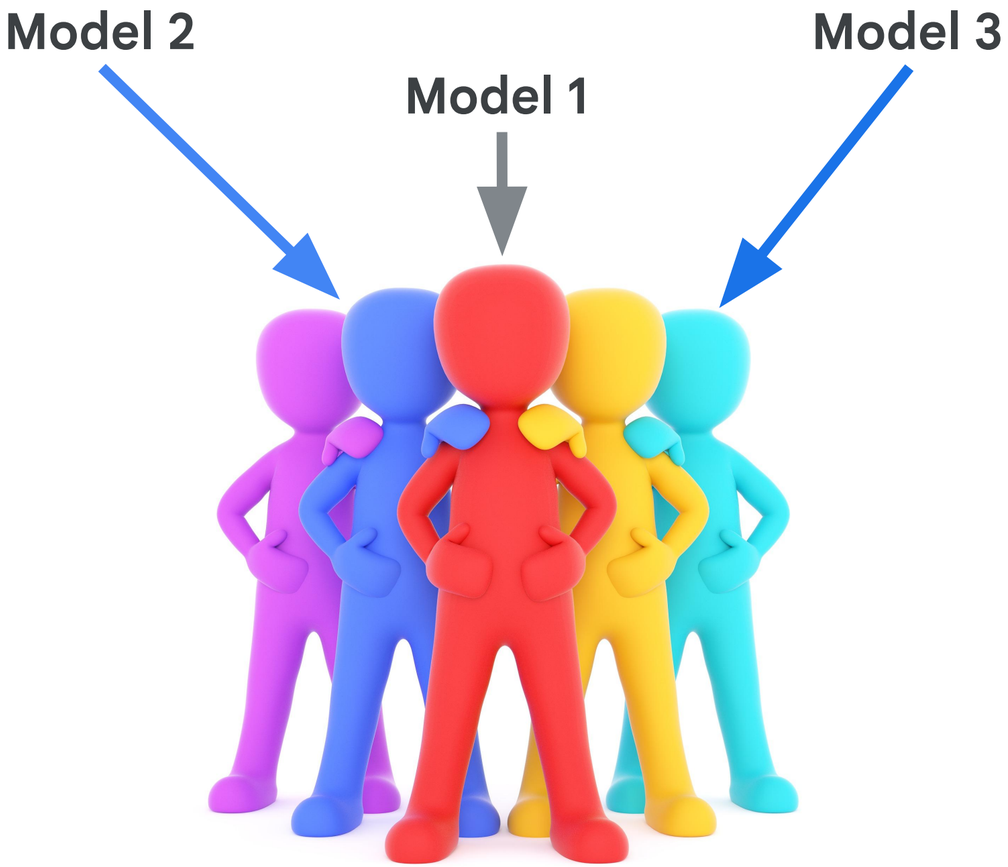
There is nothing you need to do to deploy a trained model

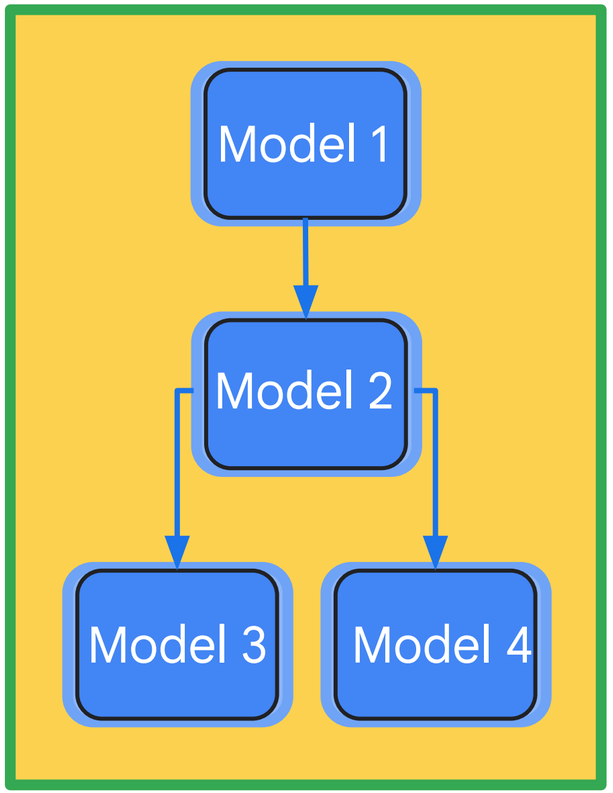


Serve models using the Web UI, or from the command line using CURL to send a JSON-structured request

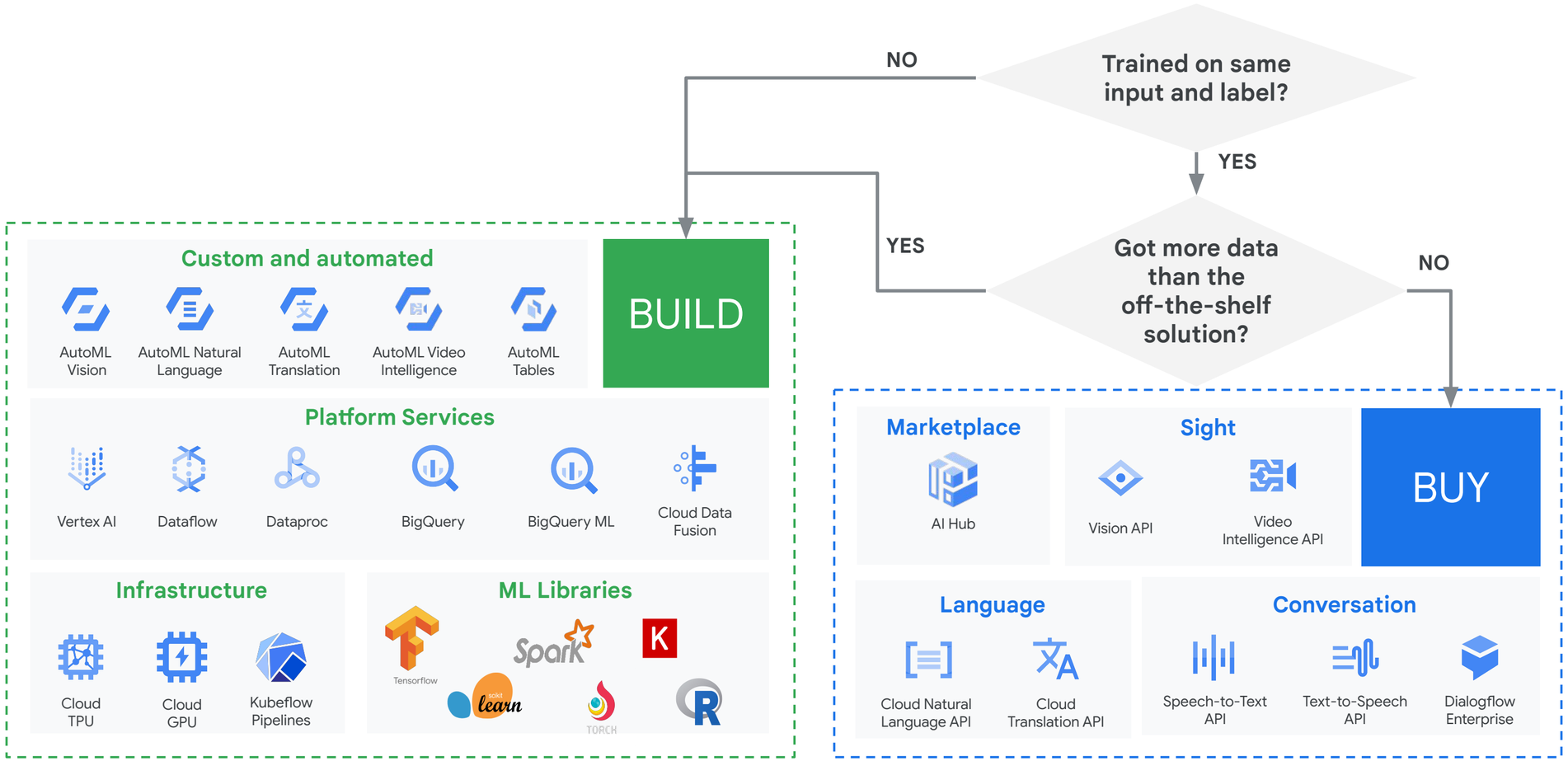


Break up complicated problem into multiple models





As a data engineer should you build or buy a solution?



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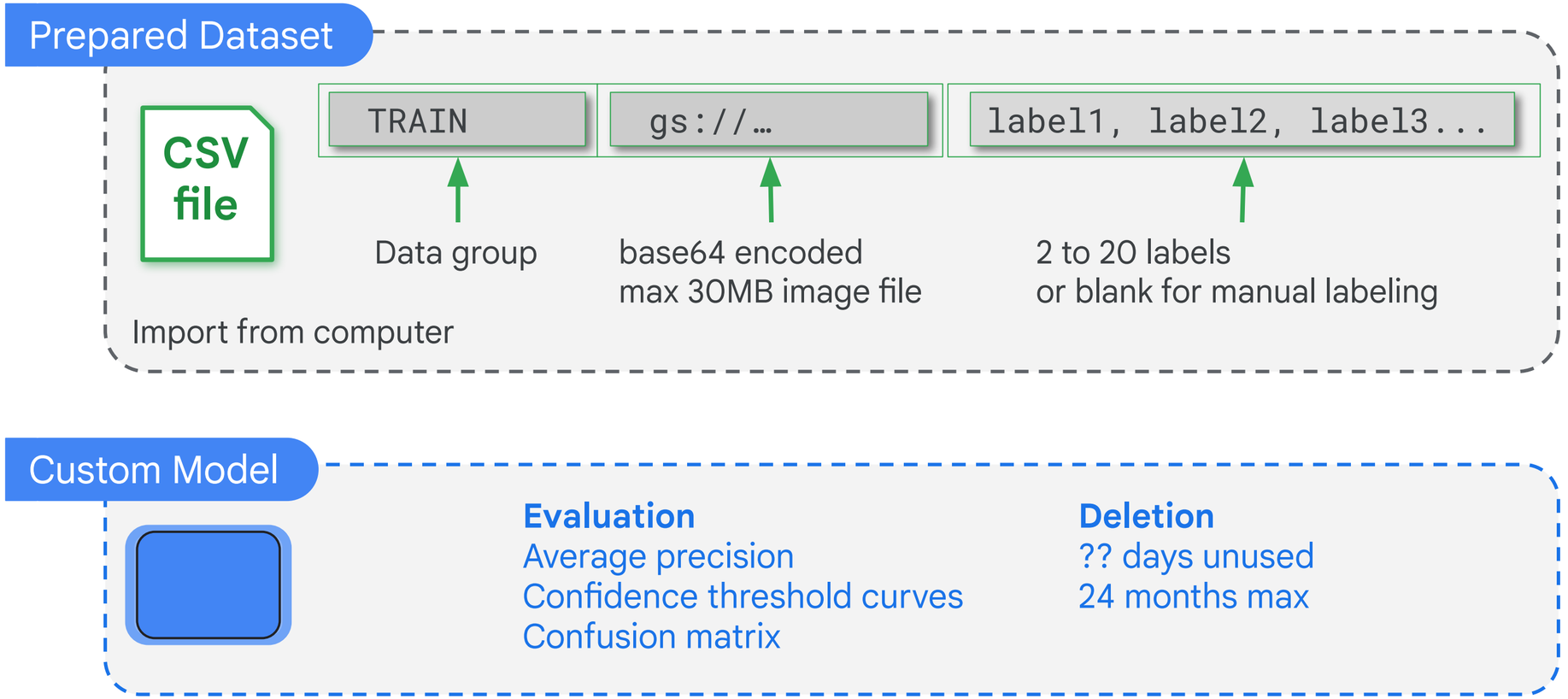
AutoML Vision specializes in training models for image classification



Improving Vision Custom Models

Train on examples similar to those you will classify

Low scores:
Increase data

Perfect scores:
Increase variety

- Verify labels are used consistently
- 100x images for most common labels than the least common labels
- Remove infrequently used labels

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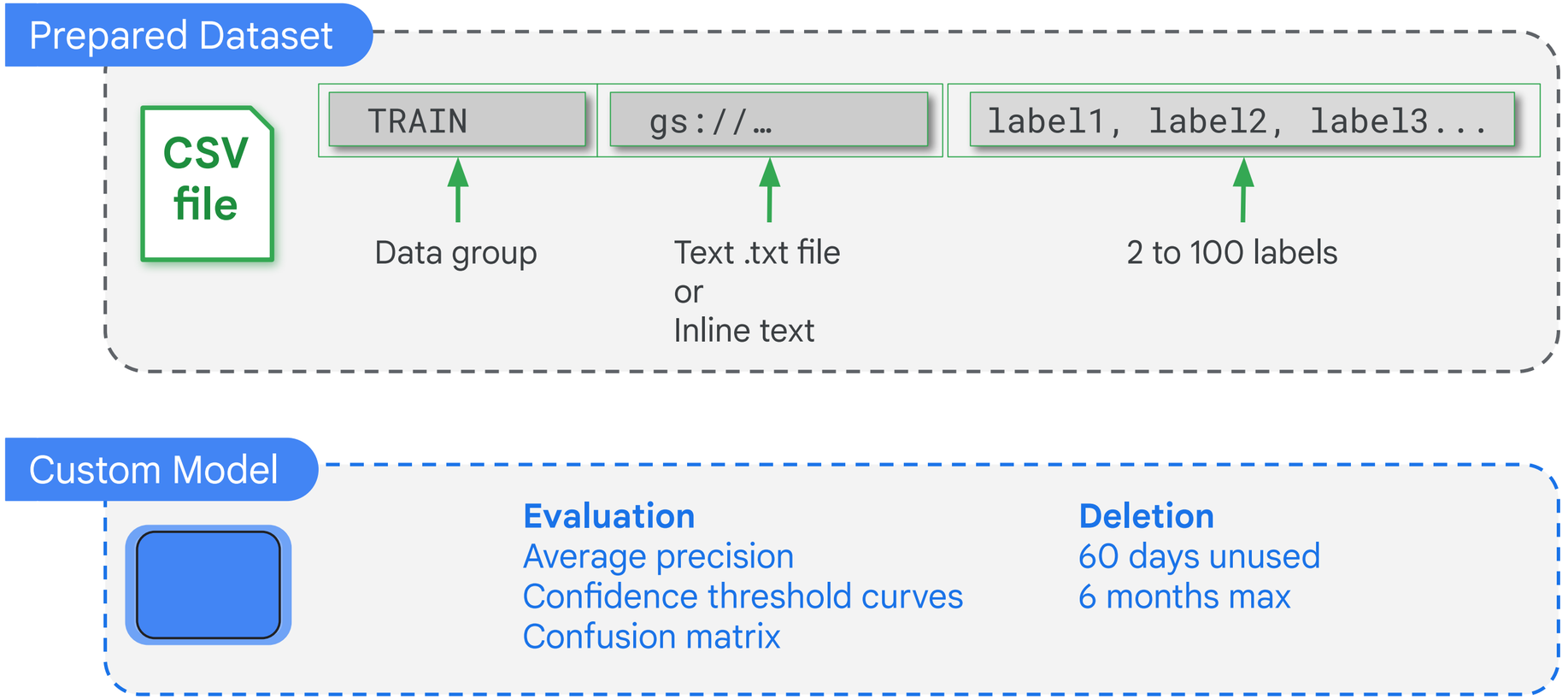
AutoML Natural Language specializes in training models for text



Improving Natural Language custom models

Add more documents

Increase document variety

Reduce the number of labels

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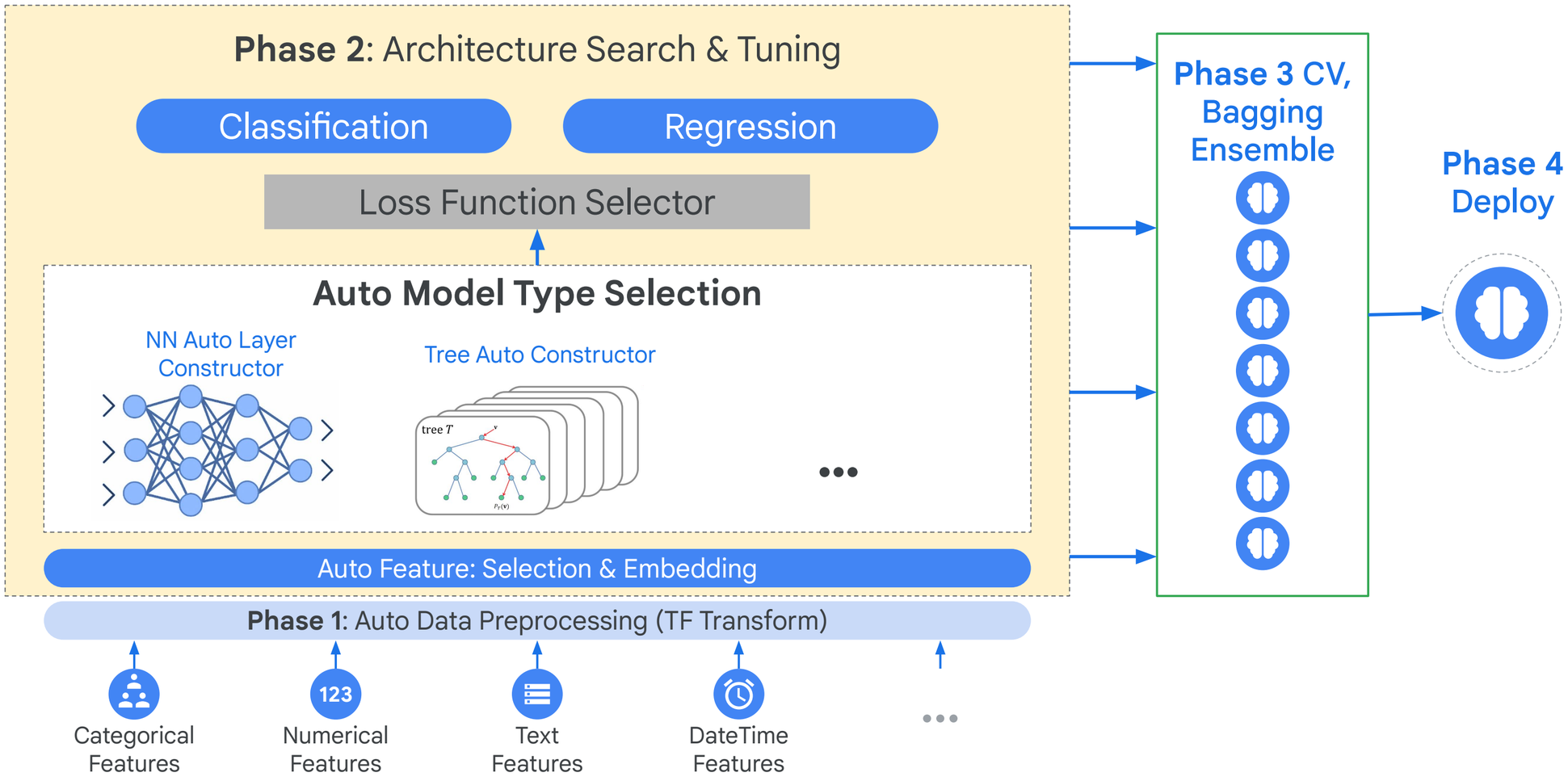
AutoML Table is for structured data



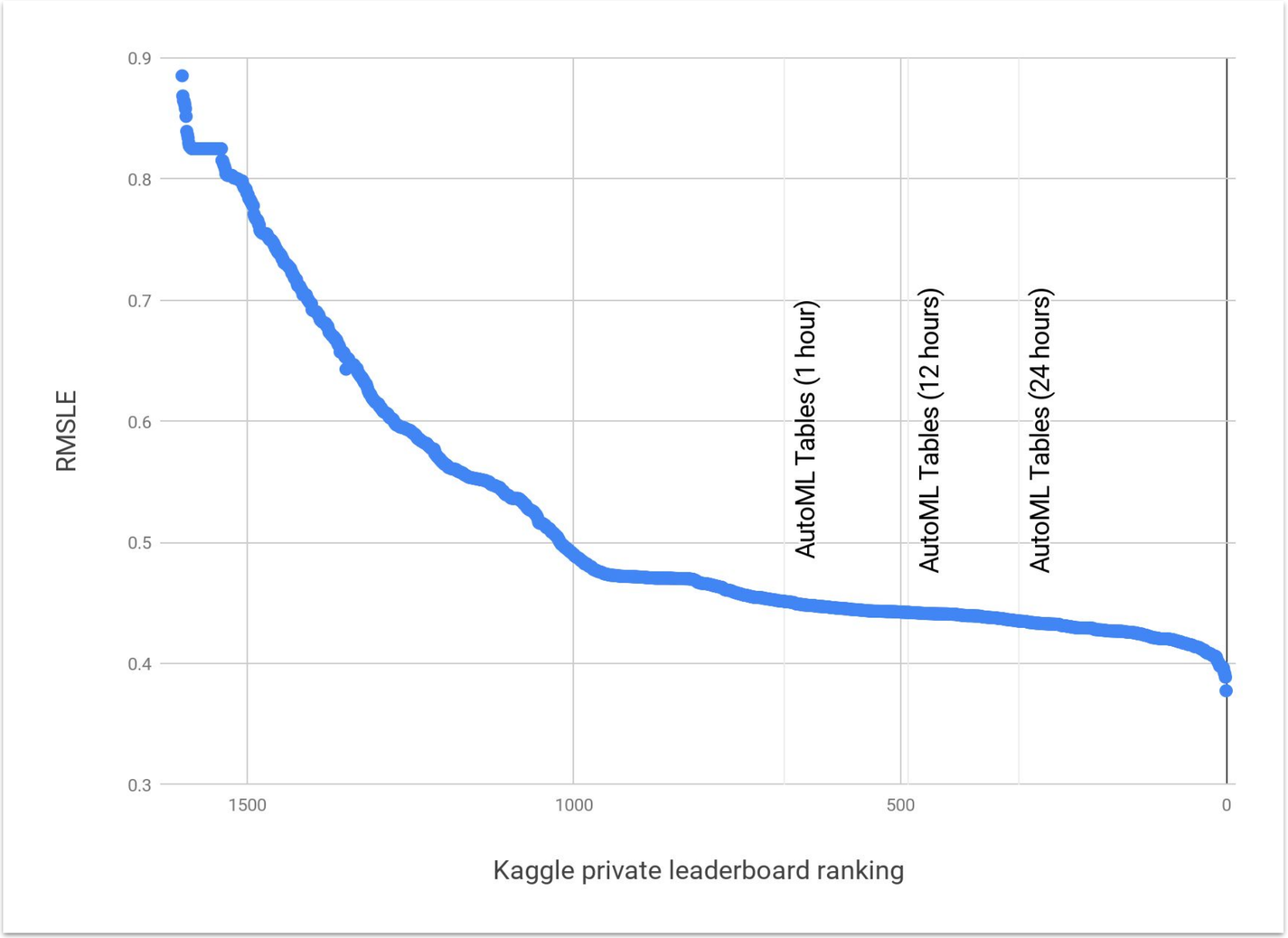
Example: Mercari price suggestion challenge

Goal: Automatically suggest product prices to online sellers

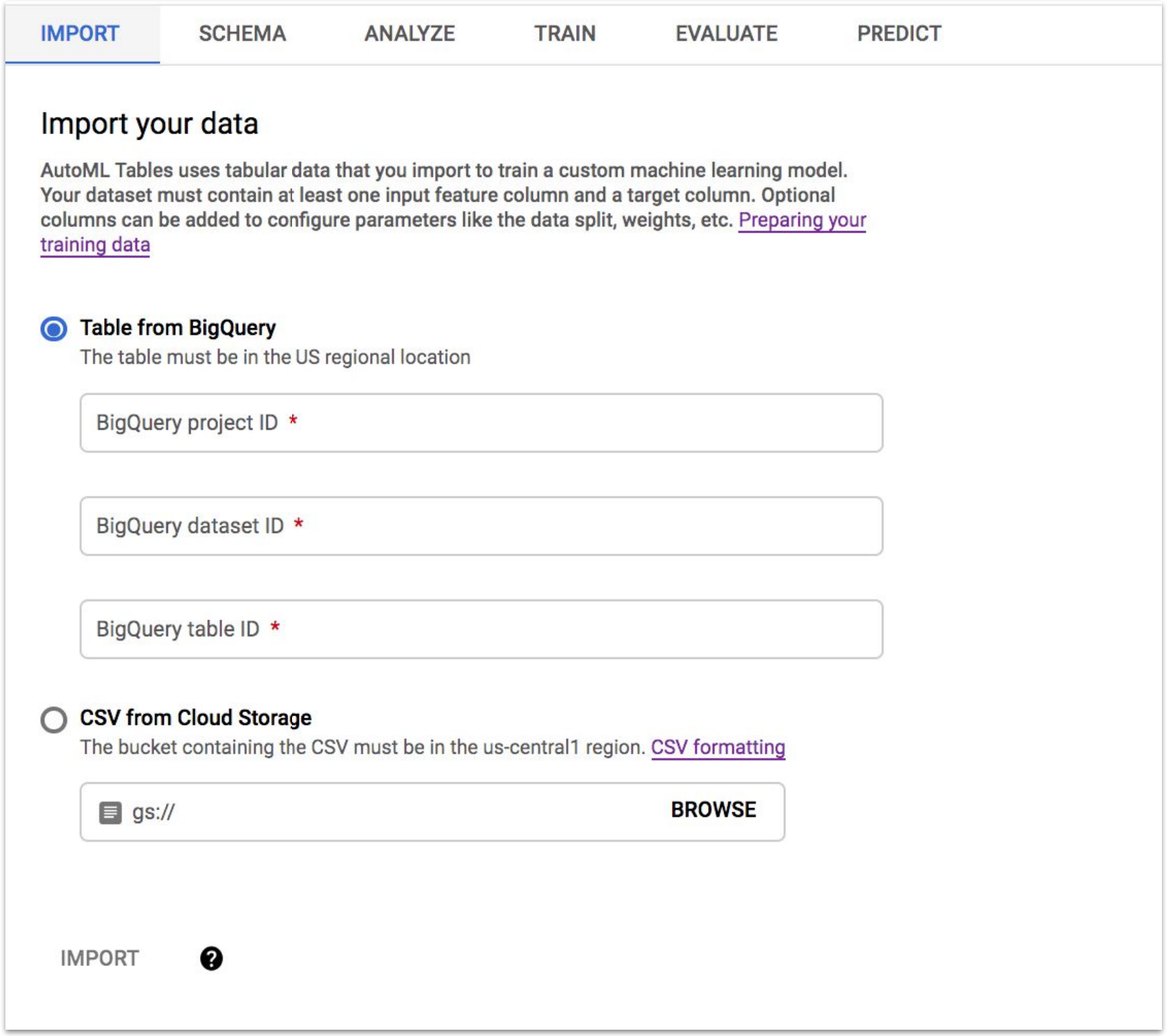
Training data

ID	Name	Item Condition	Categories	Brand name	Shipping	Item description	Price
0	MLB Cincinnati Reds T Shirt Size XL	3	Men, Tops, T-shirts		1	No description yet.	$10
1	Razer BlackWidow Chroma Keyboard	3	Electronics, Computers & Tablets, Components & Parts	Razer	0	This keyboard is in great condition and works like it came out of the box. All of the ports are tested and work perfectly. The lights are customizable via the Razer Synapse app on your PC.	$52
2	AVA-VIV Blouse	1	Women, Tops & Blouses, Blouse	Target	1	Adorable top with a hint of lace and a key hole in the back! The pale pink is a 1X, and I also have a 3X available in white!	$10
3	Leather Horse Statues	1	Home, Home Décor, Home Décor Accents		1	New with tags. Leather horses. Retail for [rm] each. Stand about a foot high. They are being sold as a pair. Any questions please ask. Free shipping. Just got out of storage.	$35

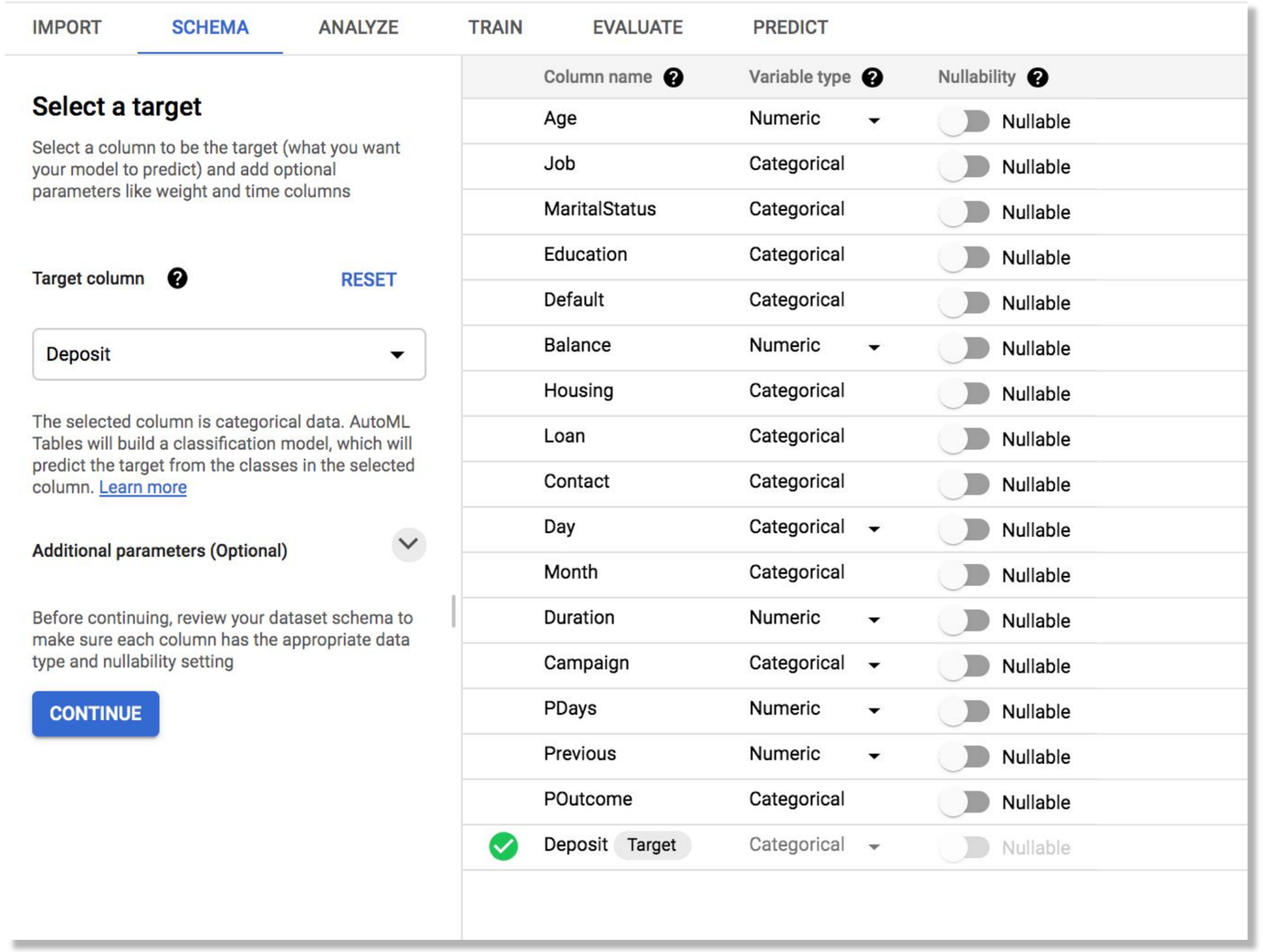
AutoML Tables produced some of the best results on the challenge



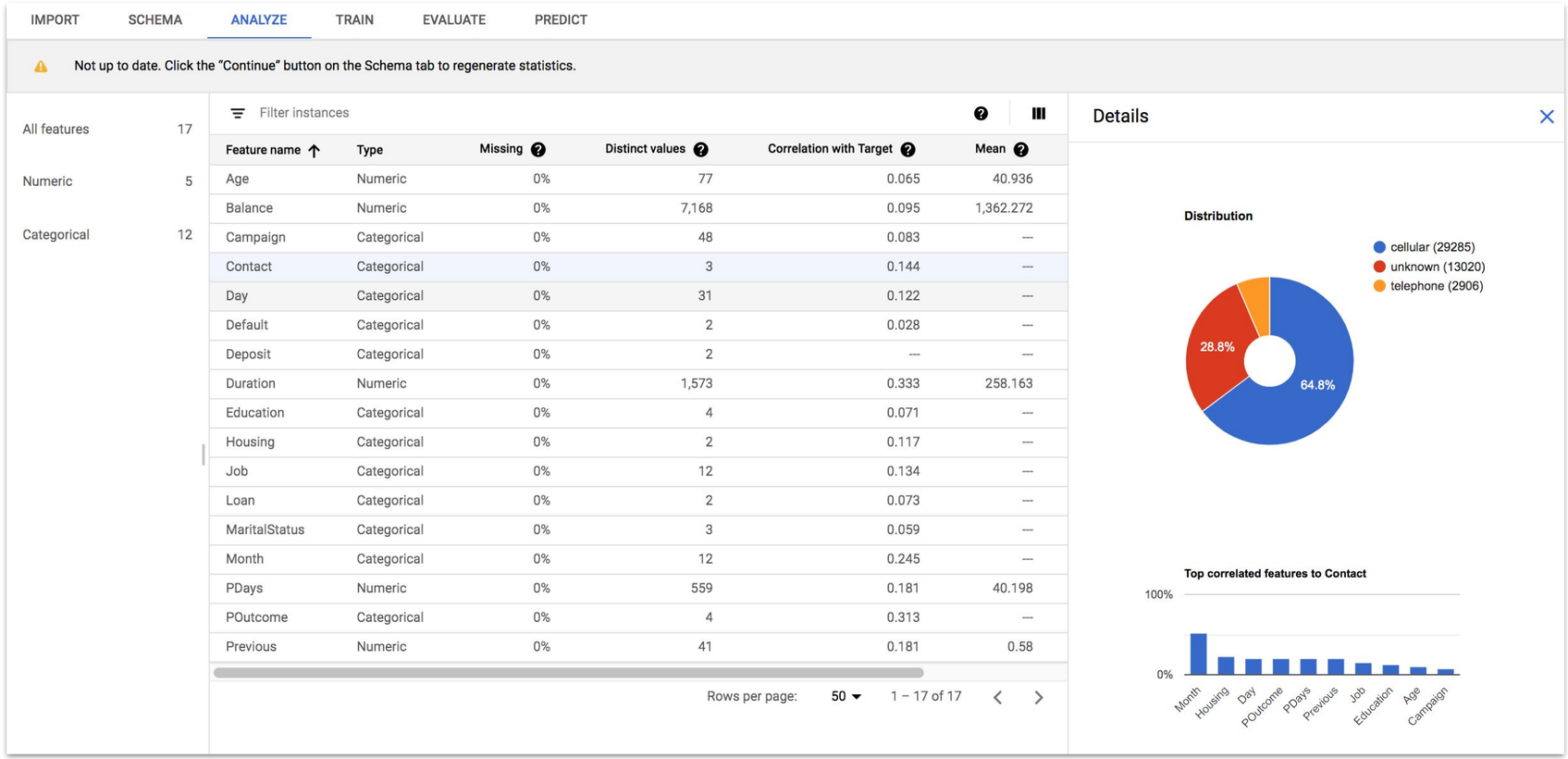
The easiest way to import data into AutoML Tables is through BigQuery



Start by setting the features/label that will be used for training

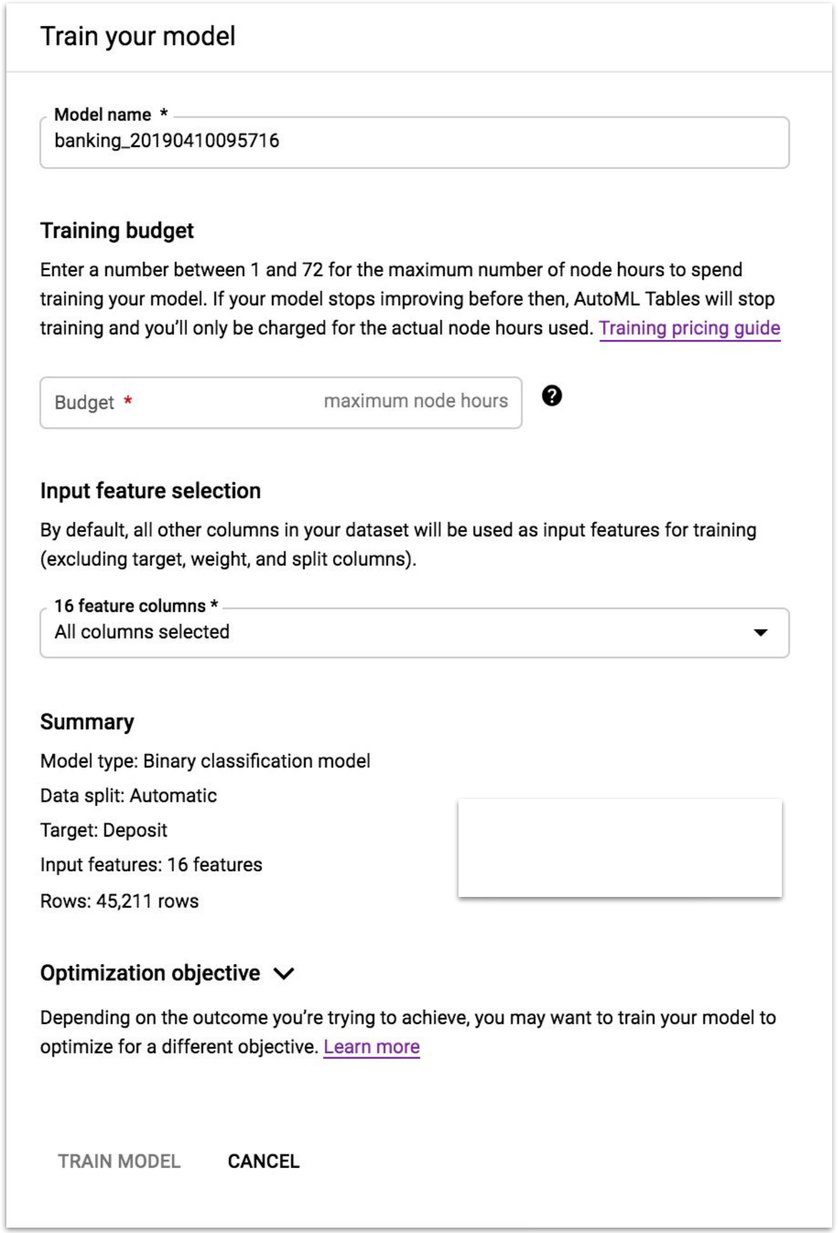


Next, do some data validation to ensure you're not passing junk into your model

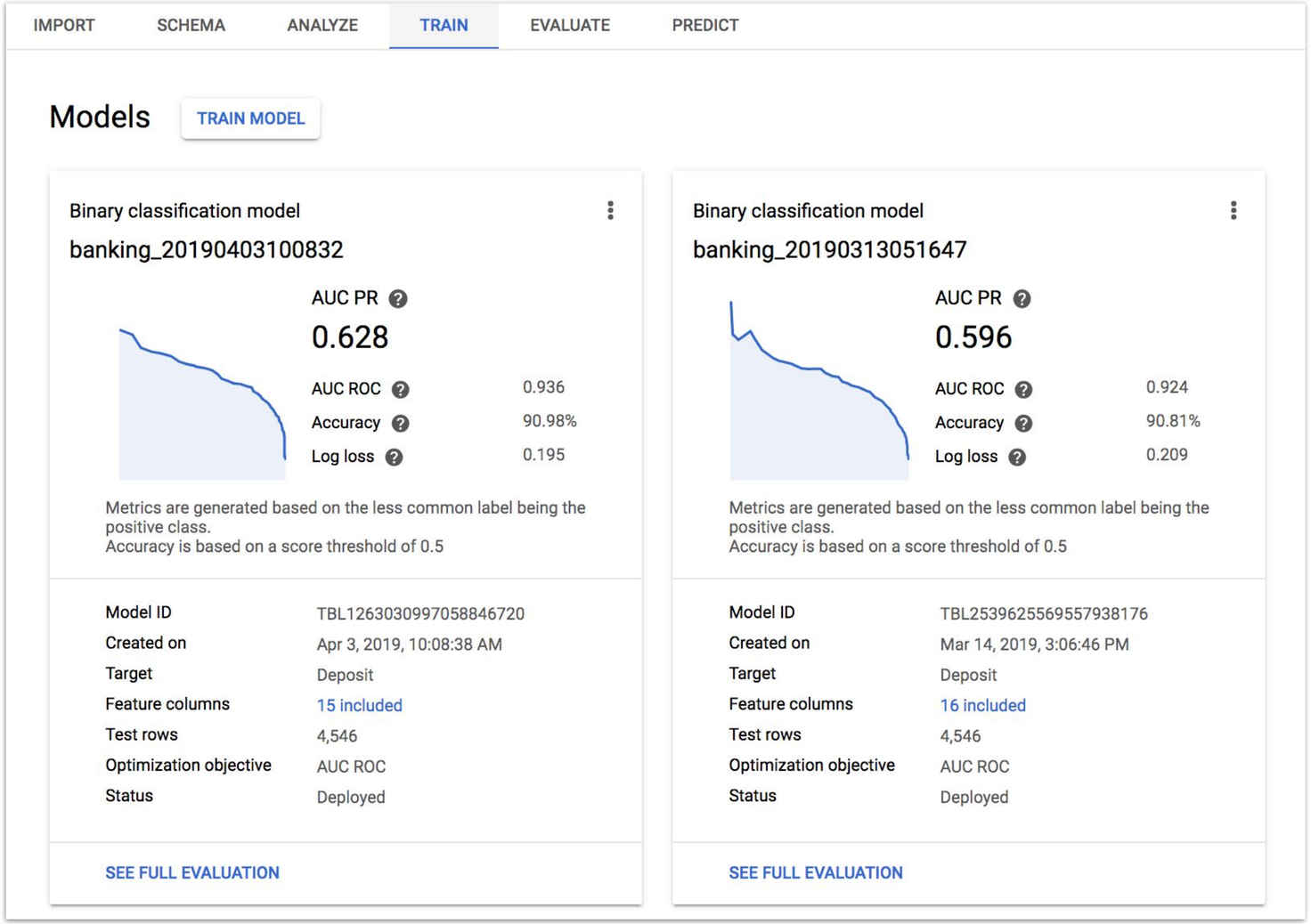


Carry out some experiments in BigQuery ML to set some base metrics for model performance

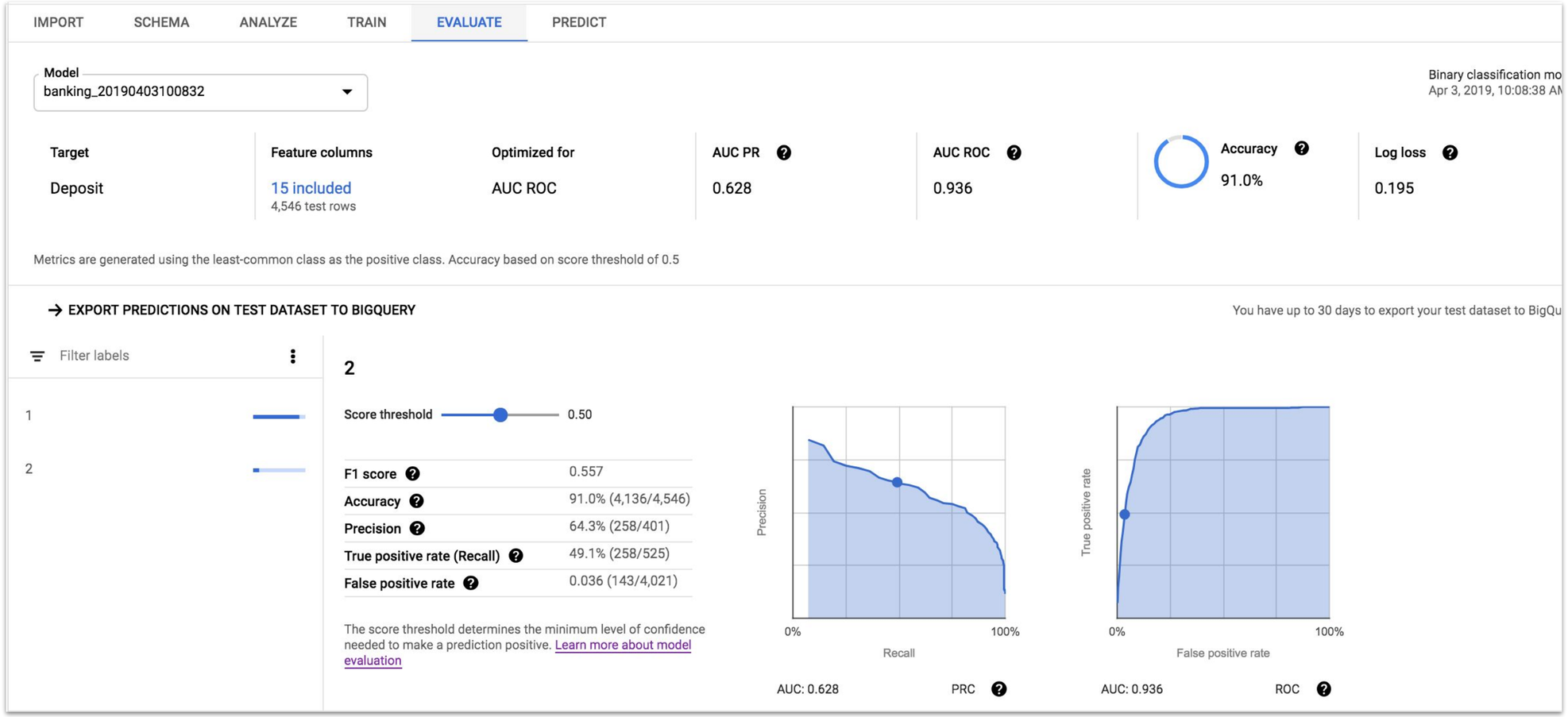
You can allocate a budget when training the model



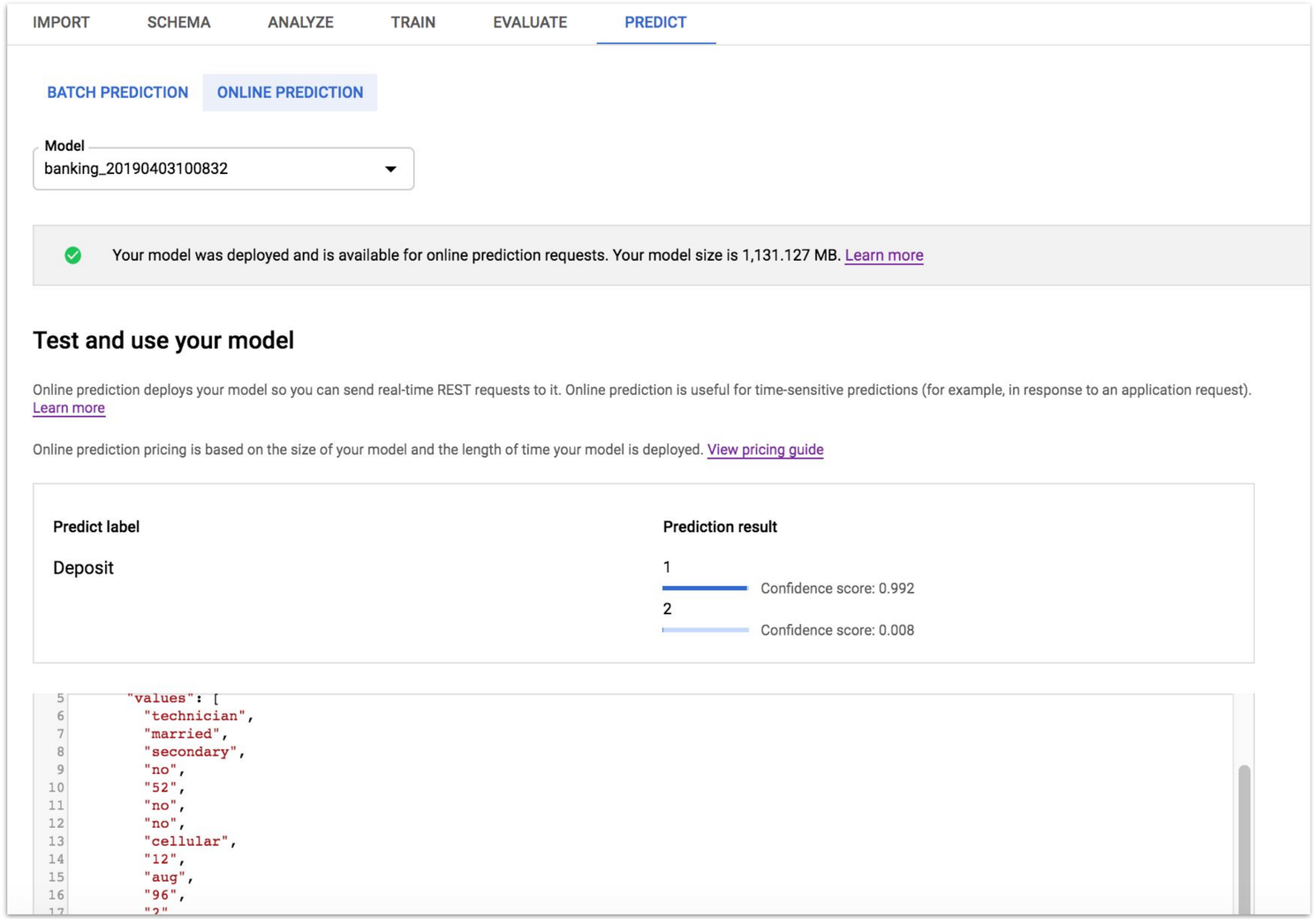
Inspect the training metrics across multiple models



Check how model performs against test data to gauge how well it will generalize in the wild



Integrate your trained model into your applications



How to choose between BigQuery ML, AutoML and a custom model

Model type	BigQuery ML	AutoML	Custom deep learning model
How	SQL in BigQuery for ML on structured data	AutoML uses neural architecture search and best-of-class model architectures for the specific problem	Keras with a TensorFlow backend, trained on Cloud ML Engine
Best if you are a	Data analyst who can wrangle data with SQL	Developer who can create the dataset in the required format	ML Engineer who knows Python and knows deep learning, NLP techniques
How long it takes an experienced practitioner	About an hour	About a day	A week to a month
Most of this time is spent in	Writing SQL	Waiting for job to finish	Coding Python and experimentation with ML
Cloud computing costs	Low	Medium	Medium to high depending on size of data, number of experiments, etc.
Accuracy	Moderate to high, mostly depending on the size of your dataset	High	Low if you don't know what you are doing; extremely high if you employ appropriate architectures and have a large-enough dataset

Summary

- AutoML can be used to create powerful ML models without any coding.
- Use AutoML Vision when you have image data.
- Use AutoML Natural Language when you have text data.
- Use AutoML Tables when you have structured data.