Slides That are used as screenshots in the github/statmike/vertex-ai-mlops repository

Notes:

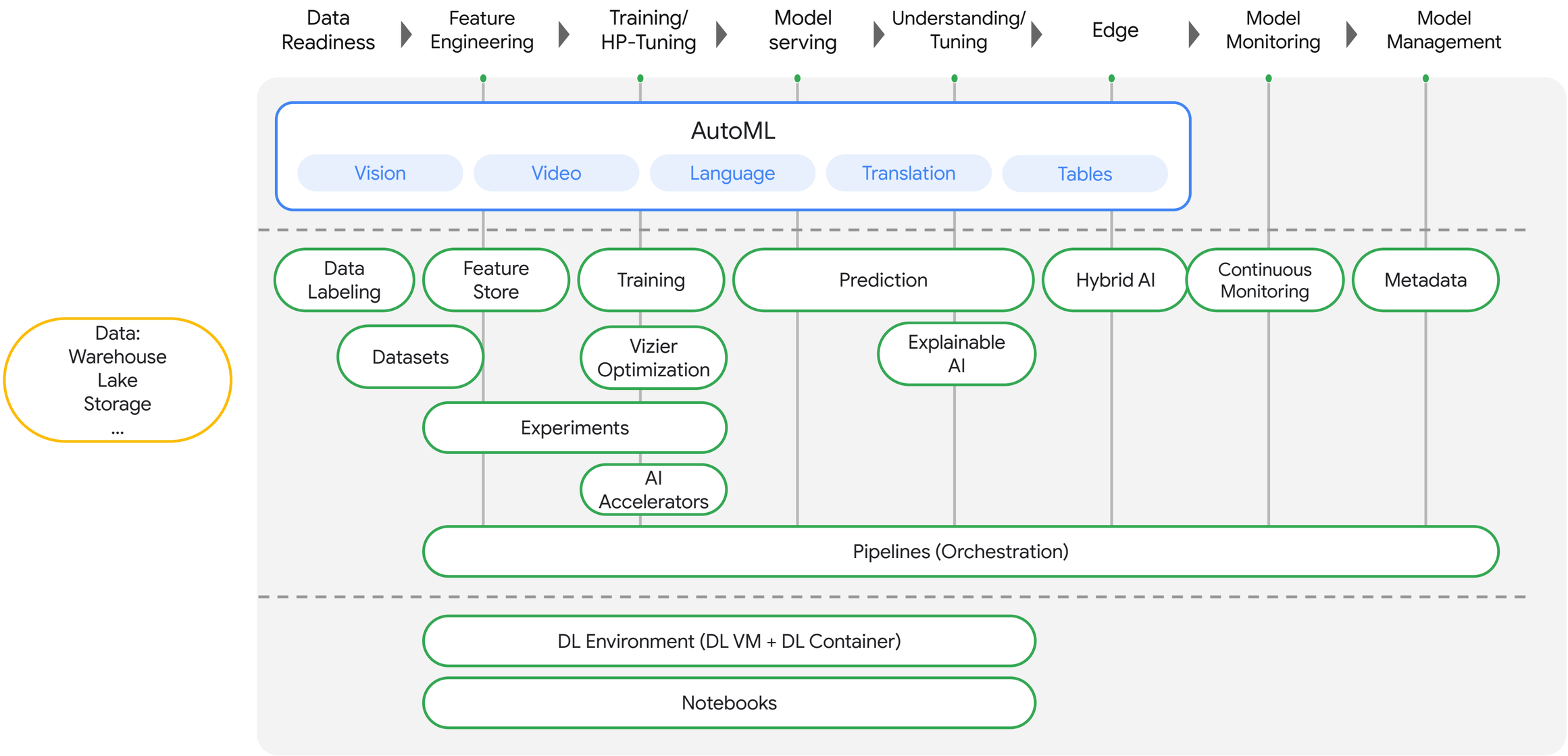
- Do not insert new slides or reorder without updating the notebooks. The slides are exported to numbered .png files that are referenced in the notebooks

Process

- Save as PDF
- Copy to github/statmike/vertex-ai-mlops/architectures/slides
- Convert PDF to PNG images
    - Use Notebook: /architectures/Create Images.ipynb
    - OUTPUT:
        - To /architectures/slides

README

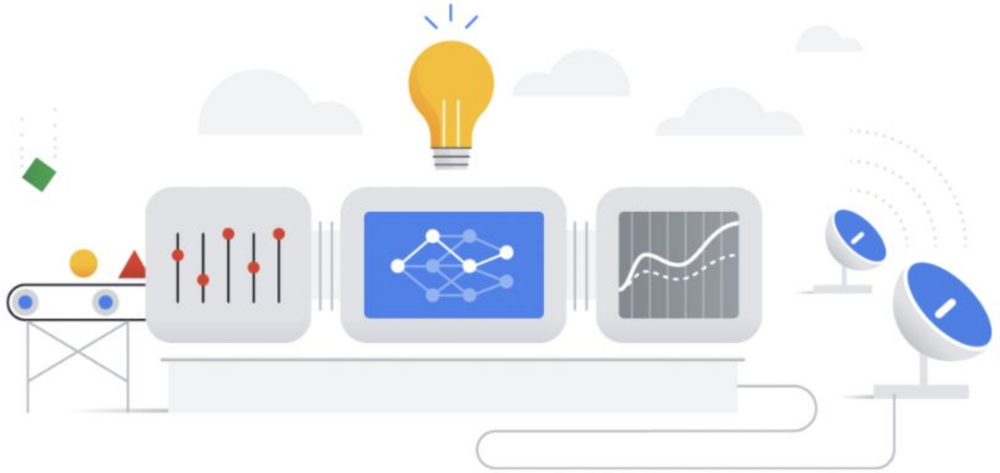
Vertex AI Overview



Dashboard

Get started with Vertex AI

Vertex AI empowers machine learning developers, data scientists, and data engineers to take their projects from ideation to deployment, quickly and cost-effectively. Learn more



Region
us-central1 (Iowa)

Recent datasets

02c_digits_20210919213805	16 hours ago
02b_digits_20210919205707	20 hours ago
02a	4 days ago
02b_digits_20210916141540	4 days ago
02c_digits_20210916004500	5 days ago

+ CREATE DATASET

Recent models

05f_digits_20210920145828	1 hour ago
05e_digits_20210920125450	3 hours ago
02c_digits_20210919213805 Average precision: 1	12 hours ago
02b_digits_20210919205707 Average precision: 1	19 hours ago
05c_digits_20210919214125-model	19 hours ago

+ TRAIN NEW MODEL

Get predictions

After you train a model, you can use it to get predictions, either online as an endpoint or through batch requests

+ CREATE BATCH PREDICTION

Show debug panel

Vertex AI

readme.md

Vertex AI for Machine Learning Operations

👋 I'm Mike

I want to share and enable Vertex AI from Google Cloud with you. The goal here is to share a comprehensive set of end-to-end workflows for machine learning that each cover the range of data to model to serving and managing - even automating the flow. Regardless of your data type, skill level or framework preferences you will find something helpful here.

Considerations

Data Type

- Tables: Tabular, structured data in rows and columns
- Language: Text for translation and/or understanding
- Vision: Images
- Video

Convenience Level

- Use Pre-Trained APIs
- Automate building Custom Models
- End-to-end Custom ML with core tools in the framework of your choice

Framework Preferences

- Scikit-learn
- XGBoost
- Tensorflow
- Pytorch
- More!

Overview

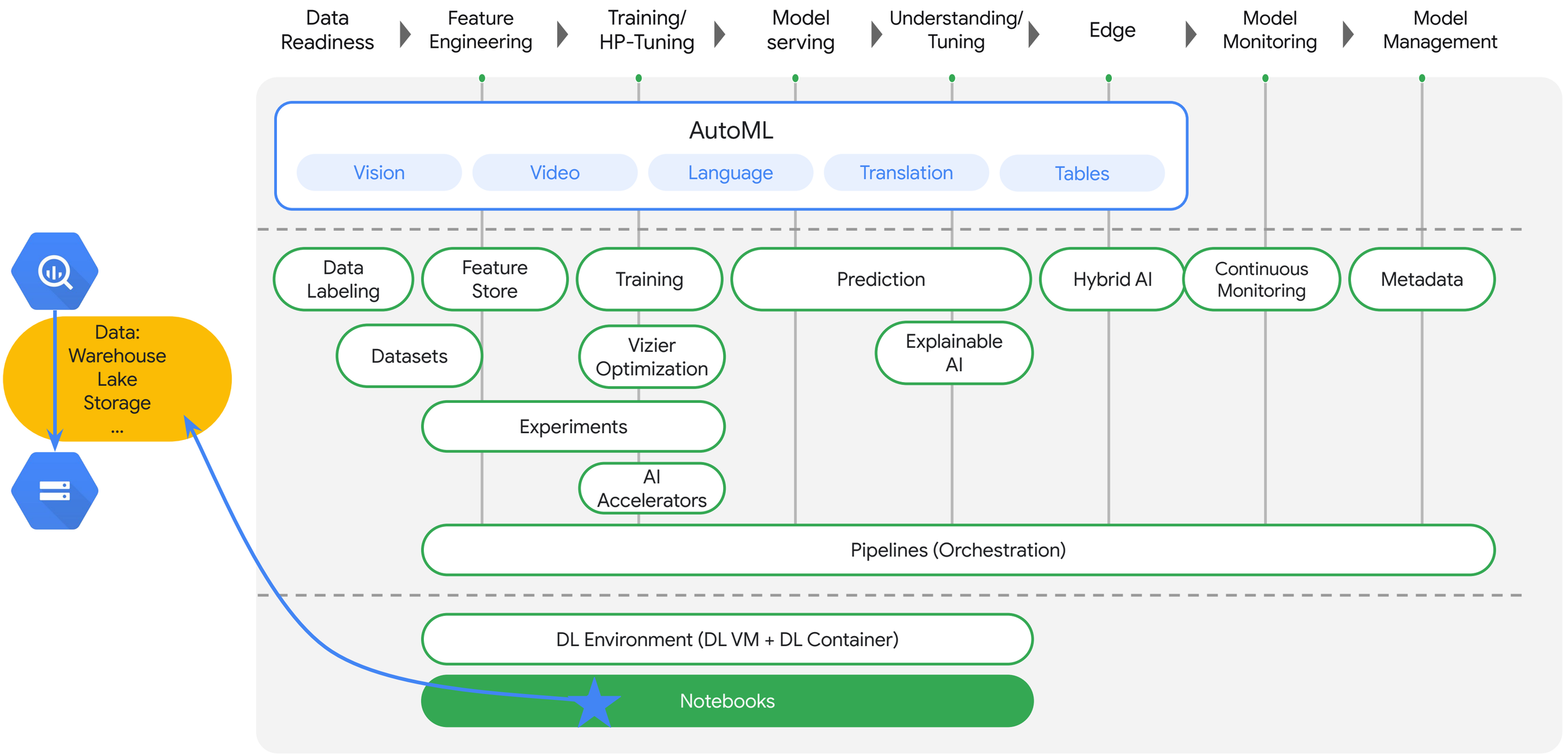
This is a series of workflow demonstrations that use the same data source to build and deploy the same machine

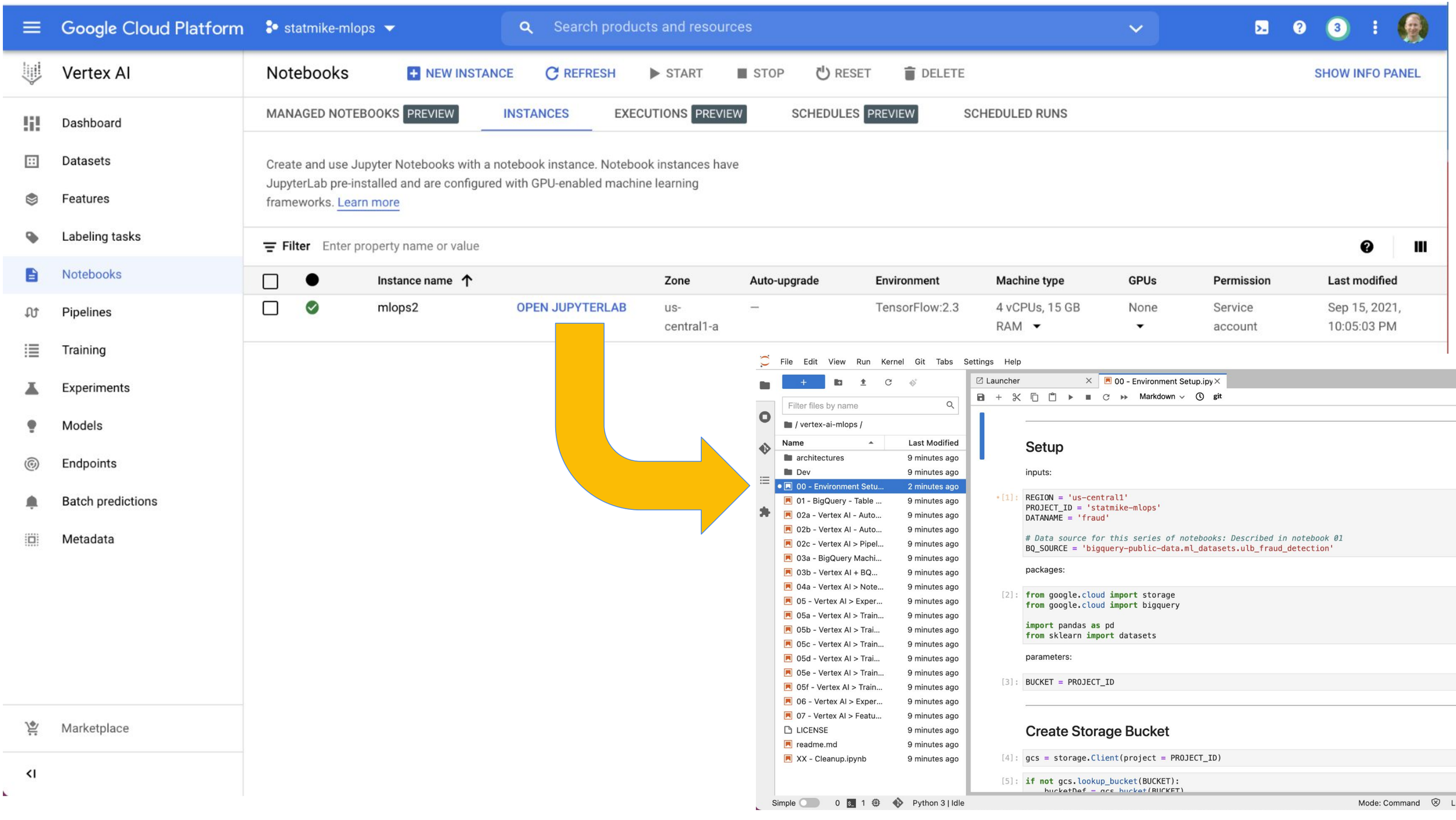
Introduction

00

Notebook: 00

Vertex AI Overview




Google Cloud Platform
statmike-mlops
Search products and resources
Vertex AI
Notebooks
NEW INSTANCE
REFRESH
START
STOP
RESET
DELETE
SHOW INFO PANEL
Dashboard
Datasets
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MANAGED NOTEBOOKS PREVIEW
INSTANCES
EXECUTIONS PREVIEW
SCHEDULES PREVIEW
SCHEDULED RUNS
Create and use Jupyter Notebooks with a notebook instance. Notebook instances have JupyterLab pre-installed and are configured with GPU-enabled machine learning frameworks. Learn more
Filter
Enter property name or value
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Auto-upgrade
Environment
Machine type
GPUs
Permission
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us-central1-a
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4 vCPUs, 15 GB RAM
None
Service account
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Launcher
00 - Environment Setup.ipy
Markdown
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architectures 9 minutes ago
Dev 9 minutes ago
00 - Environment Setu... 2 minutes ago
01 - BigQuery - Table ... 9 minutes ago
02a - Vertex AI - Auto... 9 minutes ago
02b - Vertex AI - Auto... 9 minutes ago
02c - Vertex AI > Pipel... 9 minutes ago
03a - BigQuery Machi... 9 minutes ago
03b - Vertex AI + BQ... 9 minutes ago
04a - Vertex AI > Note... 9 minutes ago
05 - Vertex AI > Exper... 9 minutes ago
05a - Vertex AI > Train... 9 minutes ago
05b - Vertex AI > Trai... 9 minutes ago
05c - Vertex AI > Train... 9 minutes ago
05d - Vertex AI > Trai... 9 minutes ago
05e - Vertex AI > Train... 9 minutes ago
05f - Vertex AI > Train... 9 minutes ago
06 - Vertex AI > Exper... 9 minutes ago
07 - Vertex AI > Featu... 9 minutes ago
LICENSE 9 minutes ago
readme.md 9 minutes ago
XX - Cleanup.ipynb 9 minutes ago
Setup
inputs:
[1]:
REGION = 'us-central1'
PROJECT_ID = 'statmike-mlops'
DATANAME = 'fraud'
# Data source for this series of notebooks: Described in notebook 01
BQ_SOURCE = 'bigquery-public-data.ml_datasets.ulb_fraud_detection'
packages:
[2]:
from google.cloud import storage
from google.cloud import bigquery
import pandas as pd
from sklearn import datasets
parameters:
[3]:
BUCKET = PROJECT_ID
Create Storage Bucket
[4]:
gcs = storage.Client(project = PROJECT_ID)
[5]:
if not gcs.lookup_bucket(BUCKET):
Simple
Python 3 | Idle
Mode: Command

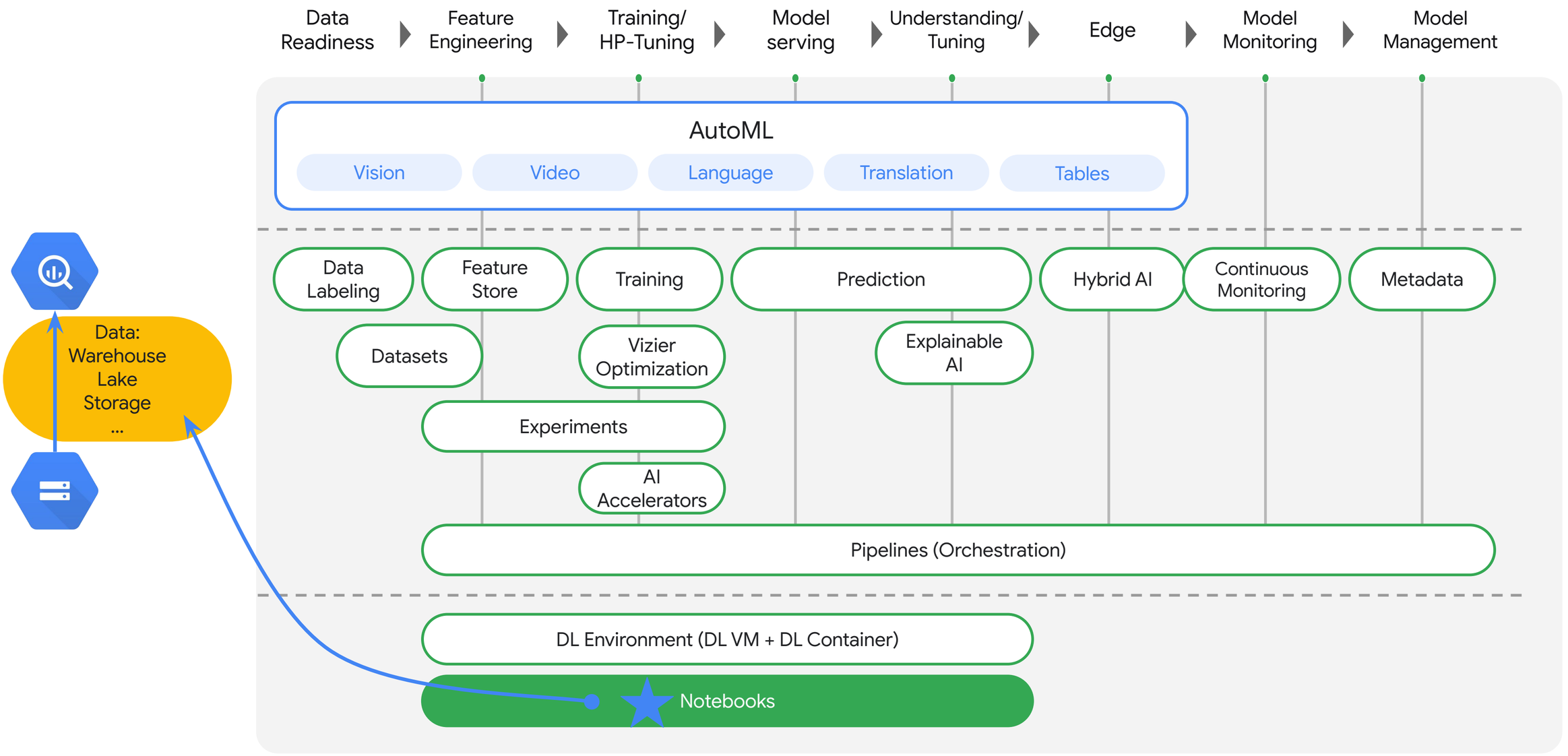
Vertex AI

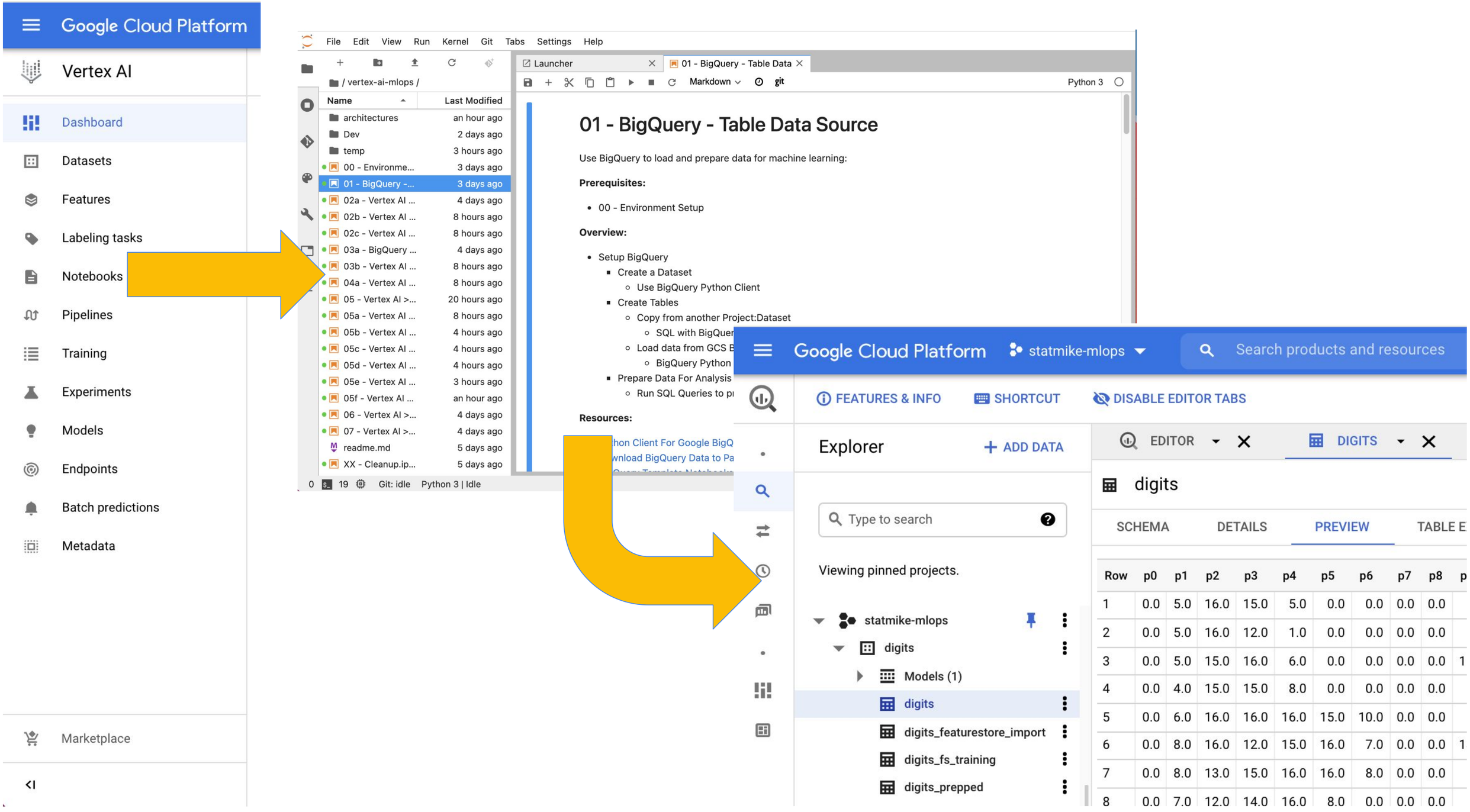
Environment Setup

01

Notebook: 01

Vertex AI Overview




Google Cloud Platform
Vertex AI
Dashboard
Datasets
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Pipelines
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Metadata
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03b - Vertex AI ... 8 hours ago
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readme.md 5 days ago
XX - Cleanup.ip... 5 days ago
0 19 Git: idle Python 3 | Idle
Launcher
01 - BigQuery - Table Data
Markdown
git
Python 3
01 - BigQuery - Table Data Source
Use BigQuery to load and prepare data for machine learning:
Prerequisites:
00 - Environment Setup
Overview:
Setup BigQuery
Create a Dataset
Use BigQuery Python Client
Create Tables
Copy from another Project:Dataset
Load data from GCS
BigQuery Python
Prepare Data For Analysis
Run SQL Queries to
Resources:
Google Cloud Platform
statmike-mlops
Search products and resources
FEATURES & INFO
SHORTCUT
DISABLE EDITOR TABS
Explorer
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statmike-mlops
digits
Models (1)
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DIGITS
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DETAILS
PREVIEW
TABLE E
Row p0 p1 p2 p3 p4 p5 p6 p7 p8 p
1 0.0 5.0 16.0 15.0 5.0 0.0 0.0 0.0 0.0
2 0.0 5.0 16.0 12.0 1.0 0.0 0.0 0.0 0.0
3 0.0 5.0 15.0 16.0 6.0 0.0 0.0 0.0 0.0 1
4 0.0 4.0 15.0 15.0 8.0 0.0 0.0 0.0 0.0
5 0.0 6.0 16.0 16.0 16.0 15.0 10.0 0.0 0.0
6 0.0 8.0 16.0 12.0 15.0 16.0 7.0 0.0 0.0 1
7 0.0 8.0 13.0 15.0 16.0 16.0 8.0 0.0 0.0
8 0.0 7.0 12.0 14.0 16.0 8.0 0.0 0.0 0.0

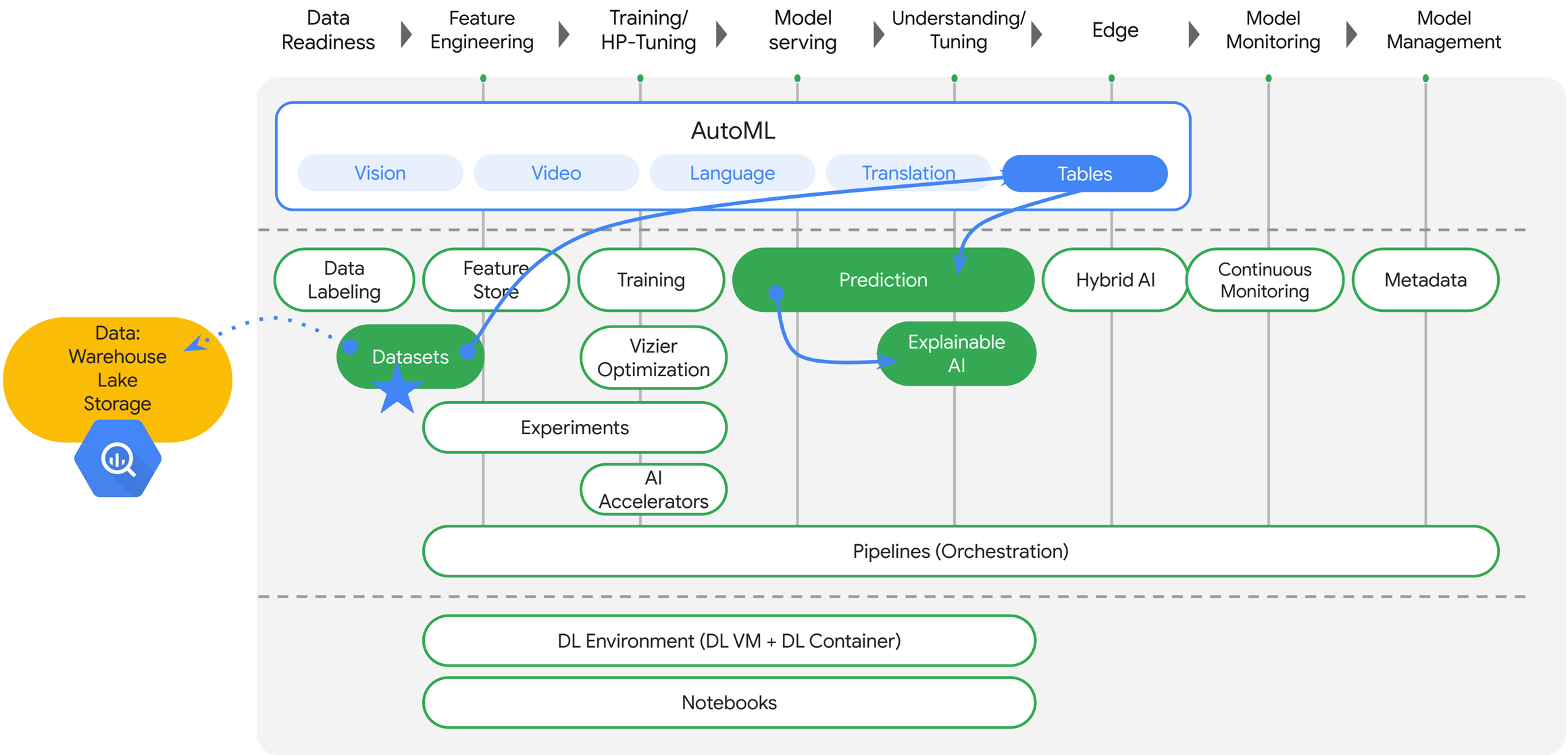
Vertex AI

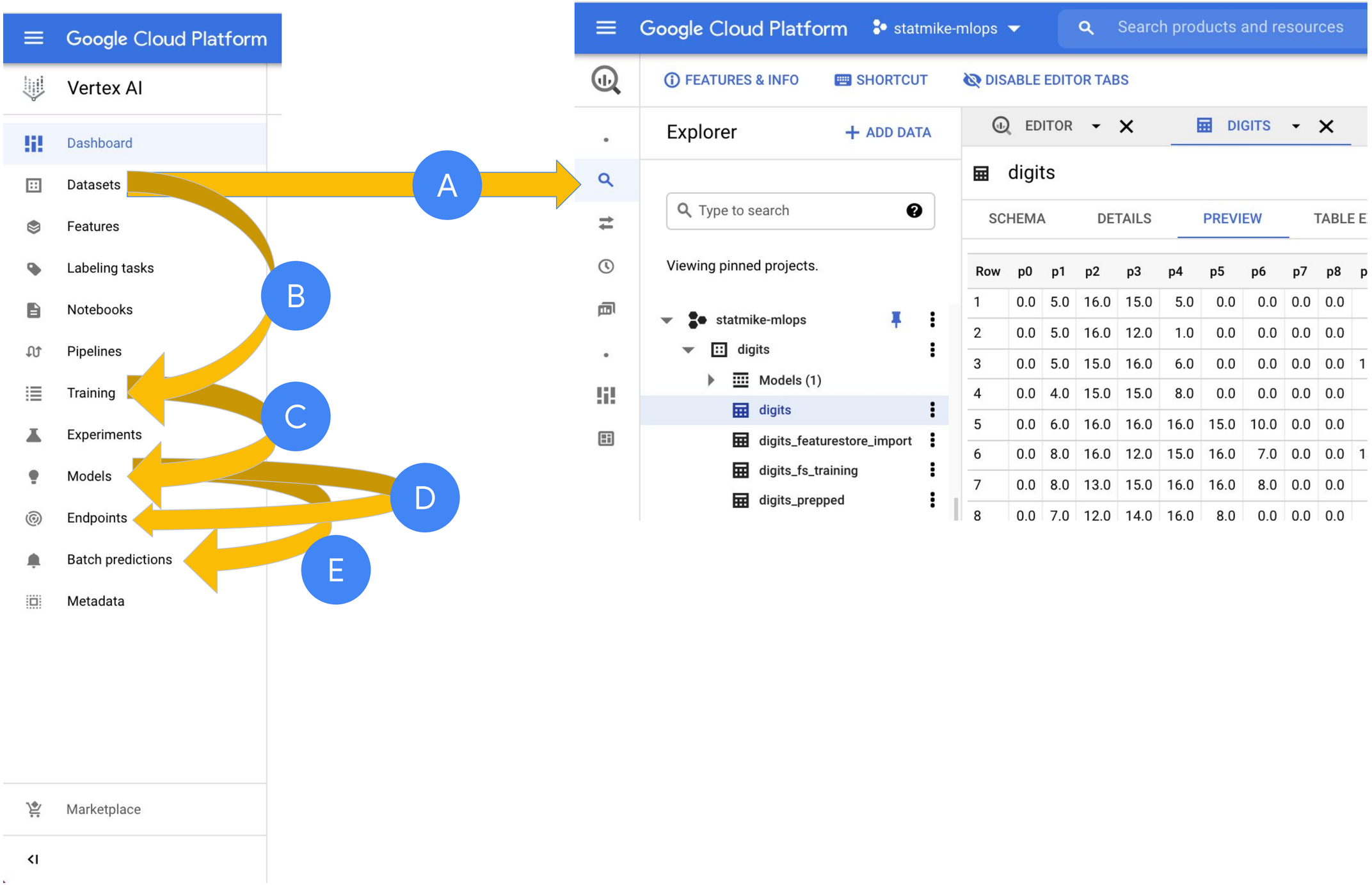
Data Source

02a

Notebook: 02a

Vertex AI Overview




Google Cloud Platform
Vertex AI
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A
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DISABLE EDITOR TABS
Explorer
ADD DATA
Type to search
Viewing pinned projects.
statmike-mlops
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Models (1)
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digits_featurestore_import
digits_fs_training
digits_prepped
EDITOR
DIGITS
digits
SCHEMA
DETAILS
PREVIEW
TABLE E
Row p0 p1 p2 p3 p4 p5 p6 p7 p8 p
1 0.0 5.0 16.0 15.0 5.0 0.0 0.0 0.0 0.0
2 0.0 5.0 16.0 12.0 1.0 0.0 0.0 0.0 0.0
3 0.0 5.0 15.0 16.0 6.0 0.0 0.0 0.0 0.0 1
4 0.0 4.0 15.0 15.0 8.0 0.0 0.0 0.0 0.0
5 0.0 6.0 16.0 16.0 16.0 15.0 10.0 0.0 0.0
6 0.0 8.0 16.0 12.0 15.0 16.0 7.0 0.0 0.0 1
7 0.0 8.0 13.0 15.0 16.0 16.0 8.0 0.0 0.0
8 0.0 7.0 12.0 14.0 16.0 8.0 0.0 0.0 0.0

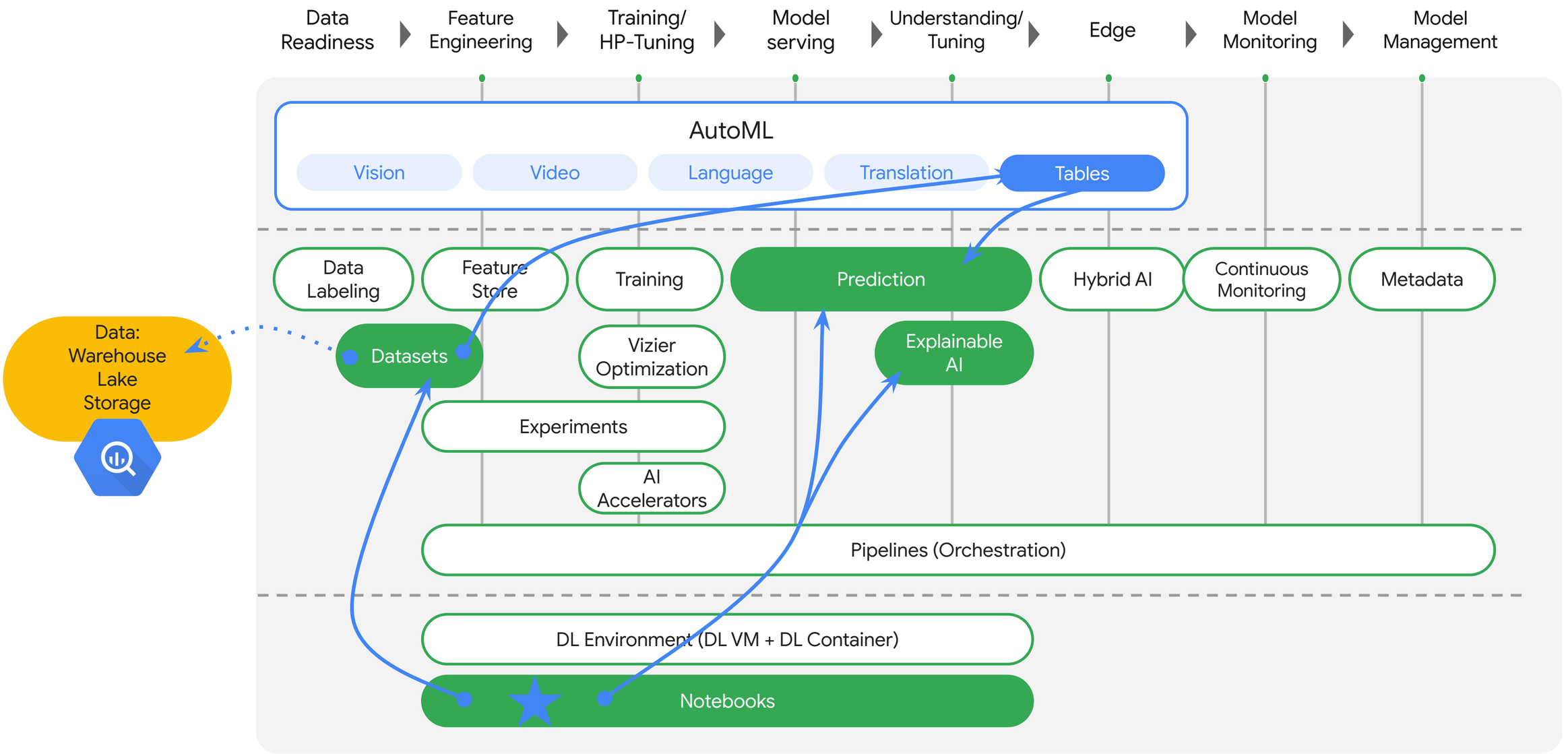
Vertex AI

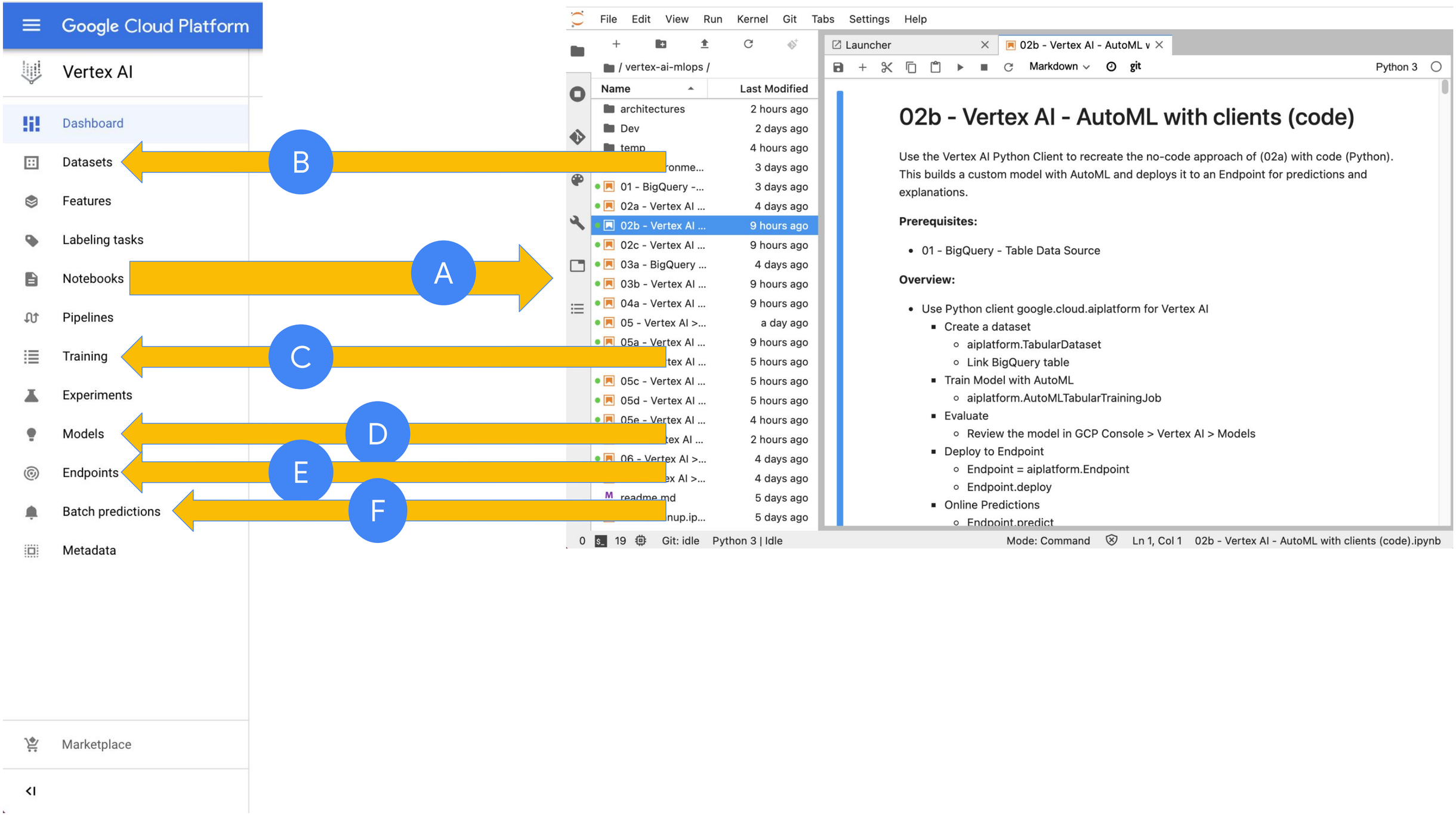
End-To-End: No Code

02b

Notebook: 02b

Vertex AI Overview




Google Cloud Platform
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Launcher
02b - Vertex AI - AutoML
Markdown
git
Python 3
02b - Vertex AI - AutoML with clients (code)
Use the Vertex AI Python Client to recreate the no-code approach of (02a) with code (Python). This builds a custom model with AutoML and deploys it to an Endpoint for predictions and explanations.
Prerequisites:
01 - BigQuery - Table Data Source
Overview:
Use Python client google.cloud.aiplatform for Vertex AI
Create a dataset
aiplatform.TabularDataset
Link BigQuery table
Train Model with AutoML
aiplatform.AutoMLTabularTrainingJob
Evaluate
Review the model in GCP Console > Vertex AI > Models
Deploy to Endpoint
Endpoint = aiplatform.Endpoint
Endpoint.deploy
Online Predictions
Endpoint.predict
0 19 Git: idle Python 3 | Idle
Mode: Command Ln 1, Col 1 02b - Vertex AI - AutoML with clients (code).ipynb

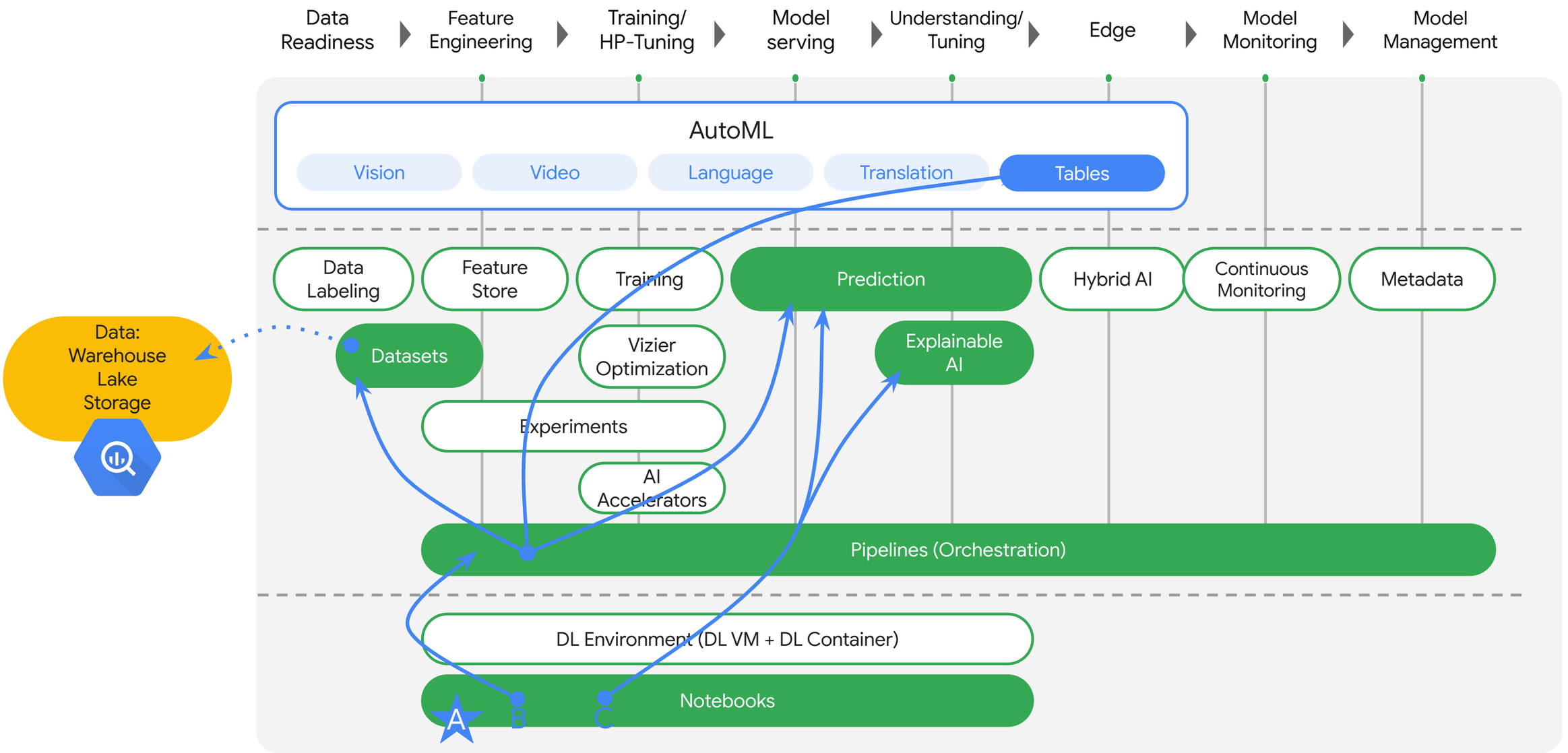
Vertex AI

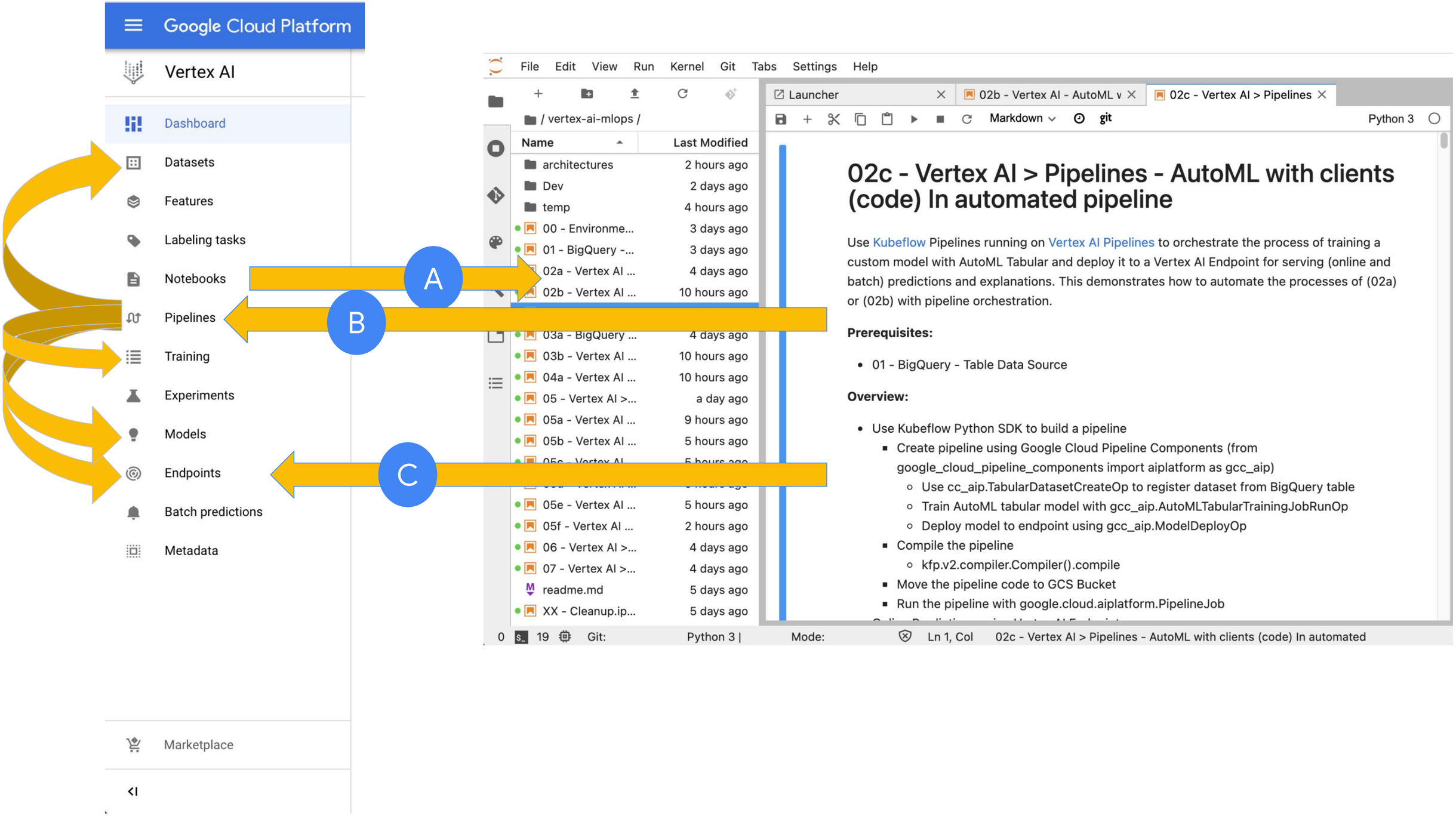
End-To-End: Interactive Code

02c

Notebook: 02c

Vertex AI Overview

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Launcher
02b - Vertex AI - AutoML v
02c - Vertex AI > Pipelines
Markdown
git
Python 3
02c - Vertex AI > Pipelines - AutoML with clients (code) In automated pipeline
Use Kubeflow Pipelines running on Vertex AI Pipelines to orchestrate the process of training a custom model with AutoML Tabular and deploy it to a Vertex AI Endpoint for serving (online and batch) predictions and explanations. This demonstrates how to automate the processes of (02a) or (02b) with pipeline orchestration.
Prerequisites:
01 - BigQuery - Table Data Source
Overview:
Use Kubeflow Python SDK to build a pipeline
Create pipeline using Google Cloud Pipeline Components (from google_cloud_pipeline_components import aiplatform as gcc_aip)
Use cc_aip.TabularDatasetCreateOp to register dataset from BigQuery table
Train AutoML tabular model with gcc_aip.AutoMLTabularTrainingJobRunOp
Deploy model to endpoint using gcc_aip.ModelDeployOp
Compile the pipeline
kfp.v2.compiler.Compiler().compile
Move the pipeline code to GCS Bucket
Run the pipeline with google.cloud.aiplatform.PipelineJob
0 19 Git: Python 3 | Mode: Ln 1, Col 02c - Vertex AI > Pipelines - AutoML with clients (code) In automated

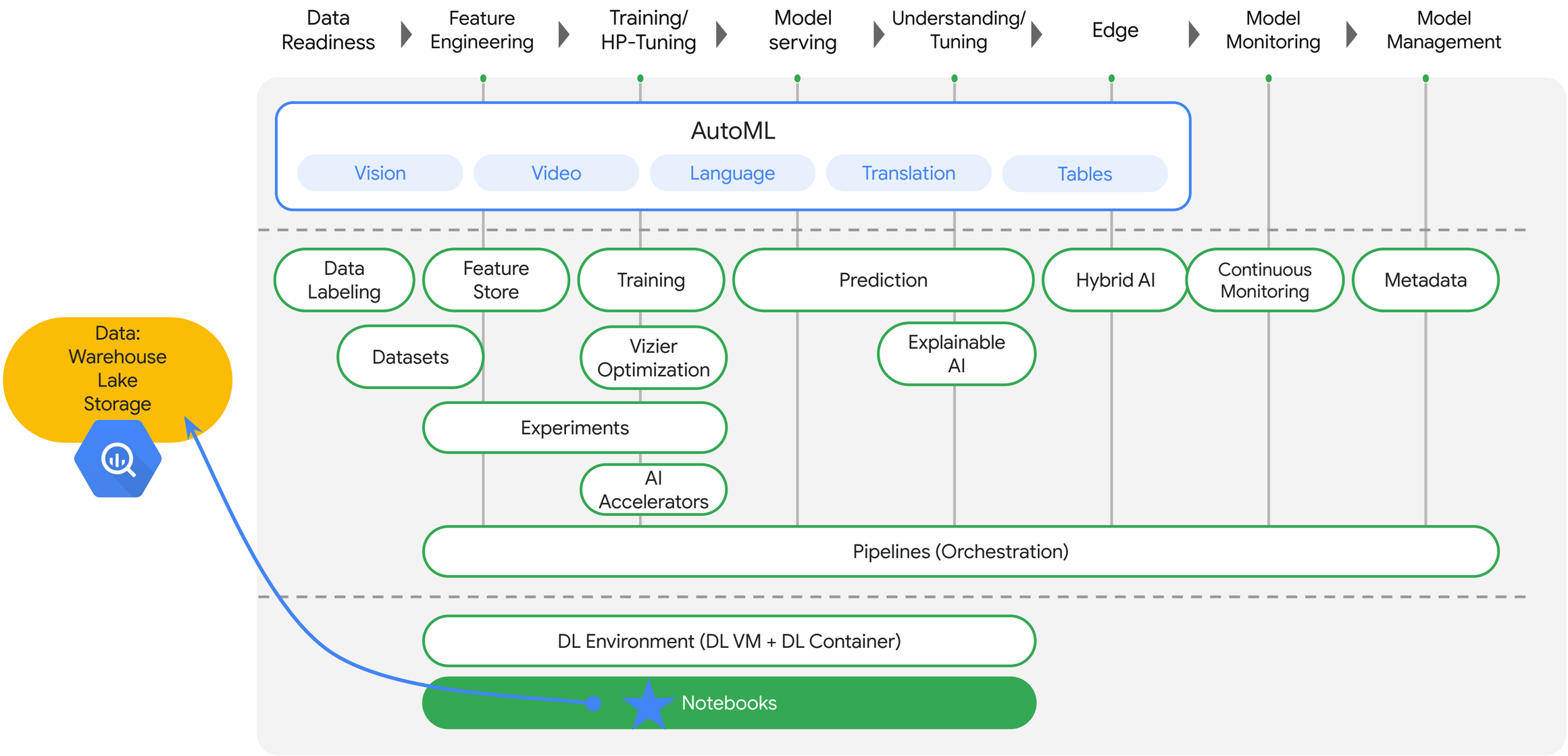
Vertex AI

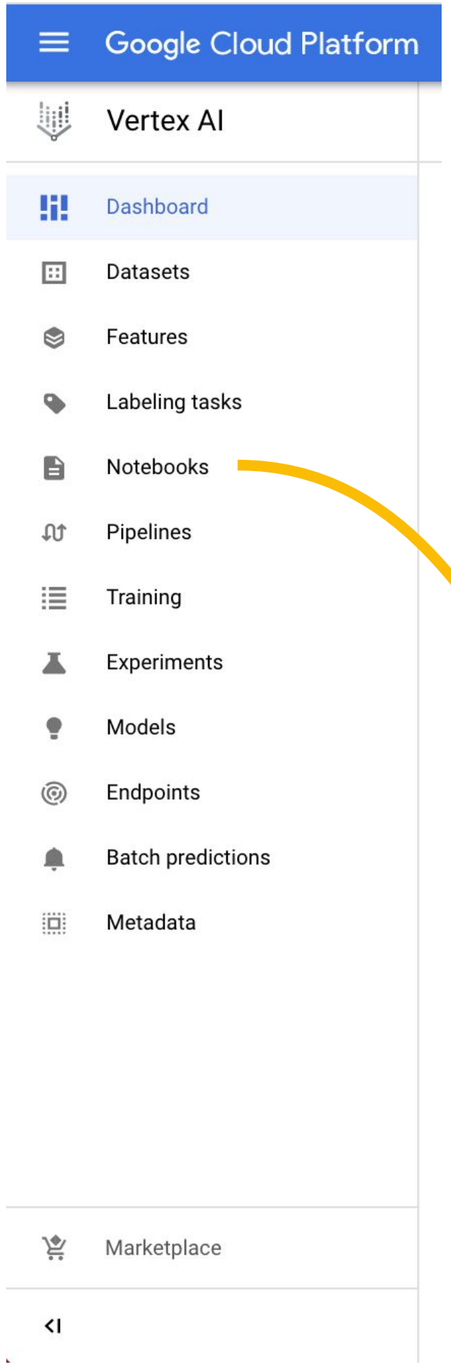
End-To-End: Pipeline Orchestration

03a

Notebook: 03a

Vertex AI Overview




Google Cloud Platform
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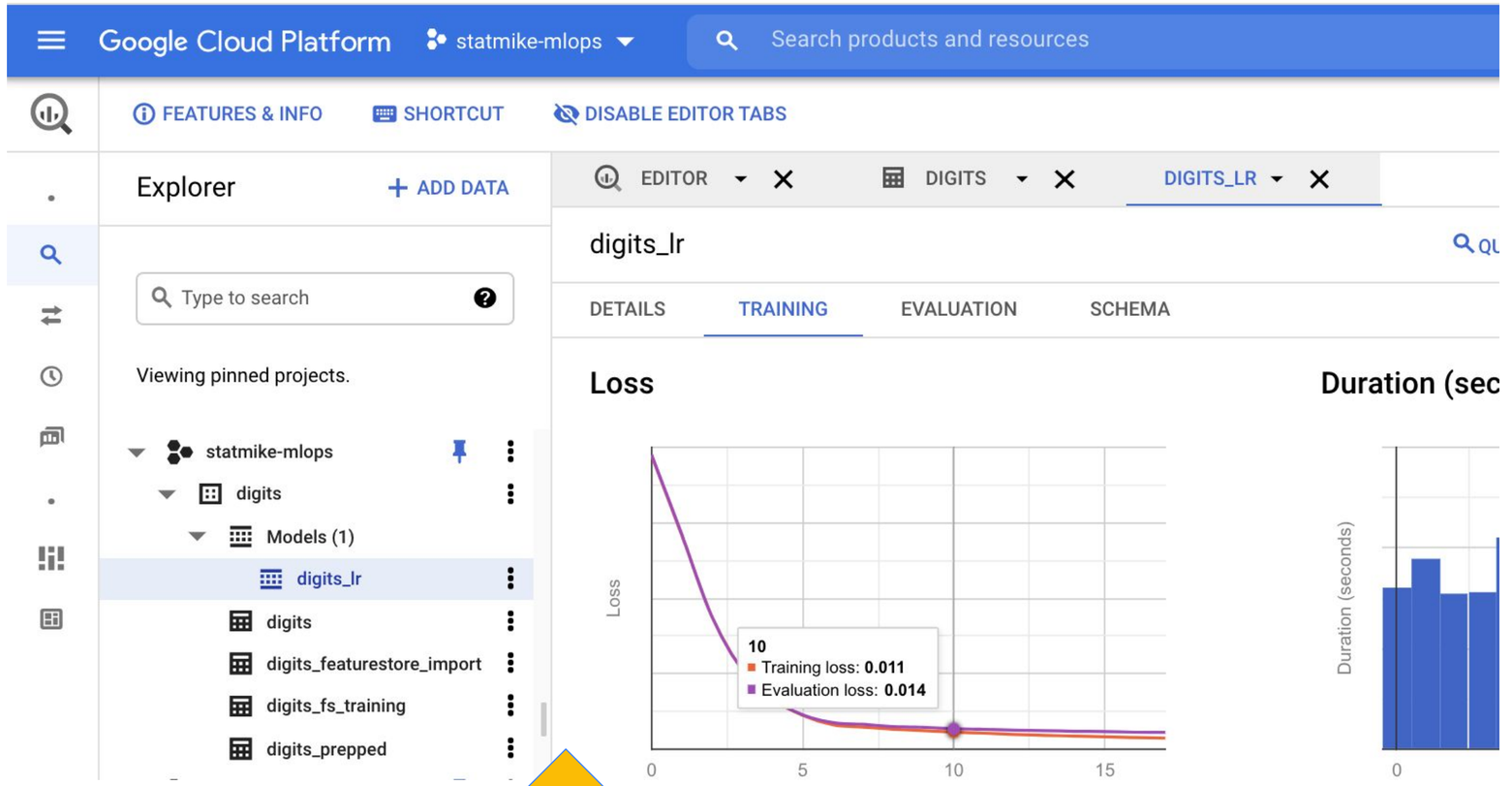
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Search products and resources
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DISABLE EDITOR TABS
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statmike-mlops
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Models (1)
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digits_featurestore_import
digits_fs_training
digits_prepped
EDITOR
DIGITS
DIGITS_LR
digits_lr
DETAILS
TRAINING
EVALUATION
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Duration (sec
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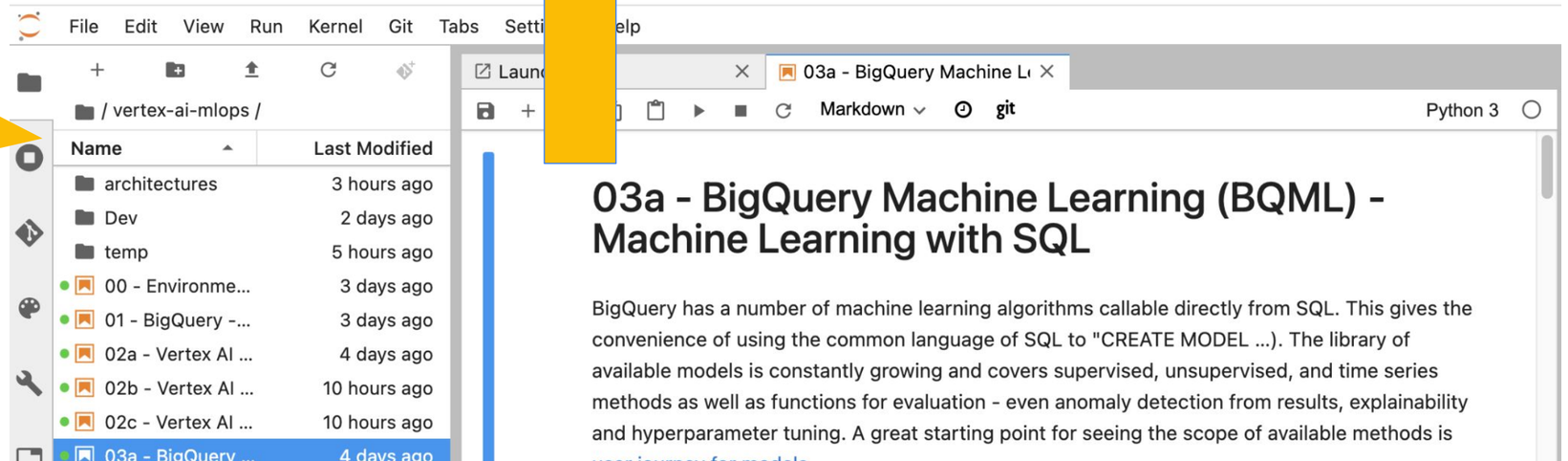
Training loss: 0.011
Evaluation loss: 0.014
0
5
10
15
Duration (seconds)
0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03a - BigQuery ...
4 days ago
03a - BigQuery Machine L
Markdown
git
Python 3
03a - BigQuery Machine Learning (BQML) - Machine Learning with SQL
BigQuery has a number of machine learning algorithms callable directly from SQL. This gives the convenience of using the common language of SQL to "CREATE MODEL ...). The library of available models is constantly growing and covers supervised, unsupervised, and time series methods as well as functions for evaluation - even anomaly detection from results, explainability and hyperparameter tuning. A great starting point for seeing the scope of available methods is

BigQuery Machine Learning

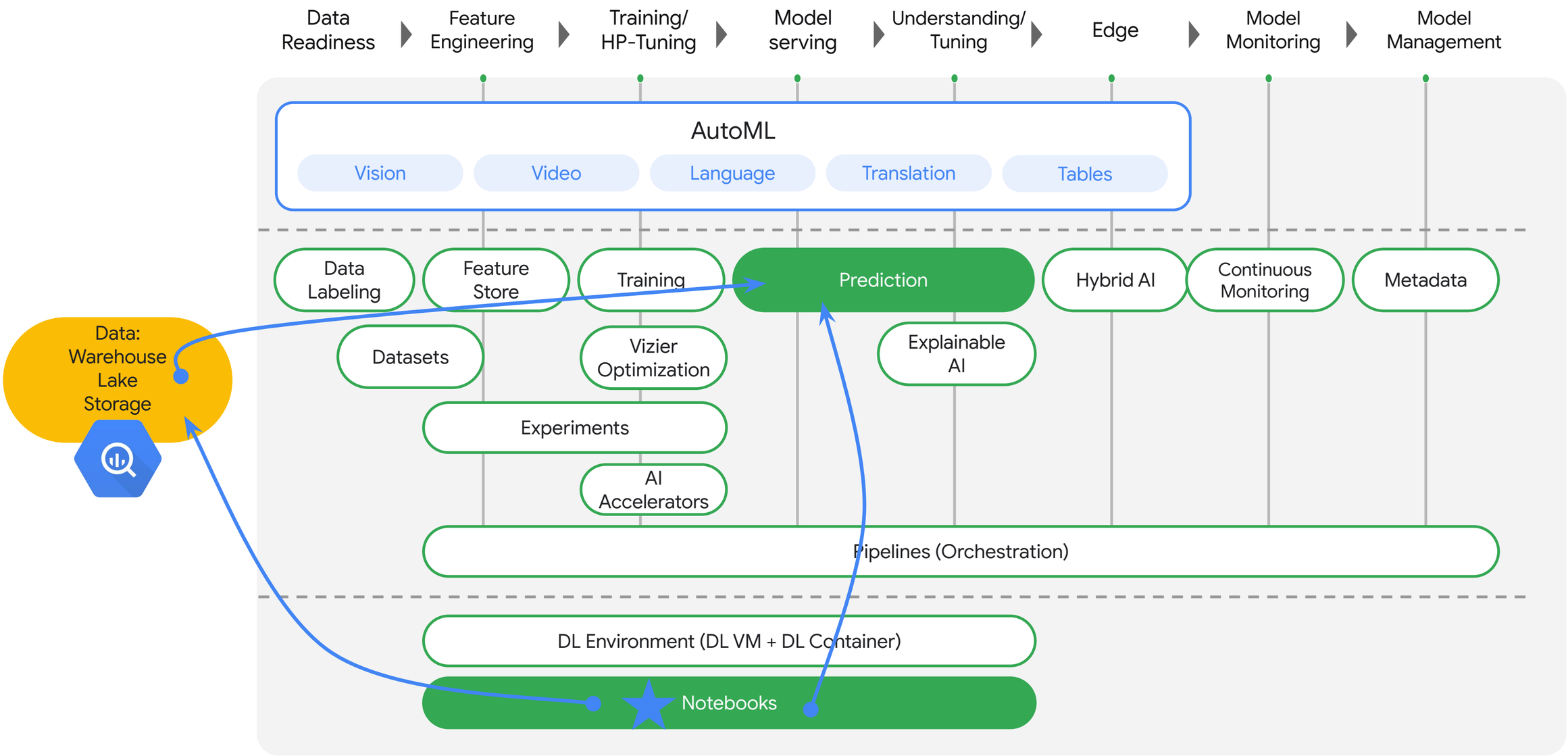
Vertex AI

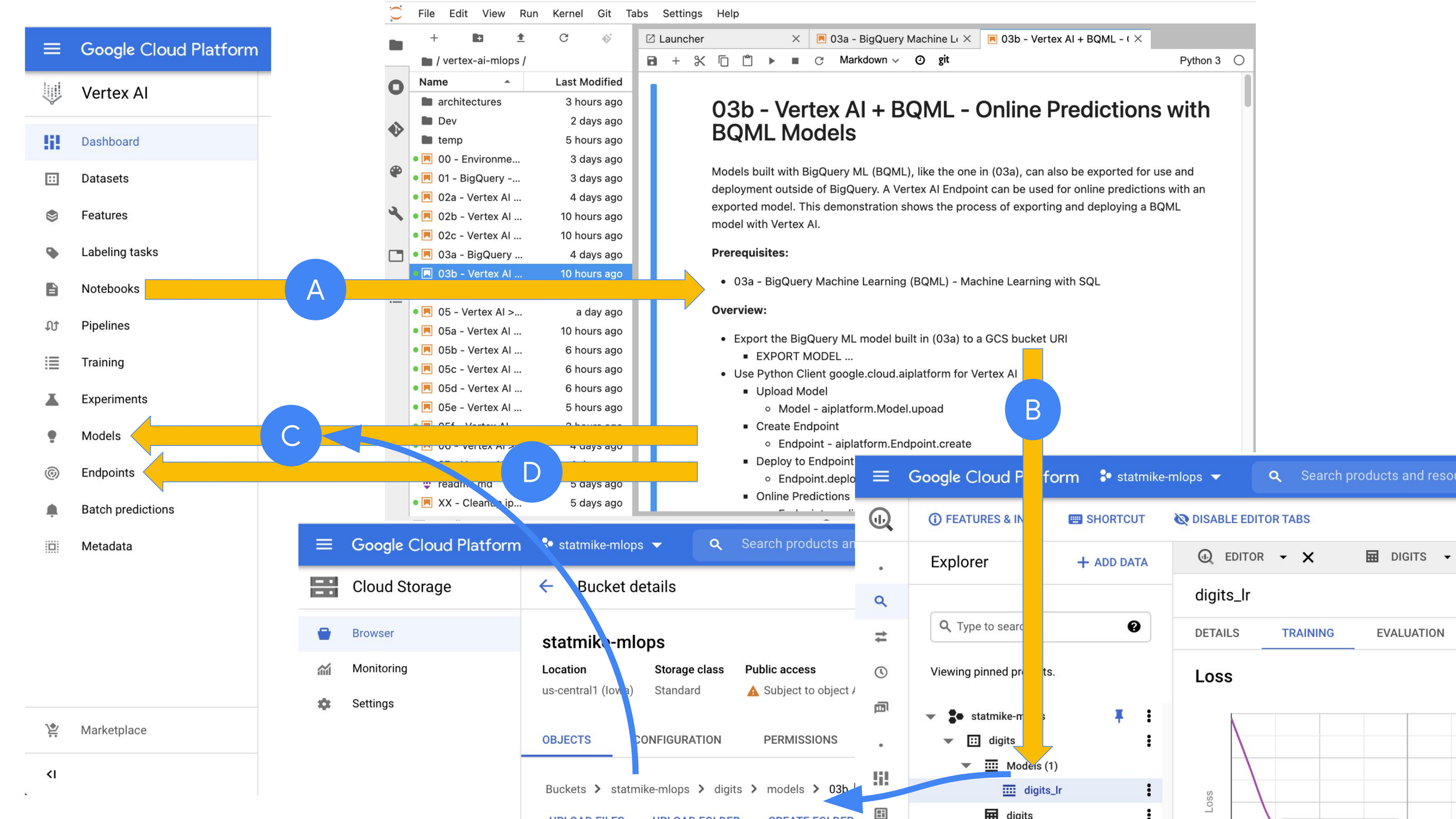
End-To-End with SQL

03b

Notebook: 03b

Vertex AI Overview

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02a - Vertex AI ... 4 days ago
02b - Vertex AI ... 10 hours ago
02c - Vertex AI ... 10 hours ago
03a - BigQuery ... 4 days ago
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05a - Vertex AI ... 10 hours ago
05b - Vertex AI ... 6 hours ago
05c - Vertex AI ... 6 hours ago
05d - Vertex AI ... 6 hours ago
05e - Vertex AI ... 5 hours ago
Launcher
03a - BigQuery Machine L
03b - Vertex AI + BQML -
Markdown
git
Python 3
03b - Vertex AI + BQML - Online Predictions with BQML Models
Models built with BigQuery ML (BQML), like the one in (03a), can also be exported for use and deployment outside of BigQuery. A Vertex AI Endpoint can be used for online predictions with an exported model. This demonstration shows the process of exporting and deploying a BQML model with Vertex AI.
Prerequisites:
03a - BigQuery Machine Learning (BQML) - Machine Learning with SQL
Overview:
Export the BigQuery ML model built in (03a) to a GCS bucket URI
EXPORT MODEL ...
Use Python Client google.cloud.aiplatform for Vertex AI
Upload Model
Model - aiplatform.Model.upoad
Create Endpoint
Endpoint - aiplatform.Endpoint.create
Deploy to Endpoint
Online Predictions
Google Cloud Platform
statmike-mlops
Search products and resources
Cloud Storage
Browser
Monitoring
Settings
Bucket details
statmike-mlops
Location
Storage class
Public access
Standard
OBJECTS
CONFIGURATION
PERMISSIONS
Buckets > statmike-mlops > digits > models > 03b
FEATURES & IN
SHORTCUT
DISABLE EDITOR TABS
Explorer
ADD DATA
Type to search
Viewing pinned pr ts.
digits
Models (1)
digits_lr
EDITOR
DIGITS
digits_lr
DETAILS
TRAINING
EVALUATION
Loss
Loss

BigQuery Machine Learning

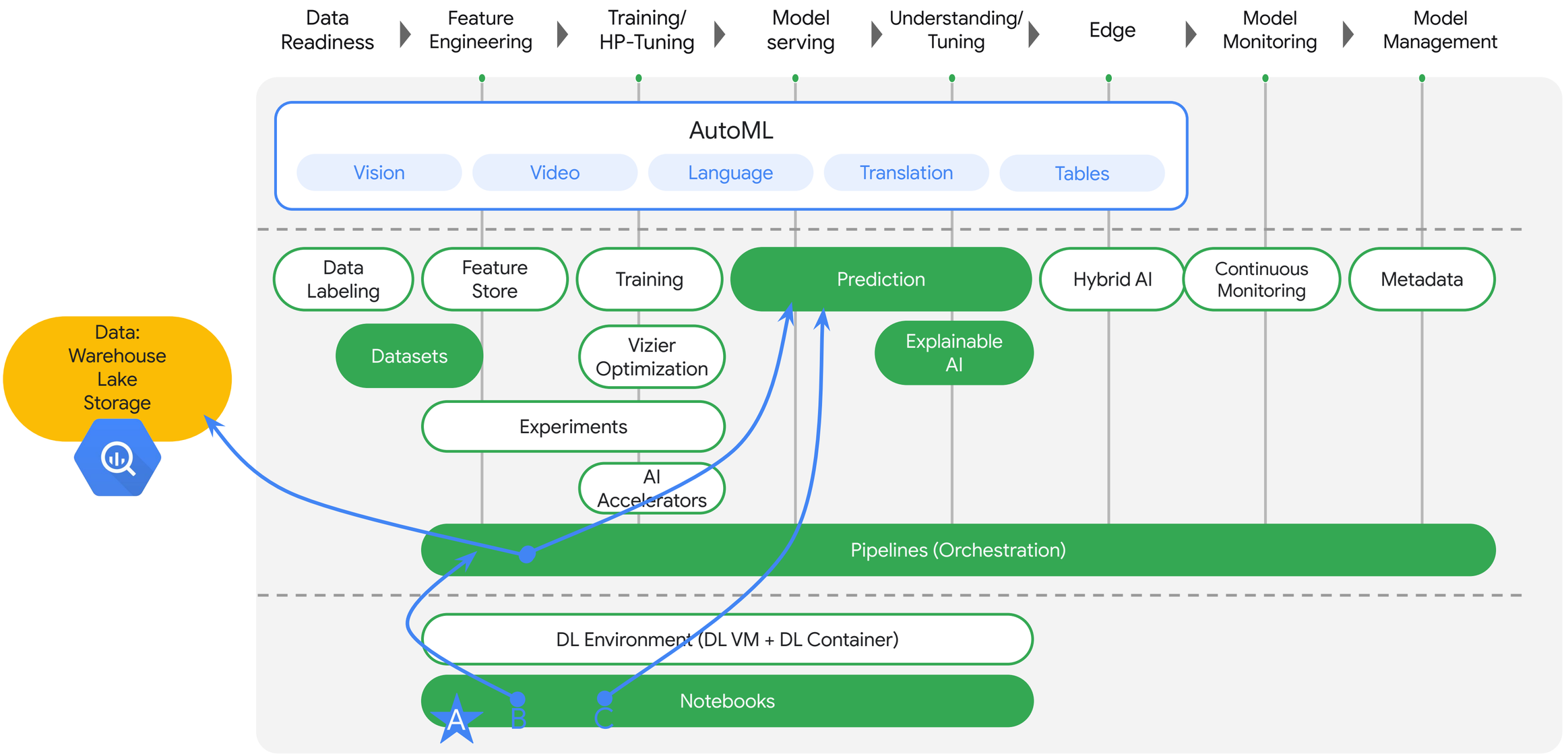
Vertex AI

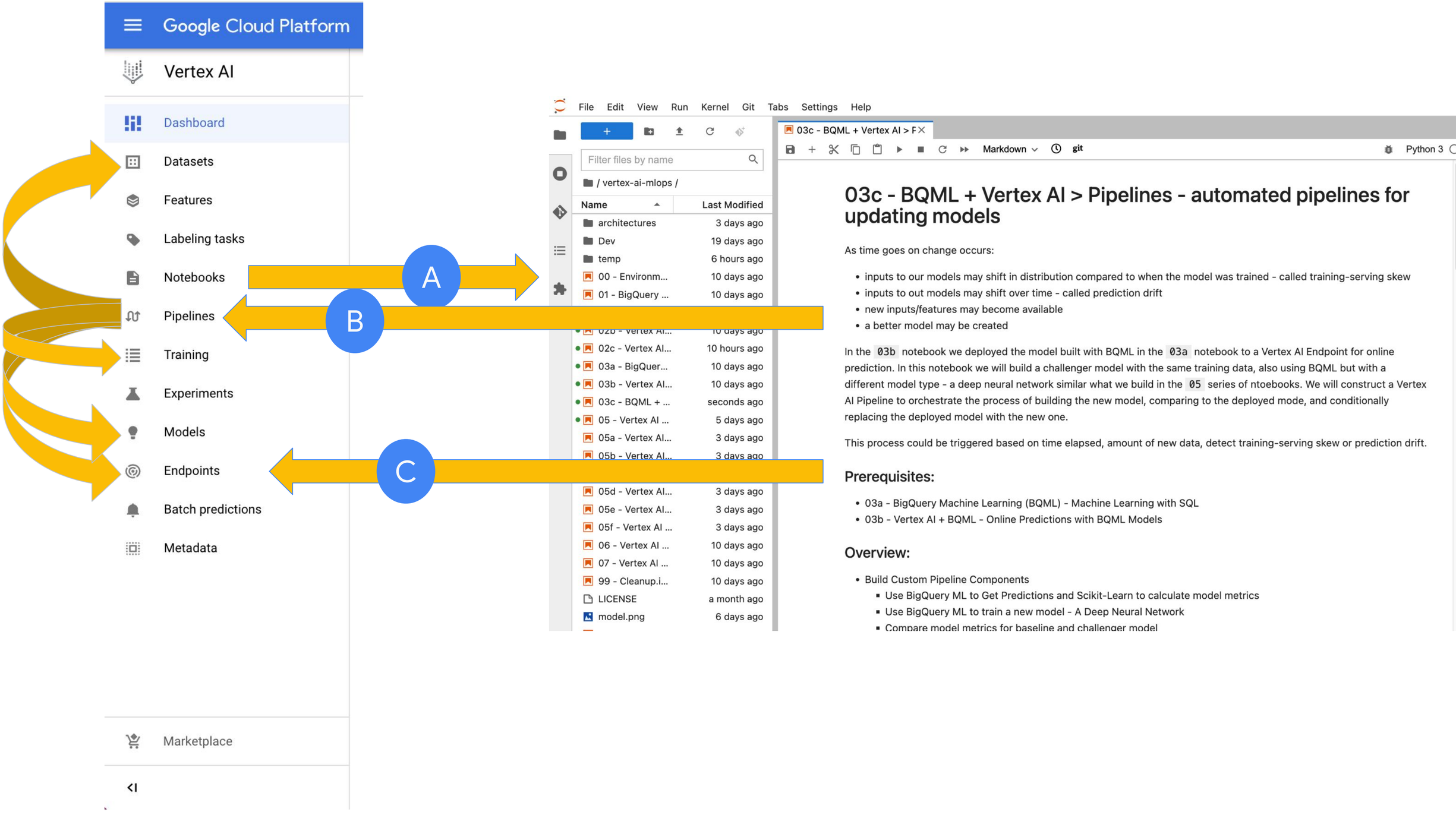
BQML to Online Predictions

03c

Notebook: 03c

Vertex AI Overview




Google Cloud Platform
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BigQuery Machine Learning

Vertex AI

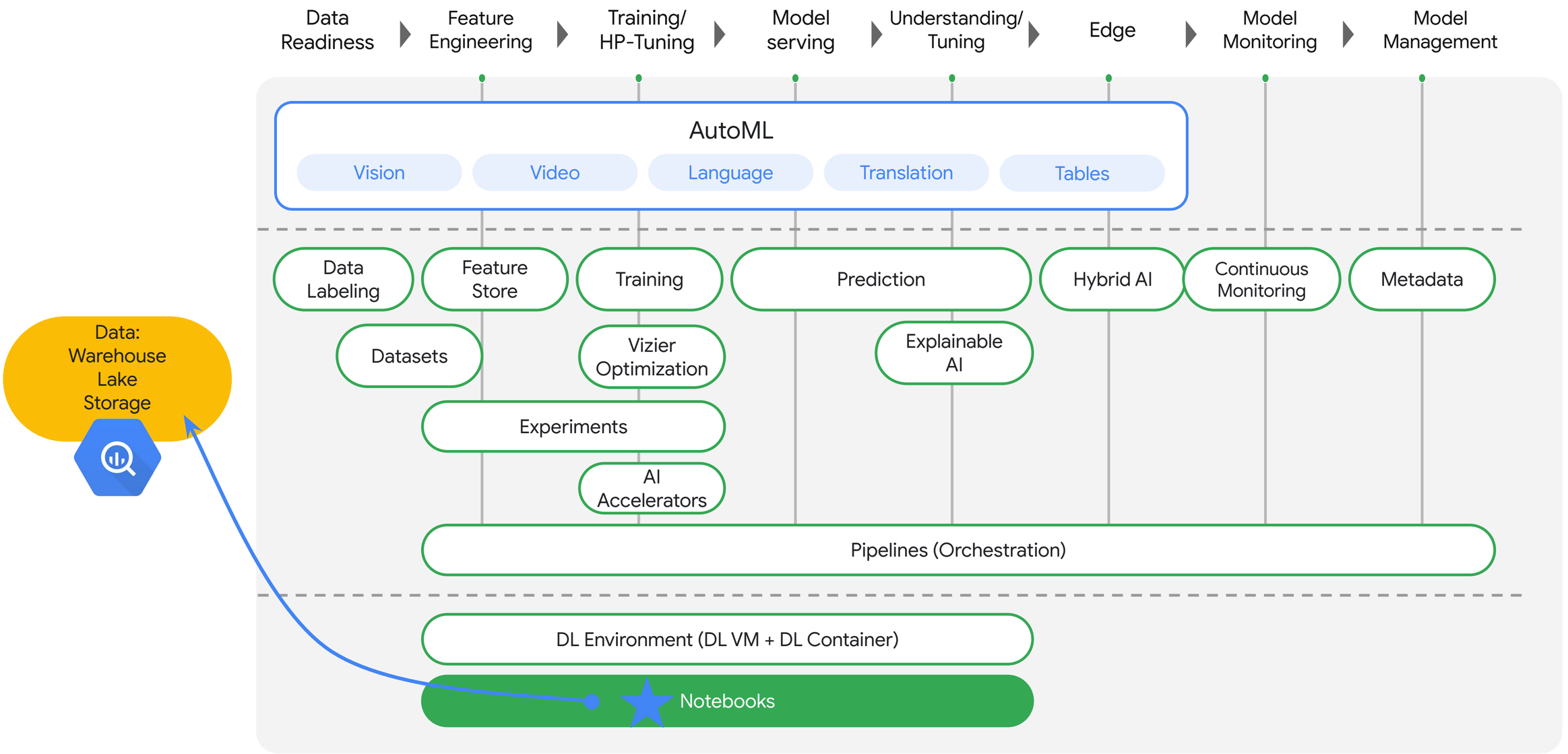
End-To-End Pipeline Orchestration

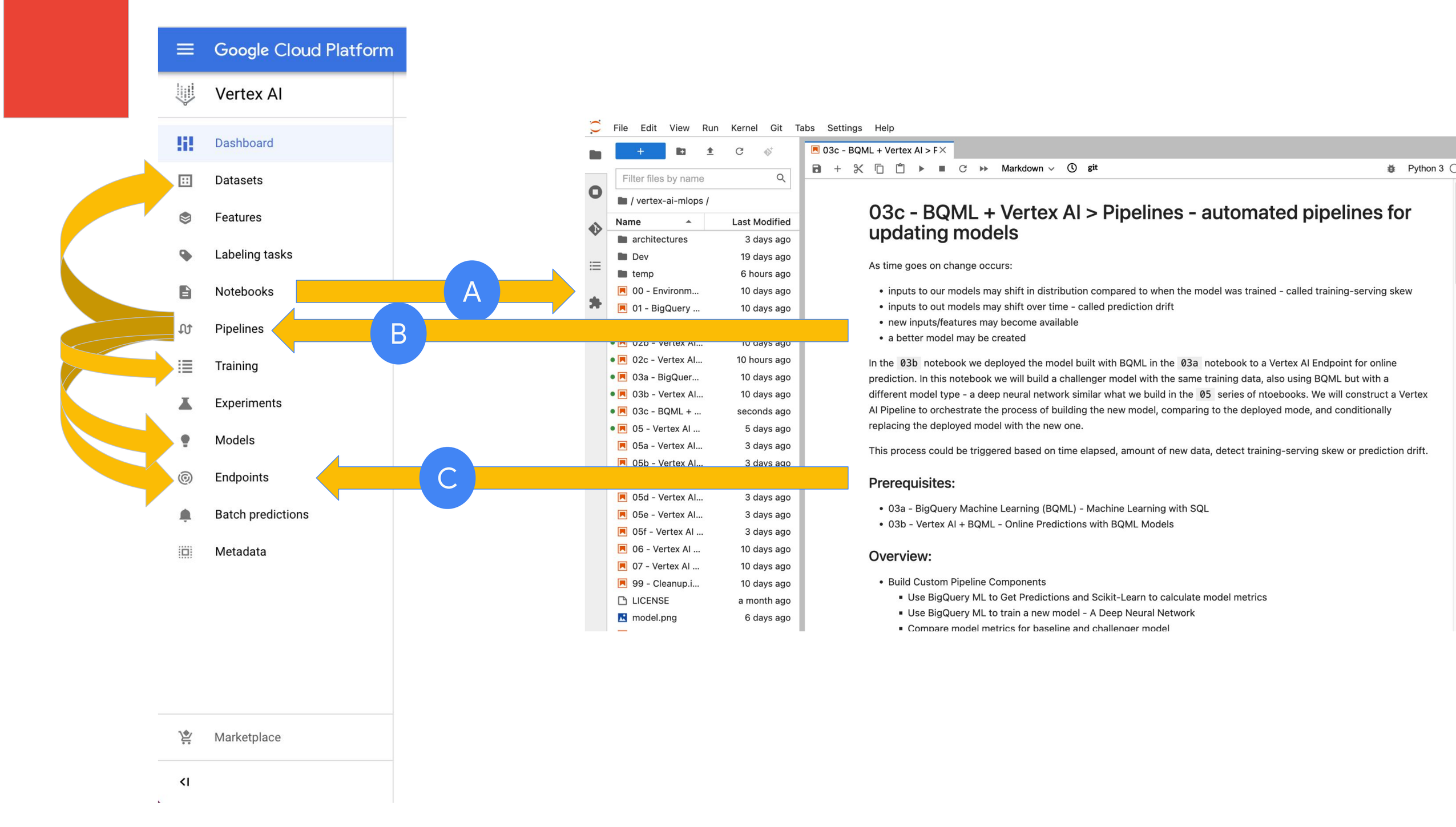
Conditionally Update Endpoints

04

Notebook: 04

Vertex AI Overview

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Time Series Forecasting

Vertex AI

Data Review with BigQuery

04a

Notebook: 04

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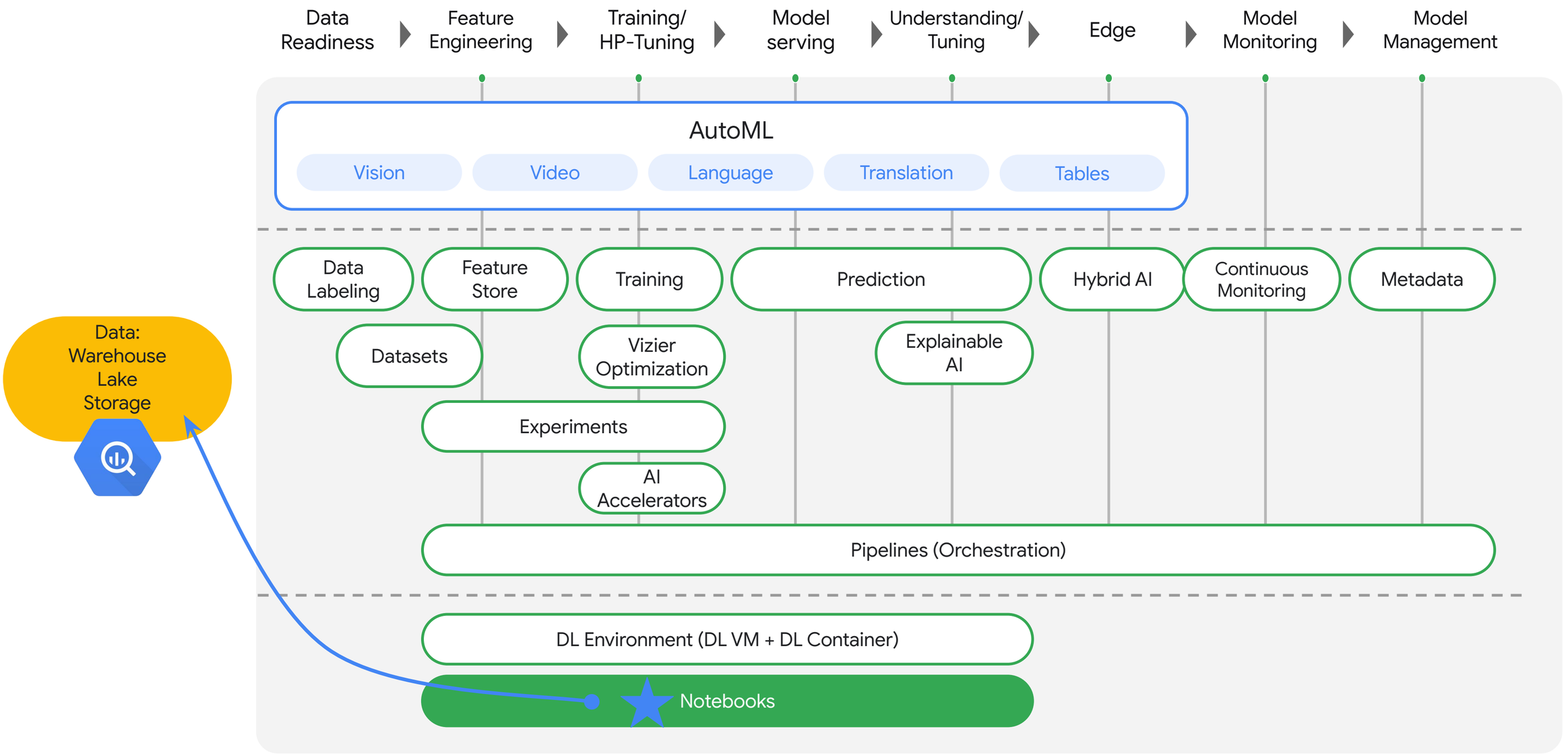

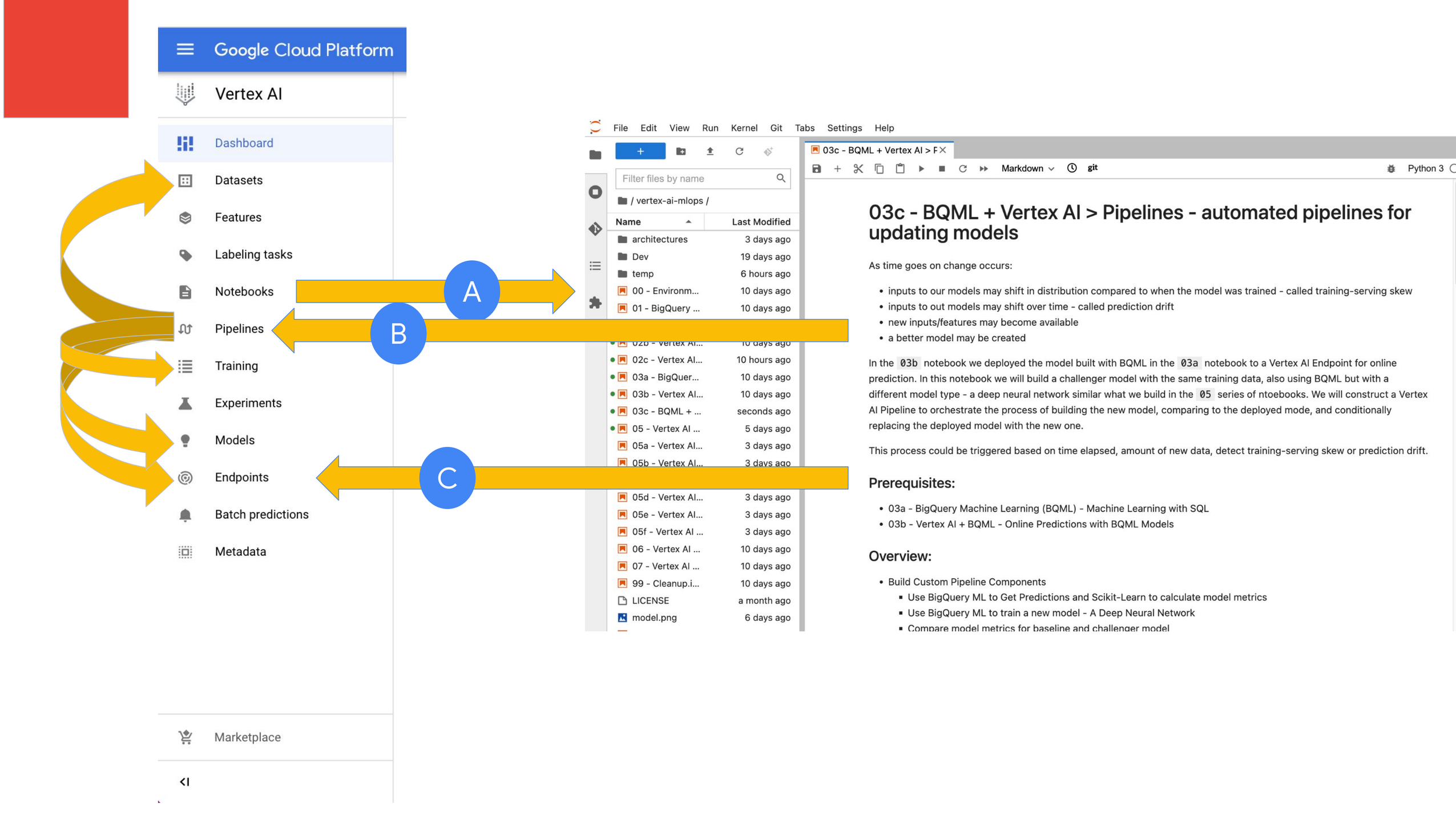
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Time Series Forecasting

Vertex AI

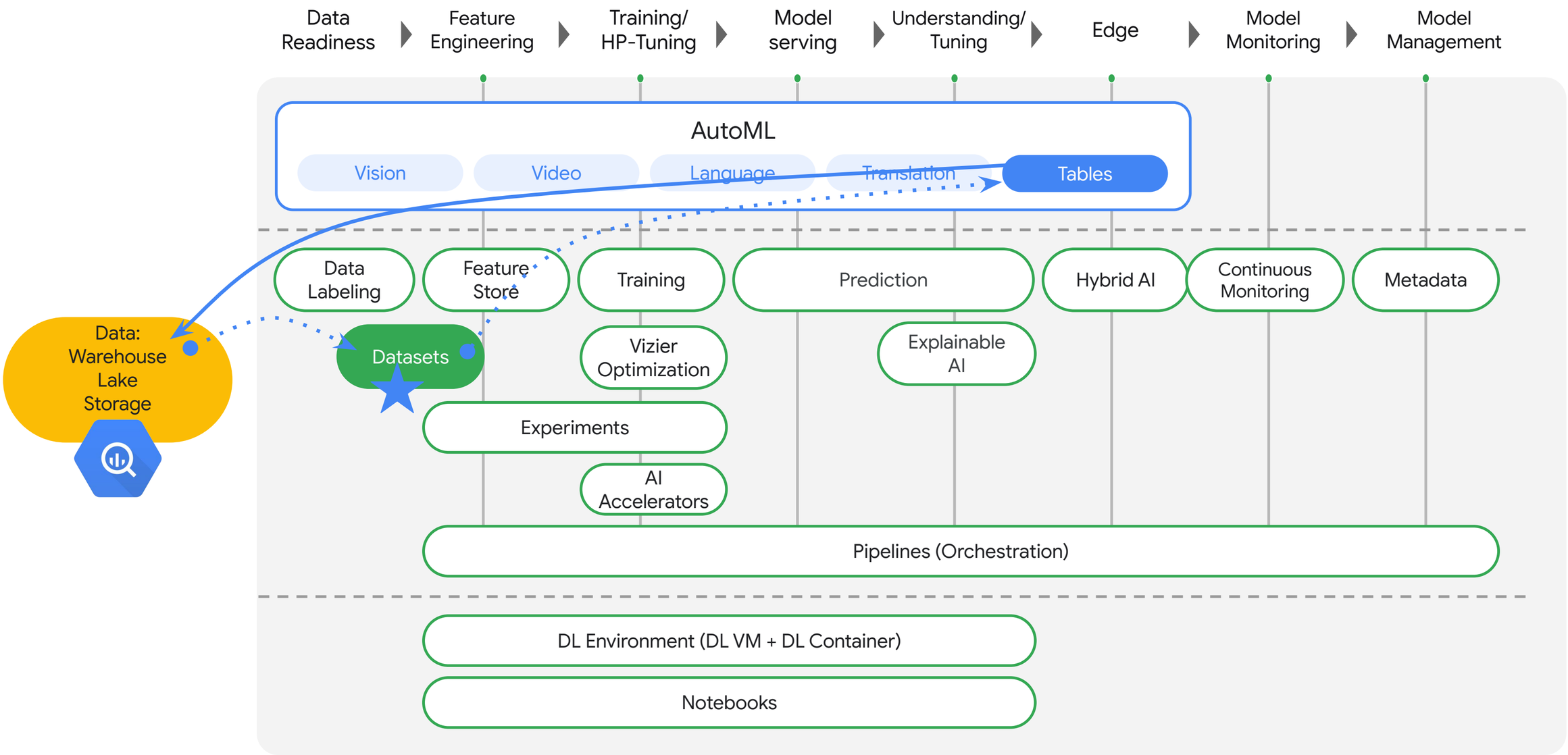
BigQuery Machine Learning

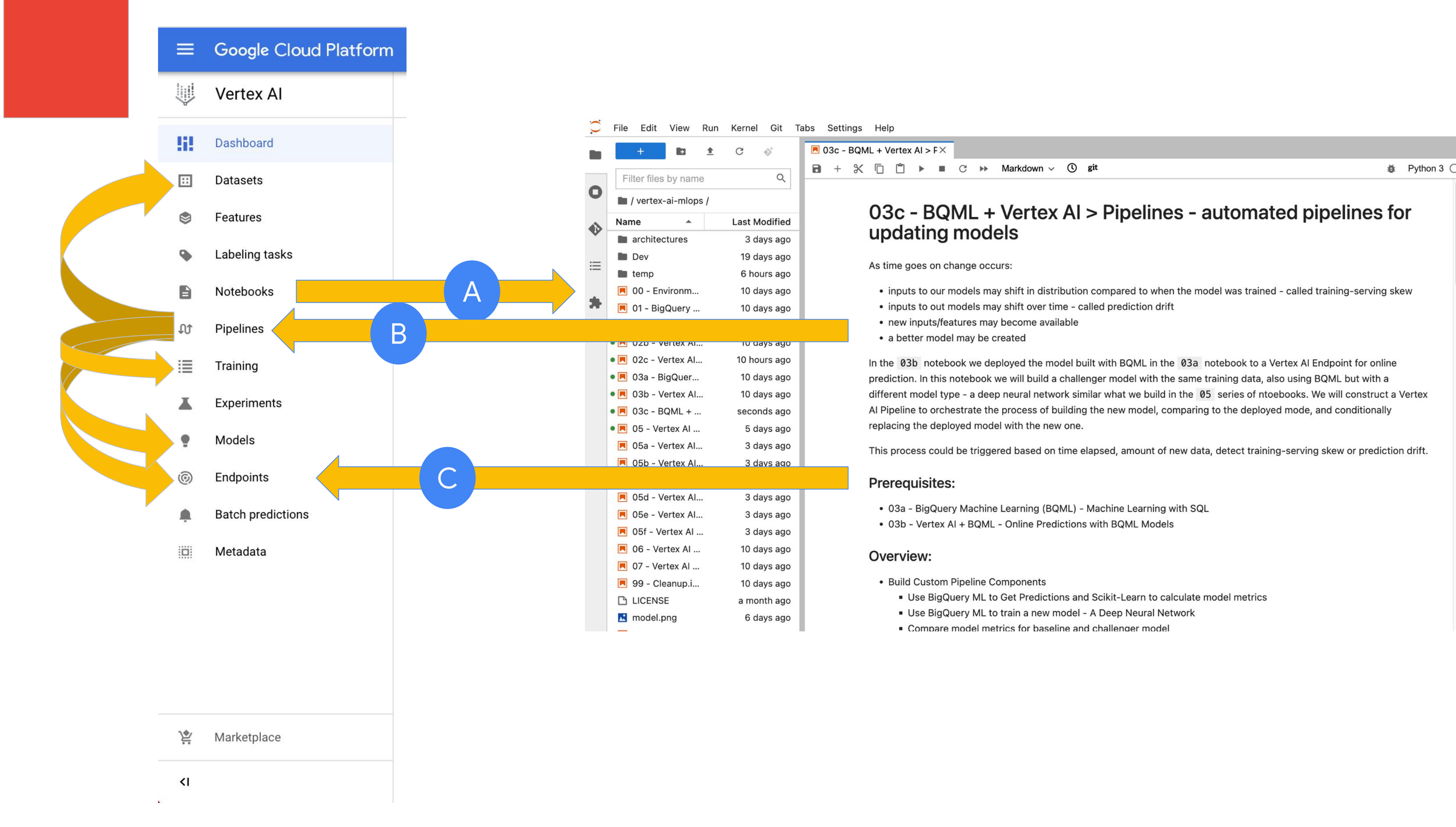
Univariate Forecasting with ARIMA+

04b

Notebook: 04b

Vertex AI Overview

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Time Series Forecasting

Vertex AI

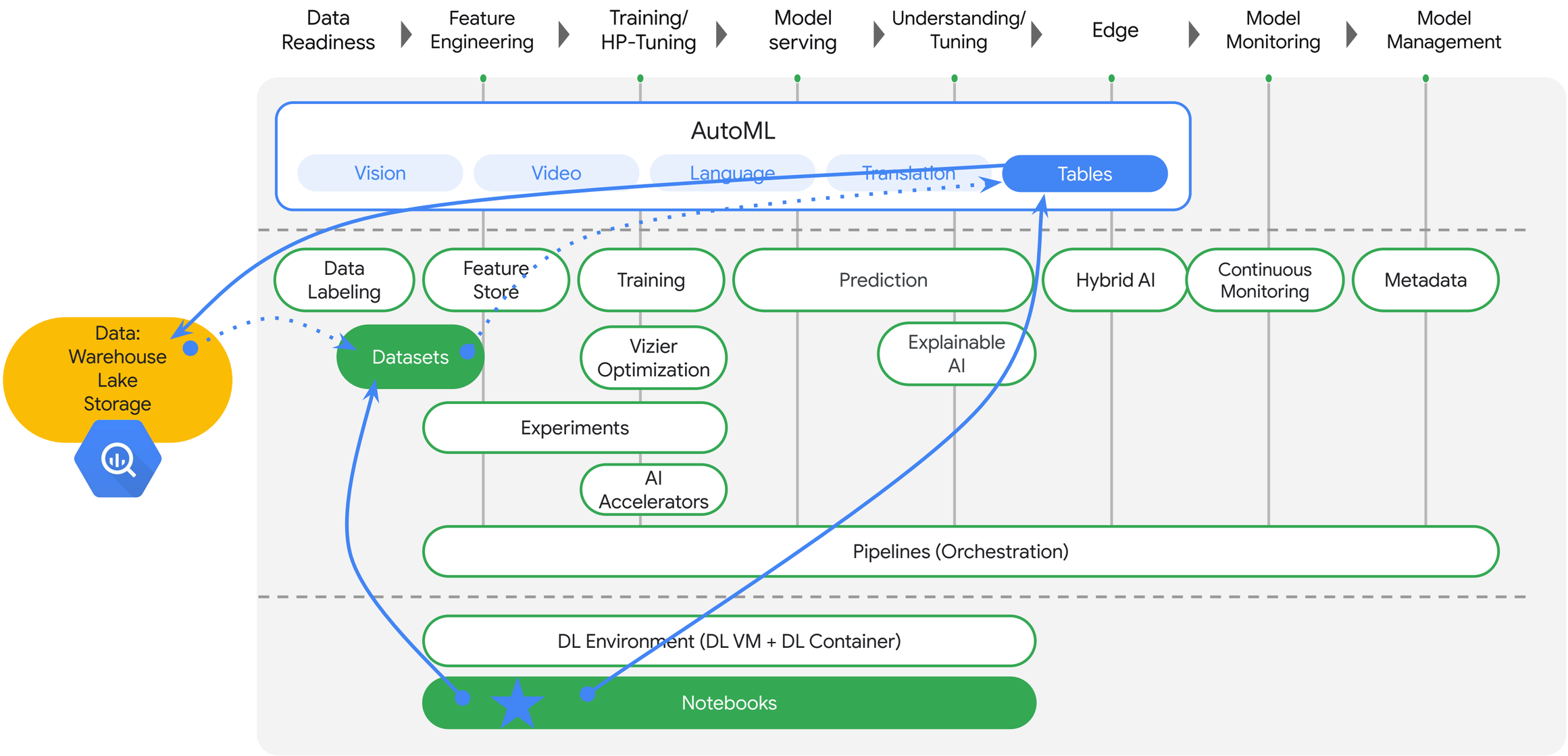
AutoML With The Console (No Code)

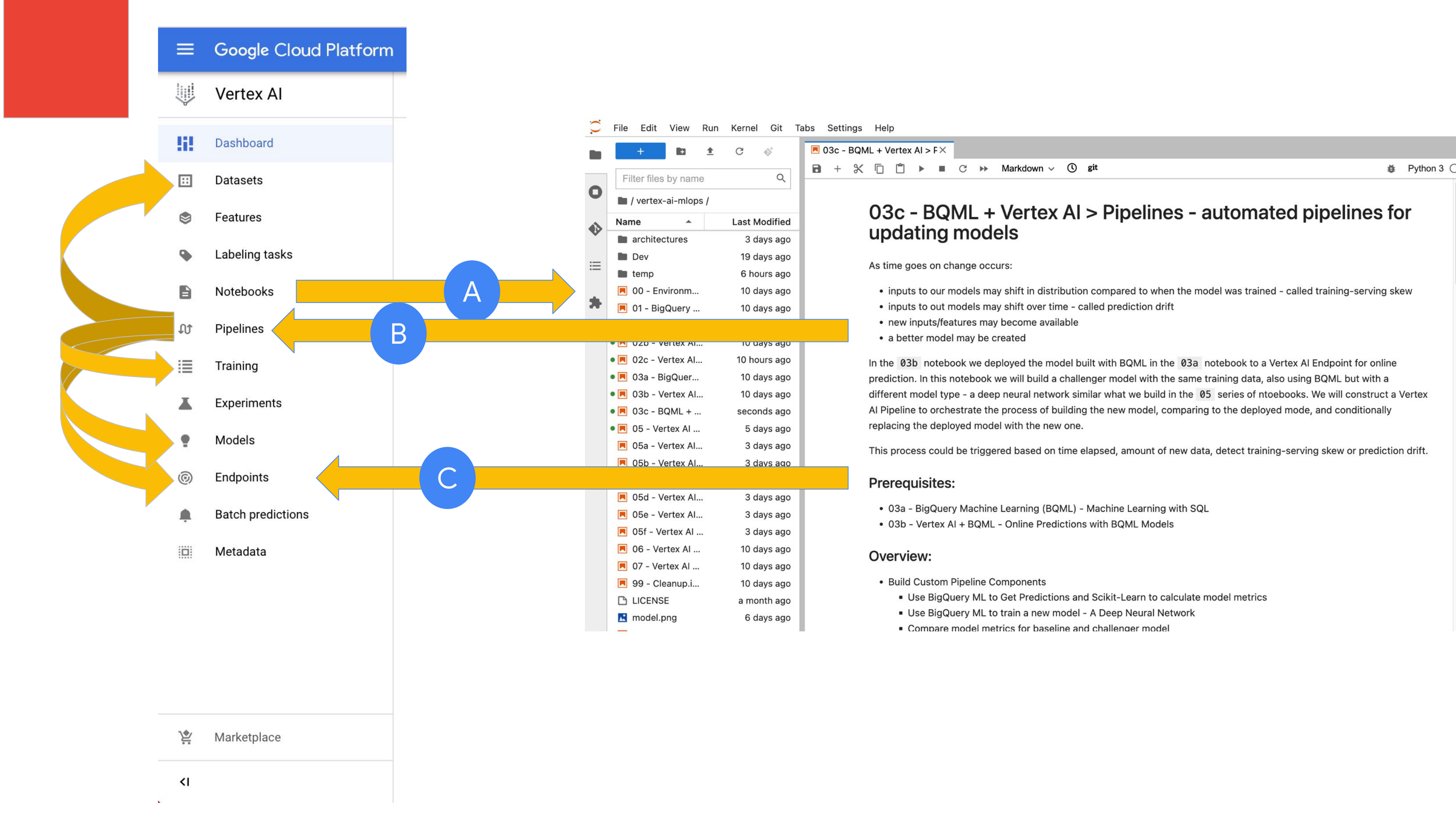
Global Forecasting With Deep Learning

04c

Notebook: 04c

Vertex AI Overview

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Time Series Forecasting

Vertex AI

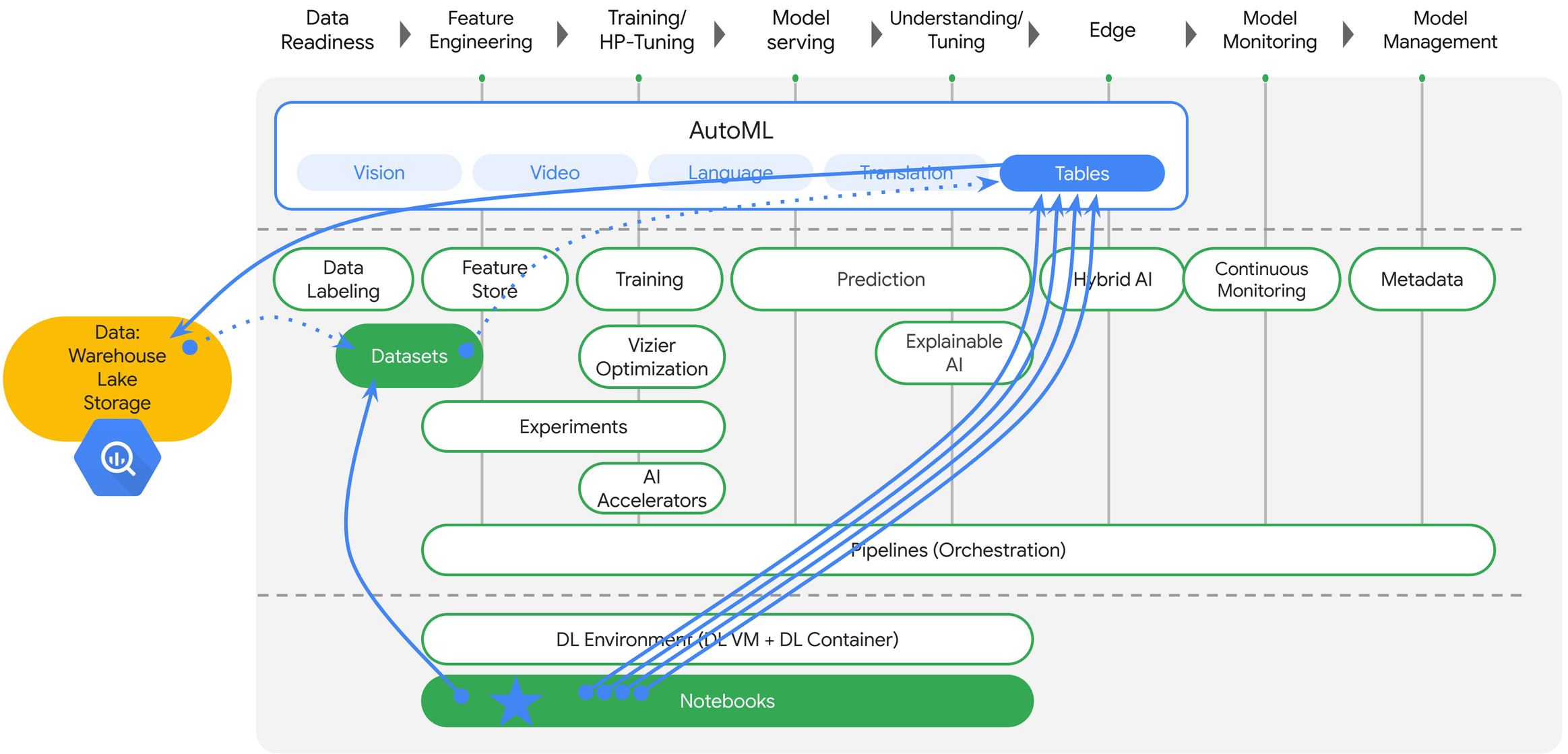
AutoML With The Python Client

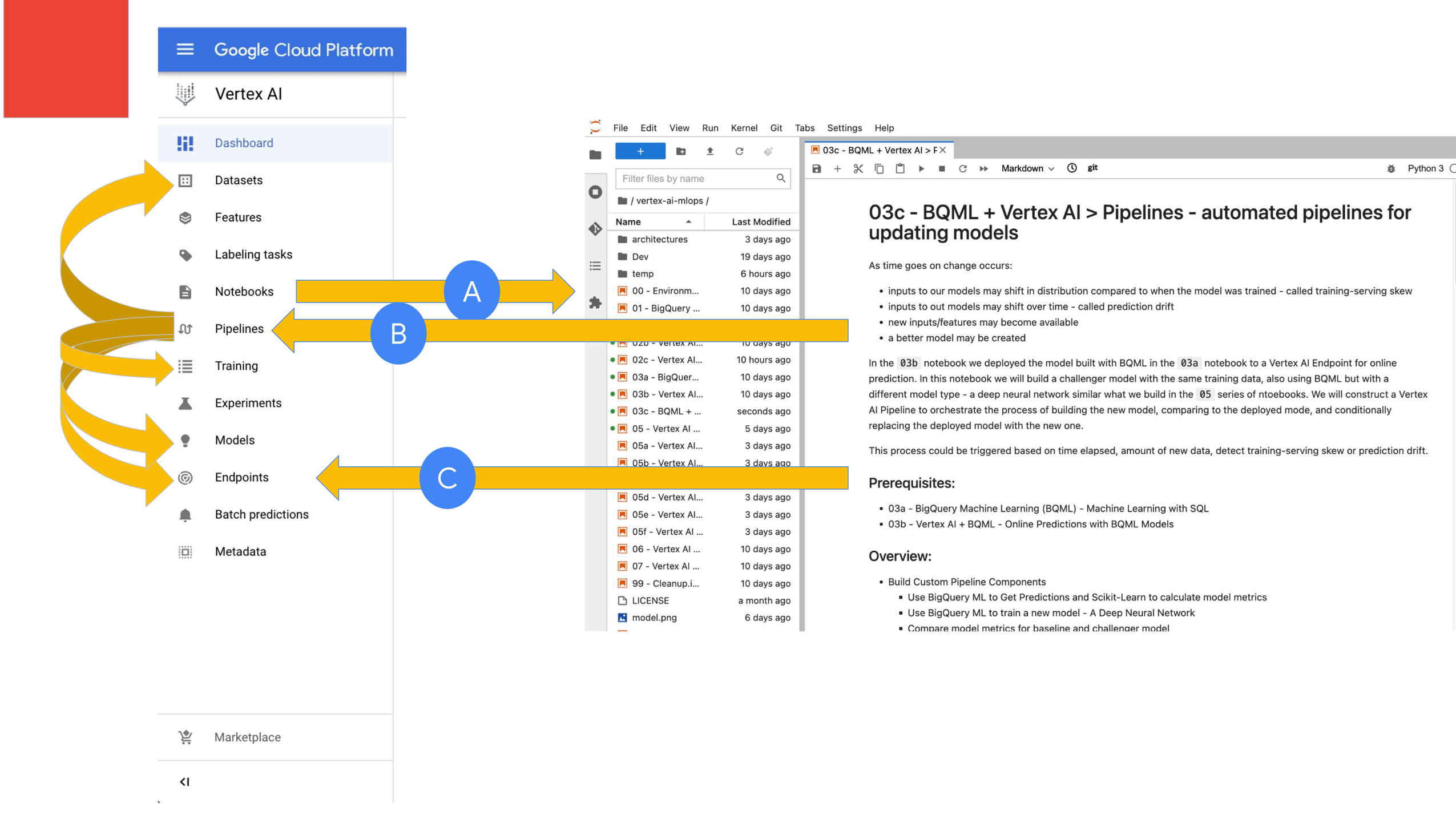
Global Forecasting With Deep Learning

04d

Notebook: 04d

Vertex AI Overview

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Time Series Forecasting

Vertex AI

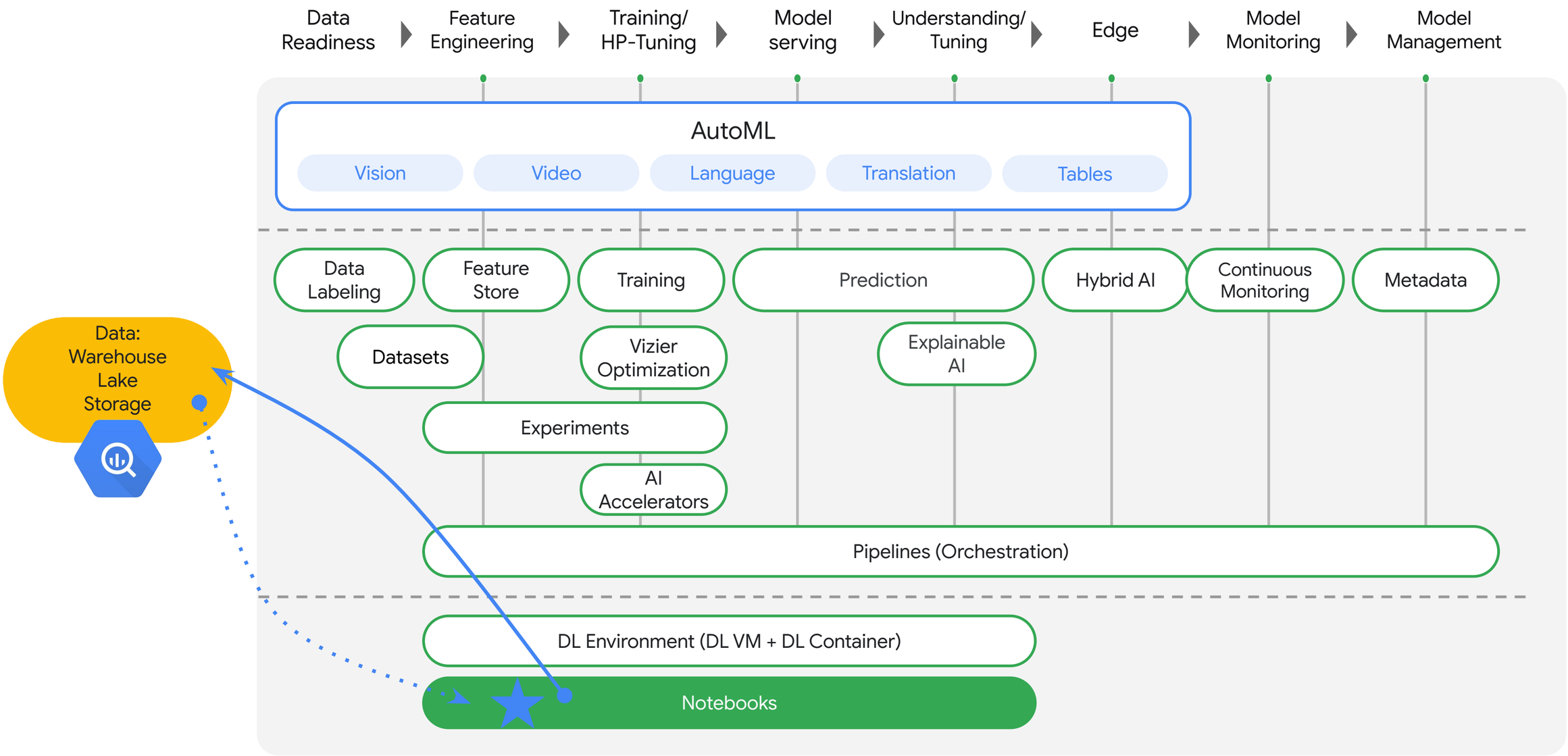
AutoML With Multiple Scenarios

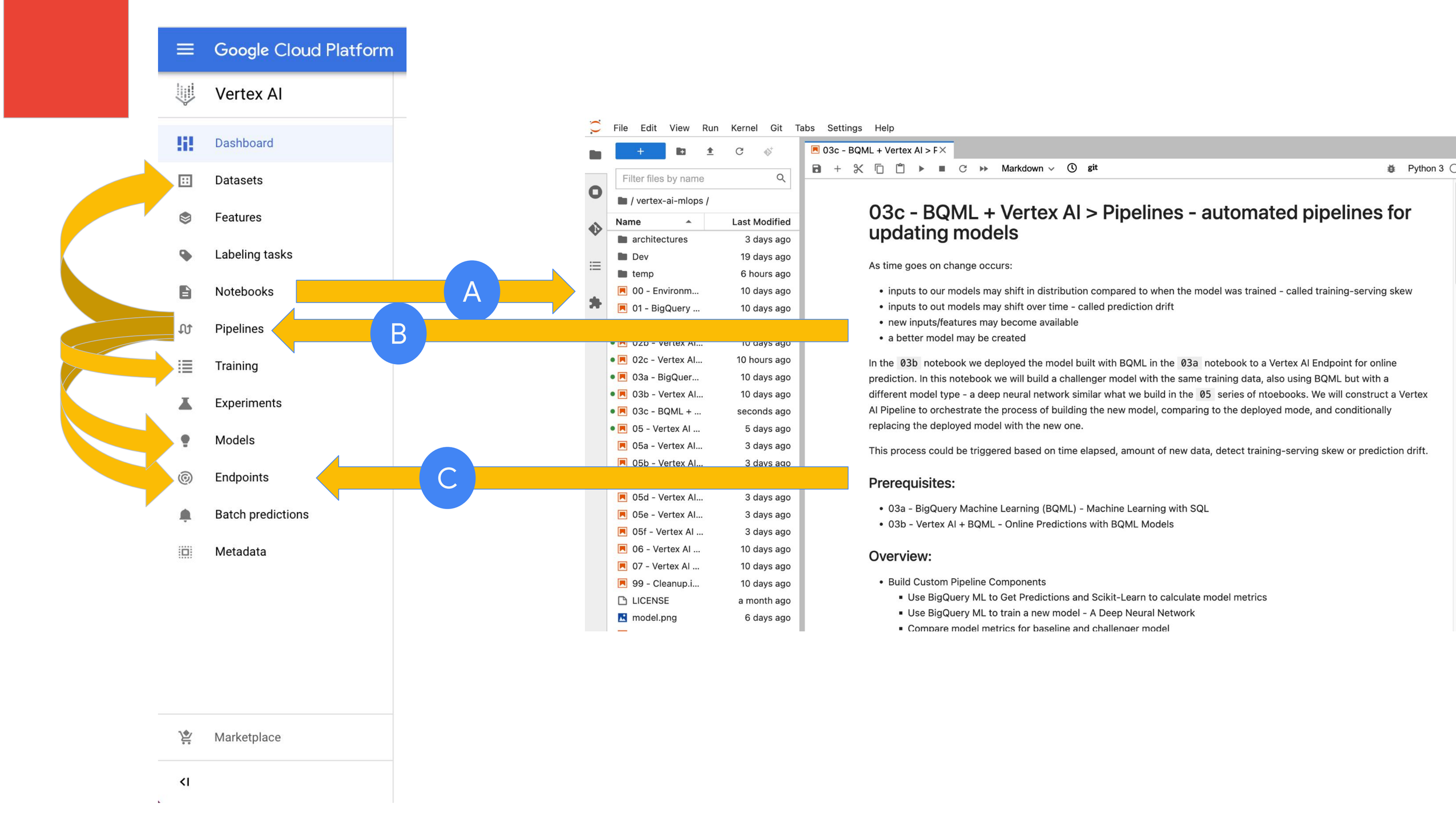
Global Forecasting With Deep Learning

04e

Notebook: 04e

Vertex AI Overview

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Time Series Forecasting

Vertex AI

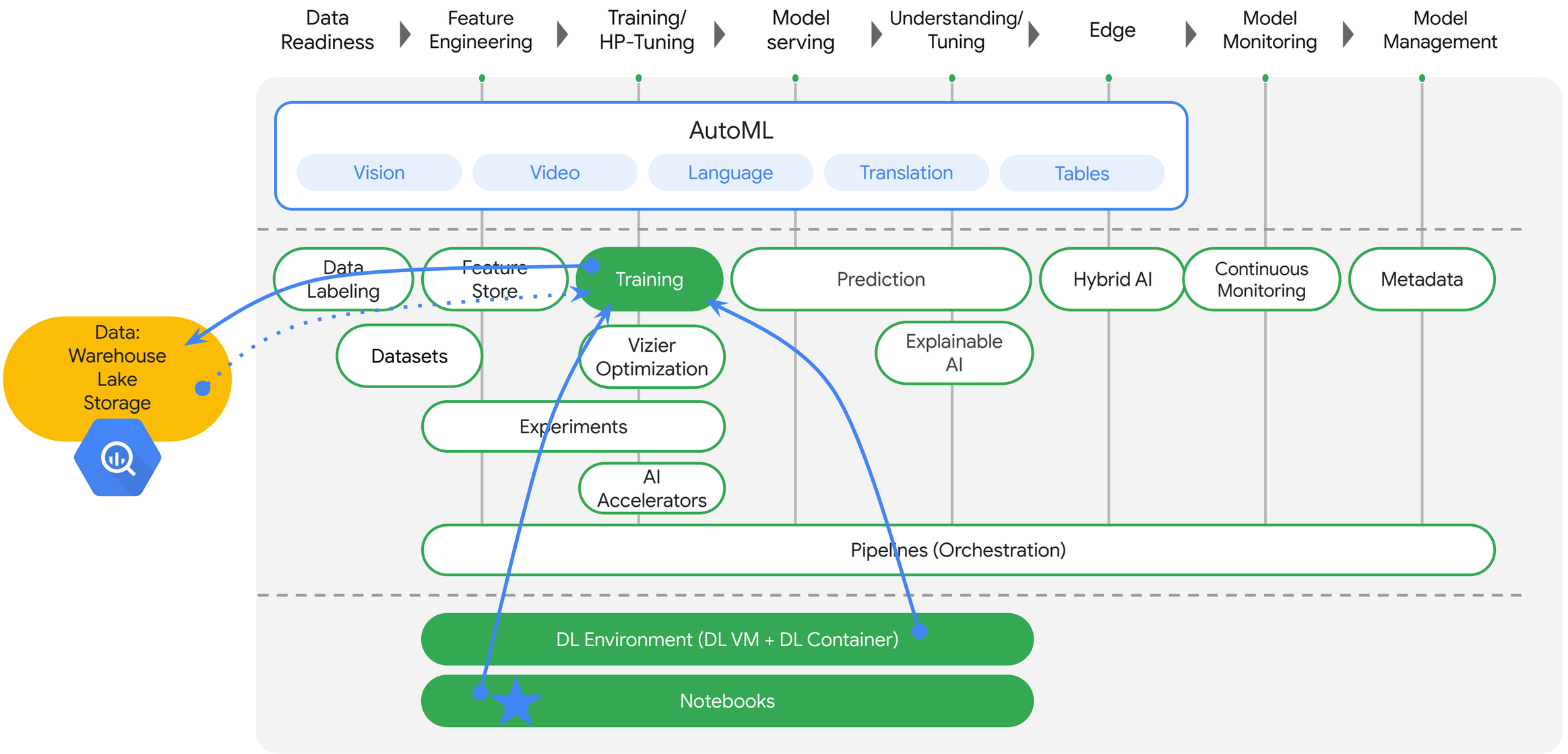
Custom Forecast In Notebook

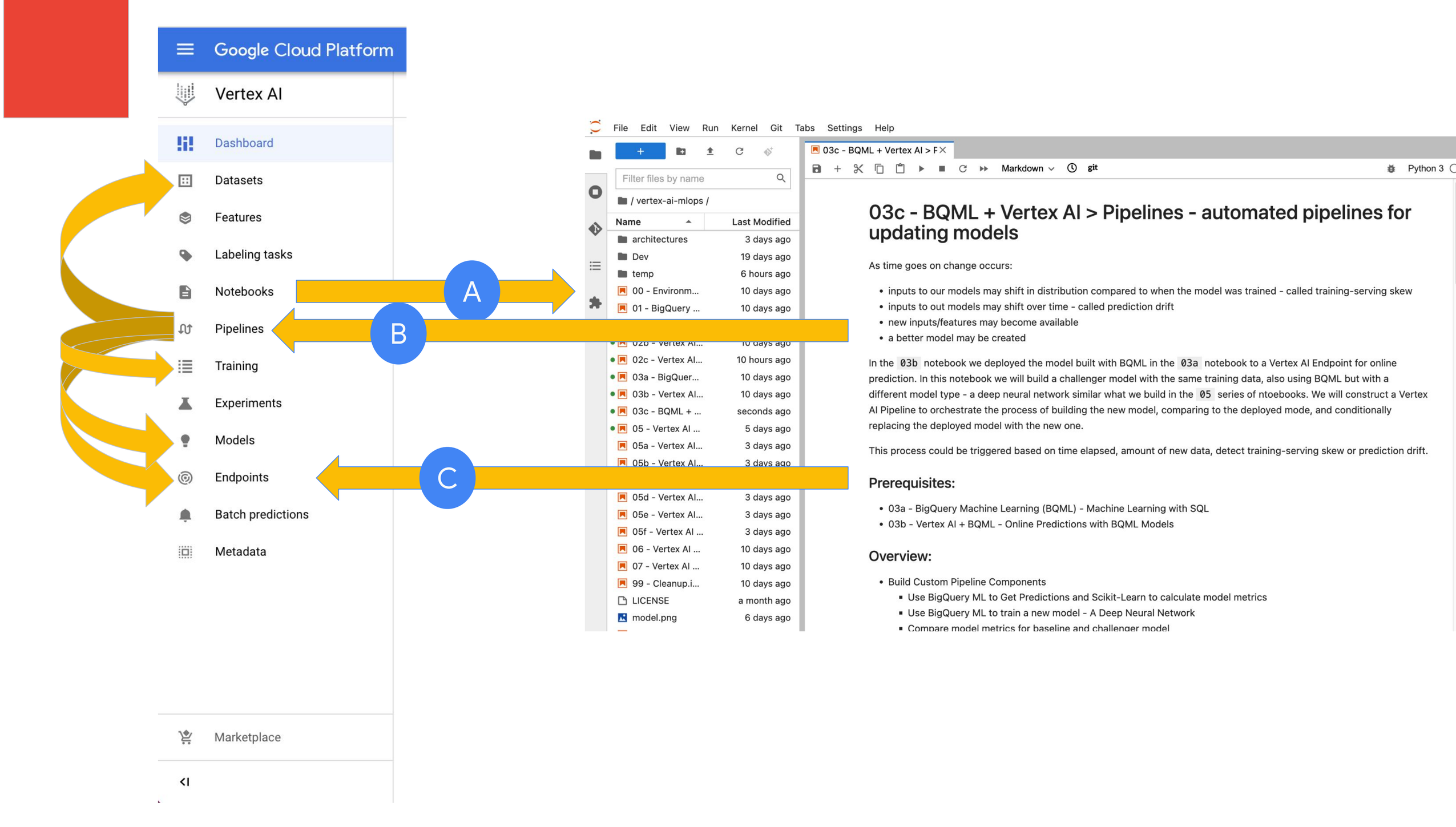
Using Prophet in Vertex AI Notebooks

04f

Notebook: 04e

Vertex AI Overview

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Time Series Forecasting

Vertex AI

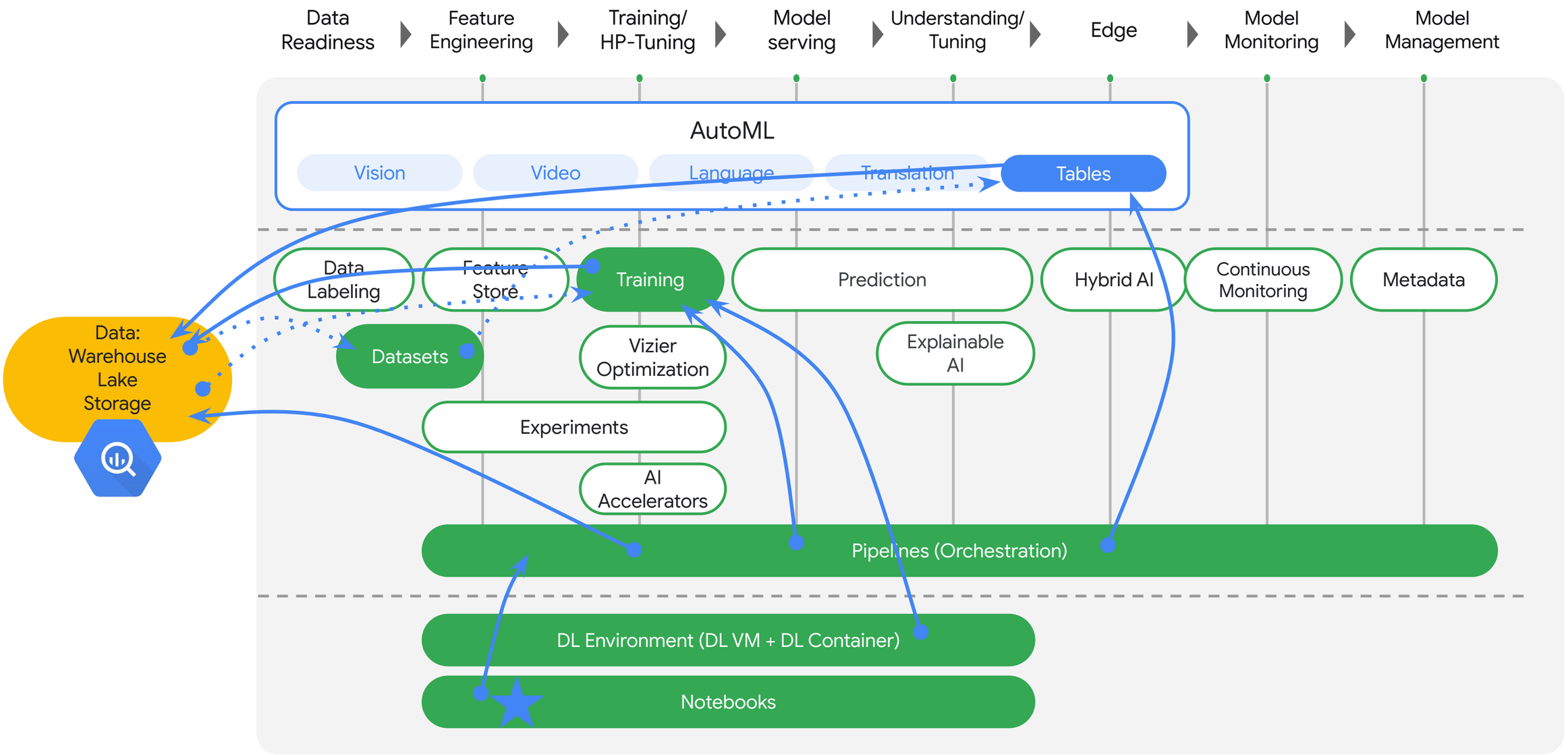
Custom Job With Custom Container

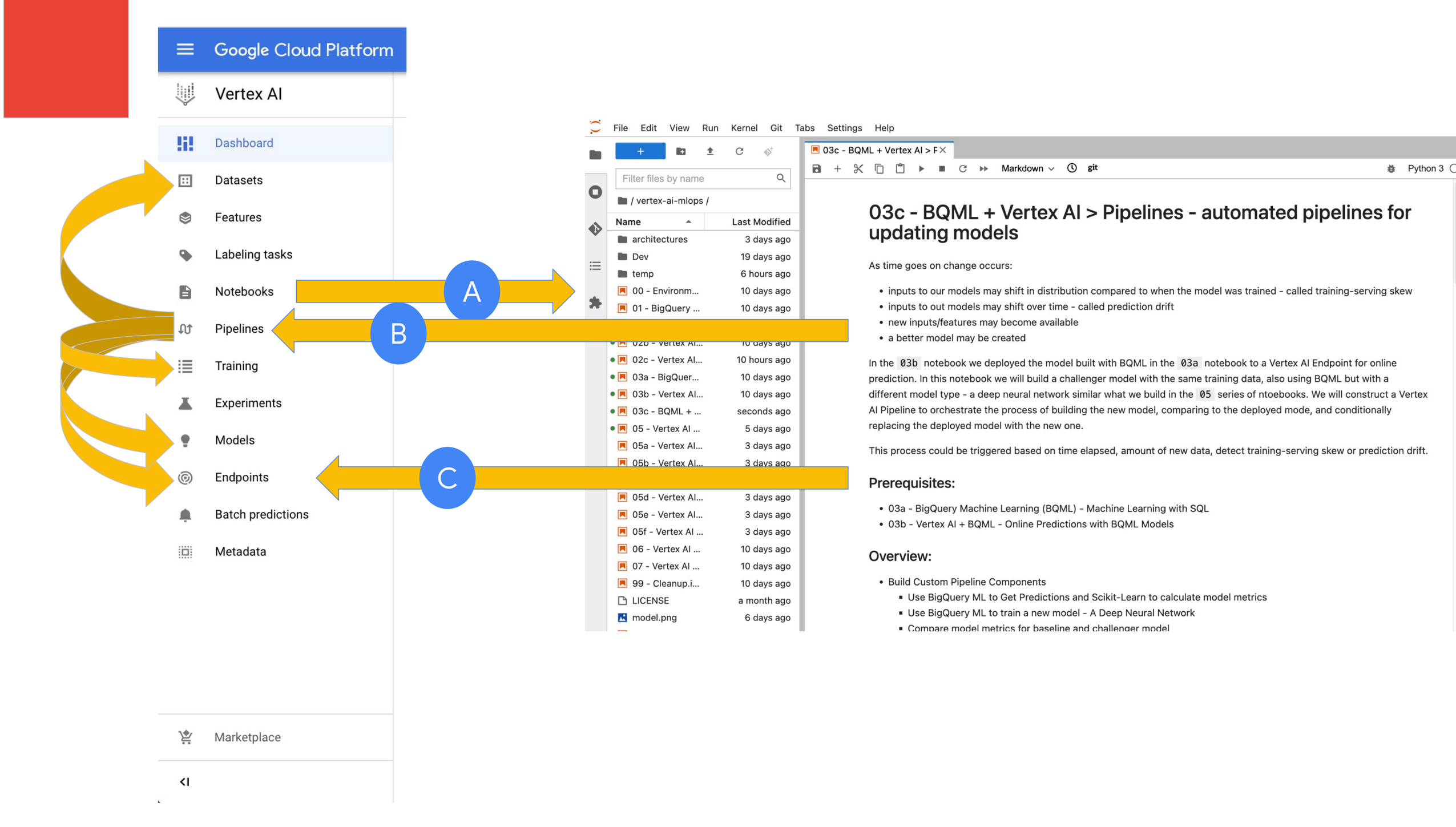
Using Prophet in Vertex AI Training

04g

Notebook: 04g

Vertex AI Overview

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In the 03b notebook we deployed the model built with BQML in the 03a notebook to a Vertex AI Endpoint for online prediction. In this notebook we will build a challenger model with the same training data, also using BQML but with a different model type - a deep neural network similar what we build in the 05 series of ntoebooks. We will construct a Vertex AI Pipeline to orchestrate the process of building the new model, comparing to the deployed mode, and conditionally replacing the deployed model with the new one.
This process could be triggered based on time elapsed, amount of new data, detect training-serving skew or prediction drift.
Prerequisites:
03a - BigQuery Machine Learning (BQML) - Machine Learning with SQL
03b - Vertex AI + BQML - Online Predictions with BQML Models
Overview:
Build Custom Pipeline Components
Use BigQuery ML to Get Predictions and Scikit-Learn to calculate model metrics
Use BigQuery ML to train a new model - A Deep Neural Network
Compare model metrics for baseline and challenger model

Time Series Forecasting

Vertex AI

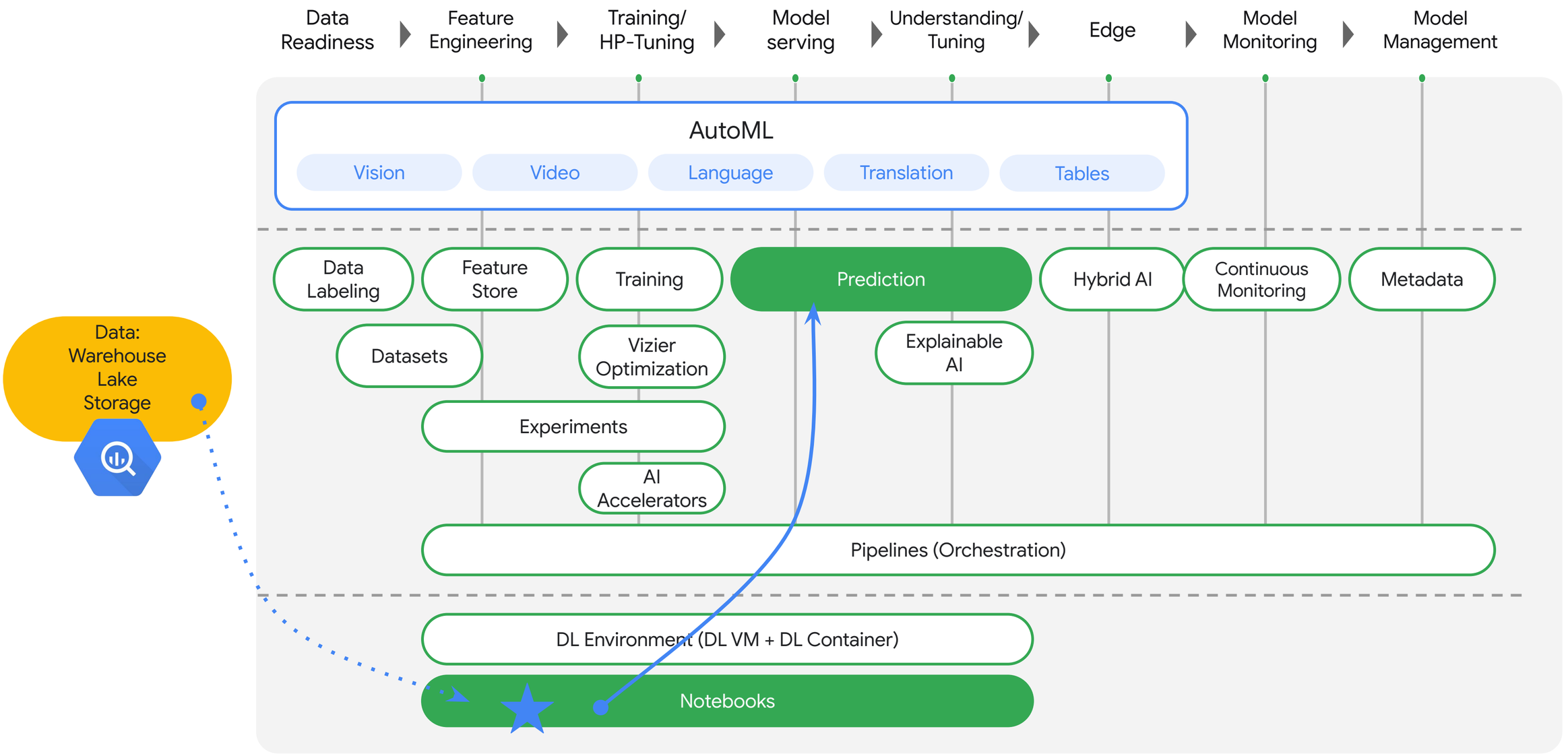
Forecast Tournament Pipeline

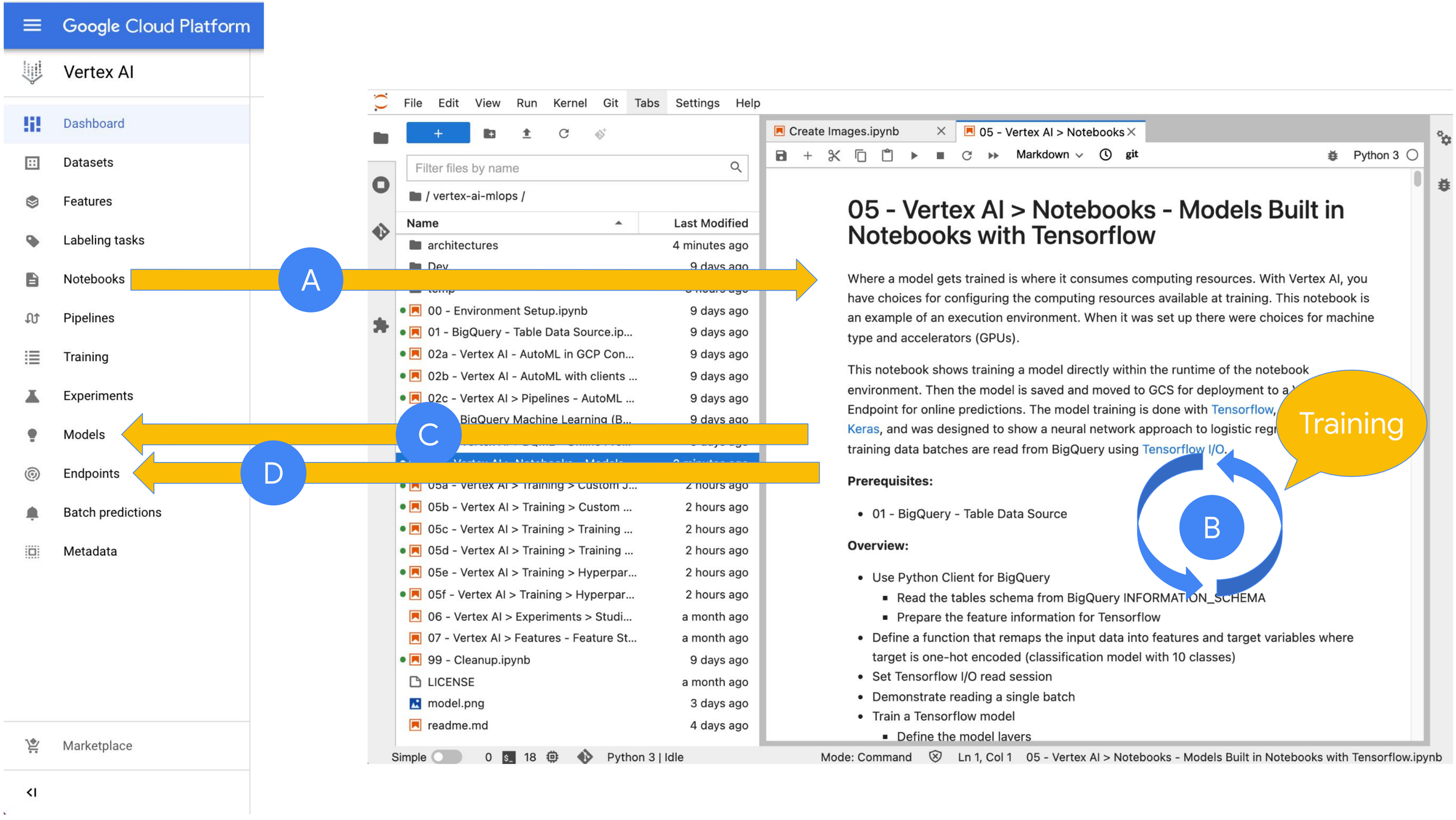
BigQuery ML ARIMA+, AutoML and Prophet

05

Notebook: 05

Vertex AI Overview

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02a - Vertex AI - AutoML in GCP Con... 9 days ago
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05b - Vertex AI > Training > Custom ... 2 hours ago
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05d - Vertex AI > Training > Training ... 2 hours ago
05e - Vertex AI > Training > Hyperpar... 2 hours ago
05f - Vertex AI > Training > Hyperpar... 2 hours ago
06 - Vertex AI > Experiments > Studi... a month ago
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99 - Cleanup.ipynb 9 days ago
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05 - Vertex AI > Notebooks - Models Built in Notebooks with Tensorflow
Where a model gets trained is where it consumes computing resources. With Vertex AI, you have choices for configuring the computing resources available at training. This notebook is an example of an execution environment. When it was set up there were choices for machine type and accelerators (GPUs).
This notebook shows training a model directly within the runtime of the notebook environment. Then the model is saved and moved to GCS for deployment to a
Endpoint for online predictions. The model training is done with Tensorflow,
Keras, and was designed to show a neural network approach to logistic regr
training data batches are read from BigQuery using Tensorflow I/O.
Prerequisites:
01 - BigQuery - Table Data Source
Overview:
Use Python Client for BigQuery
Read the tables schema from BigQuery INFORMATION_SCHEMA
Prepare the feature information for Tensorflow
Define a function that remaps the input data into features and target variables where target is one-hot encoded (classification model with 10 classes)
Set Tensorflow I/O read session
Demonstrate reading a single batch
Train a Tensorflow model
Define the model layers
Simple 0 18 Python 3 | Idle
Mode: Command Ln 1, Col 1 05 - Vertex AI > Notebooks - Models Built in Notebooks with Tensorflow.ipynb

Custom Training

Vertex AI

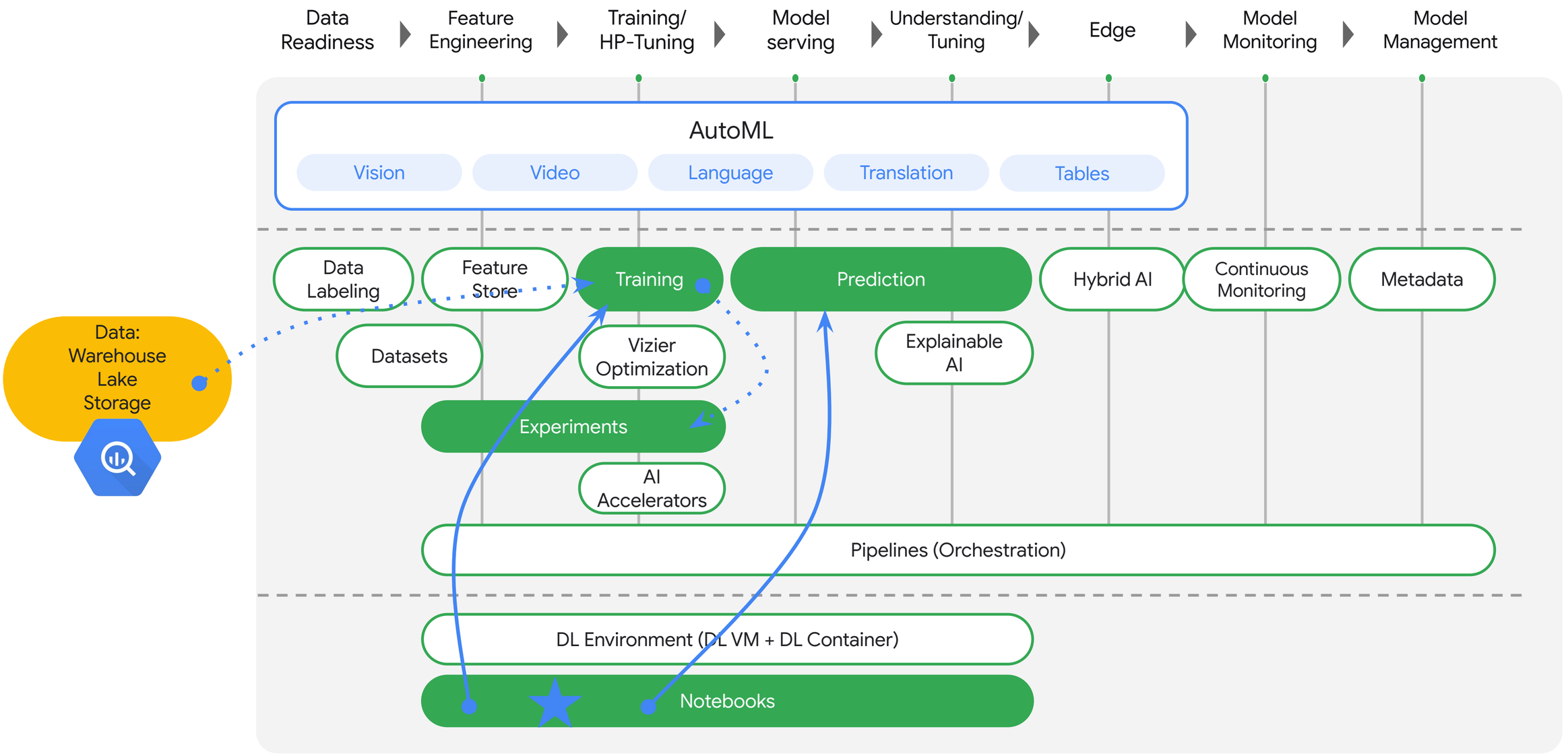
TensorFlow

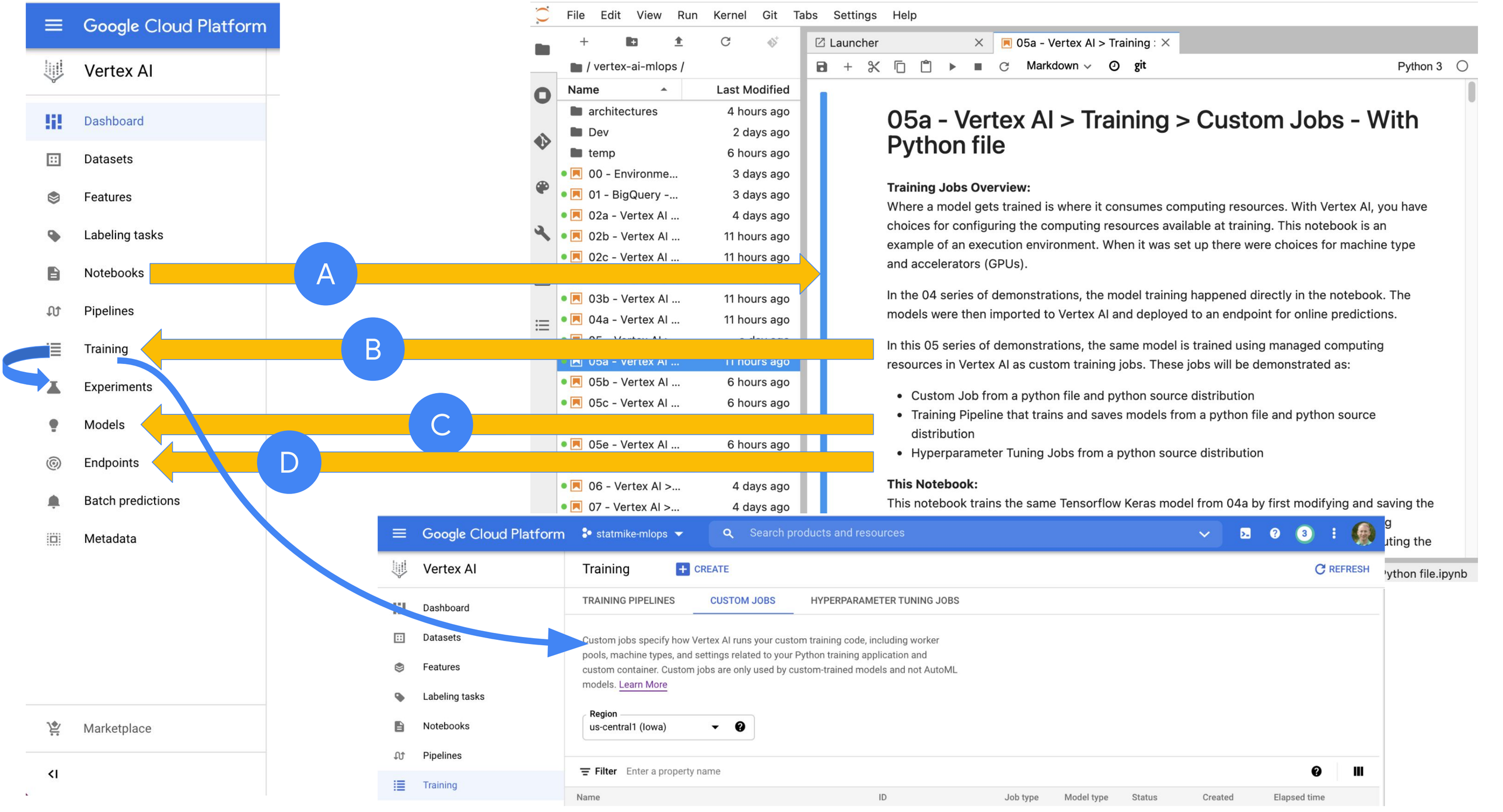
Custom Training in Notebook

05a

Notebook: 05a

Vertex AI Overview

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05a - Vertex AI > Training > Custom Jobs - With Python file
Training Jobs Overview:
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This notebook trains the same Tensorflow Keras model from 04a by first modifying and saving the
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Custom Training

TensorFlow

Vertex AI

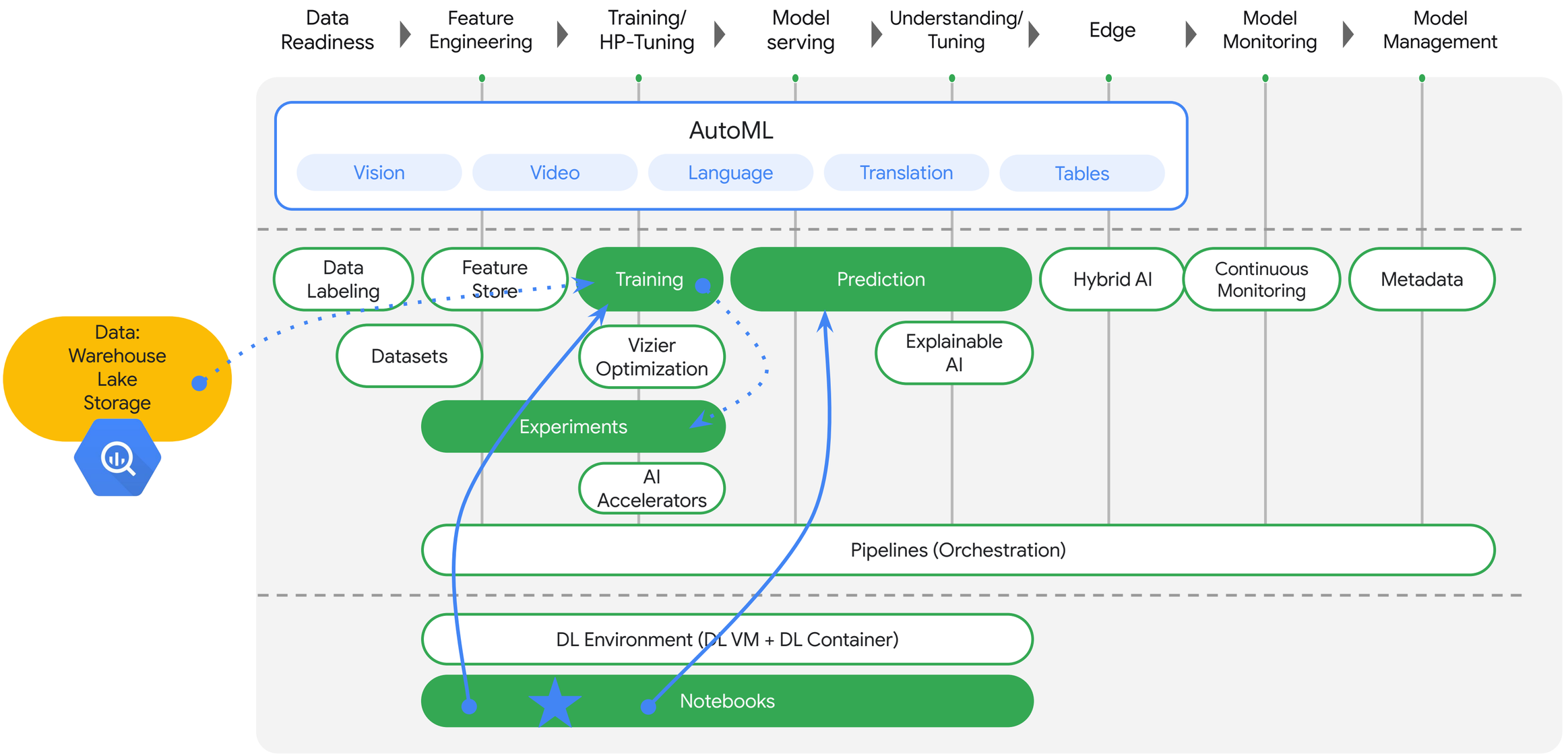
Custom Job

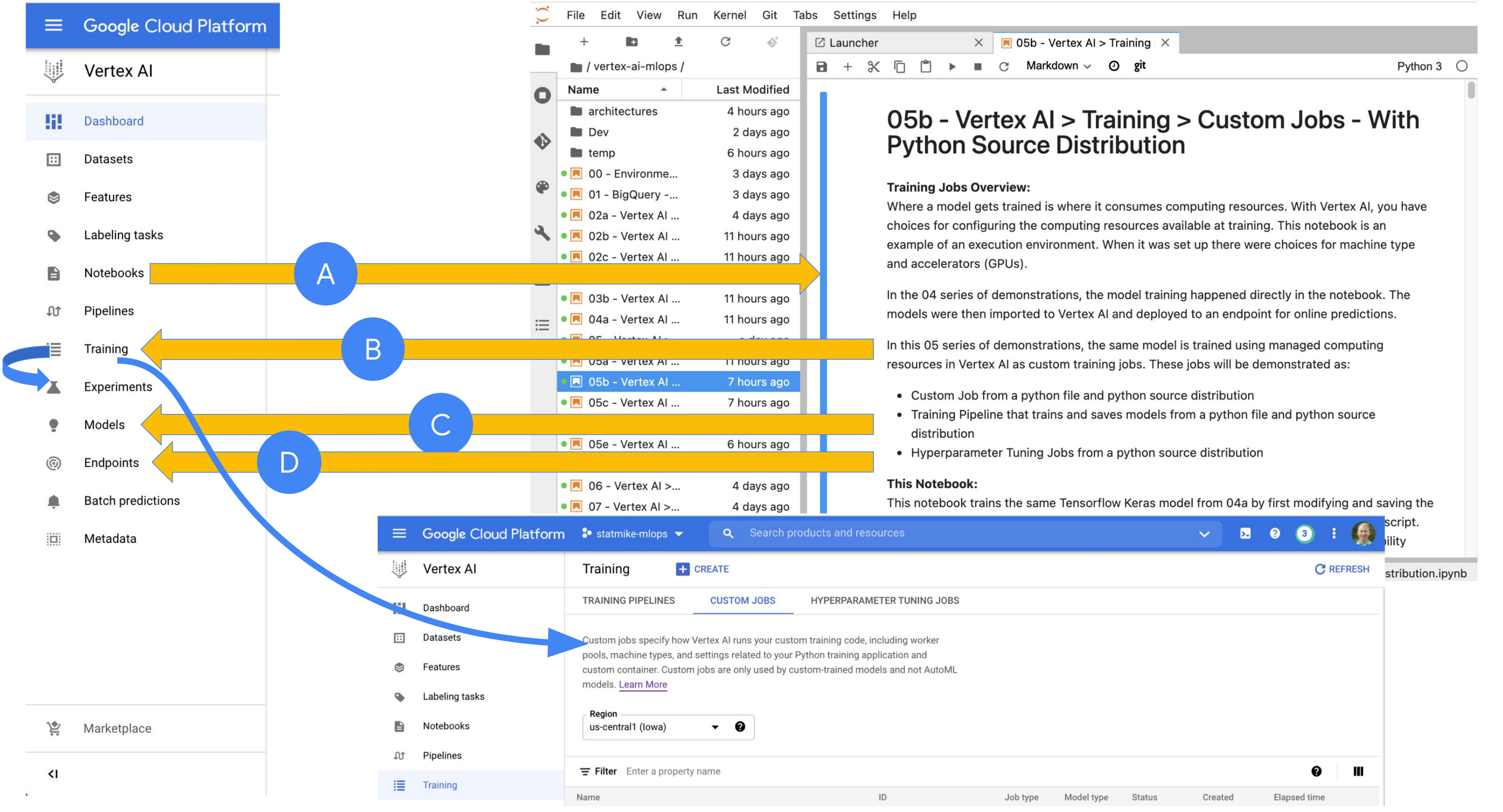
With Python File

05b

Notebook: 05b

Vertex AI Overview

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05b - Vertex AI > Training > Custom Jobs - With Python Source Distribution
Training Jobs Overview:
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Model type
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Elapsed time

Custom Training

Vertex AI

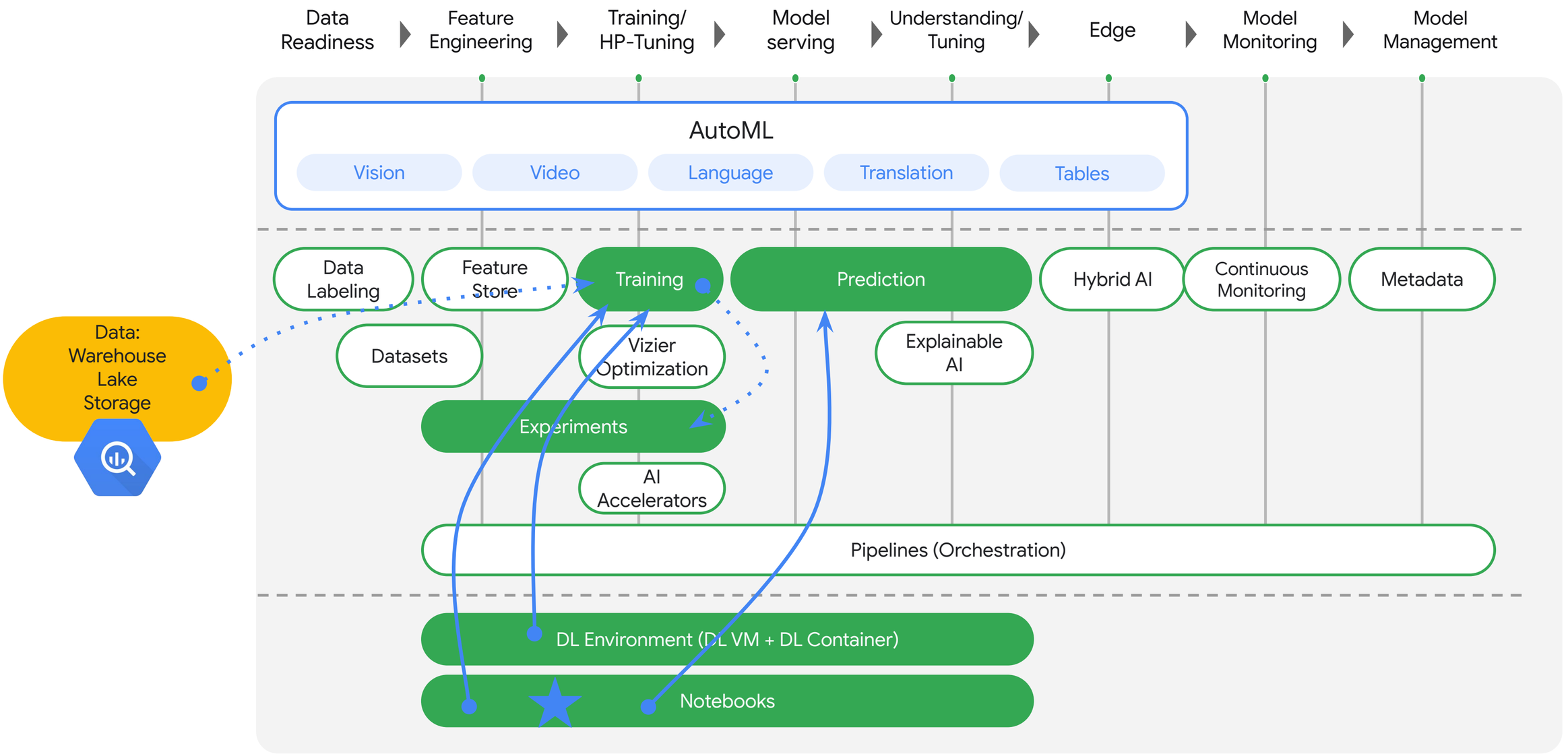
Custom Job

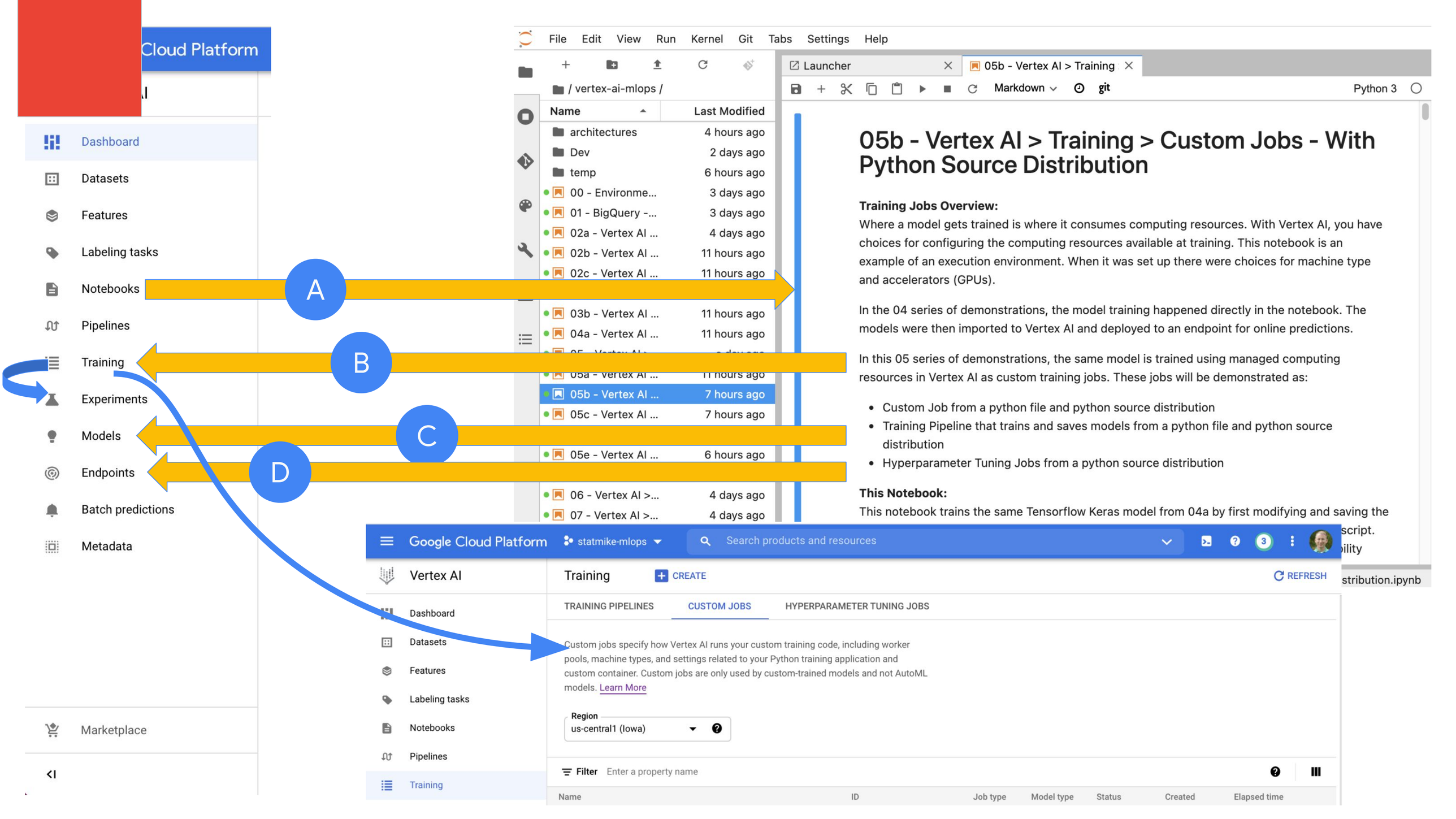
With Python Source Distribution

05c

Notebook: 05c

Vertex AI Overview

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Custom Training

TensorFlow

Vertex AI

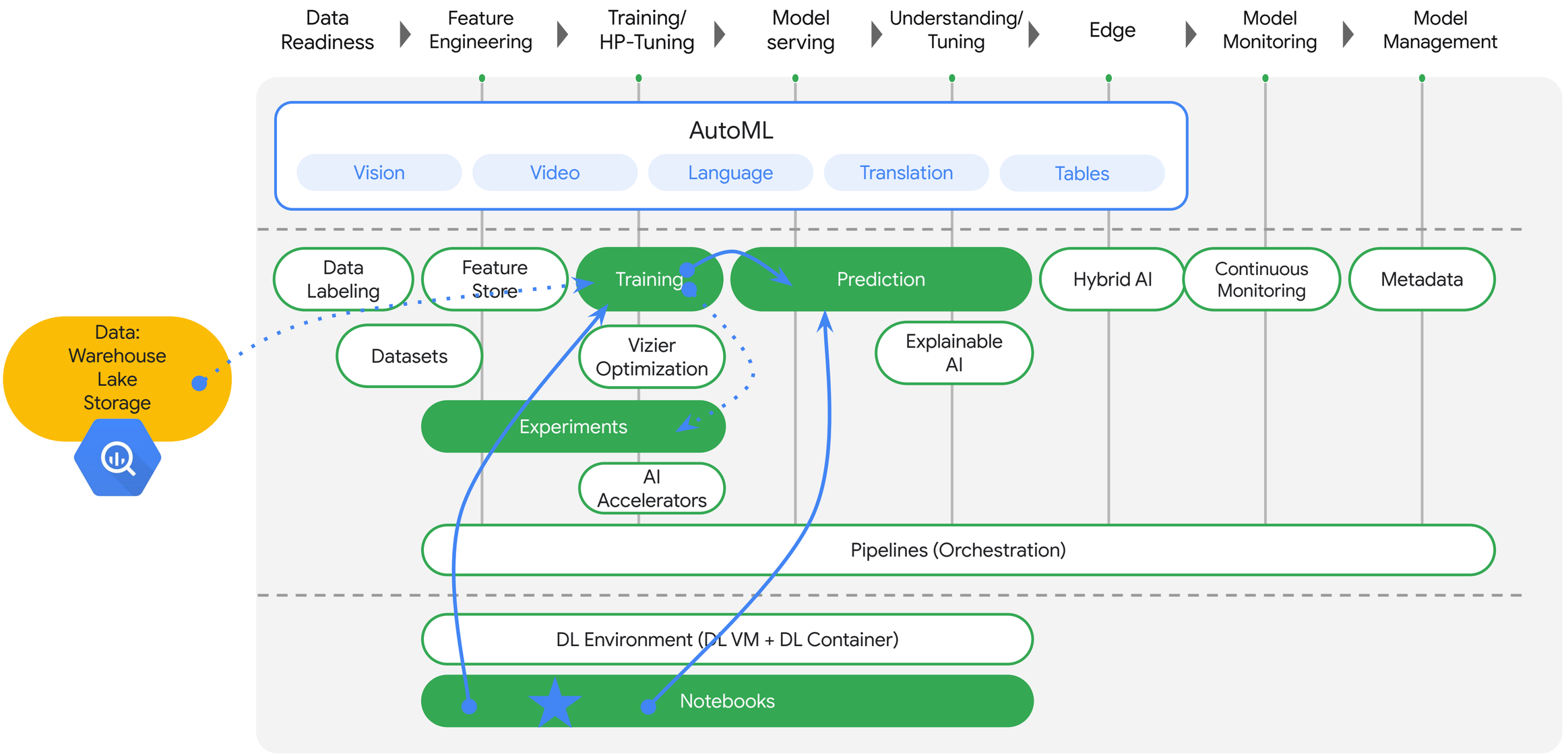
Custom Job

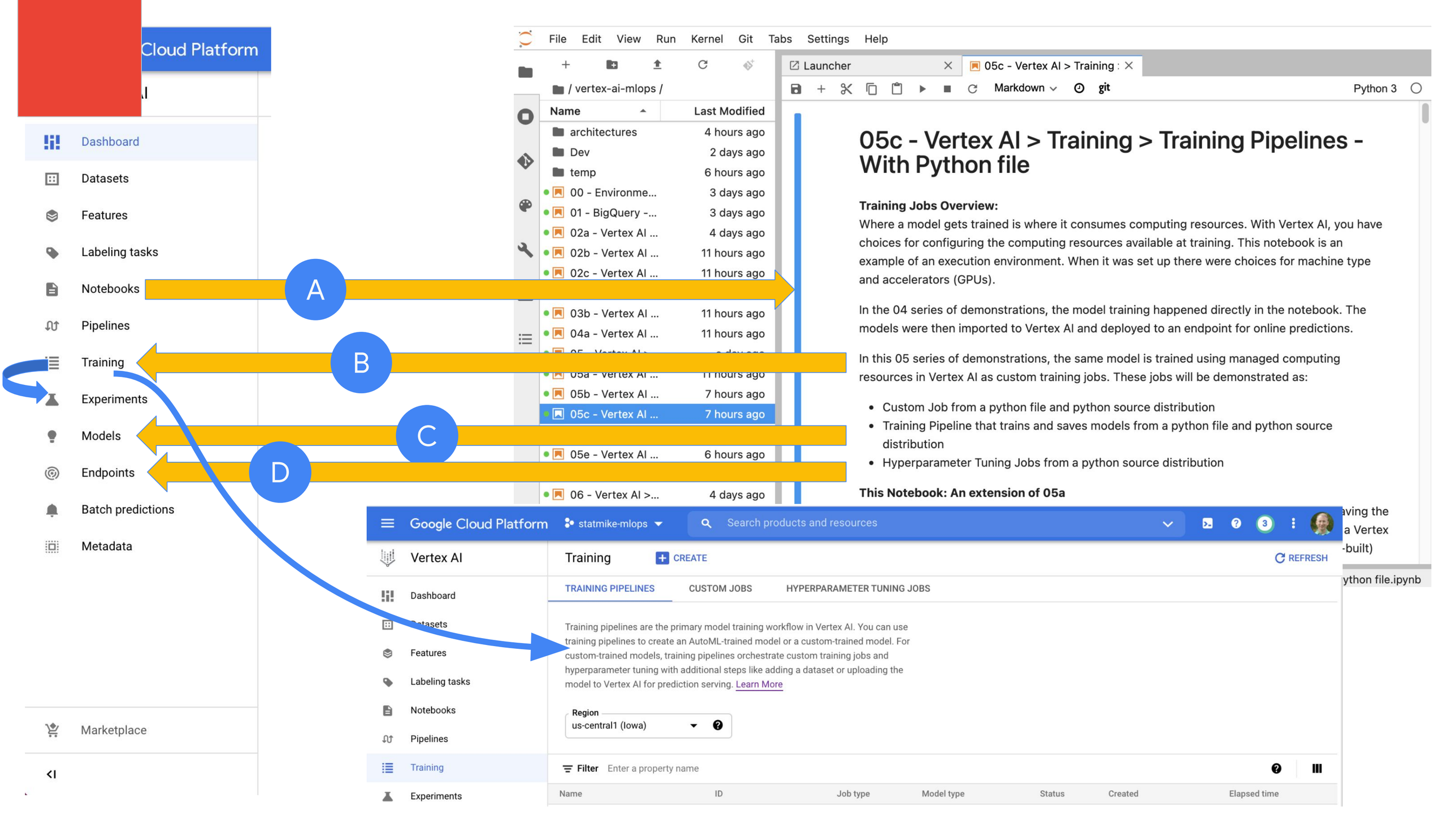
With Custom Container

05d

Notebook: 05d

Vertex AI Overview

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Custom Training

TensorFlow

Vertex AI

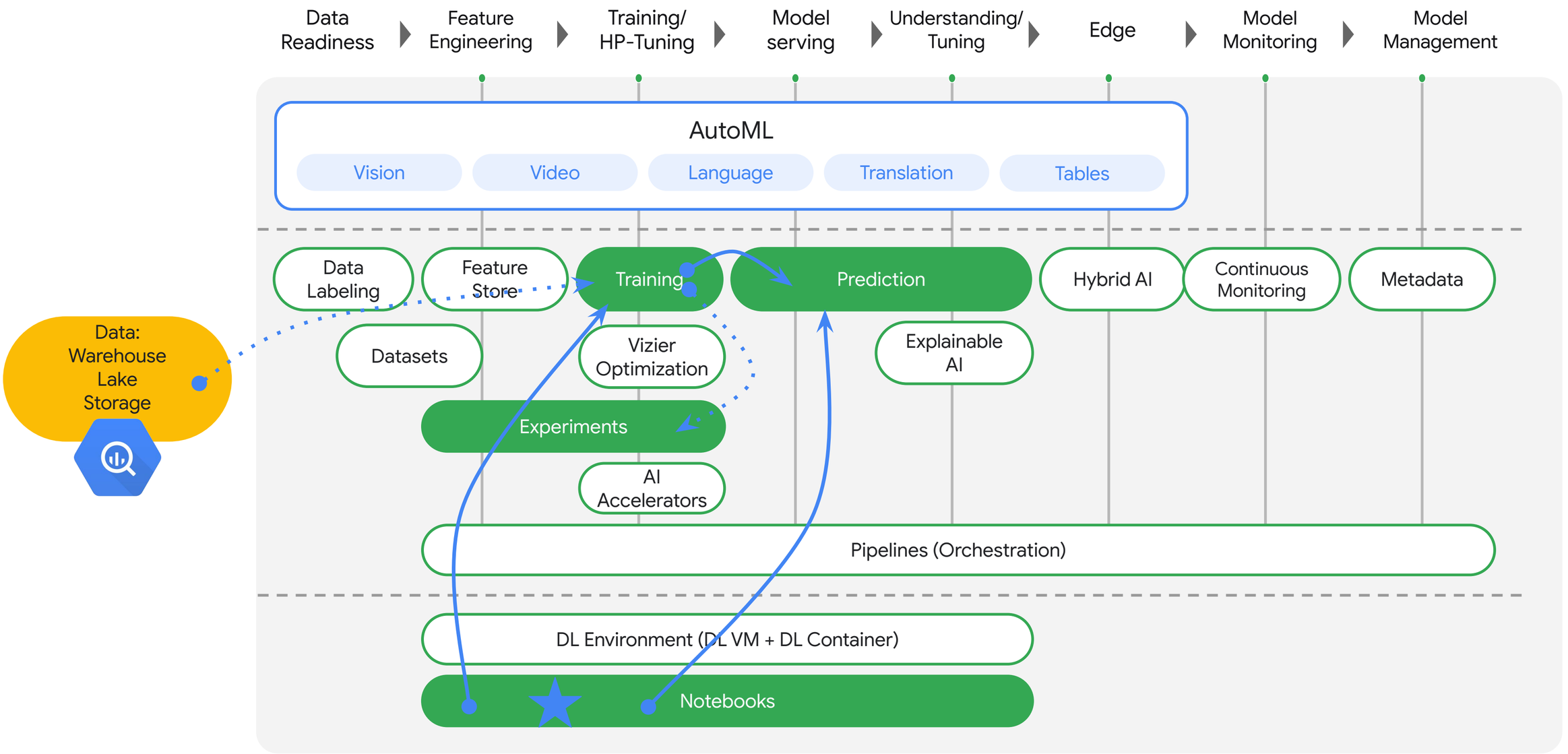
Training Pipeline

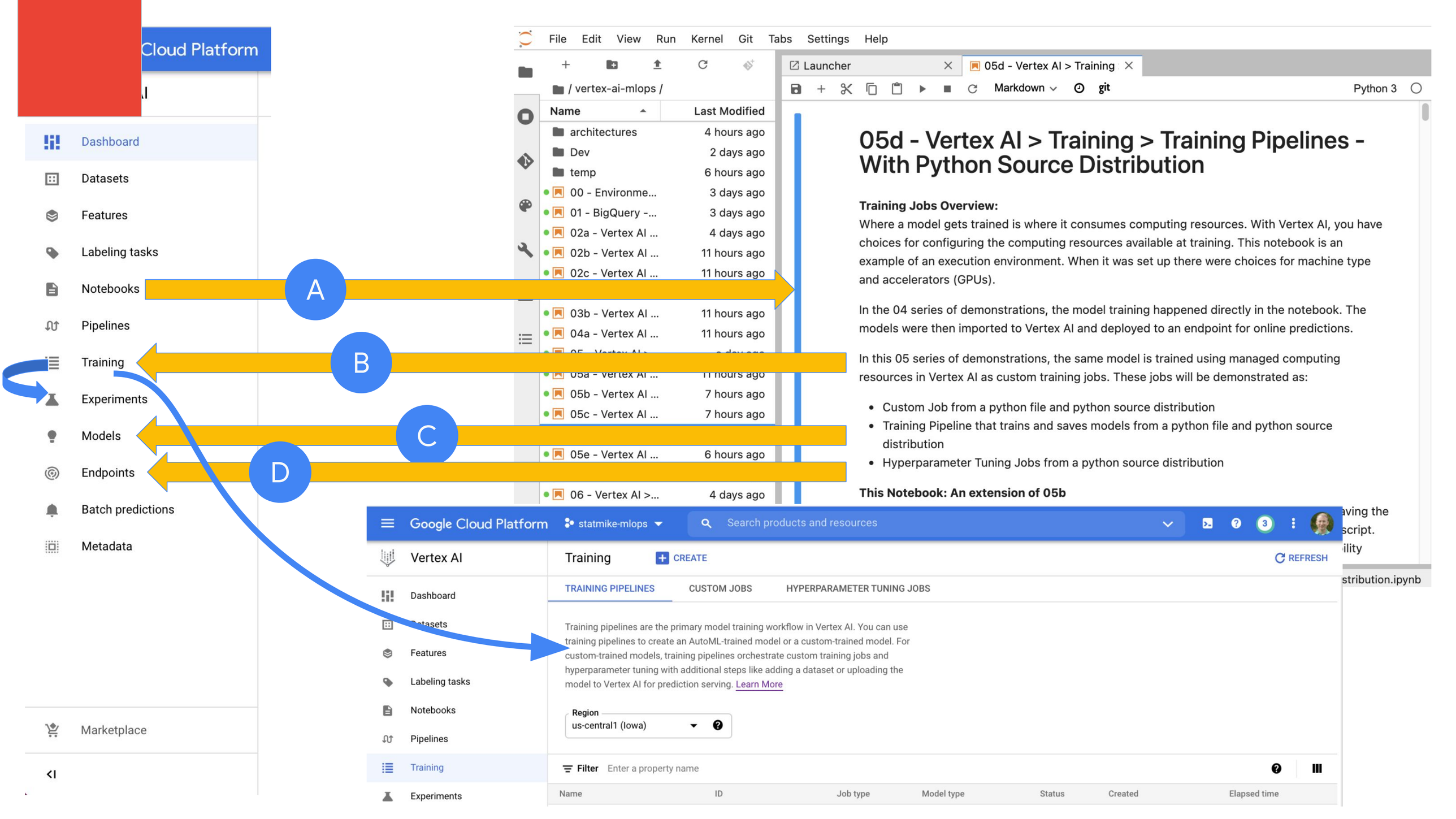
With Python File

05e

Notebook: 05e

Vertex AI Overview

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Custom Training

TensorFlow

Vertex AI

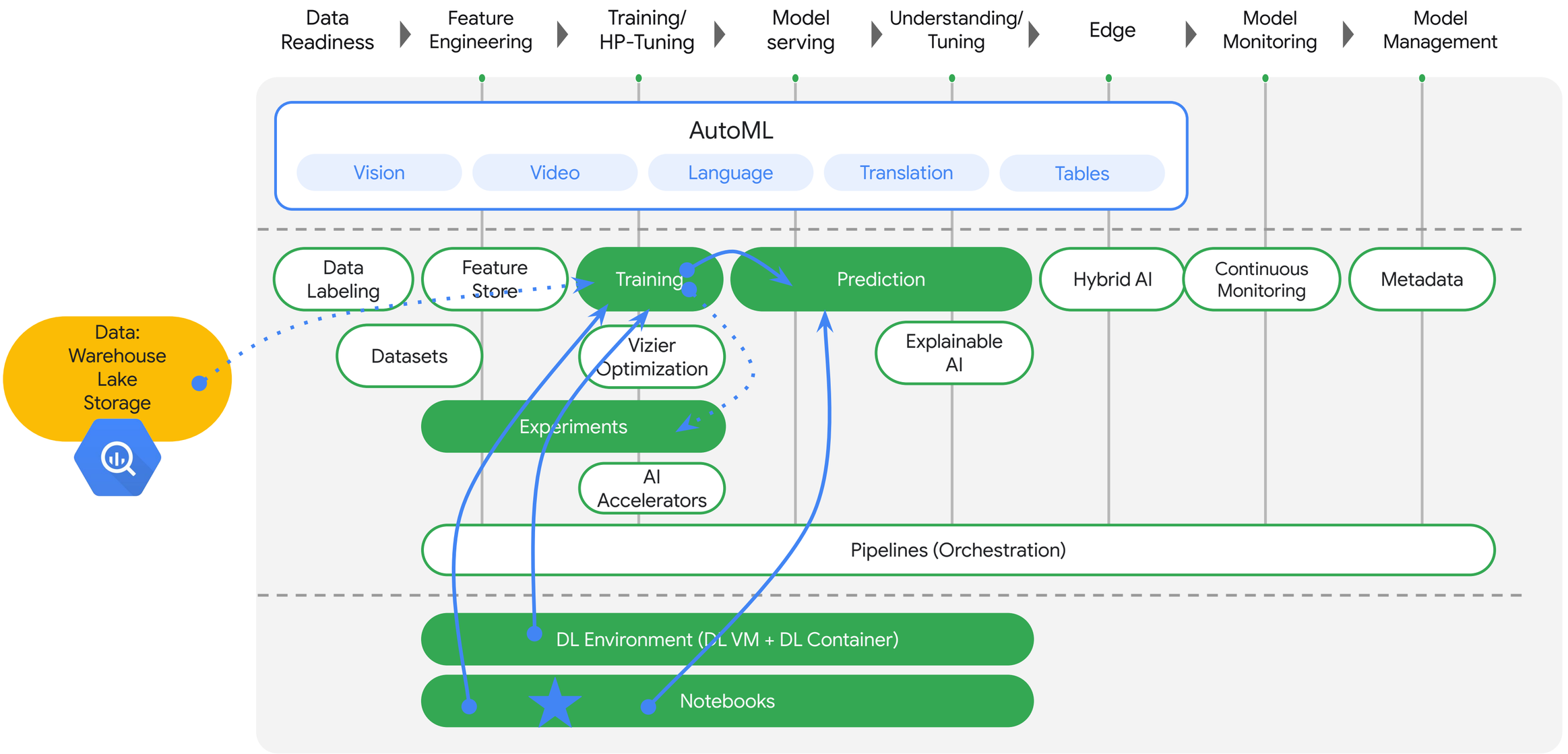
Training Pipeline

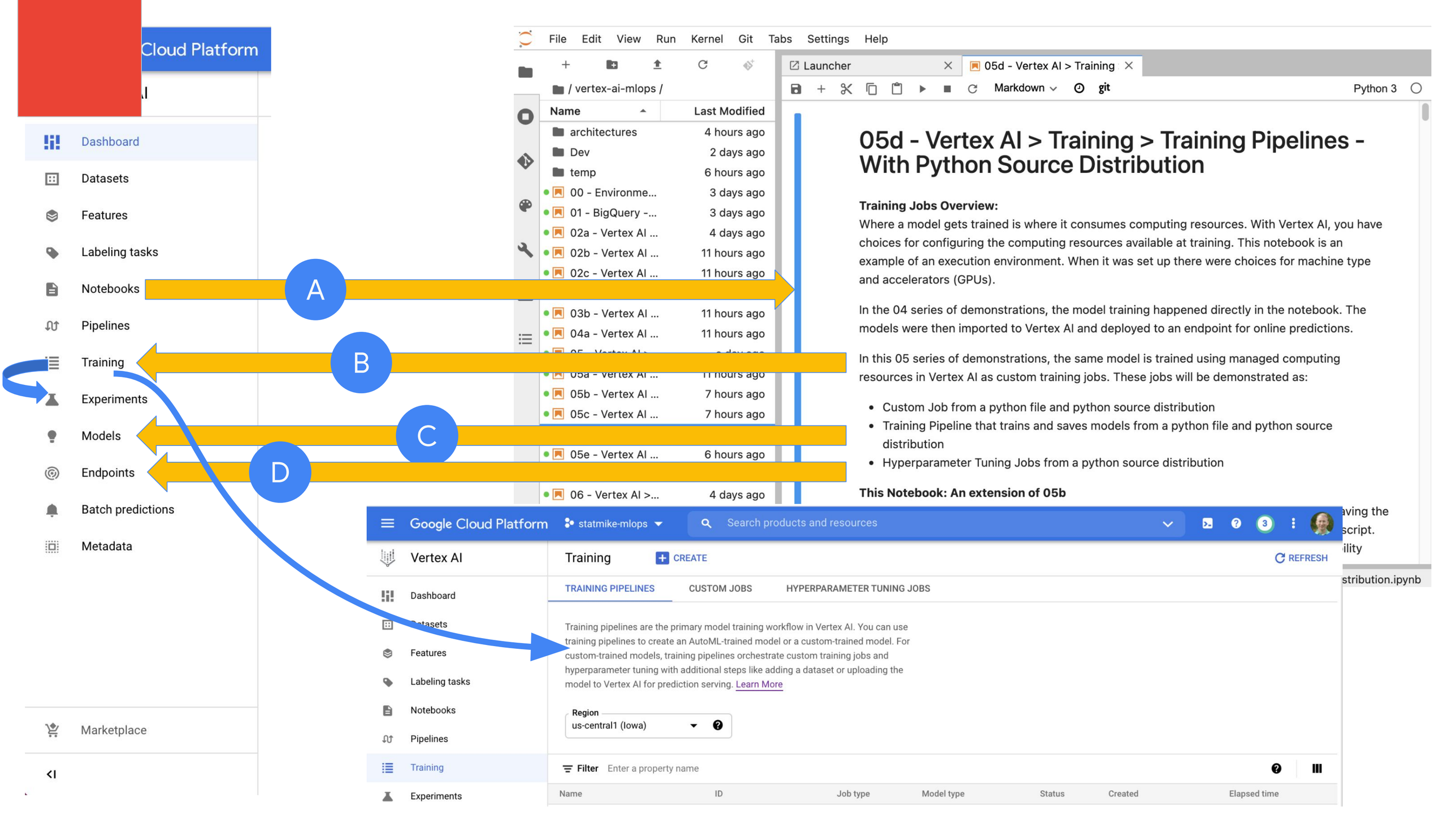
With Python Source Distribution

05f

Notebook: 05f

Vertex AI Overview

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Custom Training

Vertex AI

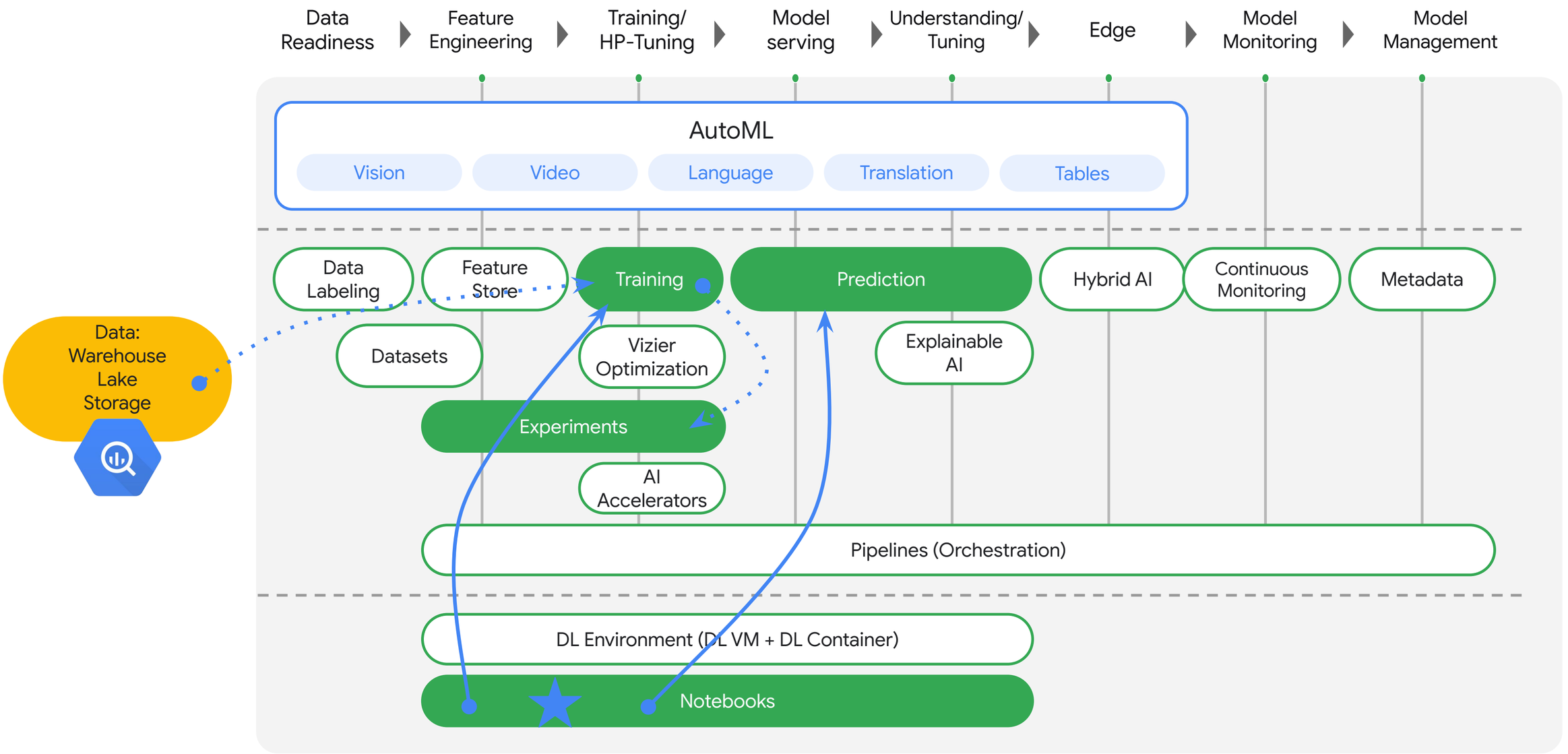
Training Pipeline

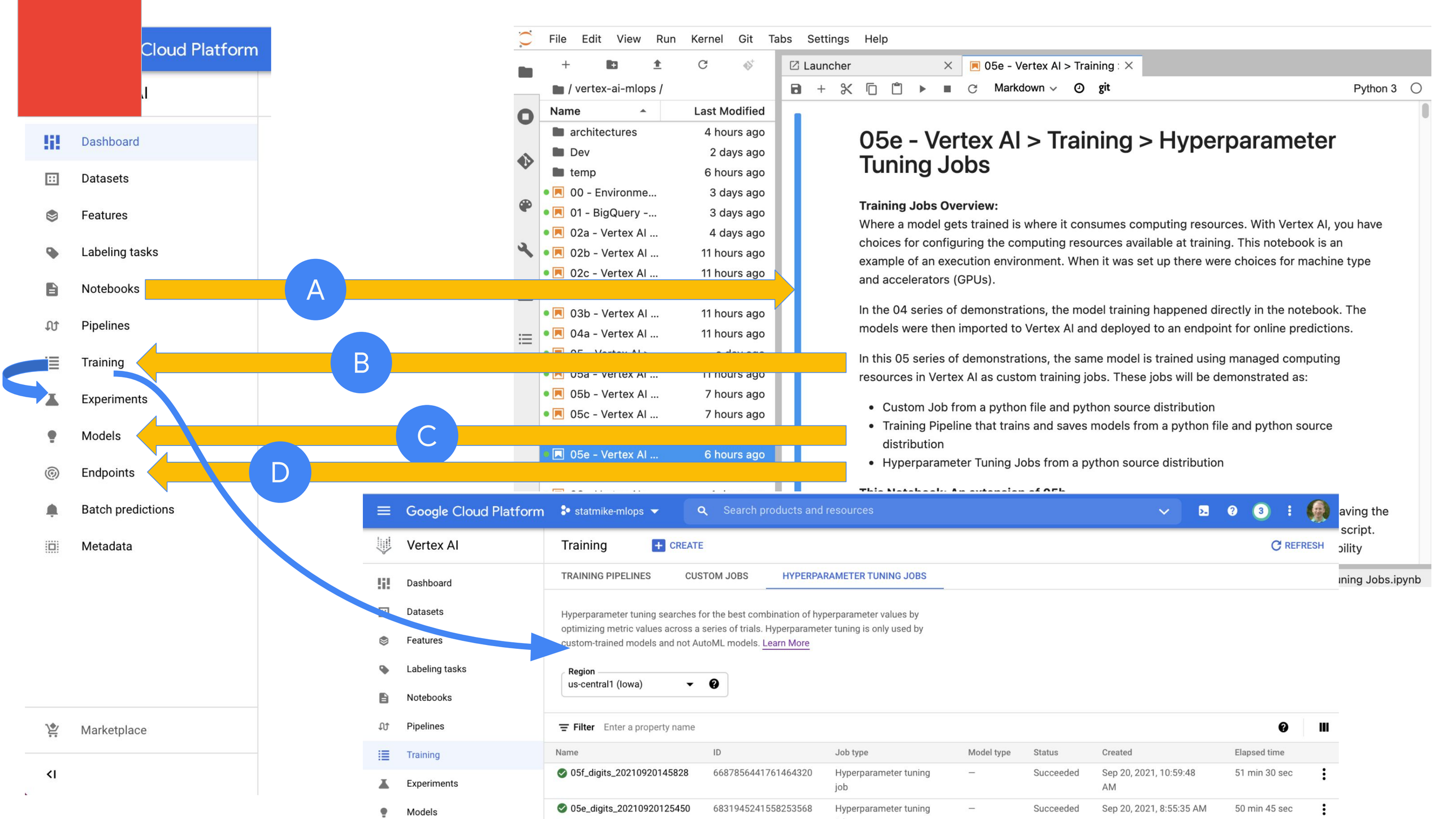
With Custom Container

05g

Notebook: 05g

Vertex AI Overview

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HYPERPARAMETER TUNING JOBS
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Hyperparameter tuning job
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Hyperparameter tuning
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Succeeded
Sep 20, 2021, 8:55:35 AM
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Custom Training

TensorFlow

Vertex AI

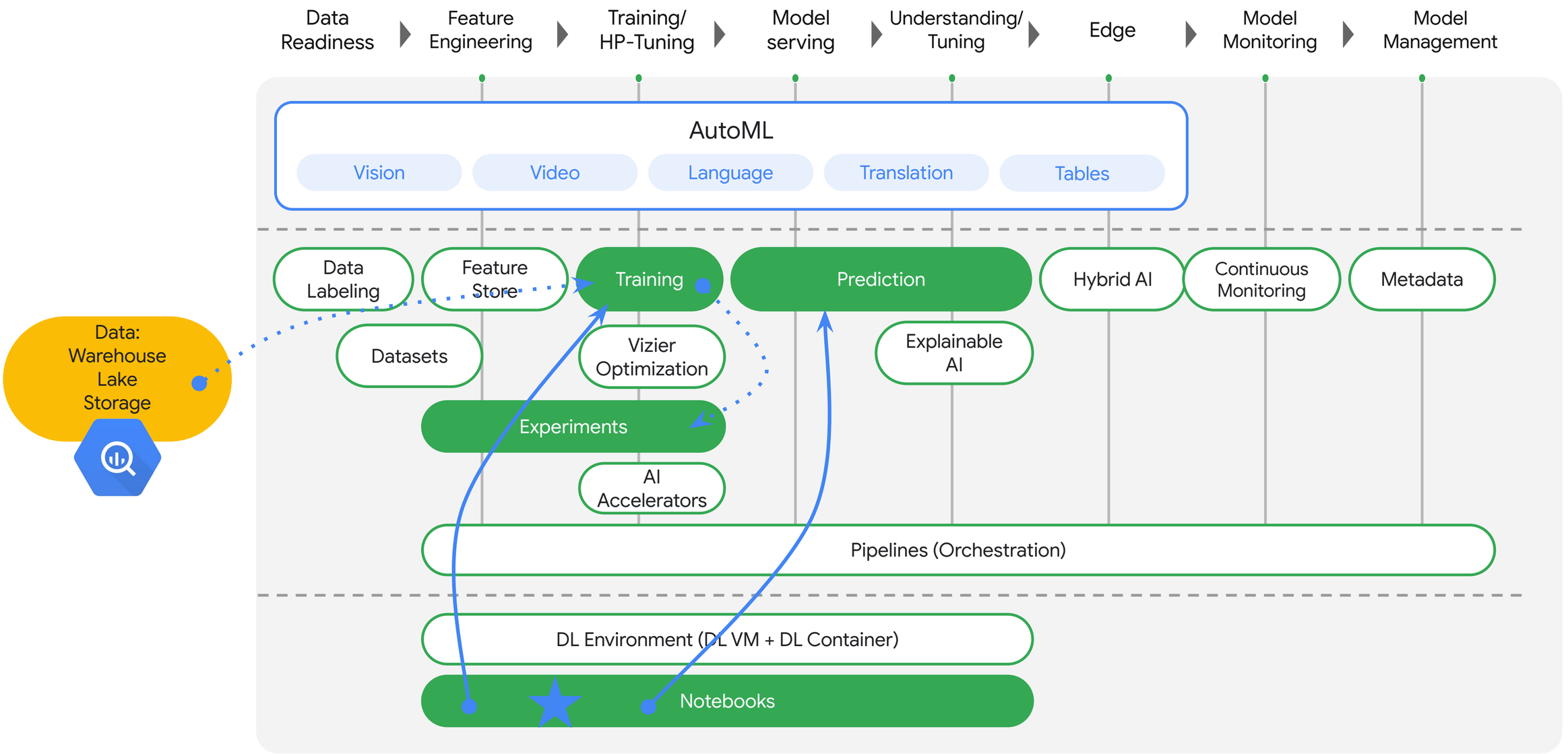
Hyperparameter Tuning Job

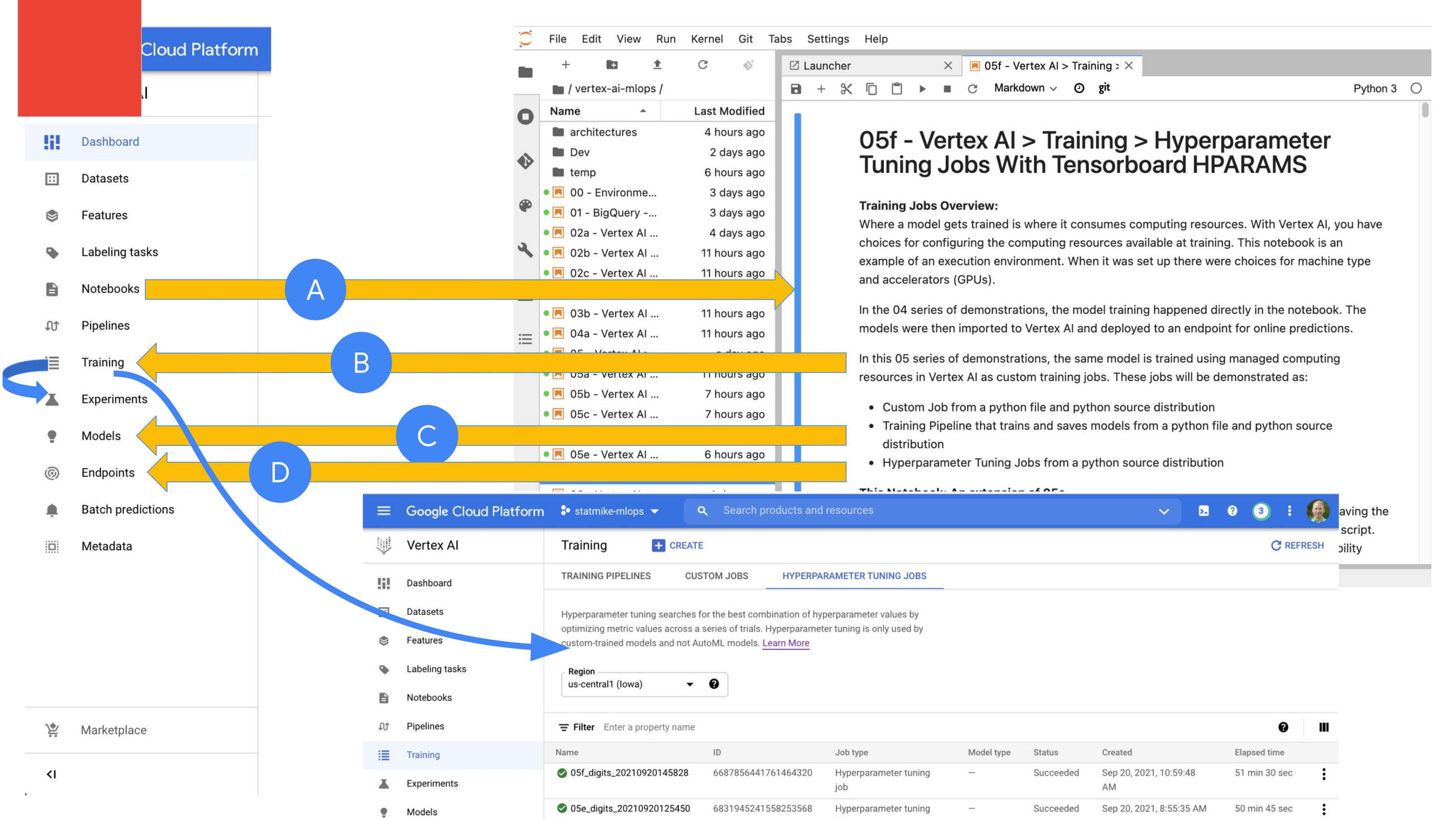
With Python File

05h

Notebook: 05h

Vertex AI Overview




Cloud Platform
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05c - Vertex AI ... 7 hours ago
05e - Vertex AI ... 6 hours ago
Launcher
05f - Vertex AI > Training >
Markdown
git
Python 3
05f - Vertex AI > Training > Hyperparameter Tuning Jobs With Tensorboard HPARAMS
Training Jobs Overview:
Where a model gets trained is where it consumes computing resources. With Vertex AI, you have choices for configuring the computing resources available at training. This notebook is an example of an execution environment. When it was set up there were choices for machine type and accelerators (GPUs).
In the 04 series of demonstrations, the model training happened directly in the notebook. The models were then imported to Vertex AI and deployed to an endpoint for online predictions.
In this 05 series of demonstrations, the same model is trained using managed computing resources in Vertex AI as custom training jobs. These jobs will be demonstrated as:
Custom Job from a python file and python source distribution
Training Pipeline that trains and saves models from a python file and python source distribution
Hyperparameter Tuning Jobs from a python source distribution
Google Cloud Platform
statmike-mlops
Search products and resources
Vertex AI
Training
CREATE
REFRESH
TRAINING PIPELINES
CUSTOM JOBS
HYPERPARAMETER TUNING JOBS
Hyperparameter tuning searches for the best combination of hyperparameter values by optimizing metric values across a series of trials. Hyperparameter tuning is only used by custom-trained models and not AutoML models. Learn More
Region
us-central1 (Iowa)
Filter
Enter a property name
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Job type
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Status
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05f_digits_20210920145828
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Hyperparameter tuning job
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05e_digits_20210920125450
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Hyperparameter tuning
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Succeeded
Sep 20, 2021, 8:55:35 AM
50 min 45 sec

Custom Training

TensorFlow

Vertex AI

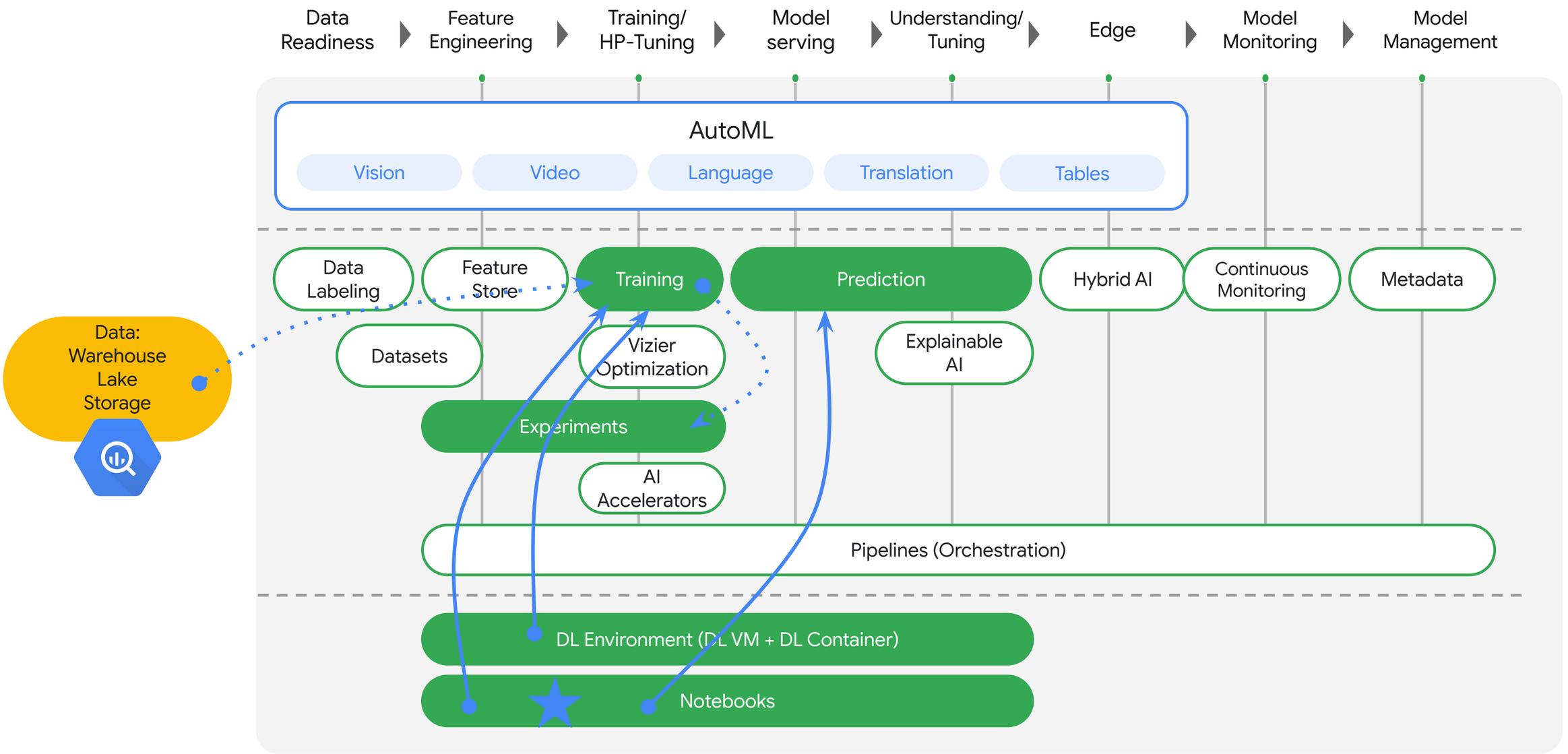
Hyperparameter Tuning Job

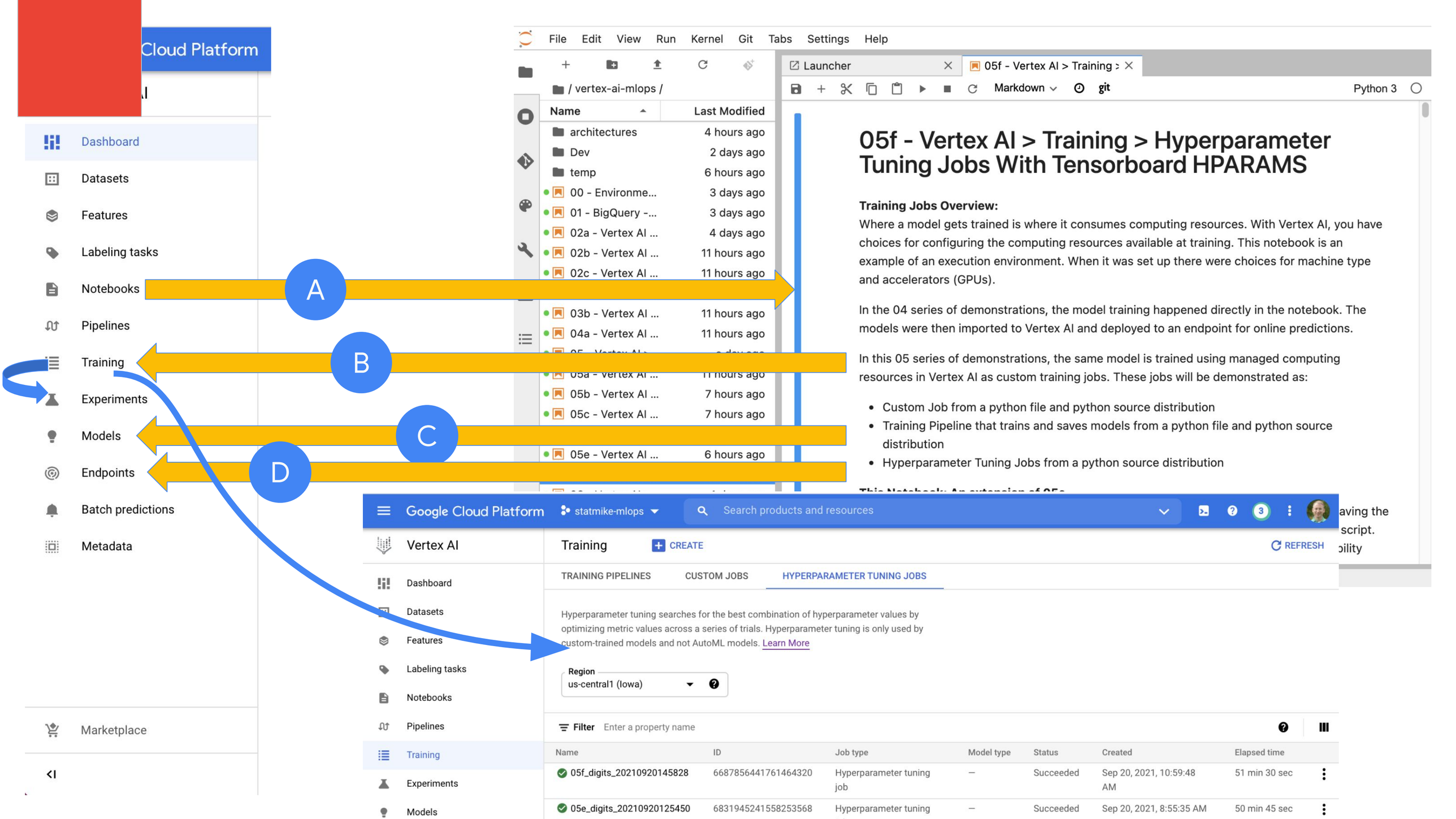
With Python Source Distribution

05i

Notebook: 05i

Vertex AI Overview

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05c - Vertex AI ... 7 hours ago
05e - Vertex AI ... 6 hours ago
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05f - Vertex AI > Training >
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Python 3
05f - Vertex AI > Training > Hyperparameter Tuning Jobs With Tensorboard HPARAMS
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Hyperparameter tuning job
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6831945241558253568
Hyperparameter tuning
—
Succeeded
Sep 20, 2021, 8:55:35 AM
50 min 45 sec

Custom Training

TensorFlow

Vertex AI

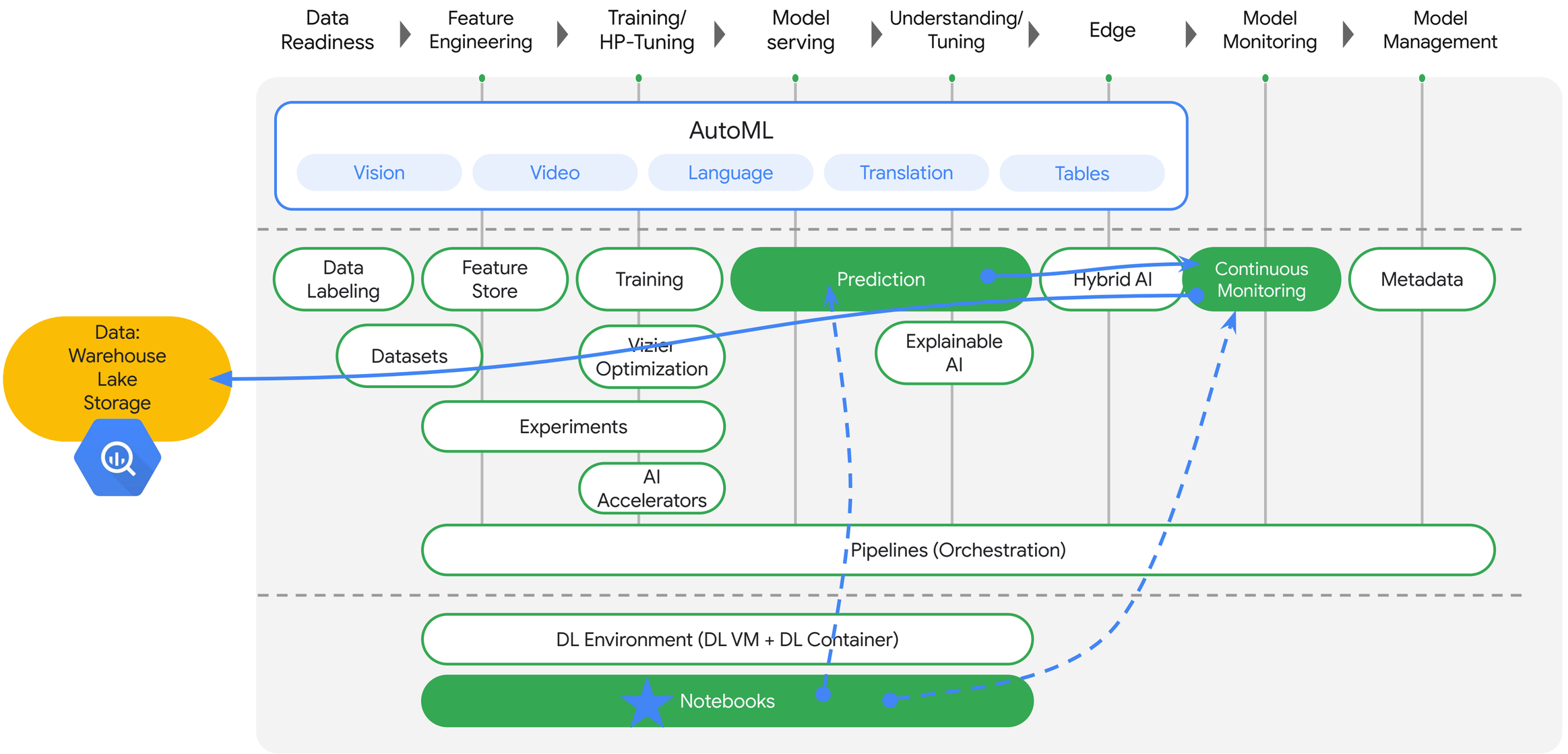
Hyperparameter Tuning Job

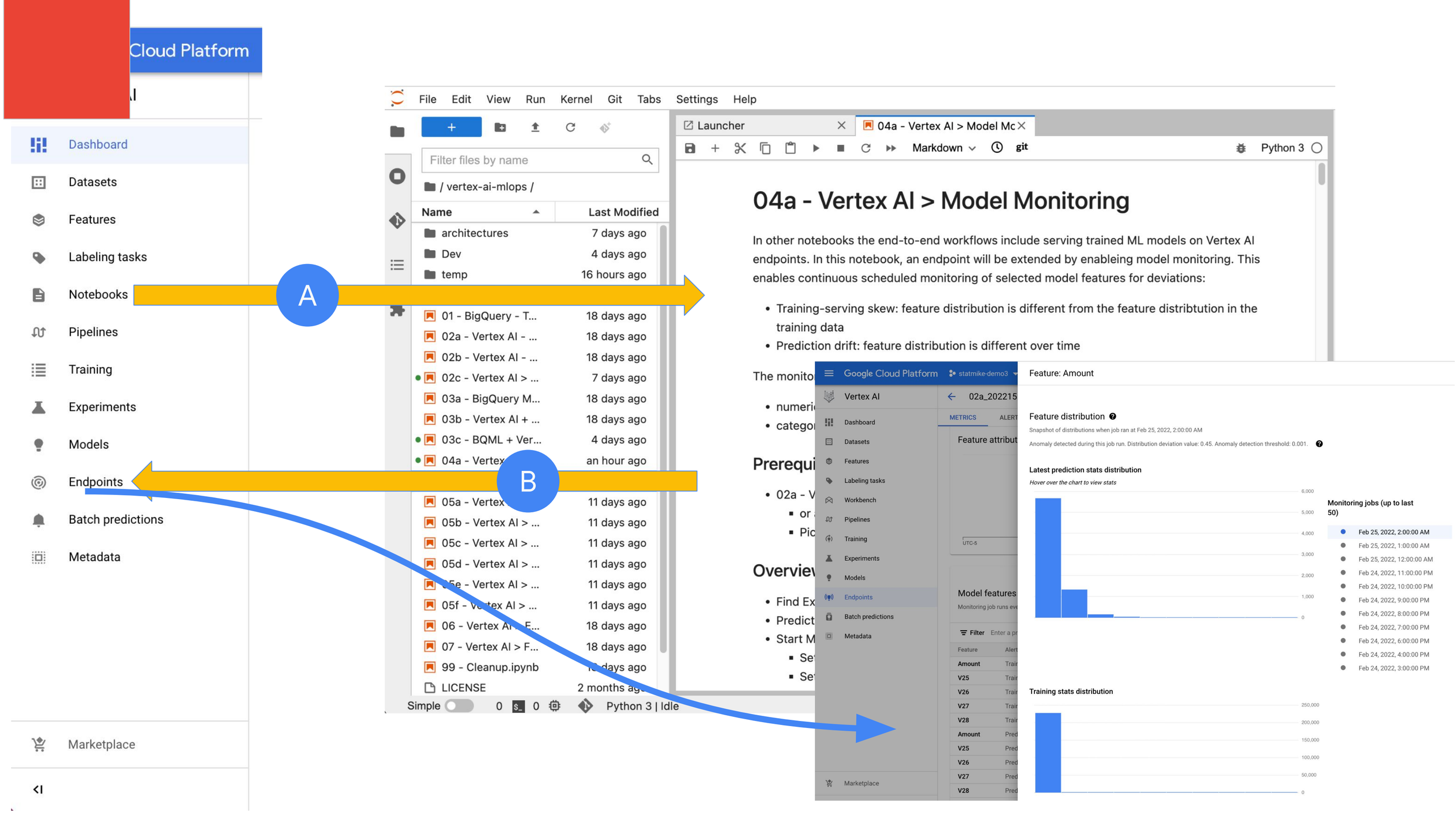
With Custom Container

06a

Notebook: 06a

Vertex AI Overview

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Simple 0 0 Python 3 | Idle
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04a - Vertex AI > Model Mc
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Python 3
04a - Vertex AI > Model Monitoring
In other notebooks the end-to-end workflows include serving trained ML models on Vertex AI endpoints. In this notebook, an endpoint will be extended by enableing model monitoring. This enables continuous scheduled monitoring of selected model features for deviations:
Training-serving skew: feature distribution is different from the feature distribtution in the training data
Prediction drift: feature distribution is different over time
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UTC-5
Model features
Monitoring job runs eve
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Feature
Alert
Amount
V25
V26
V27
V28
Feature: Amount
Feature distribution
Snapshot of distributions when job ran at Feb 25, 2022, 2:00:00 AM
Anomaly detected during this job run. Distribution deviation value: 0.45. Anomaly detection threshold: 0.001.
Latest prediction stats distribution
Hover over the chart to view stats
6,000
5,000
4,000
3,000
2,000
1,000
0
Monitoring jobs (up to last 50)
Feb 25, 2022, 2:00:00 AM
Feb 25, 2022, 1:00:00 AM
Feb 25, 2022, 12:00:00 AM
Feb 24, 2022, 11:00:00 PM
Feb 24, 2022, 10:00:00 PM
Feb 24, 2022, 9:00:00 PM
Feb 24, 2022, 8:00:00 PM
Feb 24, 2022, 7:00:00 PM
Feb 24, 2022, 6:00:00 PM
Feb 24, 2022, 4:00:00 PM
Feb 24, 2022, 3:00:00 PM
Training stats distribution
250,000
200,000
150,000
100,000
50,000
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Continuous Monitoring

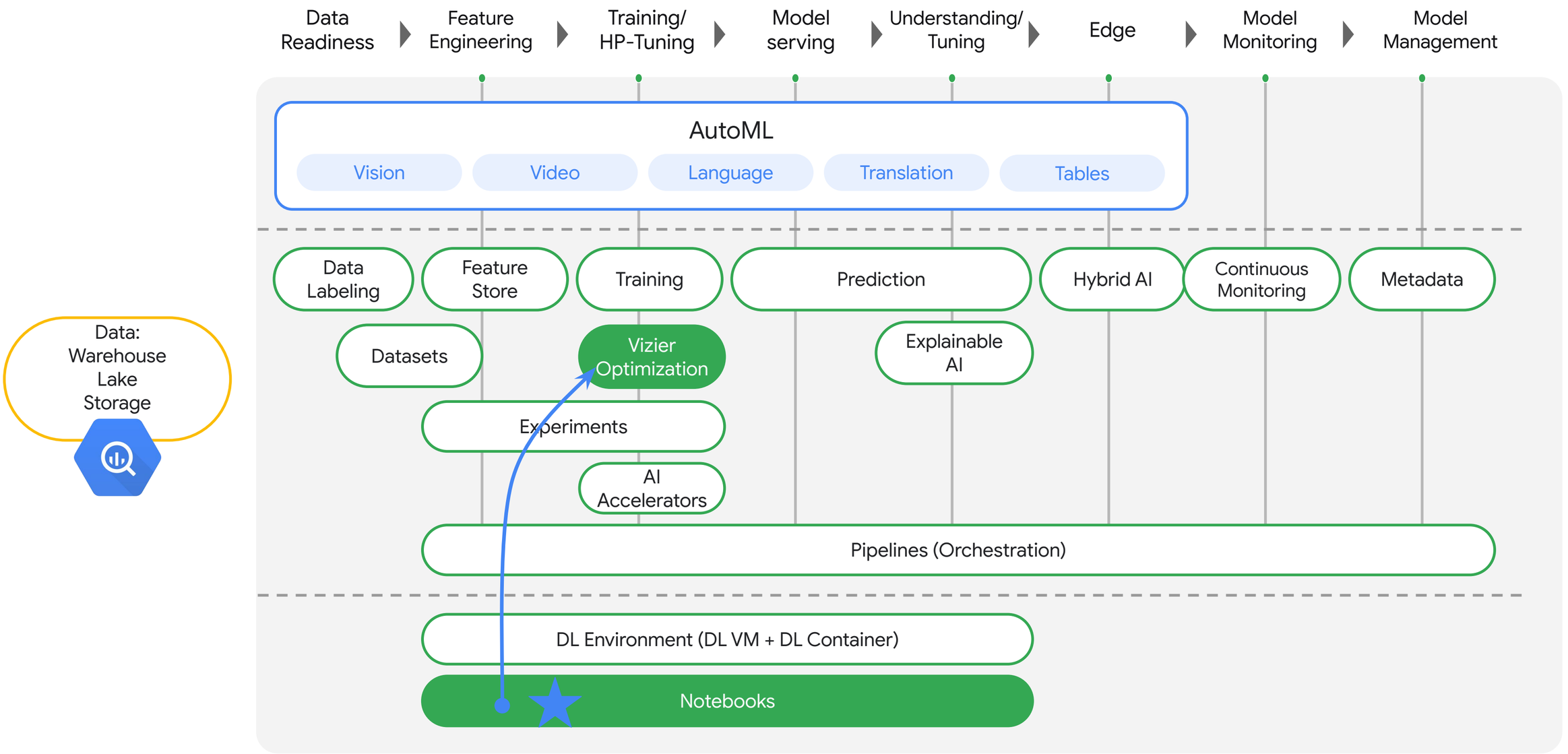
Vertex AI

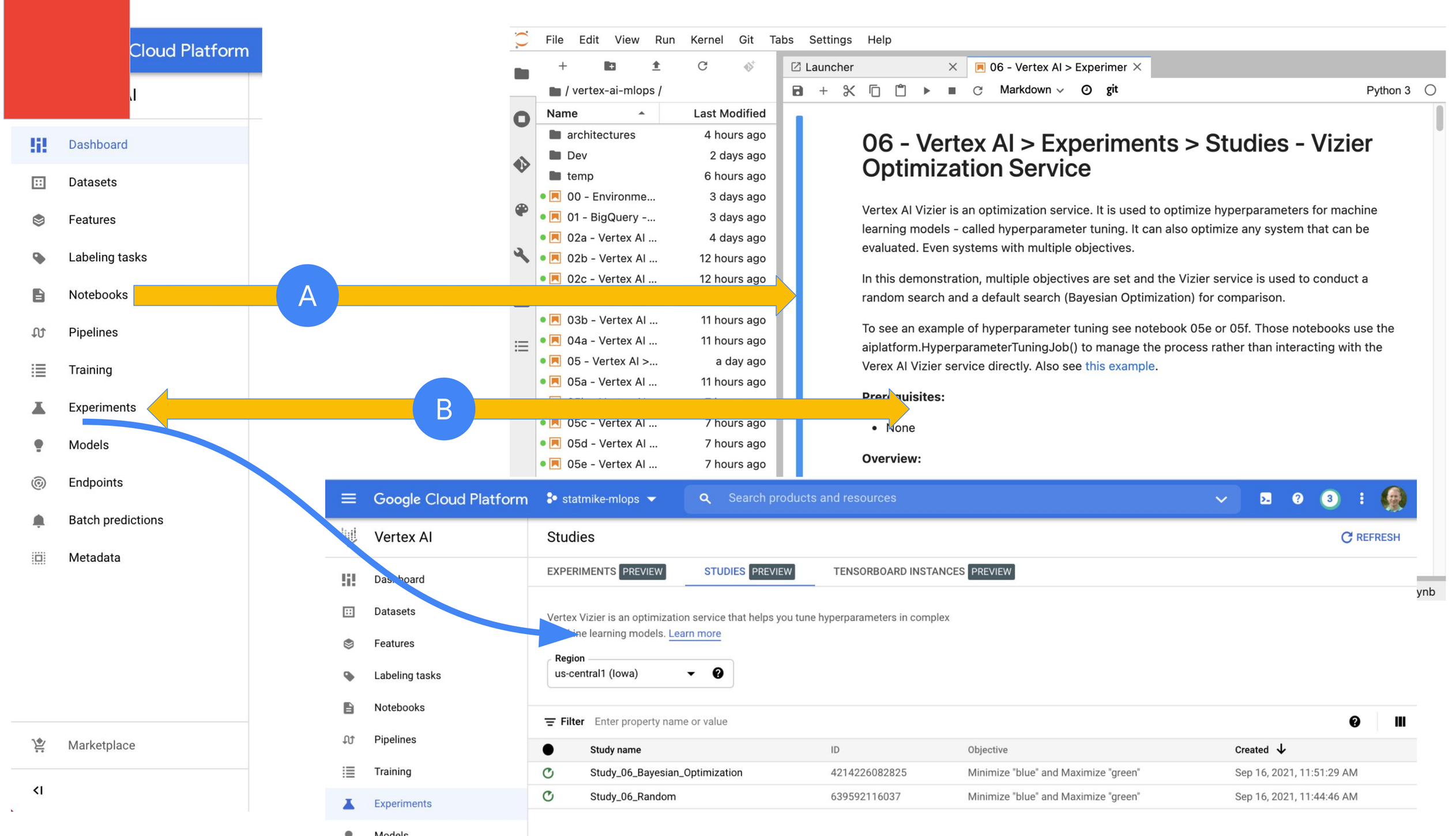
Model Skew and Drift

10

Notebook: 10

Vertex AI Overview

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01 - BigQuery -... 3 days ago
02a - Vertex AI ... 4 days ago
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02c - Vertex AI ... 12 hours ago
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04a - Vertex AI ... 11 hours ago
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05c - Vertex AI ... 7 hours ago
05d - Vertex AI ... 7 hours ago
05e - Vertex AI ... 7 hours ago
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06 - Vertex AI > Experimer
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git
Python 3
06 - Vertex AI > Experiments > Studies - Vizier Optimization Service
Vertex AI Vizier is an optimization service. It is used to optimize hyperparameters for machine learning models - called hyperparameter tuning. It can also optimize any system that can be evaluated. Even systems with multiple objectives.
In this demonstration, multiple objectives are set and the Vizier service is used to conduct a random search and a default search (Bayesian Optimization) for comparison.
To see an example of hyperparameter tuning see notebook 05e or 05f. Those notebooks use the aiplatform.HyperparameterTuningJob() to manage the process rather than interacting with the Verex AI Vizier service directly. Also see this example.
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None
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EXPERIMENTS PREVIEW
STUDIES PREVIEW
TENSORBOARD INSTANCES PREVIEW
Vertex Vizier is an optimization service that helps you tune hyperparameters in complex
ine learning models. Learn more
Region
us-central1 (Iowa)
Filter
Enter property name or value
Study name
ID
Objective
Created
Study_06_Bayesian_Optimization
4214226082825
Minimize "blue" and Maximize "green"
Sep 16, 2021, 11:51:29 AM
Study_06_Random
639592116037
Minimize "blue" and Maximize "green"
Sep 16, 2021, 11:44:46 AM

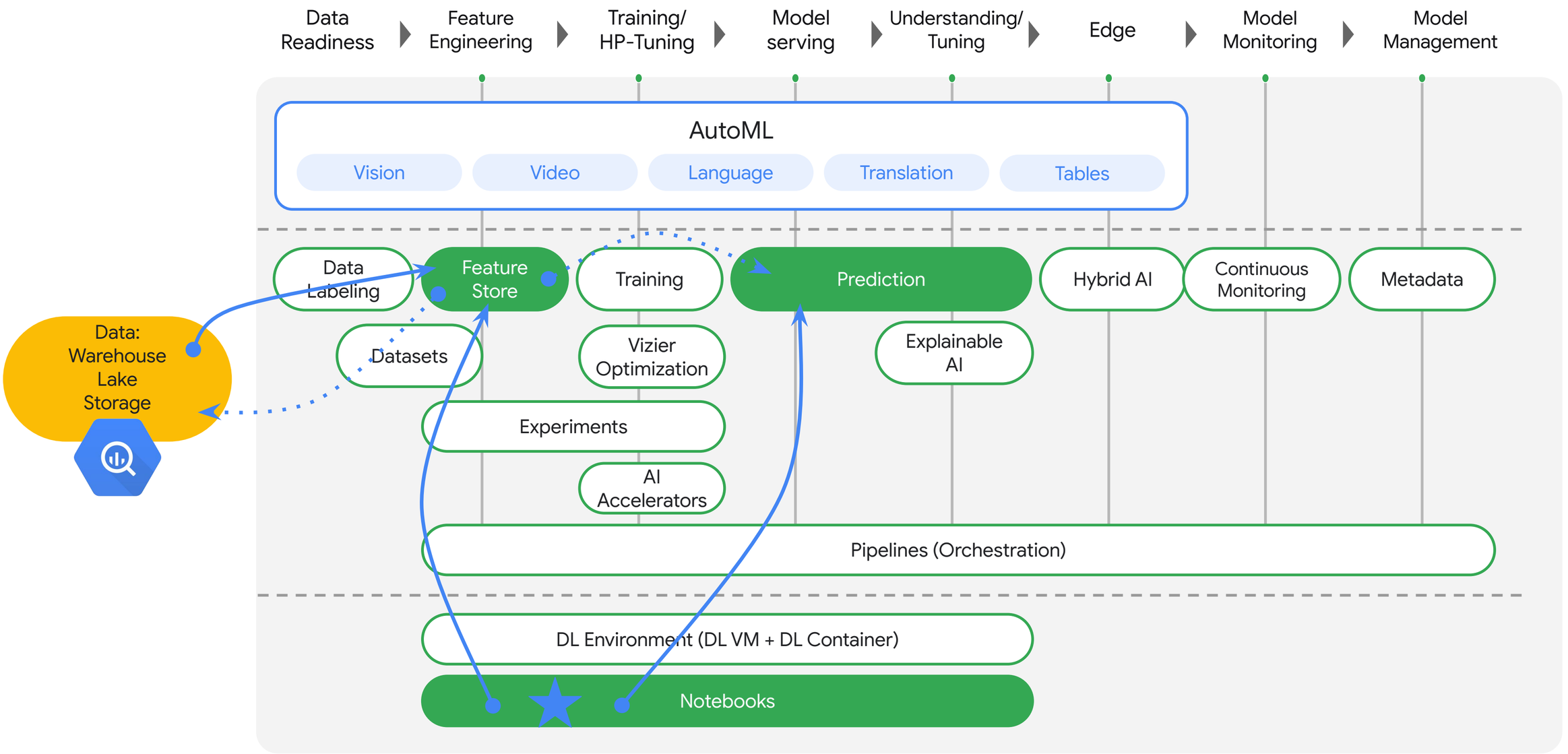
Vertex AI

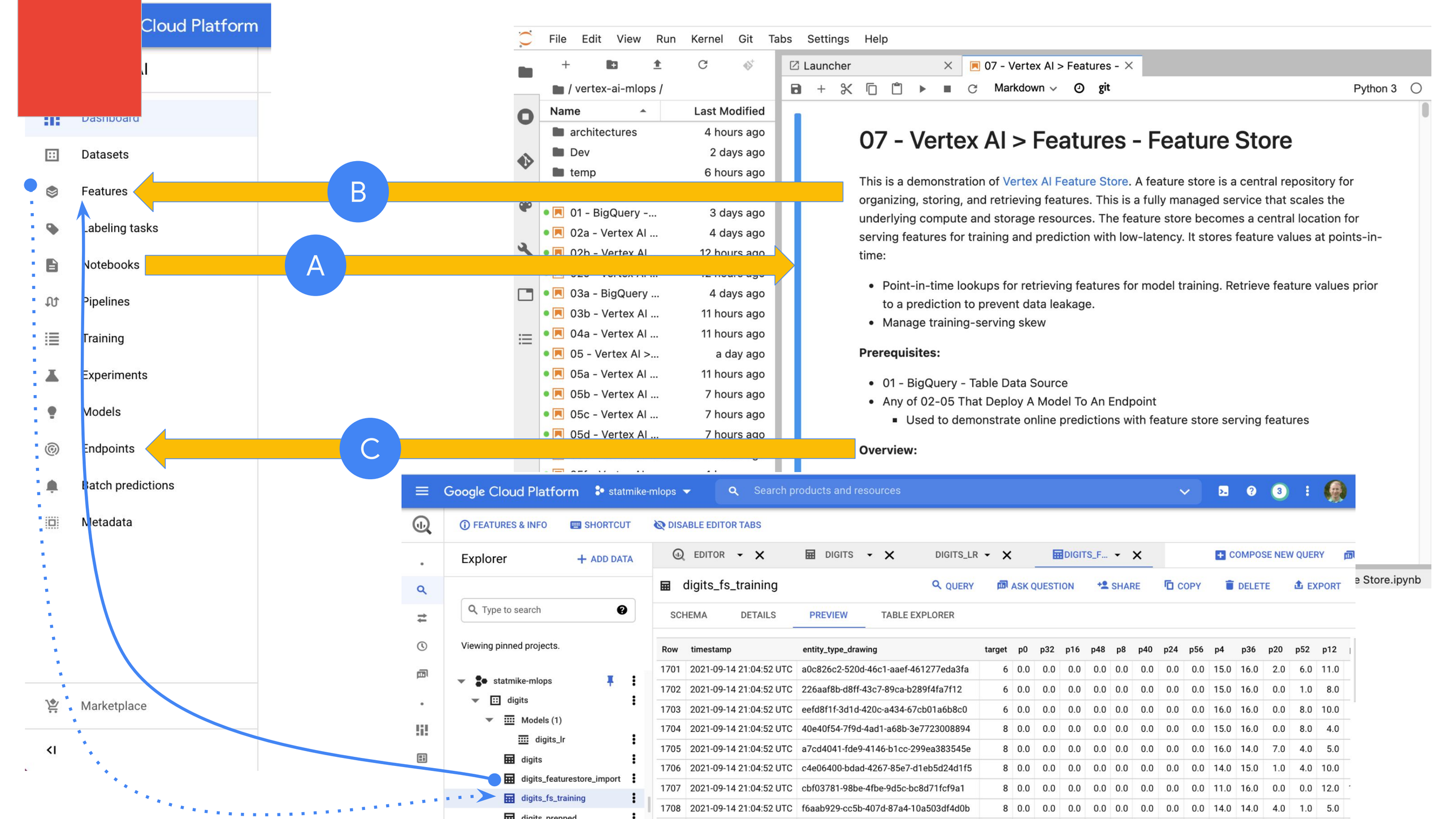
Vizier Optimization Service

11

Notebook: 11

Vertex AI Overview





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1702	2021-09-14 21:04:52 UTC	226aaf8b-d8ff-43c7-89ca-b289f4fa7f12	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	16.0	0.0	1.0	8.0
1703	2021-09-14 21:04:52 UTC	eefd8f1f-3d1d-420c-a434-67cb01a6b8c0	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	16.0	0.0	8.0	10.0
1704	2021-09-14 21:04:52 UTC	40e40f54-7f9d-4ad1-a68b-3e7723008894	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	16.0	0.0	8.0	4.0
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1707	2021-09-14 21:04:52 UTC	cbf03781-98be-4fbe-9d5c-bc8d71fcf9a1	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	16.0	0.0	0.0	12.0
1708	2021-09-14 21:04:52 UTC	f6aab929-cc5b-407d-87a4-10a503df4d0b	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	14.0	4.0	1.0	5.0

Vertex AI

Feature Store