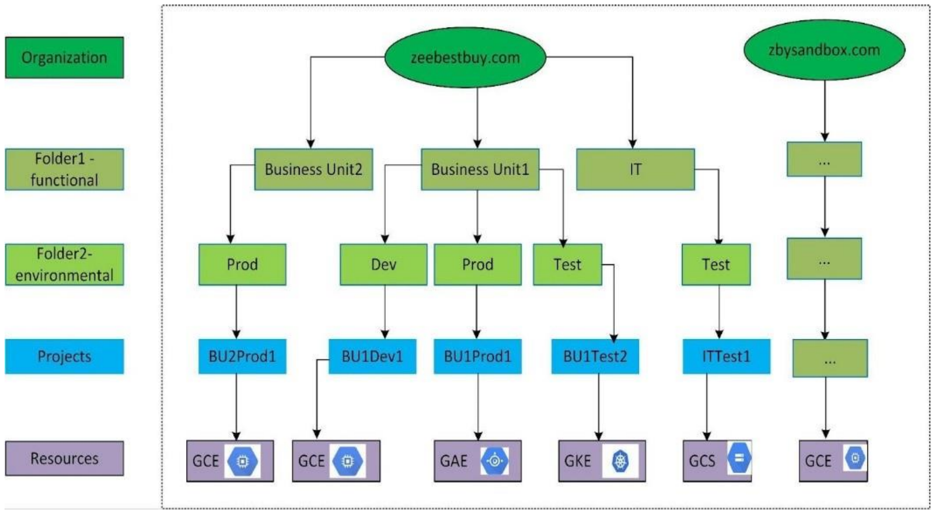
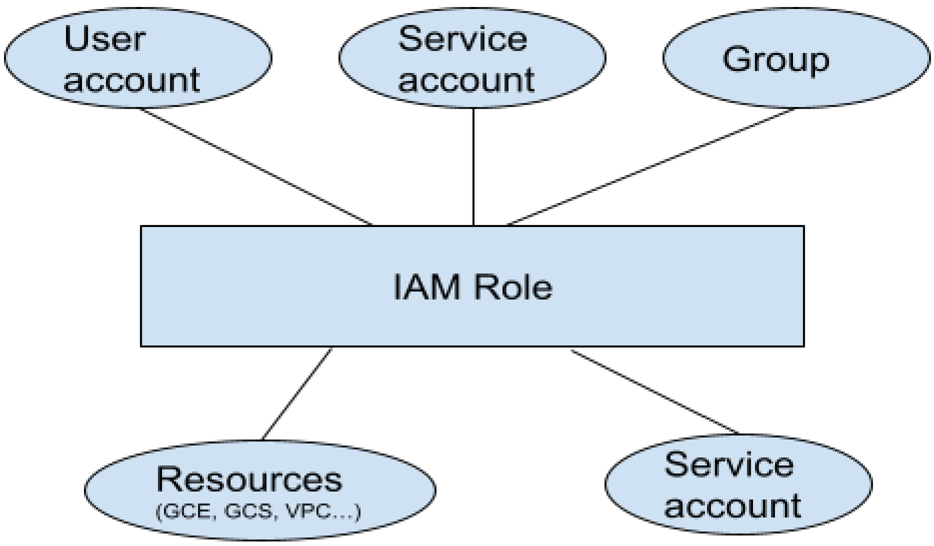
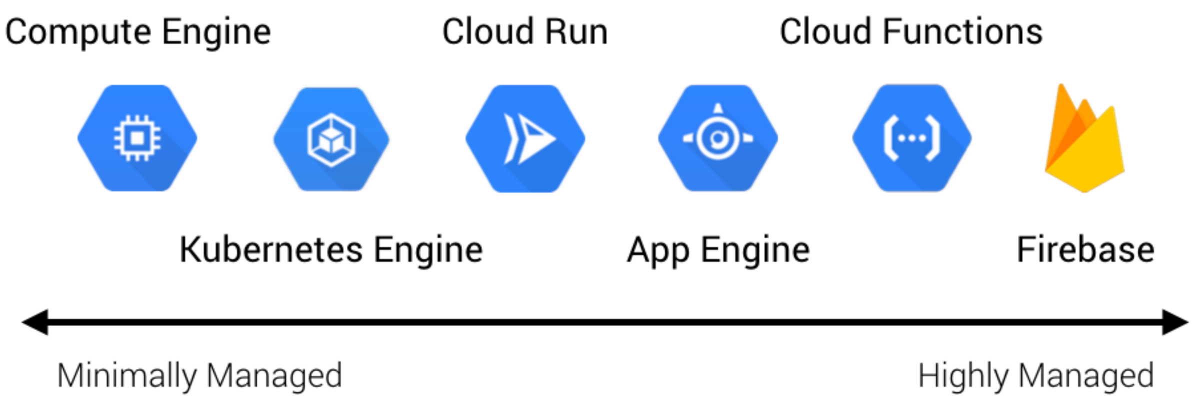
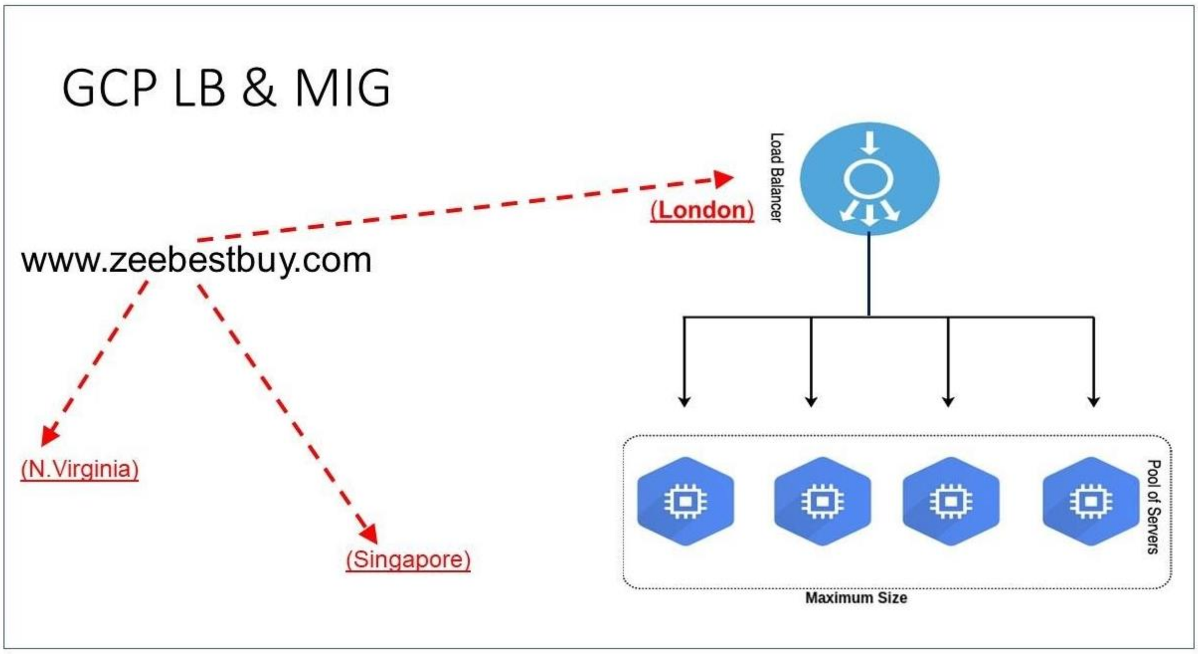
Chapter 1: Comprehending Google Cloud Services



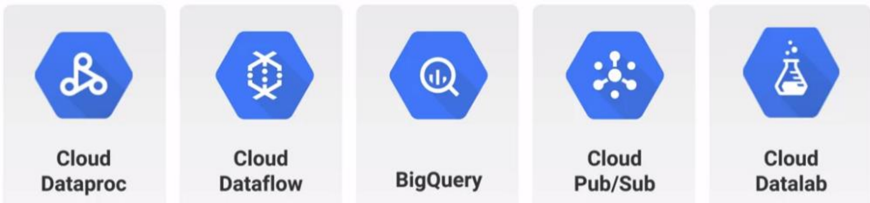


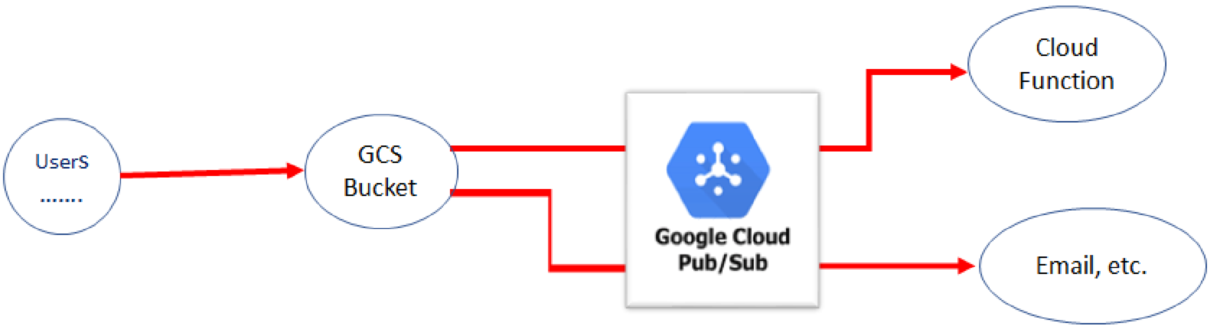




Storage & Database Services

Google Cloud's big data services are fully managed and scalable





Chapter 2: Mastering Python Programming

Python Statement	Action
x=5	assigns an integer 5 to variable x
y=5.0	assigns a real number 5.0 to variable y
a="hello"	assigns a string "hello" to variable a
b=True	assigns a Boolean value True to variable b

Python Statement	Action
c=x+y	use variable x and y to assign variable c
d=c ** x	use variable x and c to assign variable d

Arithmetic Operation	Syntax	Examples
addition	+	A=x+y
subtraction	-	B=x-y
multiplication	*	C=x*y
division	/	C=x/y
exponentiation	**	E=x**3

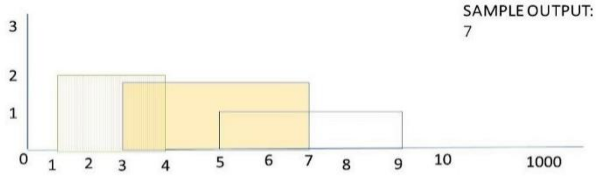
Boolean Operation	Syntax	Examples
equal	==	x==y
not equal	!=	x!==y
less than	<	x<y
more than	>	x>y
less than or equal	<=	x<=y
more than or equal	>=	x>=y

Logical Operation	Definition	Examples
and	True if both the operands are true	(x==y) and (a<b)
or	True if either operand is true	(x==y) or (a<b)
not	True if the operand is false	not (x==y)

Operation	Defination	Example
len(list)	return the length of the list	len(floats)
list.append(elem)	add an element to the end	floats.append(2.0)
list.pop()	remove the element from the end of list	floats.pop()

Understand the problem

SAMPLE INPUT:
3
5 9
1 4
3 7
SAMPLE OUTPUT:
7



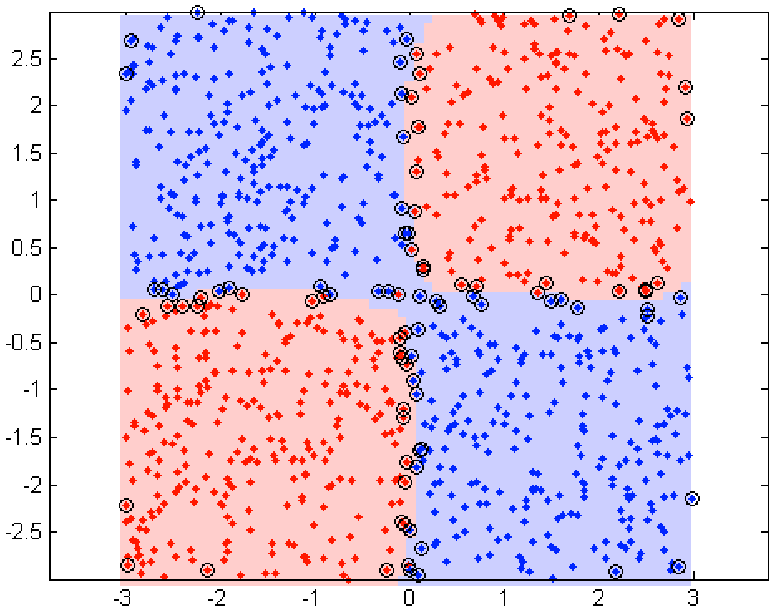
Chapter 3: Preparing for ML Development

House No	Square Foot	Age	# of Bedrooms	# of Bathrooms	Longitude	Latitude	Sale Price
1	1500	5	2	1	-96.6988856	33.0198431	250
2	2000	10	3	2	-96.6988856	33.0198431	300
5	3000	40	3	2	-96.6988856	33.0198431	350
10	5500	50	4	3	-96.6988856	33.0198431	450

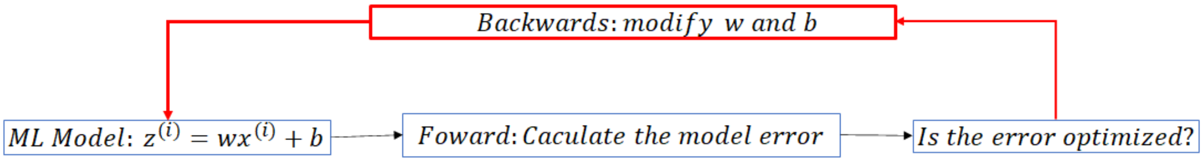
id	color
1	red
2	blue
3	green
4	blue

One Hot Encoding →

id	color_red	color_blue	color_green
1	1	0	0
2	0	1	0
3	0	0	1
4	0	1	0

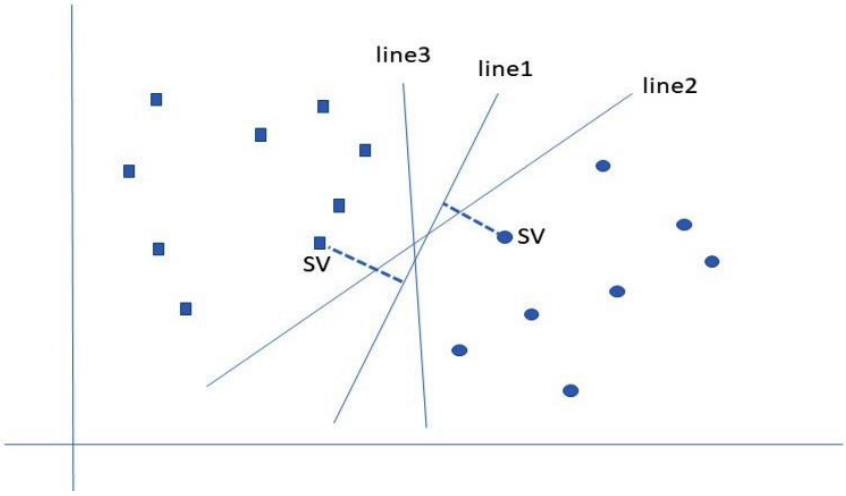


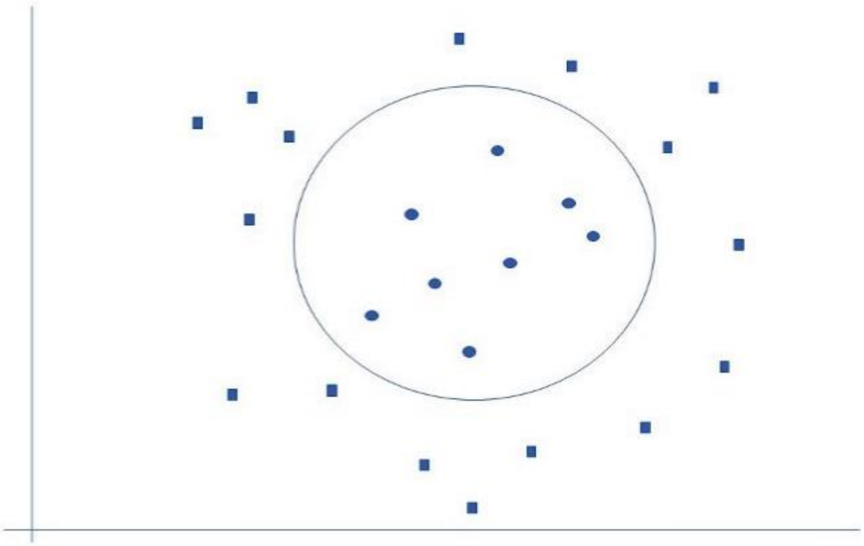
Chapter 4: Developing and Deploying ML Models



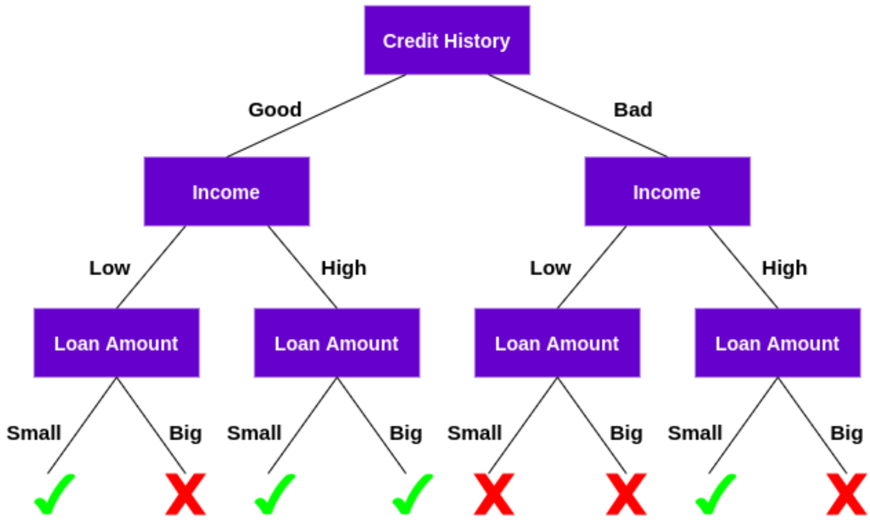
House No	Square Foot (x)	Age	BedRoom	BathRoom	Longitude	Latitude	Sale Price (y, $k)
1	1500	5	2	1	-96.6988856	33.0198431	250
2	2000	10	3	2	-96.6988856	33.0198431	300
3	2500	20	3	2	-96.6988856	33.0198431	300
4	2750	10	3	2	-96.6988856	33.0198431	400
5	3000	40	3	2	-96.6988856	33.0198431	350
6	3500	30	3	2	-96.6988856	33.0198431	375
7	4000	5	4	3	-96.6988856	33.0198431	450
8	4500	30	4	3	-96.6988856	33.0198431	400
9	5000	10	4	3	-96.6988856	33.0198431	450
10	5500	50	4	3	-96.6988856	33.0198431	450

No	Applicant Credit Score	Loan amount($k)	Annual Income (x, $k)	Age	Marriage status	Approval or not (1 for yes, 0 for no)
1	730	300	150	45	1	1
2	670	200	100	20	0	1
3	700	300	50	20	0	0
4	780	150	80	32	0	1
5	400	300	20	29	0	0
6	500	120	70	38	0	1
7	690	200	140	25	1	1
8	823	300	150	30	1	1
9	450	100	30	49	1	0
10	650	200	120	27	1	1





Decision Tree for Loan Approval

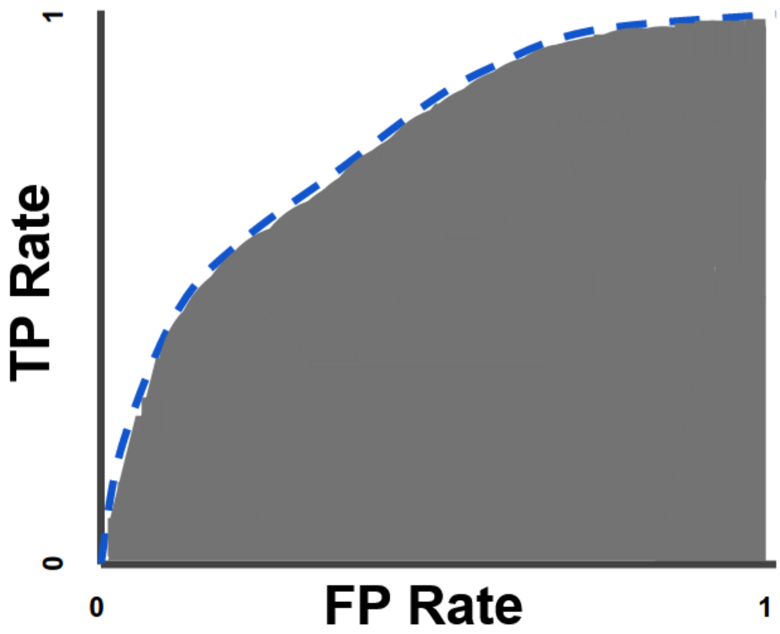


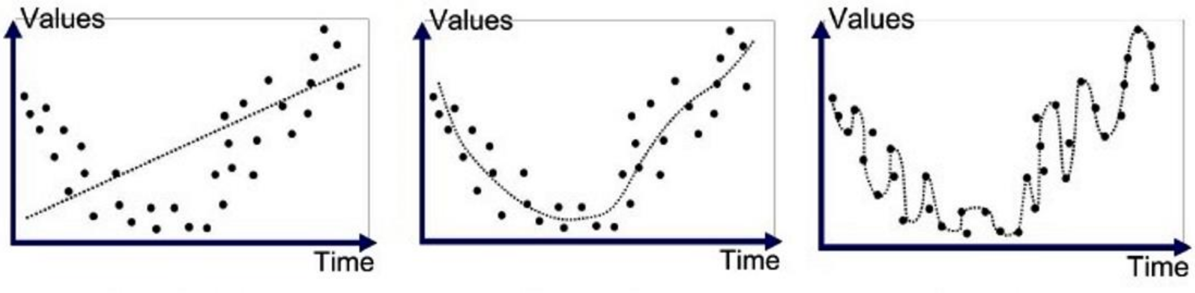
		True Class	
		Positive	Negative
Predicted Class	Positive	TP	FP
	Negative	FN	TN

		Actual	
		Cat	Not cat
Predicted	Cat	107	23
	Not cat	69	42

		Actual	
		Cat	Not cat
Predicted	Cat	148	53
	Not cat	28	12

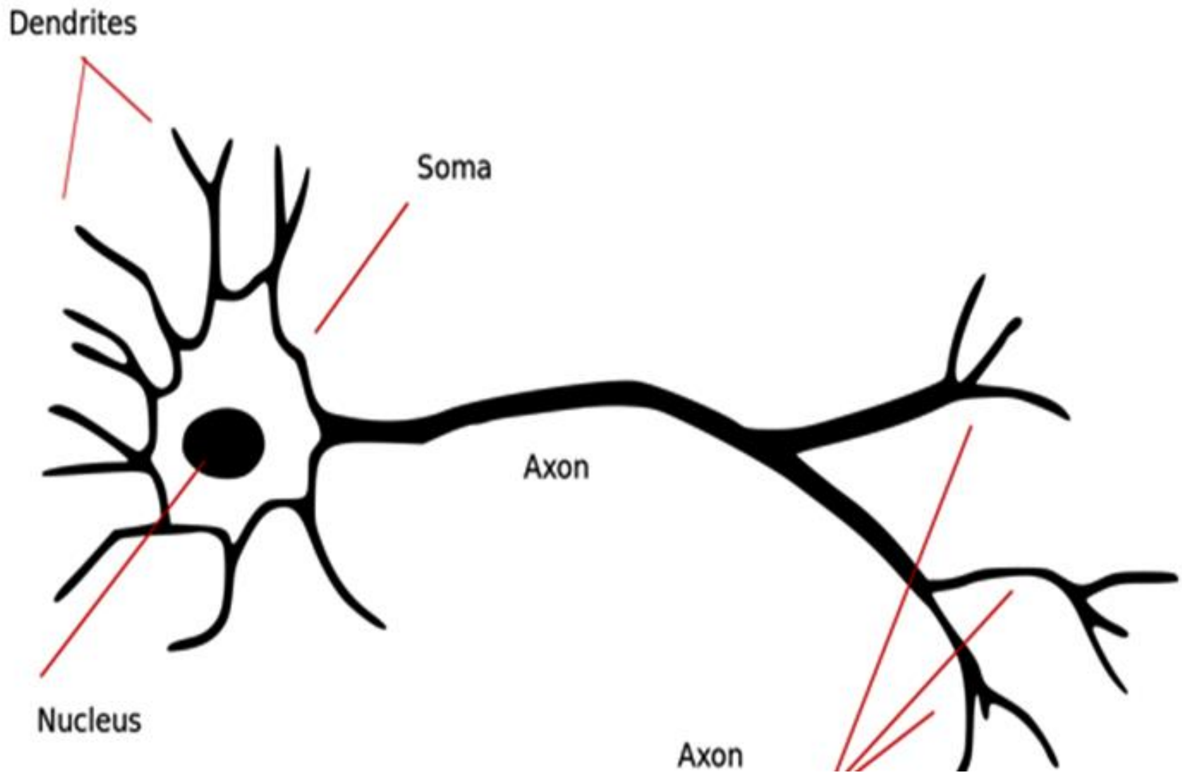
Recall	**Specificity**
Model 1: 107/ (107+69)=60% Model 2: 148/ (148+28)=84%	Model 1: 42/ (42+23)=64% Model 2: 12/ (12+53)=18%

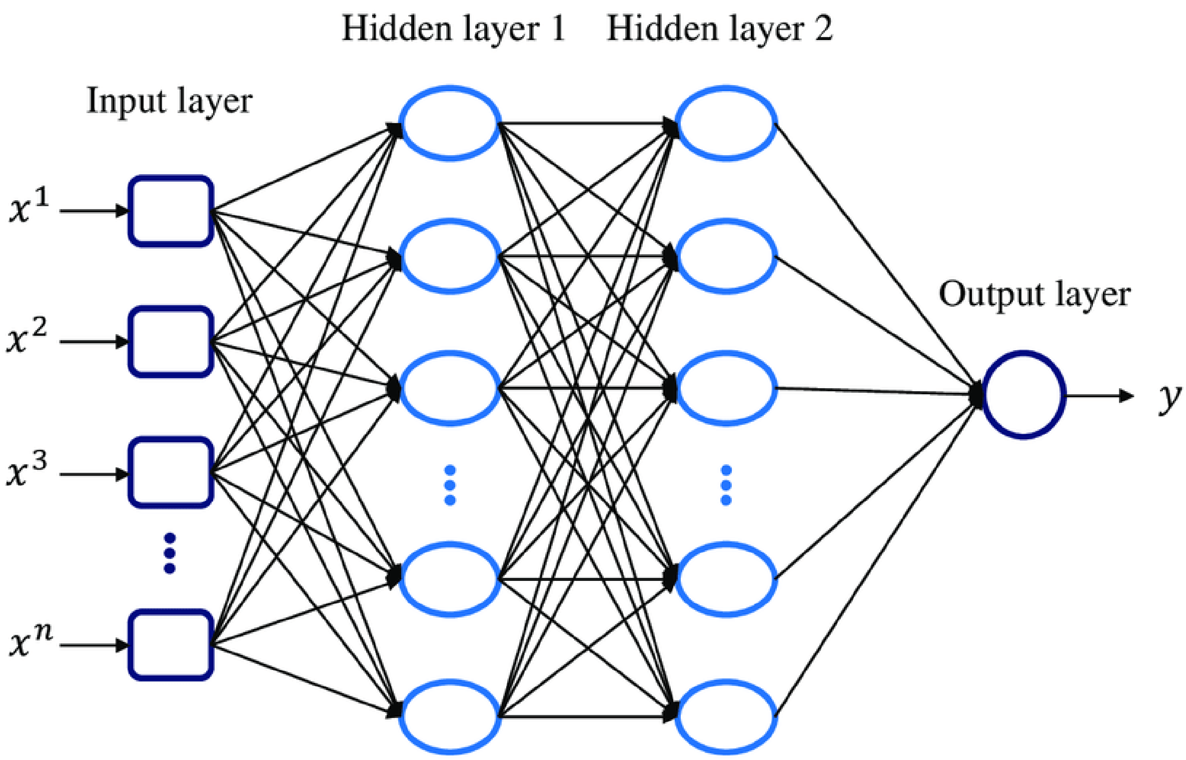


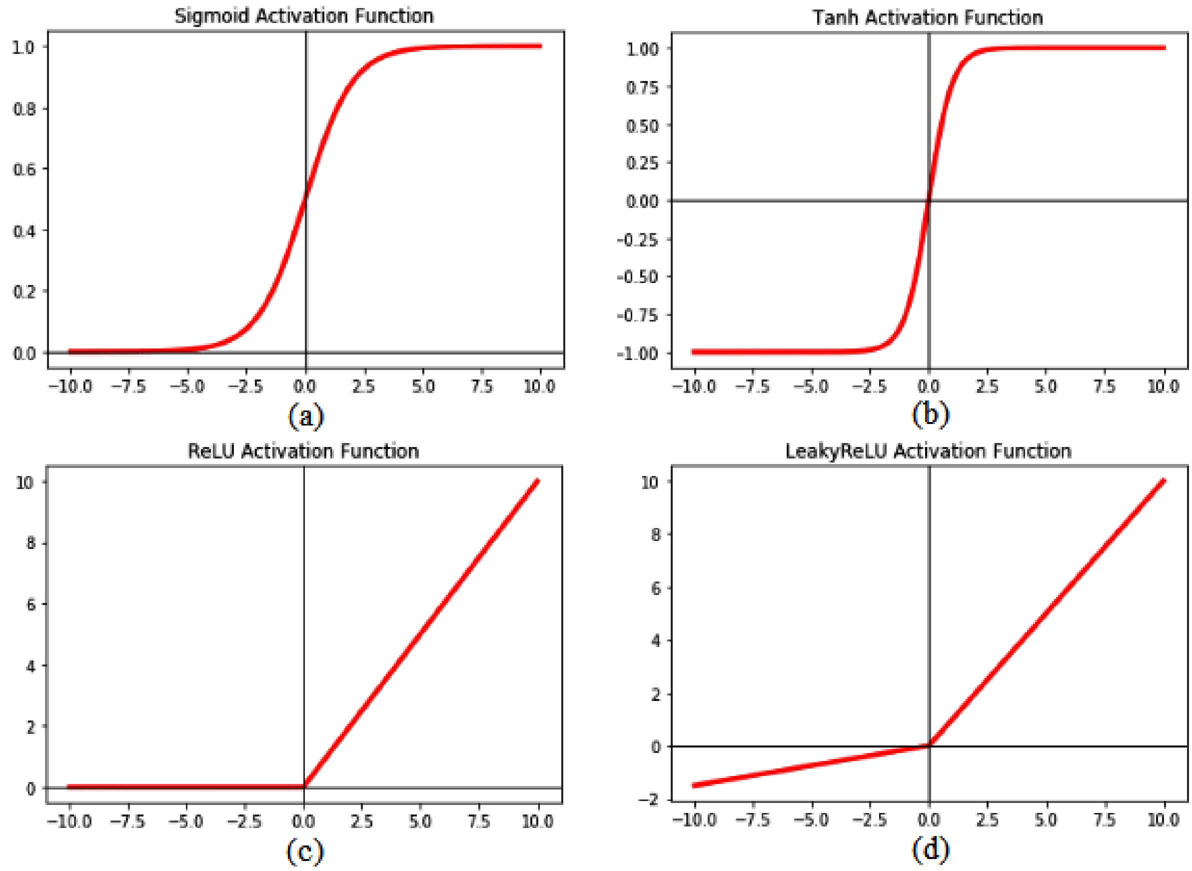


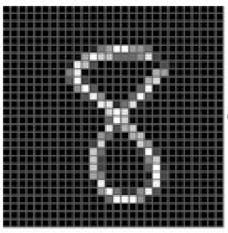
Underfitted Good Fit/Robust Overfitted

Chapter 5: Understanding Neural Networks and Deep Learning





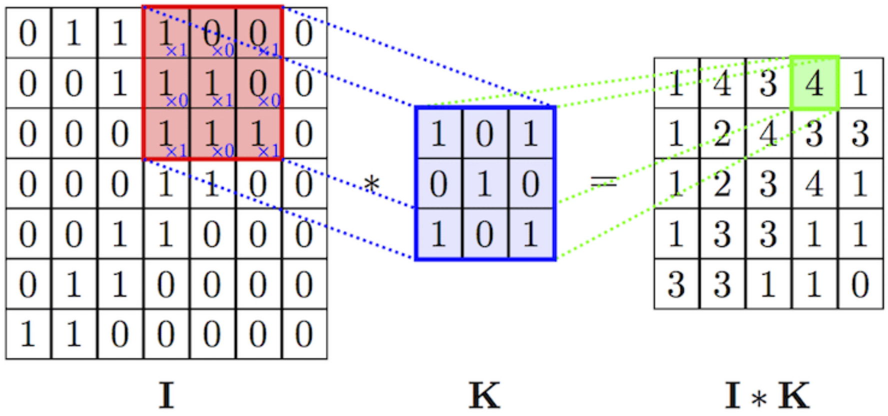


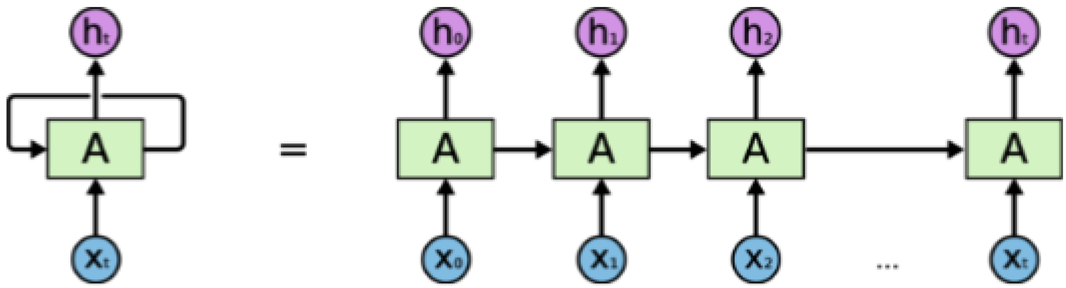


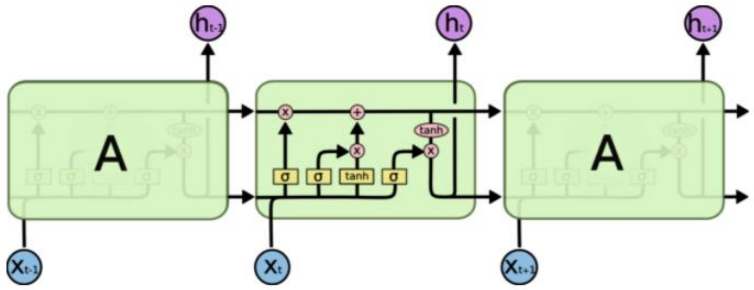
28 x 28
784 pixels

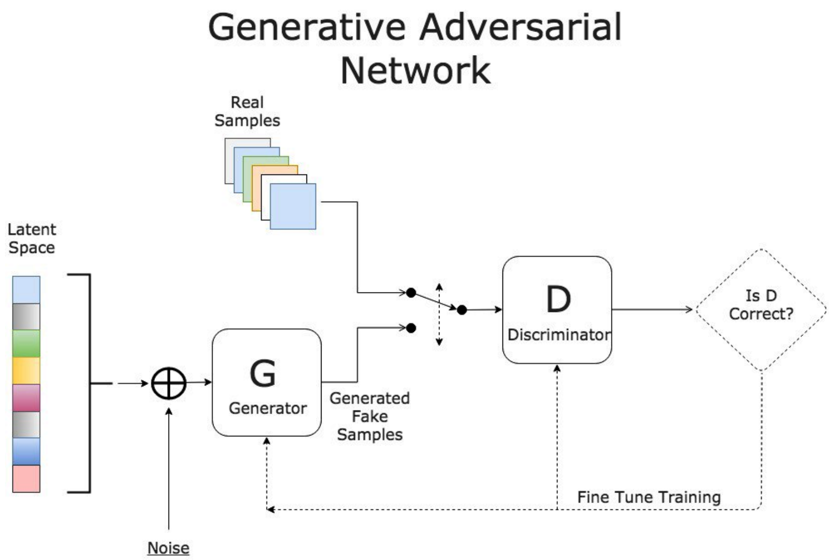
→

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	4	62	146	182	254	254	181	176	139	15	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	34	186	253	217	208	136	136	136	166	232	99	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	61	242	208	111	3	0	0	0	0	0	18	32	107	43	0	0	0	0	0	0
0	0	0	0	0	0	0	0	156	242	23	0	0	0	0	0	0	0	13	191	181	6	0	0	0	0	0	0
0	0	0	0	0	0	0	0	121	255	98	3	0	0	0	0	0	8	194	225	12	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	169	253	120	3	0	0	0	0	128	247	51	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	3	111	244	169	19	0	14	131	249	117	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	59	241	235	72	142	229	66	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	25	218	254	231	36	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	133	253	221	33	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	19	237	111	196	217	19	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	174	138	0	23	193	204	18	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	96	224	0	0	0	25	218	169	3	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	215	138	0	0	0	0	86	253	99	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	215	97	0	0	0	0	3	162	214	11	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	215	97	0	0	0	0	0	118	253	68	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	185	157	0	0	0	0	0	40	254	98	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	50	244	61	0	0	0	0	112	244	58	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	174	251	142	59	83	167	244	111	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	6	133	253	253	253	169	61	3	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0


I
K
I ∗ K


A
=

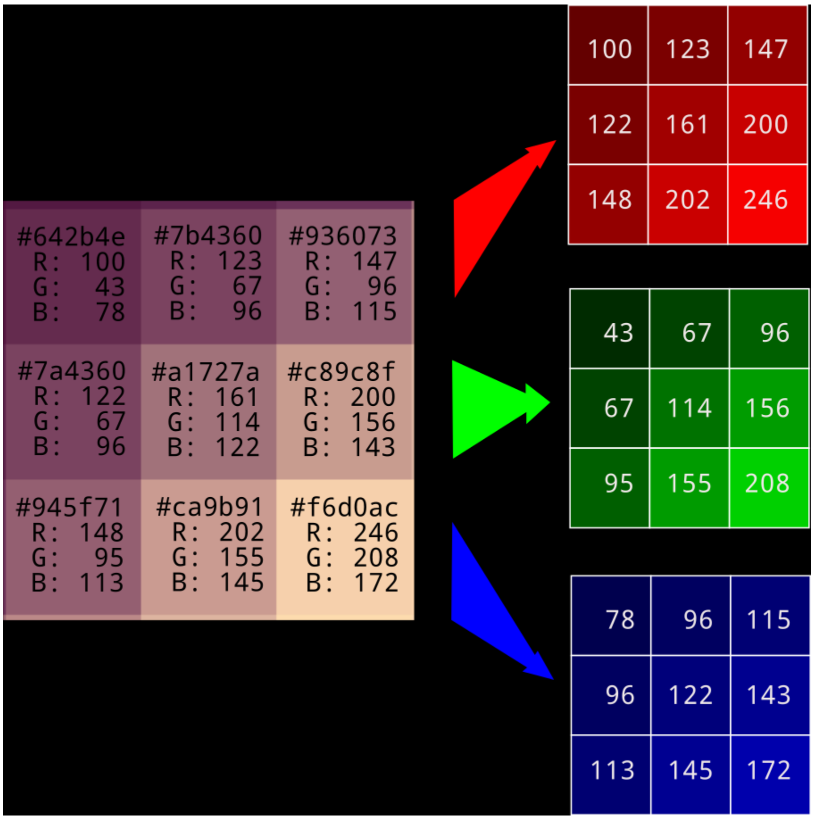

A
tanh
A


Generative Adversarial Network
Real Samples
Latent Space
G
Generator
Generated Fake Samples
D
Discriminator
Is D Correct?
Fine Tune Training
Noise

Chapter 6: Learning BQ/BQML, TensorFlow and Keras

Date	Applicant Credit Score	Loan amount($k)	Annual Income (x, $k)	Age	Marriage status	Approval (1 for yes, 0 for no)
20160801	730	300	150	45	1	1
20191207	670	200	100	20	0	1

precision	recall	accuracy	f1_score	log_loss	roc_auc
0.4451901	0.0887996	0.9716829	0.1480654	0.0792178	0.970706



A tensor is an N-dimensional array of data

	Common name	Rank (Dimension)	Example	Shape of example
	Scalar	0	`x = tf.constant(3)`	()
	Vector	1	`x = tf.constant([3, 5, 7])`	(3,)
	Matrix	2	`x = tf.constant([[3, 5, 7],` `[4, 6, 8]])`	(2, 3)

	3D Tensor	3	`tf.constant([[[3, 5, 7],[4, 6, 8]],`
			`[[1, 2, 3],[4, 5, 6]]`
			`])`
				(2, 2, 3)

	nD Tensor	n	`x1 = tf.constant([2, 3, 4])`
			`x2 = tf.stack([x1, x1])`
			`x3 = tf.stack([x2, x2, x2, x2])`
			`x4 = tf.stack([x3, x3])`
			`...`
				(3,)
				(2, 3)
				(4, 2, 3)
				(2, 4, 2, 3)

Chapter 7: Exploring Google Cloud Vertex AI

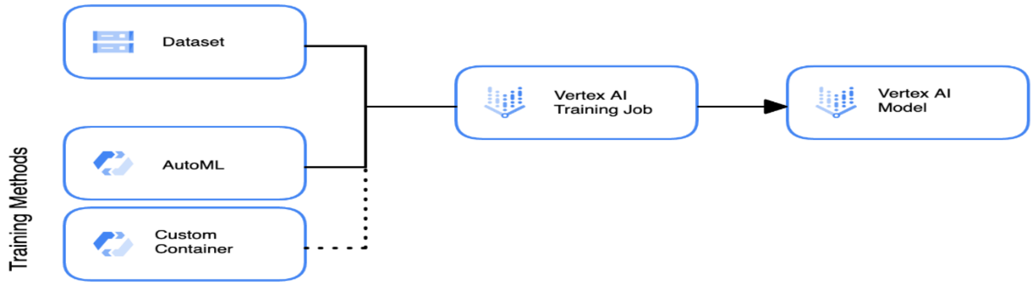
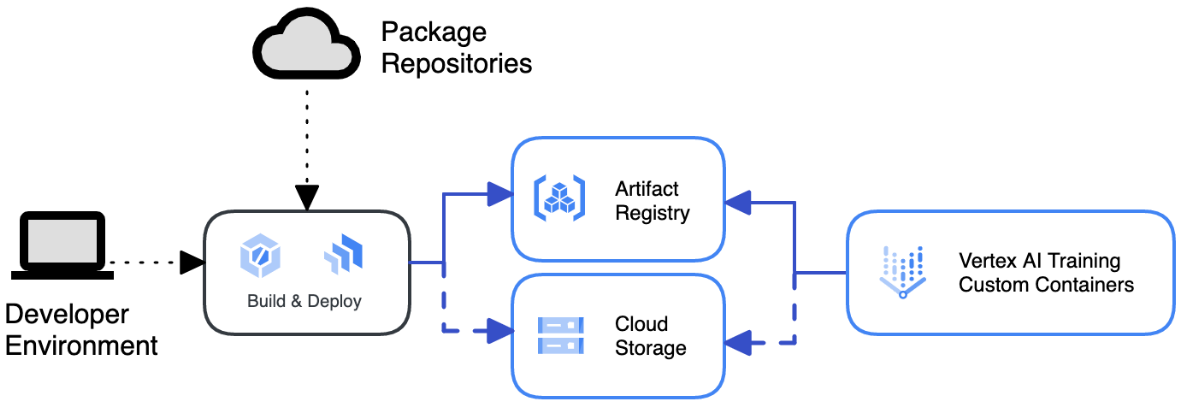
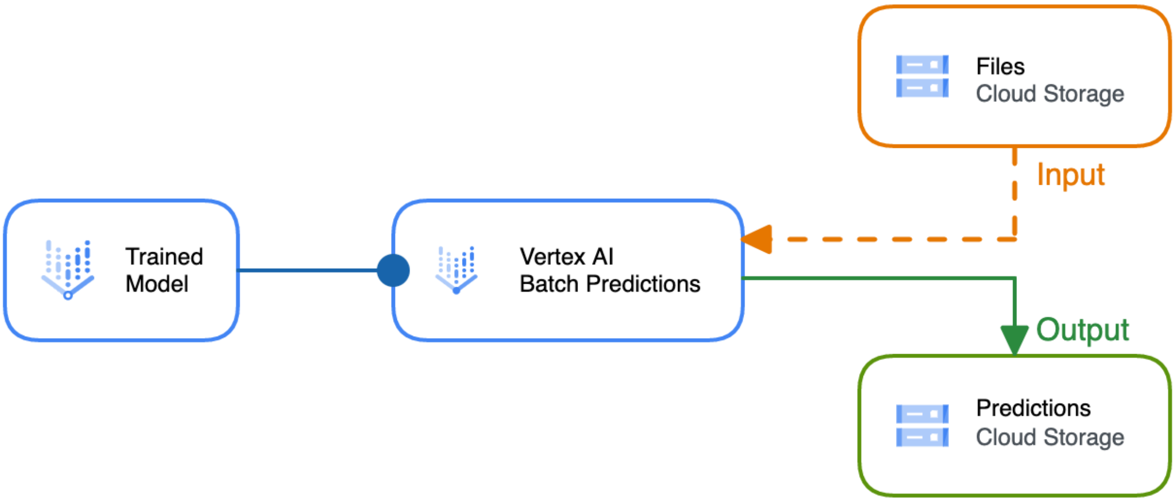
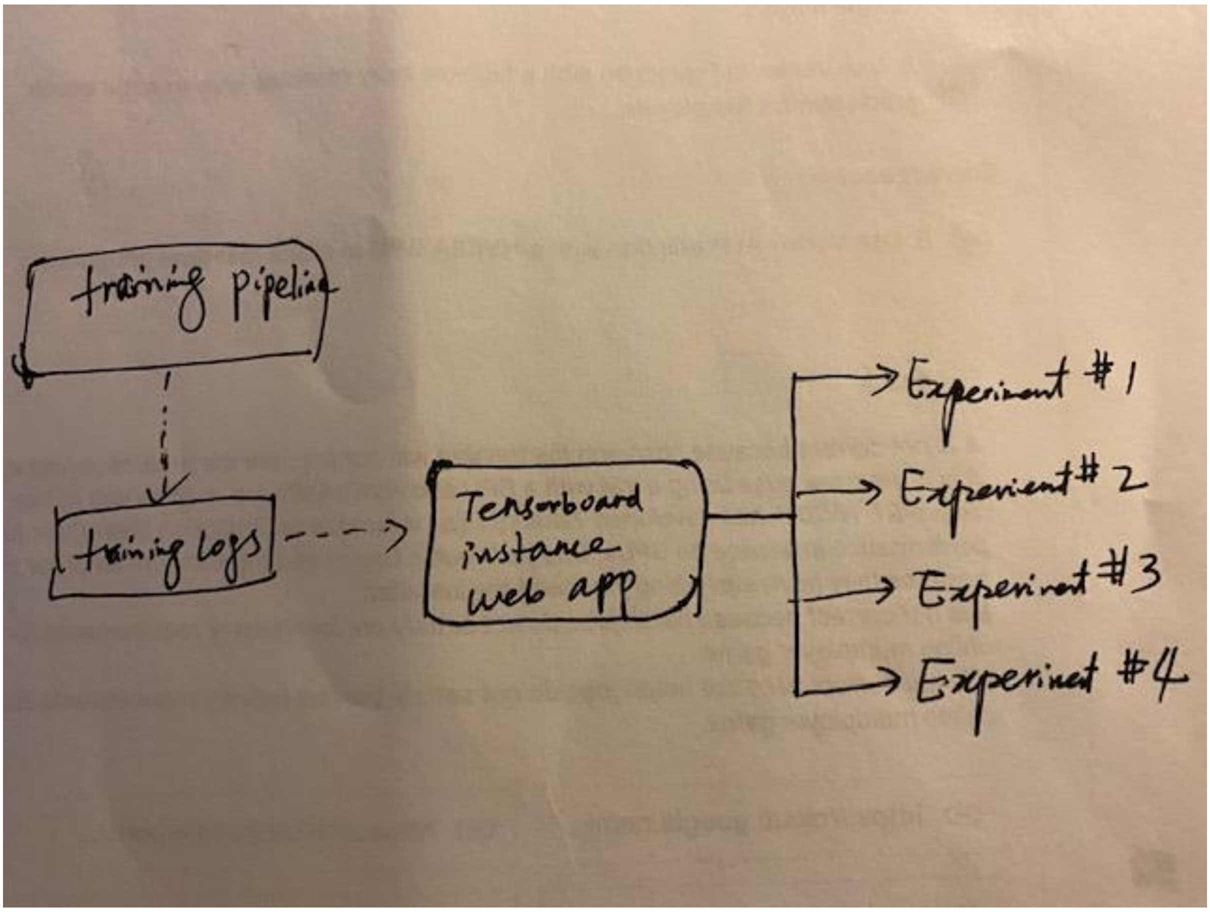


Image data	Tabular data	Text data	Video data
Classification Object detection	Regression Classification Forecasting	Classification Entity extraction Sentiment analysis	Action recognition Video classification Video object tracking

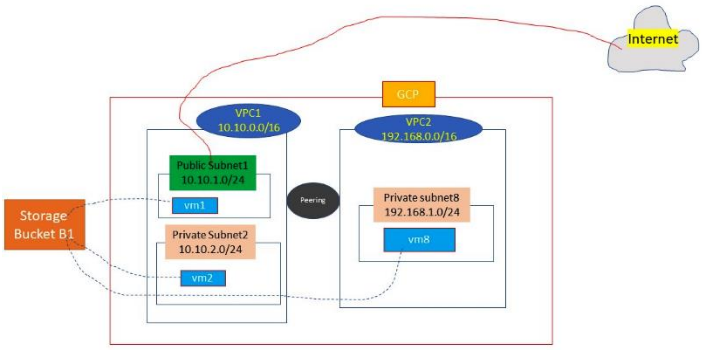


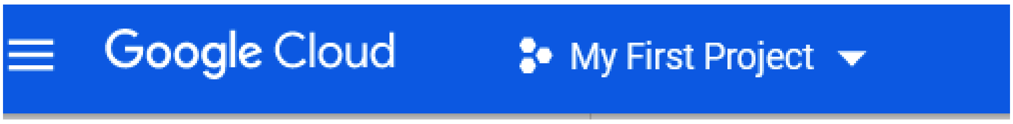



training pipeline
training logs
Tensorboard instance web app
Experiment #1
Experiment #2
Experiment #3
Experiment #4

Appendix 1 - Practicing with Basic GCP Services

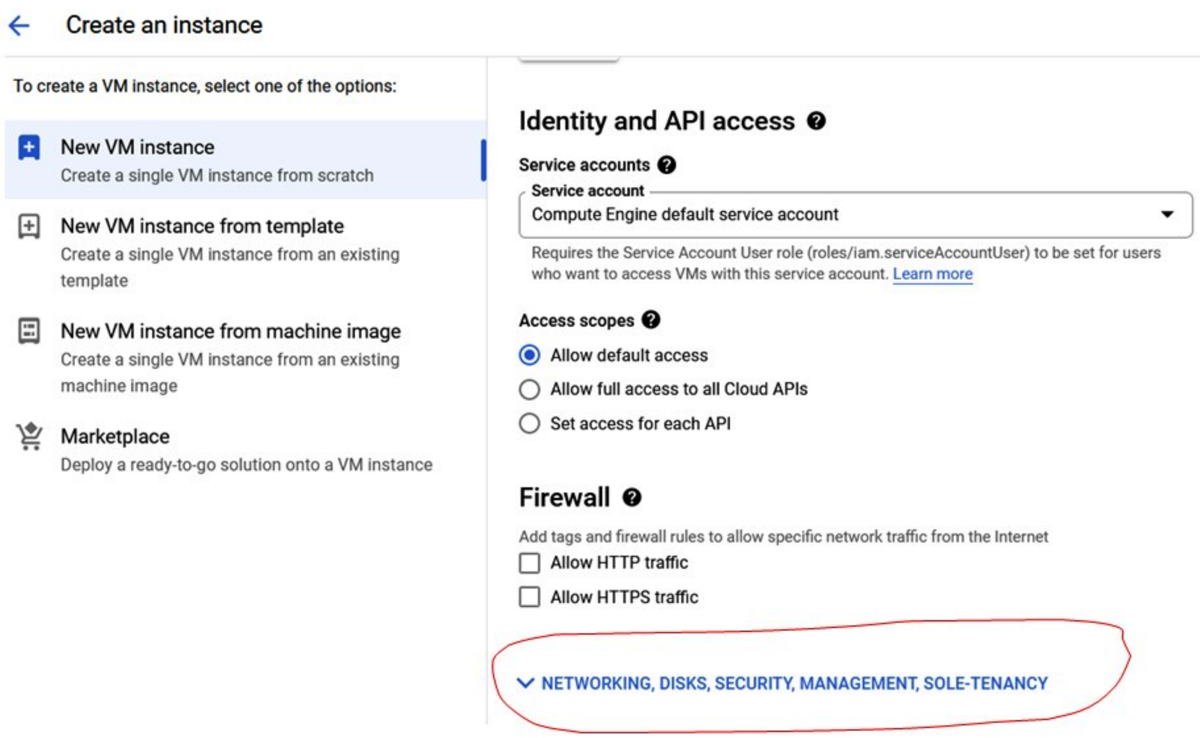
GCP Practice Diagram





vpc1		2	1460	Custom	None			
	asia-east1	subnet2			10.10.2.0/24	None	None	10.10.2.1
	us-east1	subnet1			10.10.1.0/24	None	None	10.10.1.1

vpc1		2	1460	Custom	None			
	asia-east1	subnet2			10.10.2.0/24	None	None	10.10.2.1
	us-east1	subnet1			10.10.1.0/24	None	None	10.10.1.1
vpc2		1	1460	Custom	None			
	europe-central2	subnet8			192.168.1.0/24	None	None	192.168.1.1



Networking

Hostname and network interfaces

Network tags

Hostname

Set a custom hostname for this instance or leave it default. Choice is permanent

IP forwarding

☐ Enable

Network performance configuration

Network interface card

–

Network bandwidth

☐ Increase total egress bandwidth

Maximum outbound network bandwidth: 1Gbps

Network interfaces

Network interface is permanent

default default (10.142.0.0/20)

ADD NETWORK INTERFACE

Edit network interface

Network *

vpc1

Subnetwork *

subnet1 IPv4 (10.10.1.0/24)

To use IPv6, you need an IPv6 subnet range. LEARN MORE

IP stack type

◉ IPv4 (single-stack)

○ IPv4 and IPv6 (dual-stack)

Primary internal IP

Ephemeral (Automatic)

Alias IP ranges

+ ADD IP RANGE

External IPv4 address

Ephemeral

Network Service Tier

◉ Premium

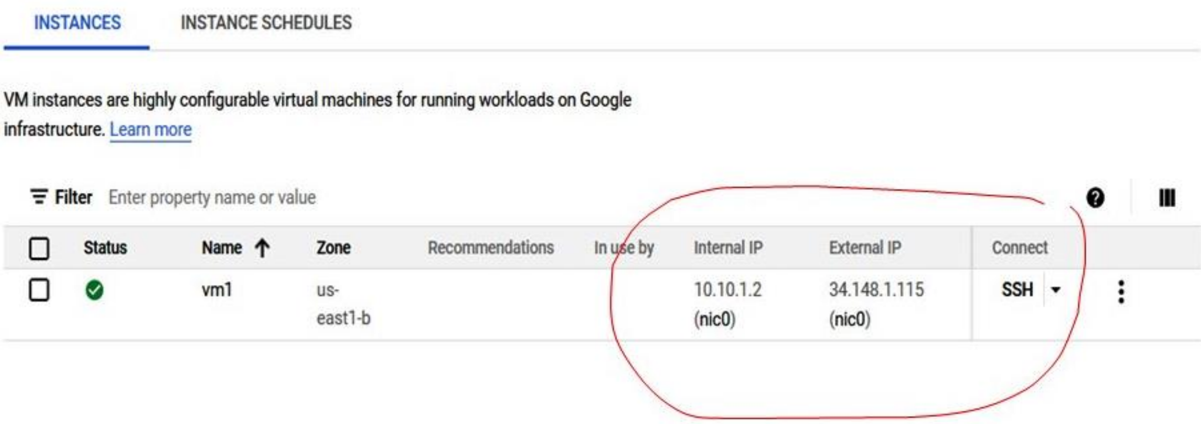
○ Standard (us-east1)

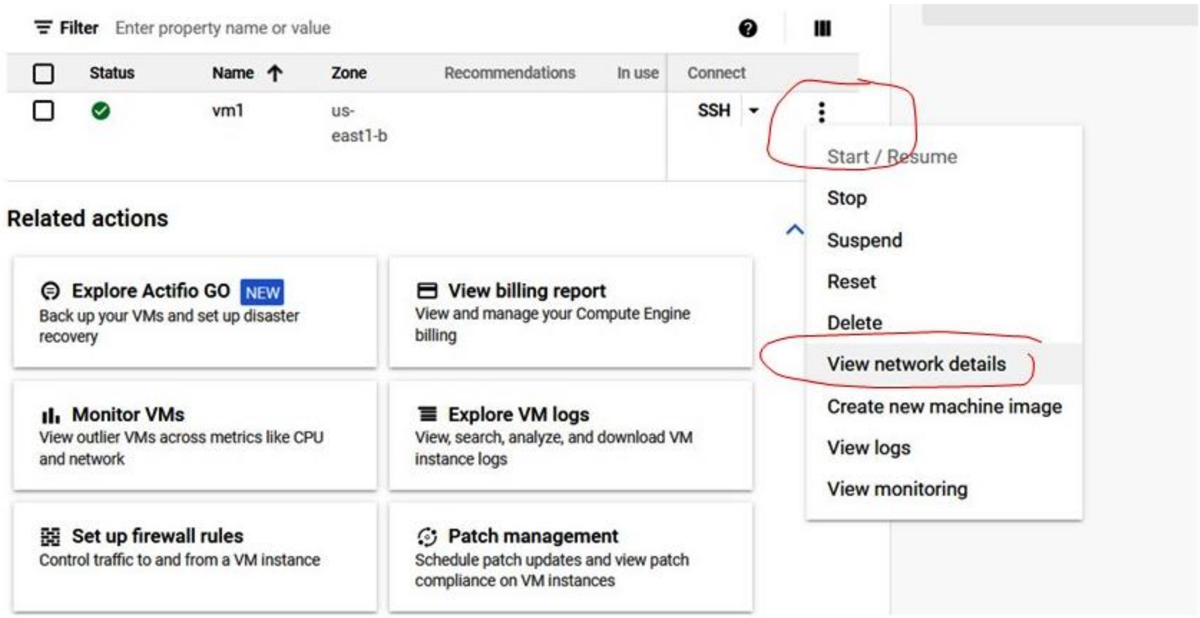
Public DNS PTR Record

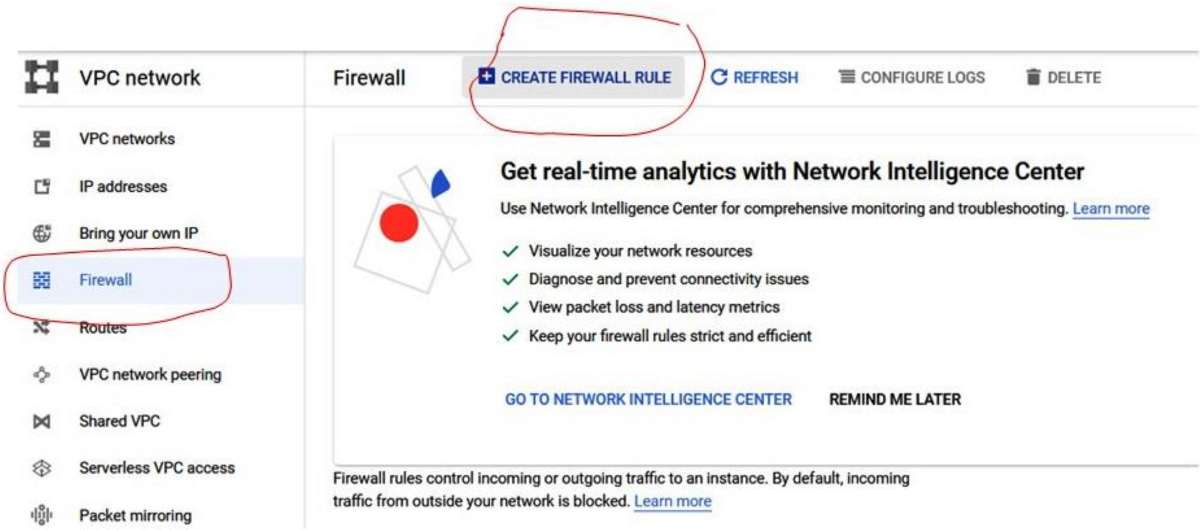
☐ Enable for IPv4

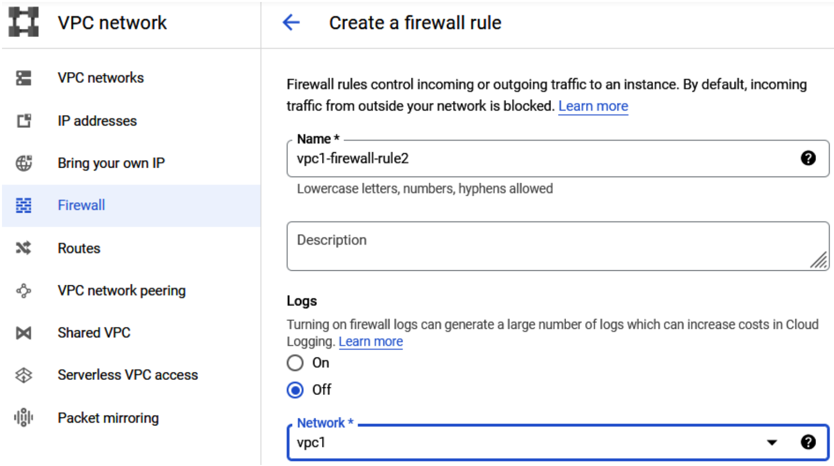
PTR domain name

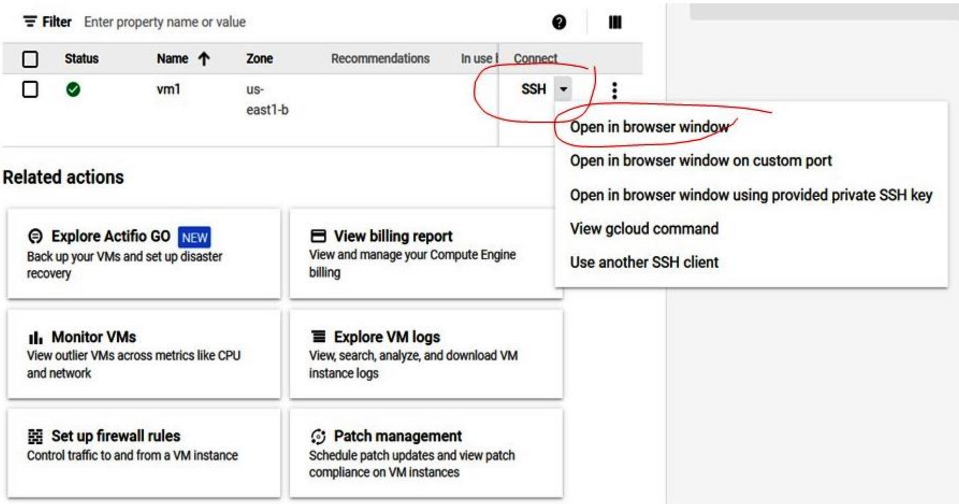
DONE

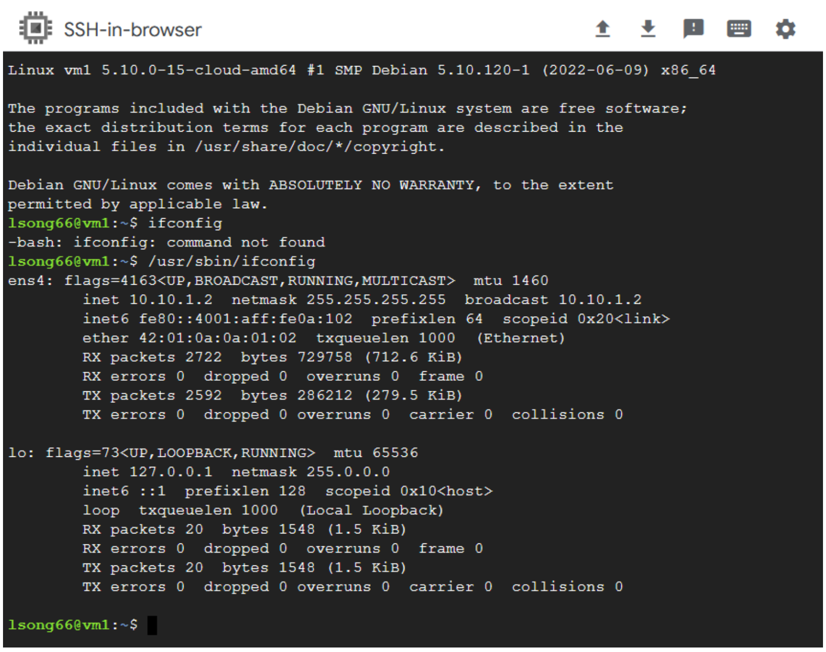

INSTANCES
INSTANCE SCHEDULES
VM instances are highly configurable virtual machines for running workloads on Google infrastructure. Learn more
Filter Enter property name or value
Status
Name
Zone
Recommendations
In use by
Internal IP
External IP
Connect
vm1
us-east1-b
10.10.1.2 (nic0)
34.148.1.115 (nic0)
SSH

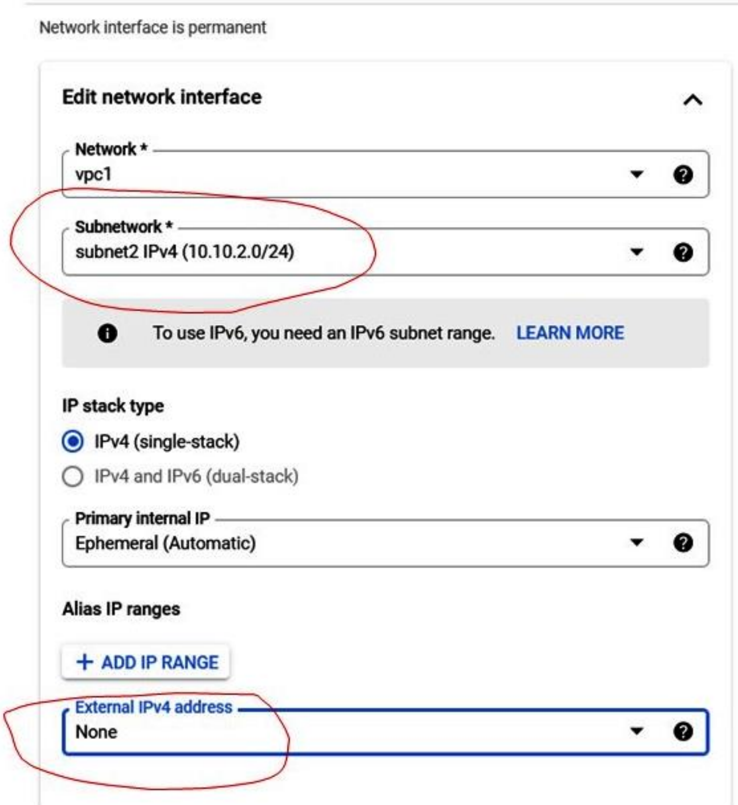

Filter Enter property name or value
Status
Name
Zone
Recommendations
In use
Connect
vm1
us-east1-b
SSH
Start / Resume
Stop
Suspend
Reset
Delete
View network details
Create new machine image
View logs
View monitoring
Related actions
Explore Actifio GO NEW
Back up your VMs and set up disaster recovery
View billing report
View and manage your Compute Engine billing
Monitor VMs
View outlier VMs across metrics like CPU and network
Explore VM logs
View, search, analyze, and download VM instance logs
Set up firewall rules
Control traffic to and from a VM instance
Patch management
Schedule patch updates and view patch compliance on VM instances


VPC network
Firewall
CREATE FIREWALL RULE
REFRESH
CONFIGURE LOGS
DELETE
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Get real-time analytics with Network Intelligence Center
Use Network Intelligence Center for comprehensive monitoring and troubleshooting. Learn more
Visualize your network resources
Diagnose and prevent connectivity issues
View packet loss and latency metrics
Keep your firewall rules strict and efficient
GO TO NETWORK INTELLIGENCE CENTER
REMIND ME LATER
Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more


VPC network
Create a firewall rule
VPC networks
IP addresses
Bring your own IP
Firewall
Routes
VPC network peering
Shared VPC
Serverless VPC access
Packet mirroring
Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more
Name *
vpc1-firewall-rule2
Lowercase letters, numbers, hyphens allowed
Description
Logs
Turning on firewall logs can generate a large number of logs which can increase costs in Cloud Logging. Learn more
On
Off
Network *
vpc1


Filter Enter property name or value
Status
Name
Zone
Recommendations
In use
Connect
vm1
us-east1-b
SSH
Open in browser window
Open in browser window on custom port
Open in browser window using provided private SSH key
View gcloud command
Use another SSH client
Related actions
Explore Actifio GO NEW
Back up your VMs and set up disaster recovery
View billing report
View and manage your Compute Engine billing
Monitor VMs
View outlier VMs across metrics like CPU and network
Explore VM logs
View, search, analyze, and download VM instance logs
Set up firewall rules
Control traffic to and from a VM instance
Patch management
Schedule patch updates and view patch compliance on VM instances

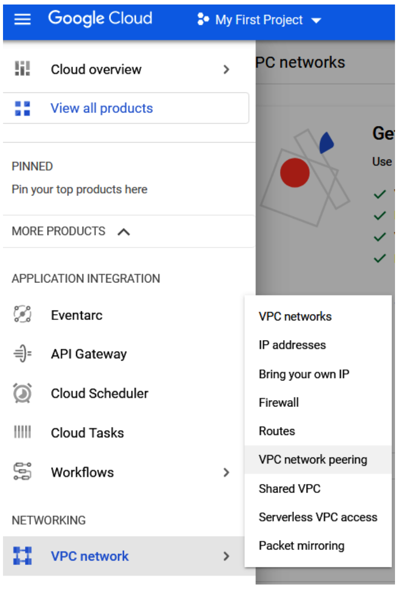

SSH-in-browser
Linux vm1 5.10.0-15-cloud-amd64 #1 SMP Debian 5.10.120-1 (2022-06-09) x86_64
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
lsong66@vm1:~$ ifconfig
-bash: ifconfig: command not found
lsong66@vm1:~$ /usr/sbin/ifconfig
ens4: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1460
inet 10.10.1.2 netmask 255.255.255.255 broadcast 10.10.1.2
inet6 fe80::4001:aff:fe0a:102 prefixlen 64 scopeid 0x20<link>
ether 42:01:0a:0a:01:02 txqueuelen 1000 (Ethernet)
RX packets 2722 bytes 729758 (712.6 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 2592 bytes 286212 (279.5 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 20 bytes 1548 (1.5 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 20 bytes 1548 (1.5 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lsong66@vm1:~$

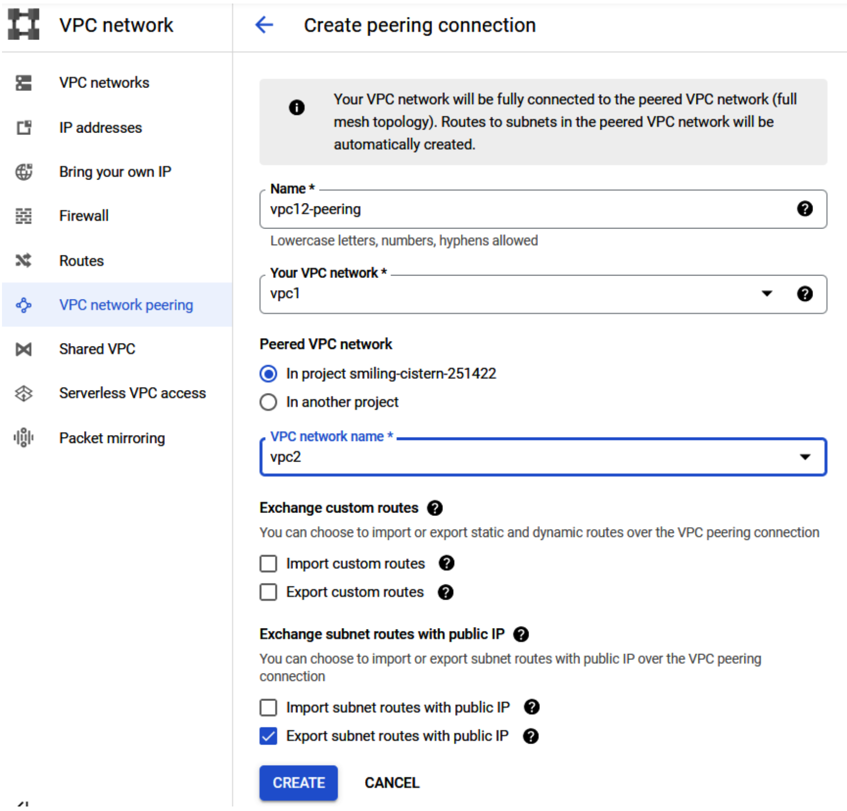


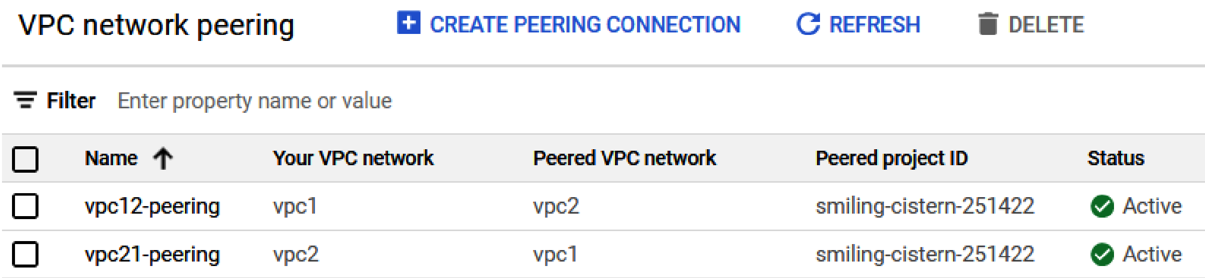
SSH-in-browser

```
lsong66@vm2:~$ /usr/sbin/ifconfig
ens4: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1460
        inet 10.10.2.2  netmask 255.255.255.255  broadcast 10.10.2.2
        inet6 fe80::4001:aff:fe0a:202  prefixlen 64  scopeid 0x20<link>
        ether 42:01:0a:0a:02:02  txqueuelen 1000  (Ethernet)
        RX packets 325  bytes 47289 (46.1 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 338  bytes 42223 (41.2 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 20  bytes 1548 (1.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 20  bytes 1548 (1.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
lsong66@vm2:~$ ping 10.10.1.2
PING 10.10.1.2 (10.10.1.2) 56(84) bytes of data.
64 bytes from 10.10.1.2: icmp_seq=1 ttl=64 time=188 ms
64 bytes from 10.10.1.2: icmp_seq=2 ttl=64 time=184 ms
64 bytes from 10.10.1.2: icmp_seq=3 ttl=64 time=183 ms
64 bytes from 10.10.1.2: icmp_seq=4 ttl=64 time=183 ms
^C
--- 10.10.1.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 183.399/184.599/188.020/1.975 ms
```

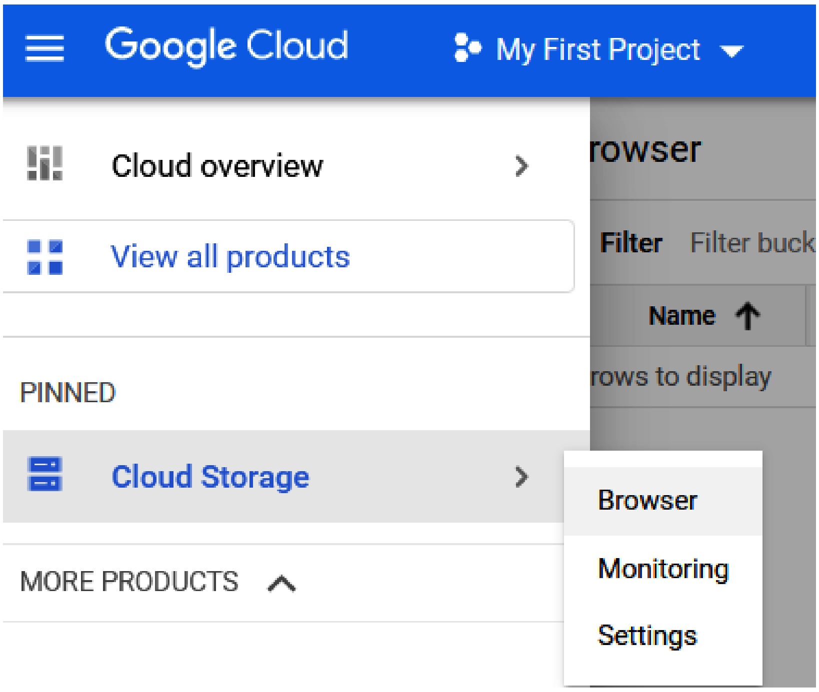


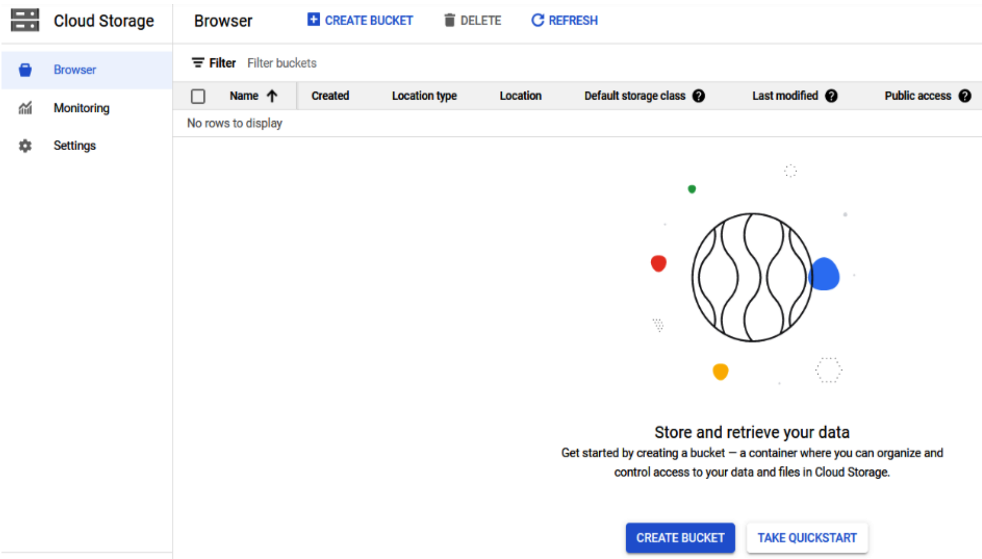


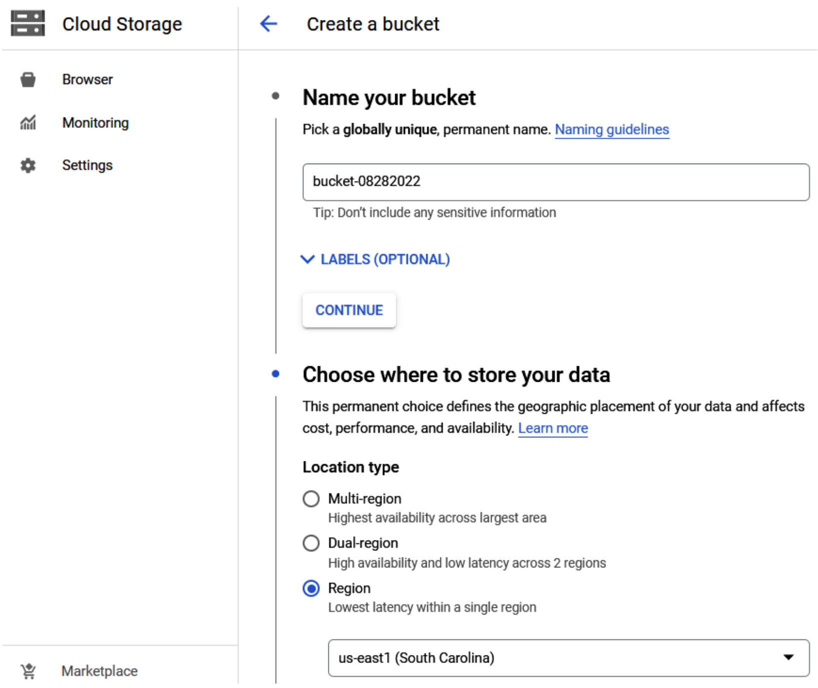


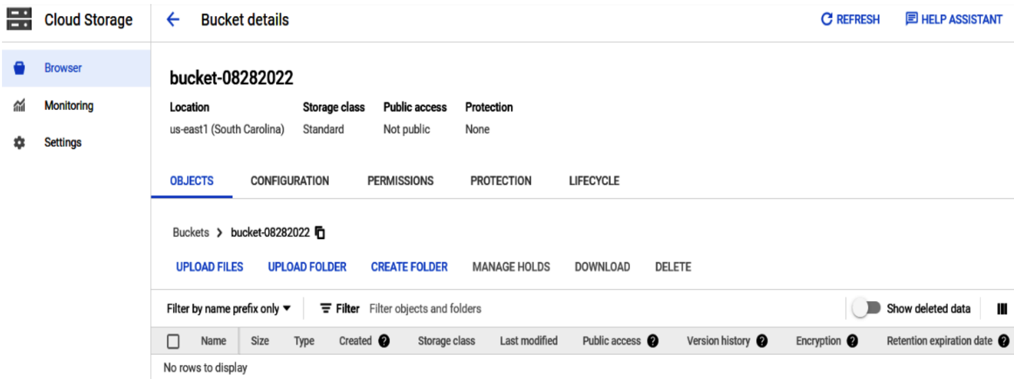
Name	Your VPC network	Peered VPC network	Peered project ID	Status
vpc12-peering	vpc1	vpc2	smiling-cistern-251422	Active
vpc21-peering	vpc2	vpc1	smiling-cistern-251422	Active

```
lsong66@vm1:~$ ping 192.168.1.2
PING 192.168.1.2 (192.168.1.2) 56(84) bytes of data.
64 bytes from 192.168.1.2: icmp_seq=1 ttl=64 time=111 ms
64 bytes from 192.168.1.2: icmp_seq=2 ttl=64 time=110 ms
64 bytes from 192.168.1.2: icmp_seq=3 ttl=64 time=110 ms
```

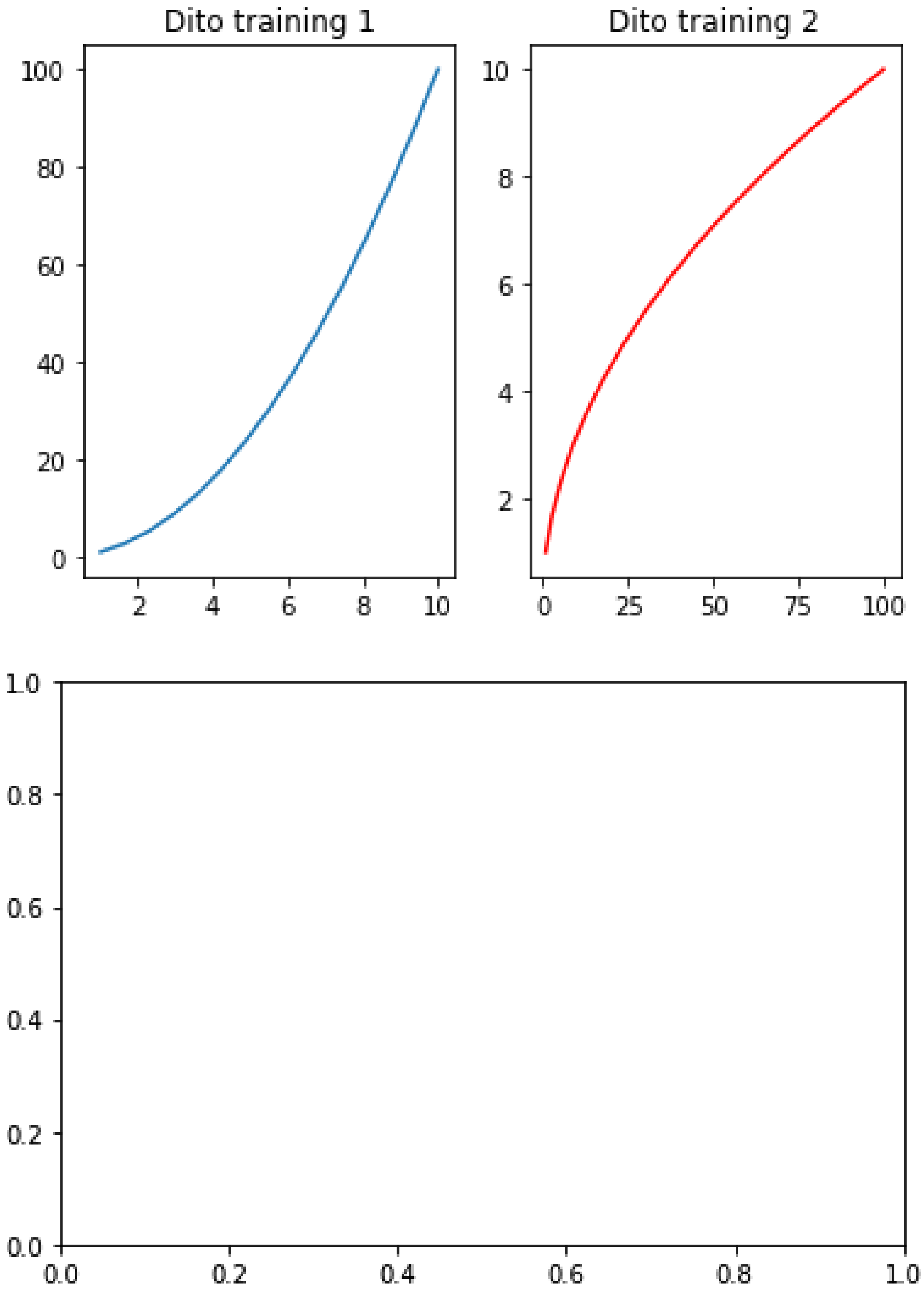


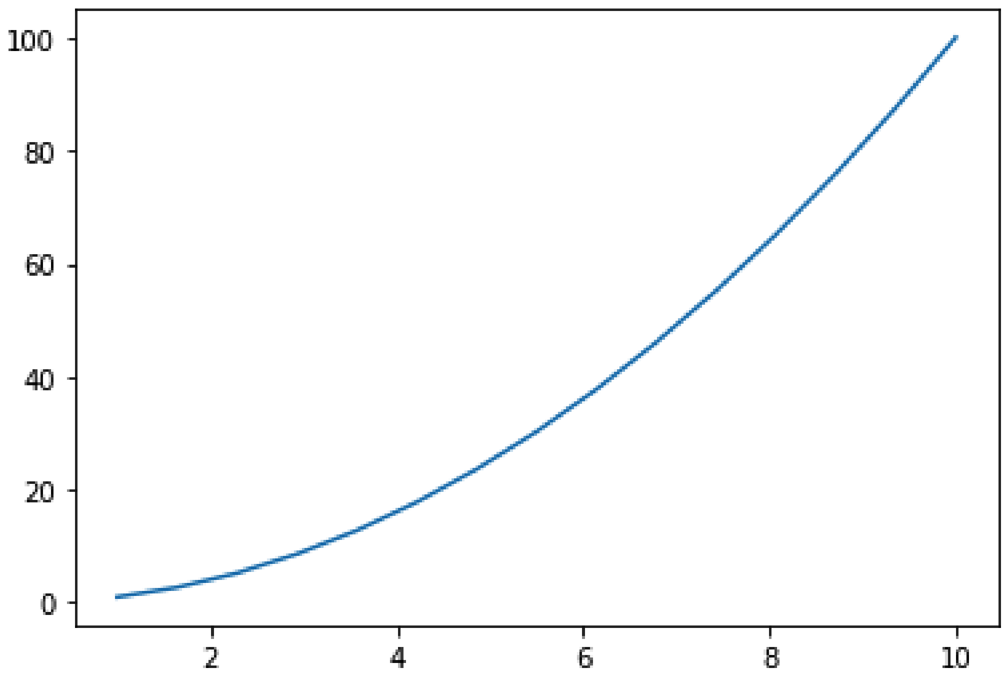



Cloud Storage
Create a bucket
Browser
Monitoring
Settings
Marketplace
Name your bucket
Pick a globally unique, permanent name. Naming guidelines
bucket-08282022
Tip: Don't include any sensitive information
LABELS (OPTIONAL)
CONTINUE
Choose where to store your data
This permanent choice defines the geographic placement of your data and affects cost, performance, and availability. Learn more
Location type
Multi-region
Highest availability across largest area
Dual-region
High availability and low latency across 2 regions
Region
Lowest latency within a single region
us-east1 (South Carolina)

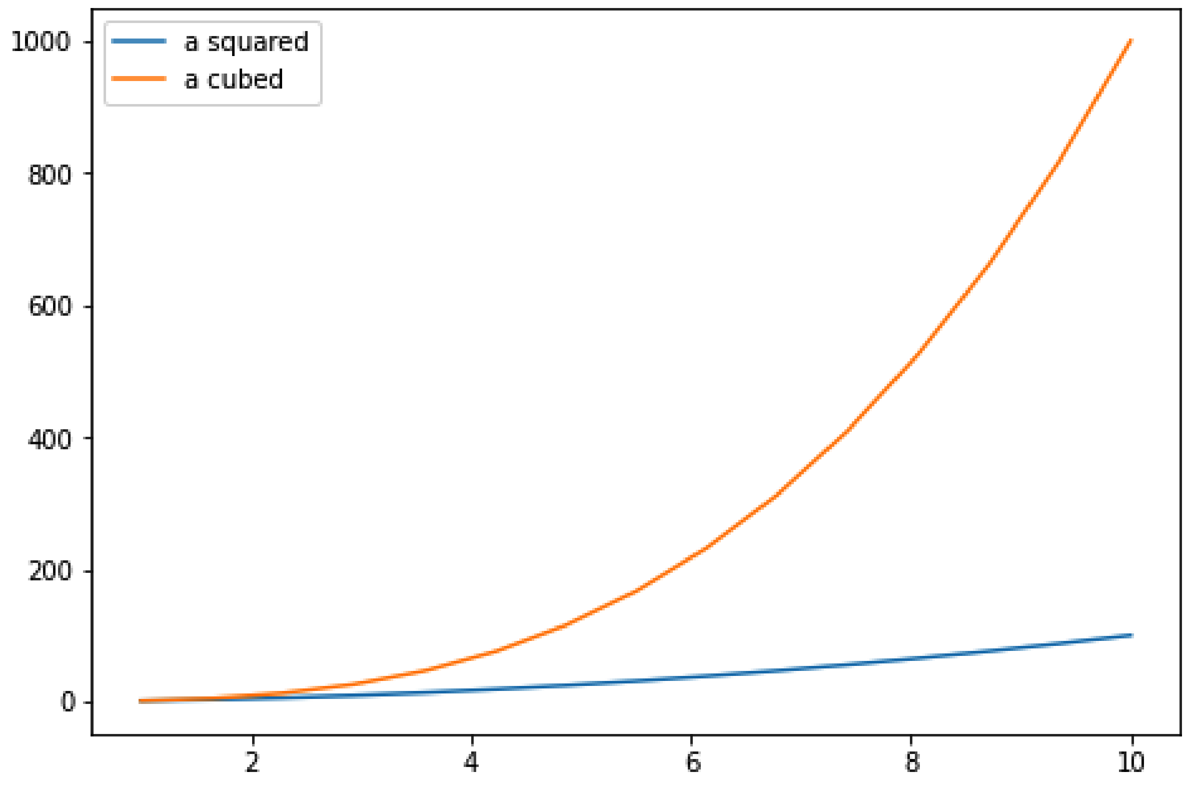

Cloud Storage
Bucket details
REFRESH
HELP ASSISTANT
Browser
Monitoring
Settings
bucket-08282022
Location
us-east1 (South Carolina)
Storage class
Standard
Public access
Not public
Protection
None
OBJECTS
CONFIGURATION
PERMISSIONS
PROTECTION
LIFECYCLE
Buckets
bucket-08282022
UPLOAD FILES
UPLOAD FOLDER
CREATE FOLDER
MANAGE HOLDS
DOWNLOAD
DELETE
Filter by name prefix only
Filter
Filter objects and folders
Show deleted data
Name
Size
Type
Created
Storage class
Last modified
Public access
Version history
Encryption
Retention expiration date
No rows to display

Appendix 2 - Practicing with Python Data LibraryChapter 13: Getting Started with Power Query

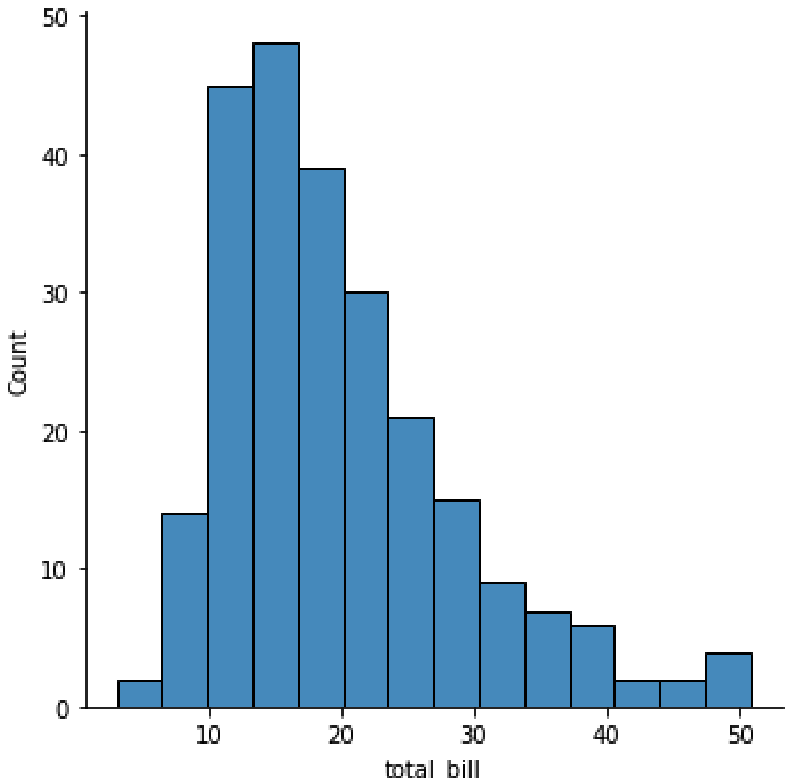




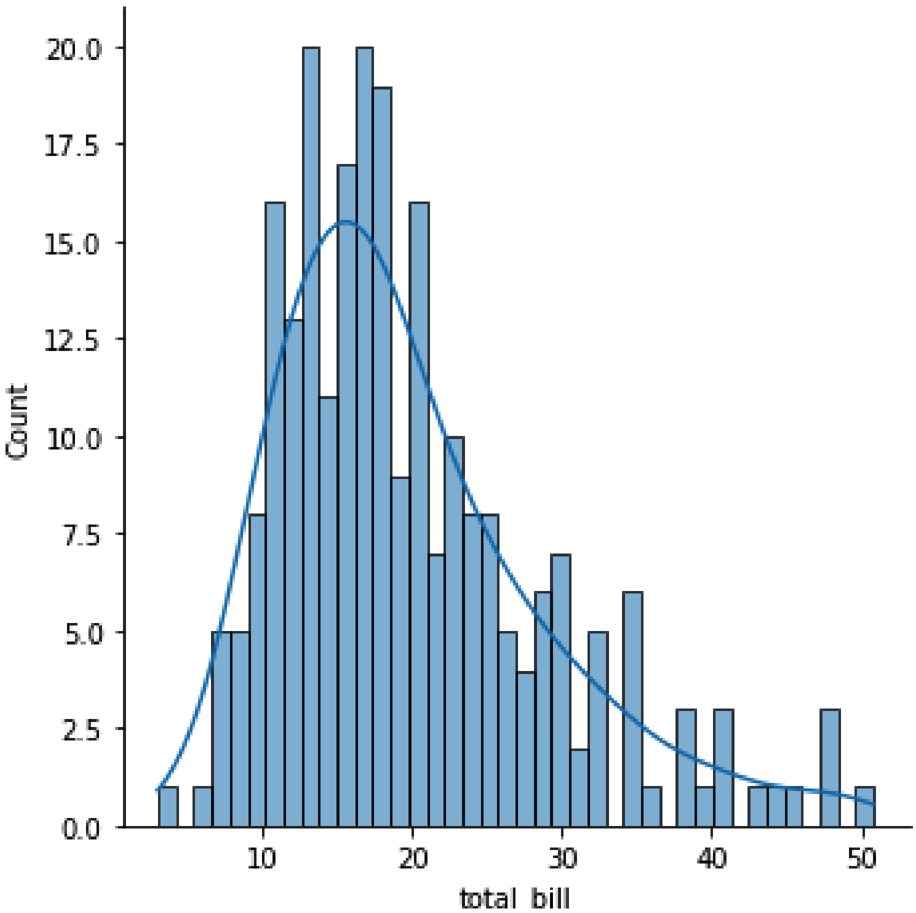
100
80
60
40
20
0
2
4
6
8
10



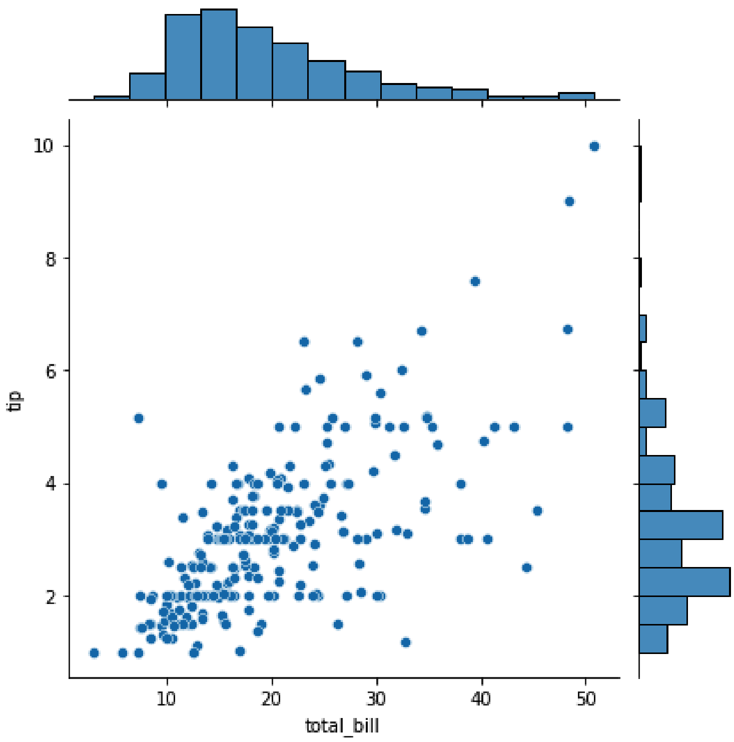
a squared
a cubed
1000
800
600
400
200
0
2
4
6
8
10



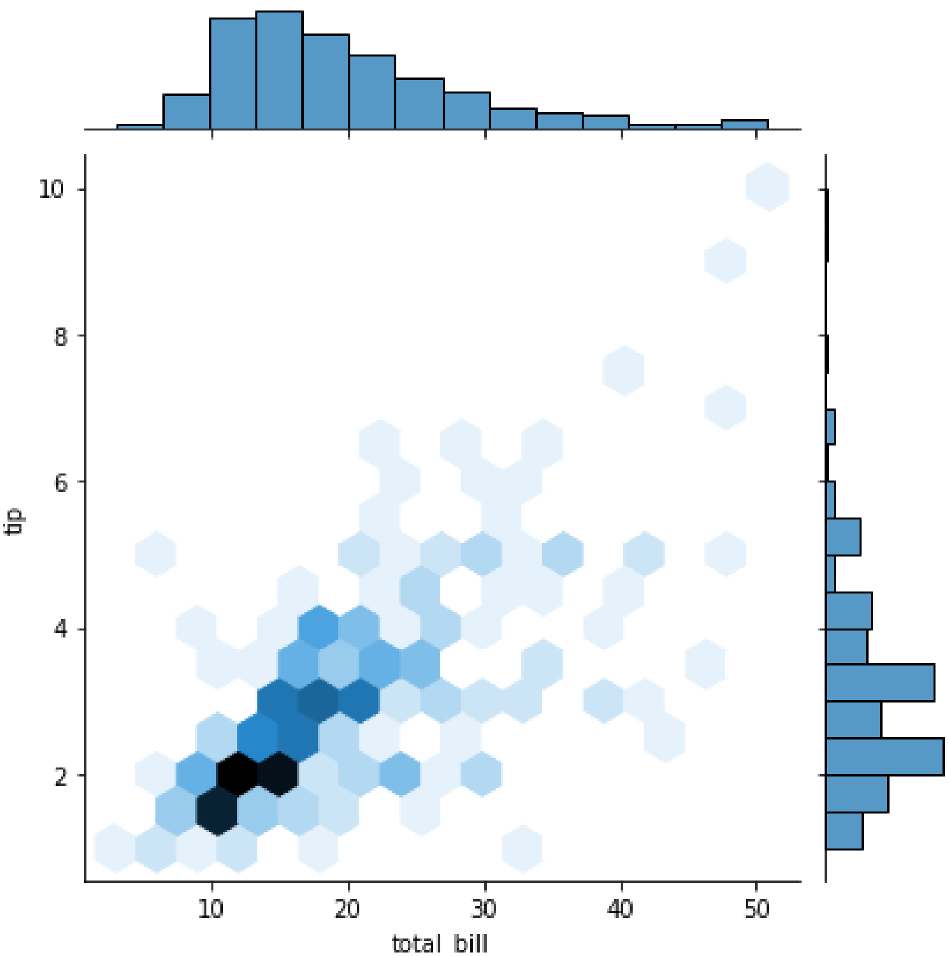
Count
total_bill



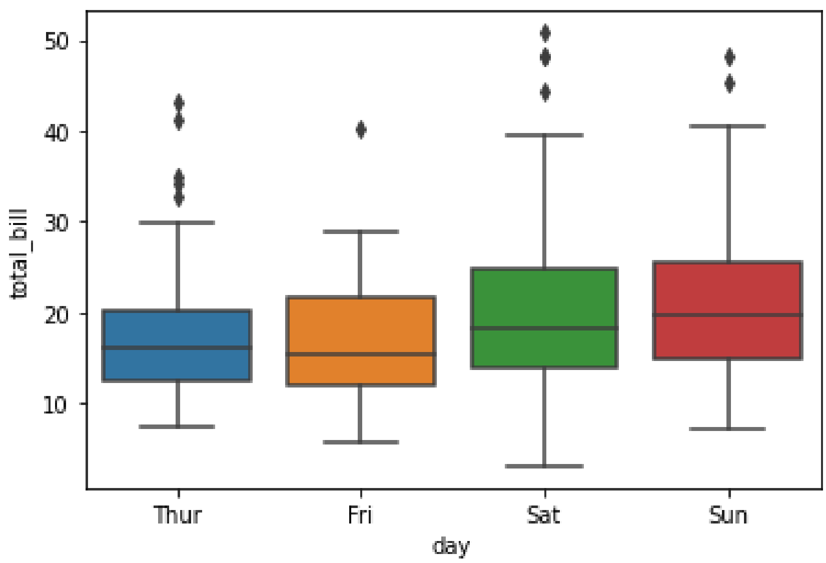
Count
total_bill



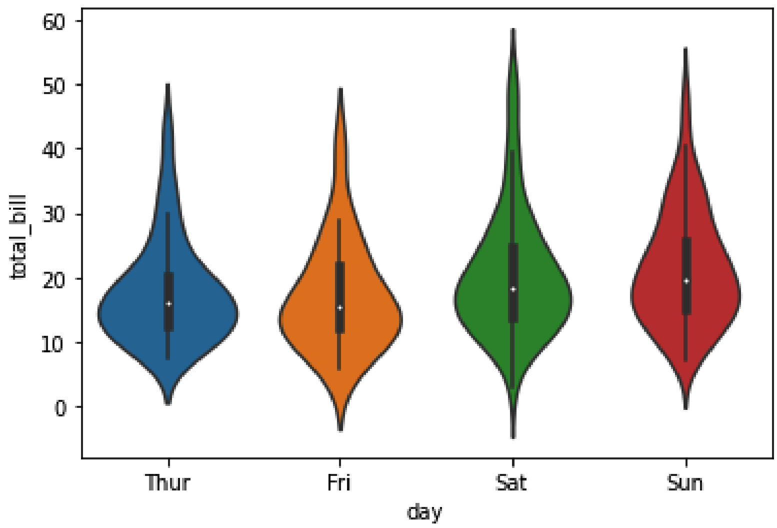
10
8
6
4
2
tip
10
20
30
40
50
total_bill



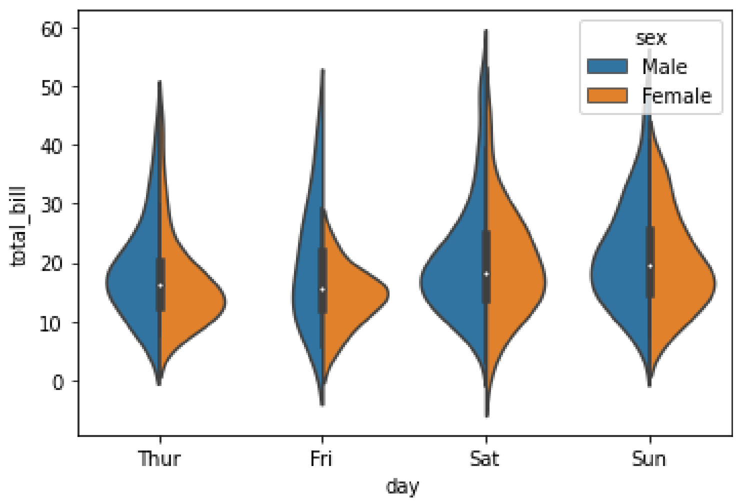
10
8
6
4
2
tip
10
20
30
40
50
total_bill



50
40
30
20
10
total_bill
Thur
Fri
Sat
Sun
day



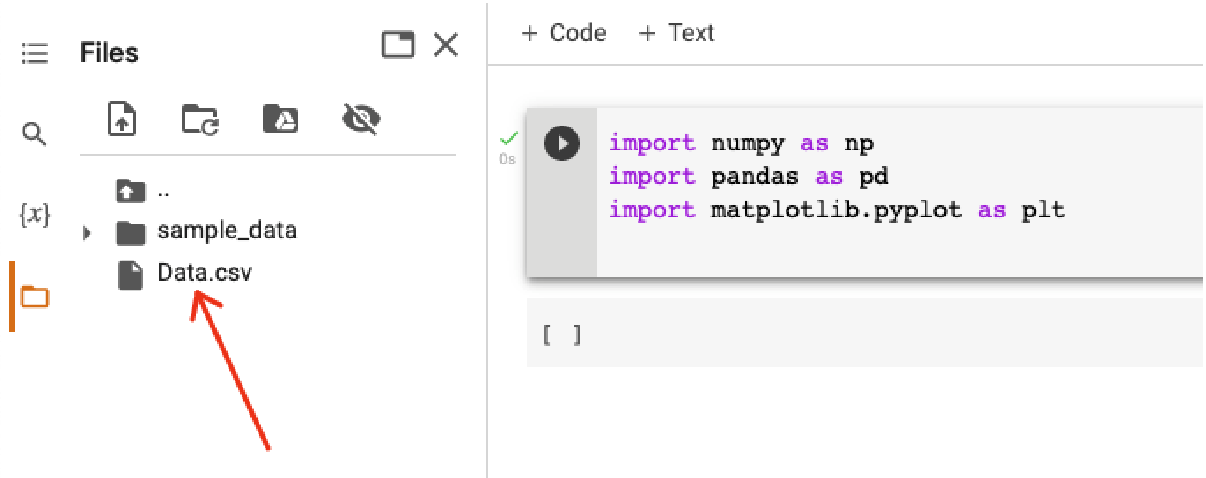
60
50
40
30
20
10
0
total_bill
Thur
Fri
Sat
Sun
day



sex
Male
Female
60
50
40
30
20
10
0
total_bill
Thur
Fri
Sat
Sun
day

Appendix 3 - Practicing with ScikitLearnAppendix 2 - Practicing with Python Data LibraryChapter 13: Getting Started with Power Query

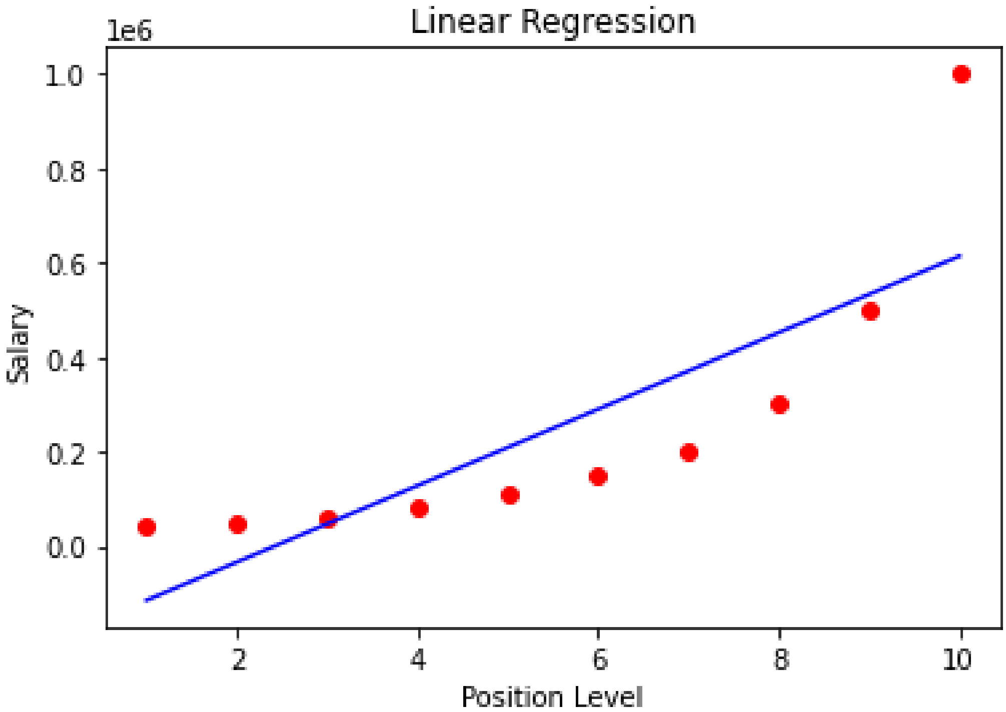
Country	Age	Salary	Purchased
France	44	72000	No
Spain	27	48000	Yes
Germany	30	54000	No
Spain	38	61000	No
Germany	40		Yes
France	35	58000	Yes
Spain		52000	No
France	48	79000	Yes
Germany	50	83000	No
France	37	67000	Yes

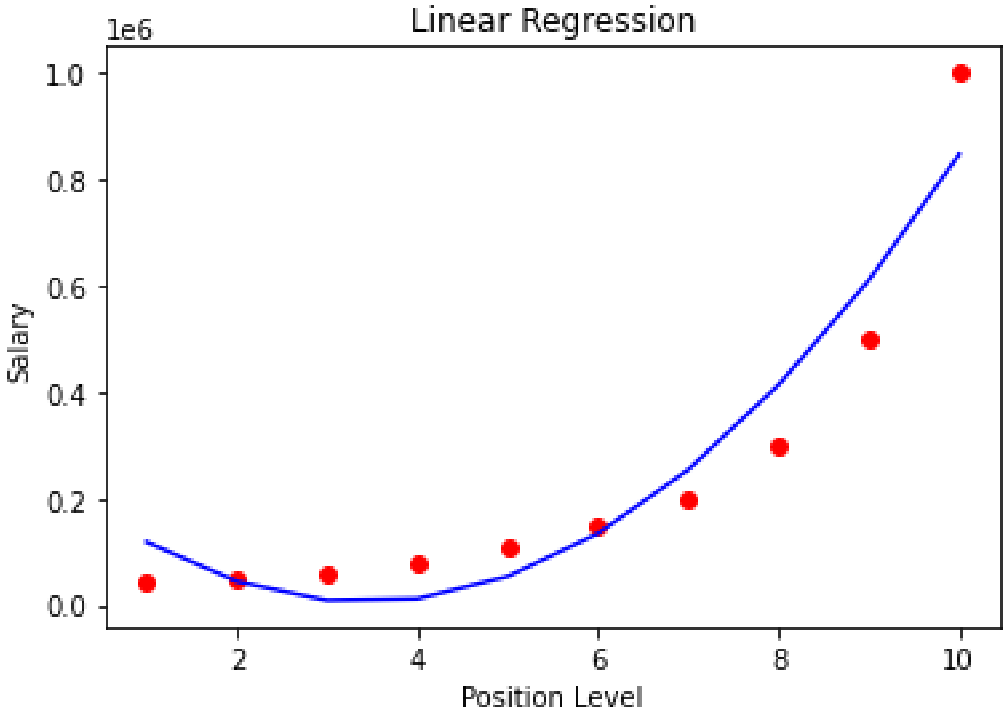


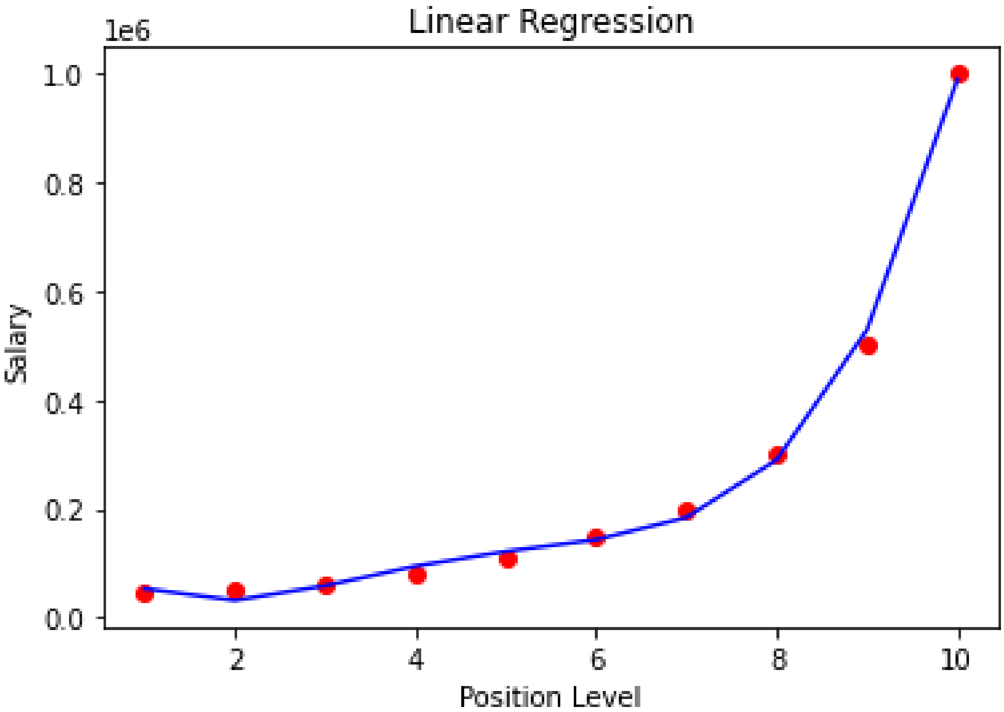
```
print(X_train)
```

```
[[0.0 0.0 1.0 38.77777777777778 52000.0]
 [0.0 1.0 0.0 40.0 63777.77777777778]
 [1.0 0.0 0.0 44.0 72000.0]
 [0.0 0.0 1.0 38.0 61000.0]
 [0.0 0.0 1.0 27.0 48000.0]
 [1.0 0.0 0.0 48.0 79000.0]
 [0.0 1.0 0.0 50.0 83000.0]
 [1.0 0.0 0.0 35.0 58000.0]]
```

R&D Spend	Administration	Marketing Spend	State	Profit
165349.2	136897.8	471784.1	New York	192261.83
162597.7	151377.59	443898.53	California	191792.06
153441.51	101145.55	407934.54	Florida	191050.39
144372.41	118671.85	383199.62	New York	182901.99
142107.34	91391.77	366168.42	Florida	166187.94
131876.9	99814.71	362861.36	New York	156991.12
134615.46	147198.87	127716.82	California	156122.51
130298.13	145530.06	323876.68	Florida	155752.6
120542.52	148718.95	311613.29	New York	152211.77

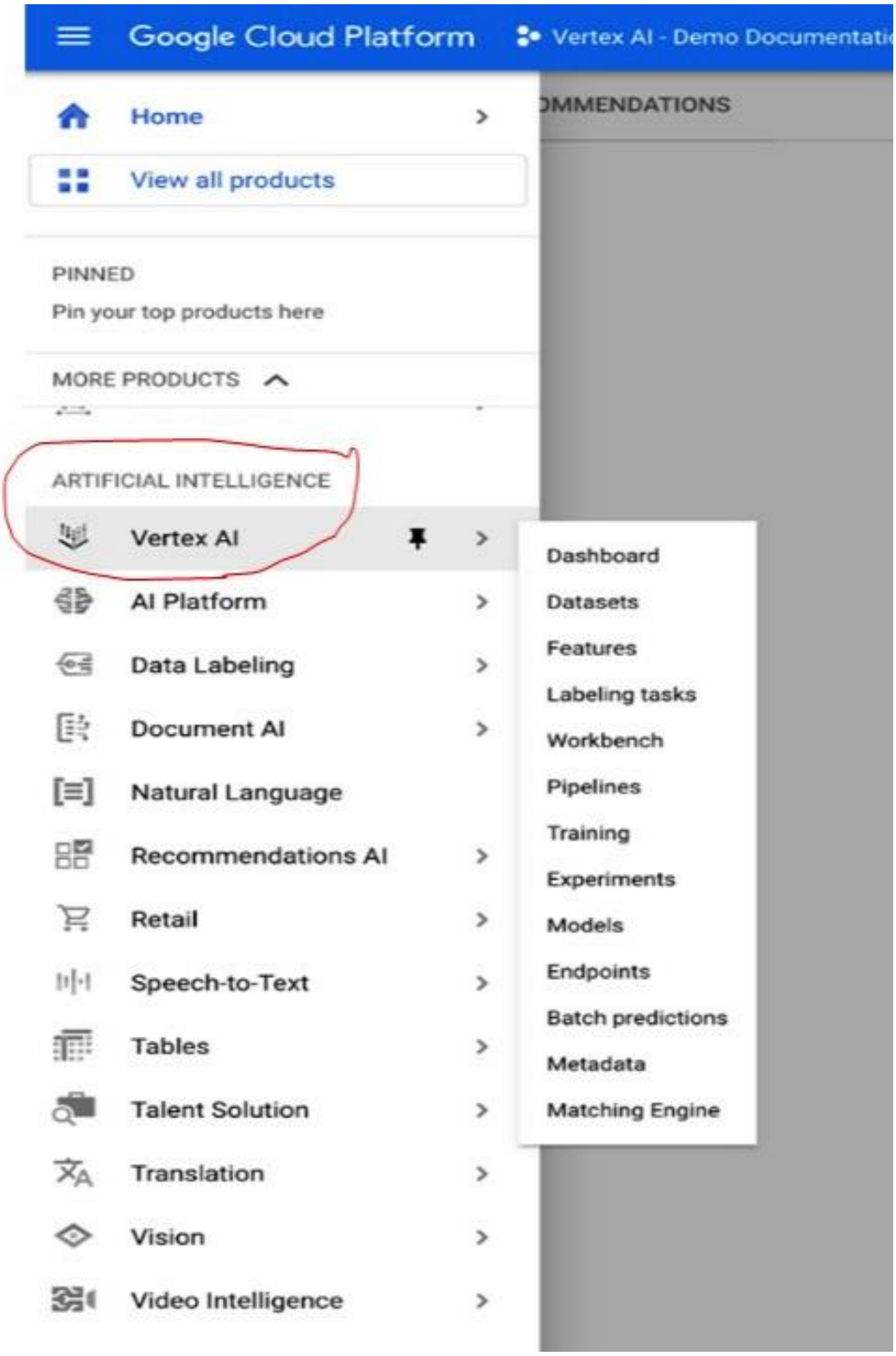

Linear Regression
1e6
1.0
0.8
0.6
0.4
0.2
0.0
Salary
2
4
6
8
10
Position Level

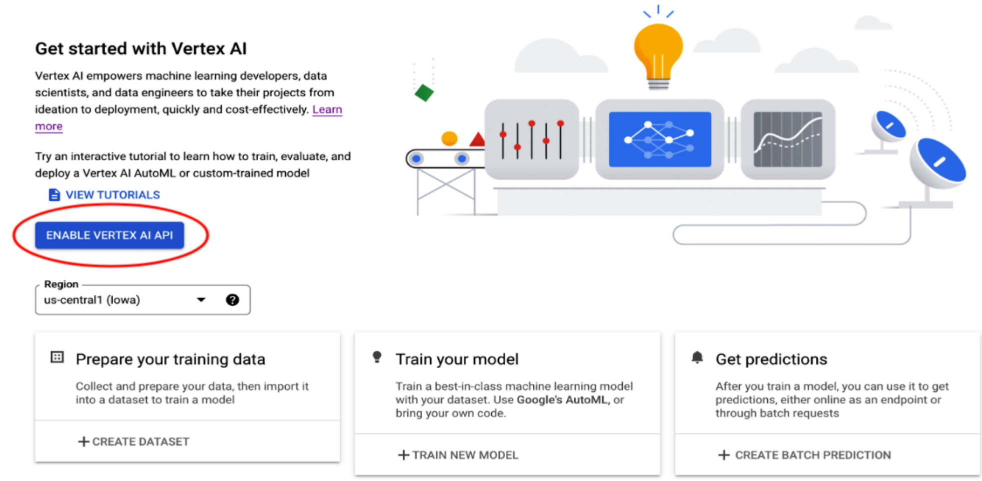

Linear Regression
1e6
1.0
0.8
0.6
0.4
0.2
0.0
Salary
2
4
6
8
10
Position Level

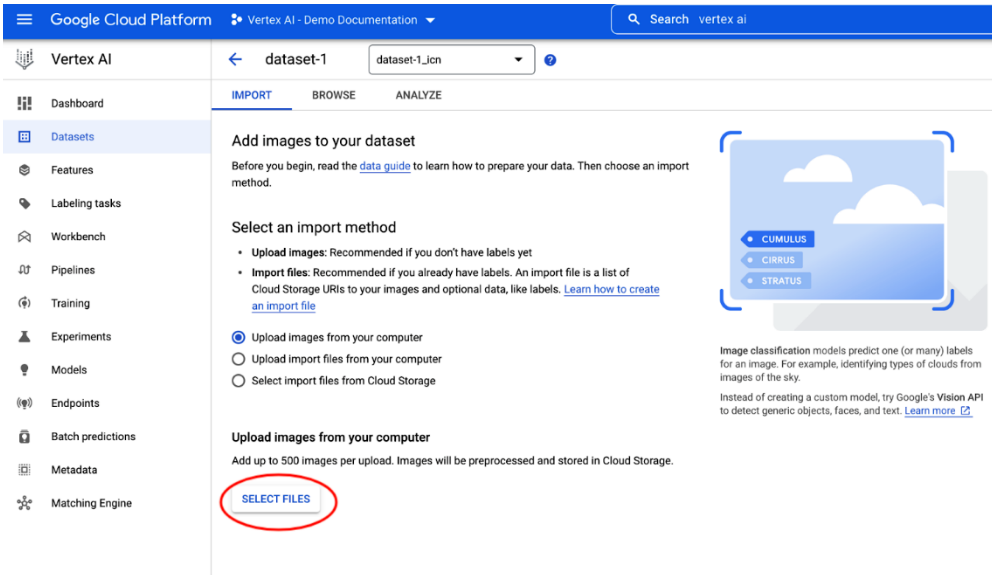


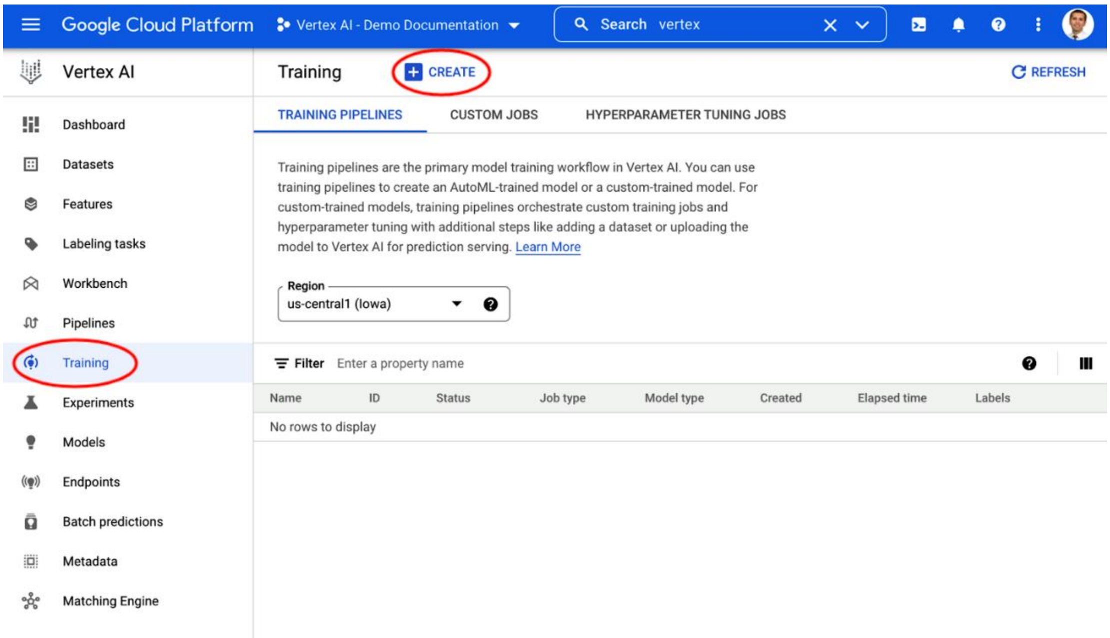
Age	EstimatedSalary	Purchased
19	19000	0
35	20000	0
26	43000	0
27	57000	0
19	76000	0
27	58000	0
27	84000	0
32	150000	1
25	33000	0
35	65000	0
26	80000	0
26	52000	0
20	86000	0
32	18000	0
18	82000	0
29	80000	0
47	25000	1
45	26000	1

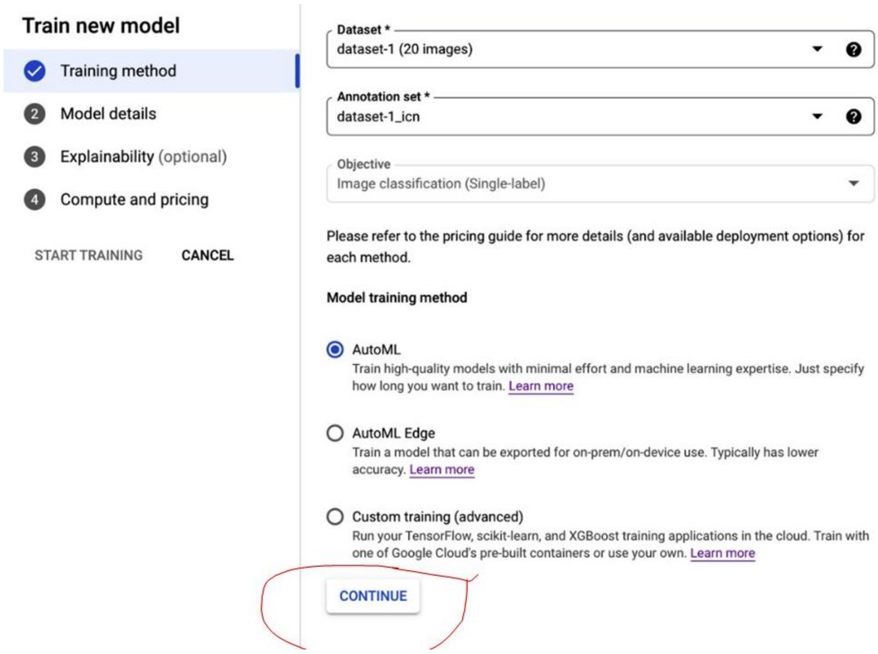
Appendix 4 - Practicing with Vertex AI

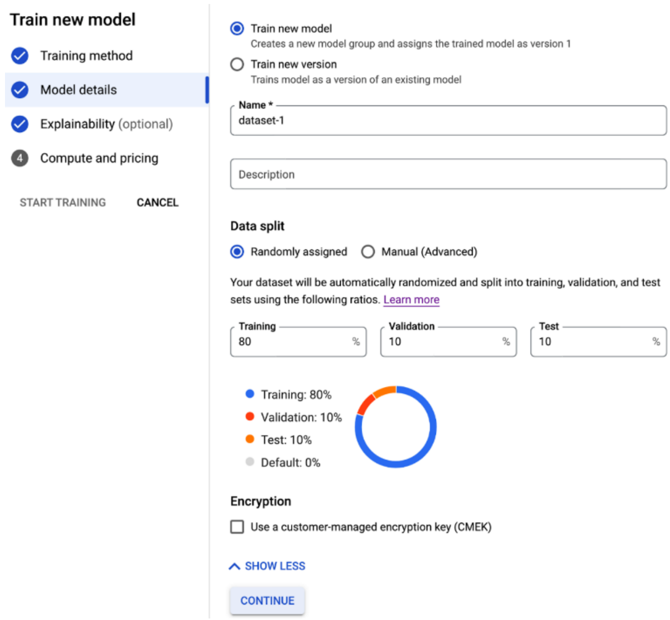


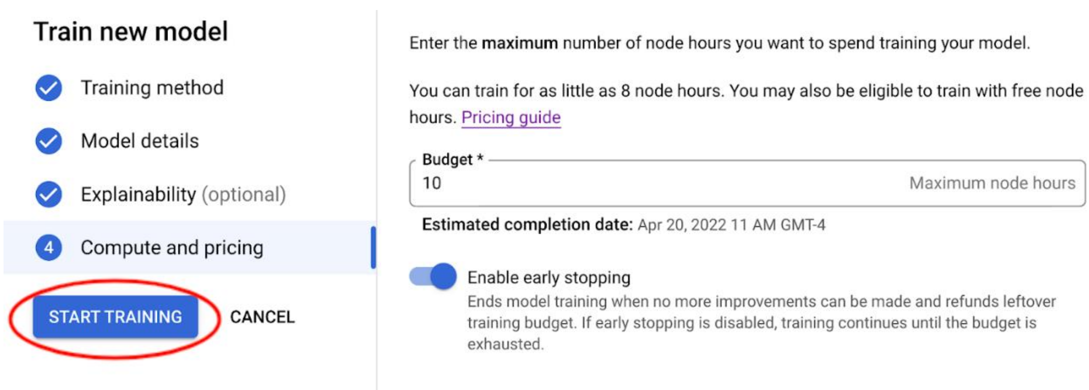

Get started with Vertex AI
Vertex AI empowers machine learning developers, data scientists, and data engineers to take their projects from ideation to deployment, quickly and cost-effectively. Learn more
Try an interactive tutorial to learn how to train, evaluate, and deploy a Vertex AI AutoML or custom-trained model
VIEW TUTORIALS
ENABLE VERTEX AI API
Region
us-central1 (Iowa)
Prepare your training data
Collect and prepare your data, then import it into a dataset to train a model
+ CREATE DATASET
Train your model
Train a best-in-class machine learning model with your dataset. Use Google's AutoML, or bring your own code.
+ 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

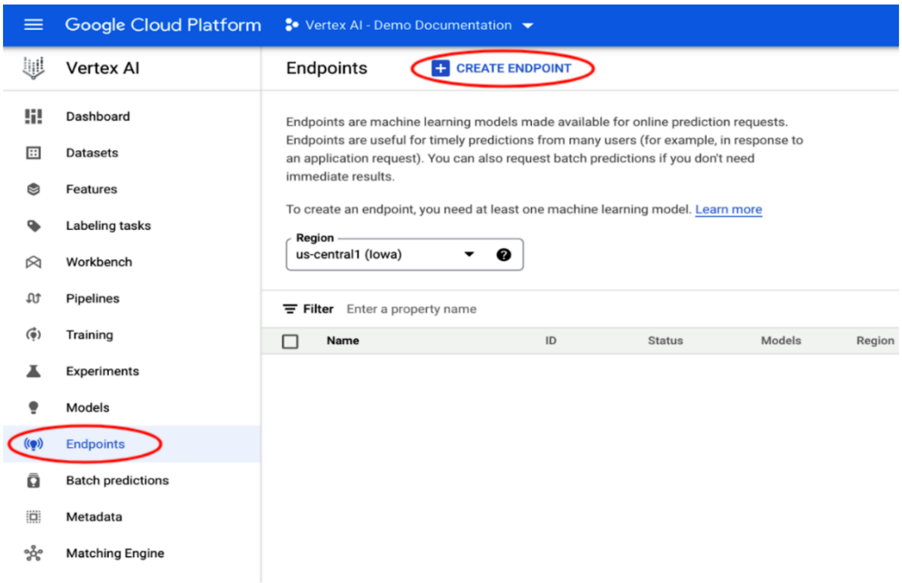

Google Cloud Platform
Vertex AI - Demo Documentation
Search vertex ai
Vertex AI
dataset-1
dataset-1_icn
IMPORT
BROWSE
ANALYZE
Dashboard
Datasets
Features
Labeling tasks
Workbench
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Matching Engine
Add images to your dataset
Before you begin, read the data guide to learn how to prepare your data. Then choose an import method.
Select an import method
Upload images: Recommended if you don't have labels yet
Import files: Recommended if you already have labels. An import file is a list of Cloud Storage URIs to your images and optional data, like labels. Learn how to create an import file
Upload images from your computer
Upload import files from your computer
Select import files from Cloud Storage
Upload images from your computer
Add up to 500 images per upload. Images will be preprocessed and stored in Cloud Storage.
SELECT FILES
CUMULUS
CIRRUS
STRATUS
Image classification models predict one (or many) labels for an image. For example, identifying types of clouds from images of the sky.
Instead of creating a custom model, try Google's Vision API to detect generic objects, faces, and text. Learn more

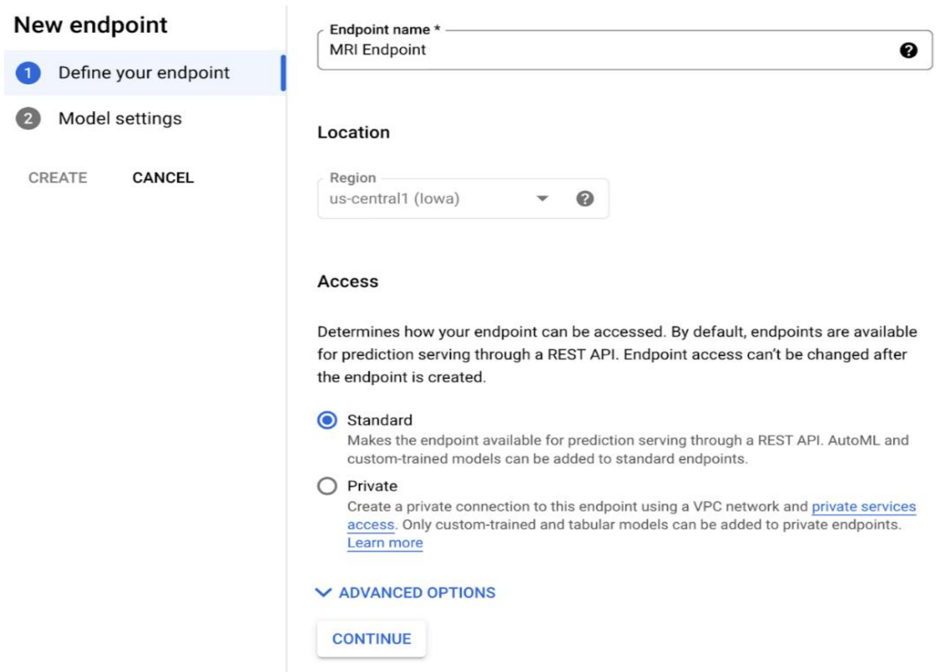

Google Cloud Platform
Vertex AI - Demo Documentation
Search vertex
Vertex AI
Training
CREATE
REFRESH
TRAINING PIPELINES
CUSTOM JOBS
HYPERPARAMETER TUNING JOBS
Dashboard
Datasets
Features
Labeling tasks
Workbench
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Matching Engine
Training pipelines are the primary model training workflow in Vertex AI. You can use training pipelines to create an AutoML-trained model or a custom-trained model. For custom-trained models, training pipelines orchestrate custom training jobs and hyperparameter tuning with additional steps like adding a dataset or uploading the model to Vertex AI for prediction serving. Learn More
Region
us-central1 (Iowa)
Filter
Enter a property name
Name
ID
Status
Job type
Model type
Created
Elapsed time
Labels
No rows to display

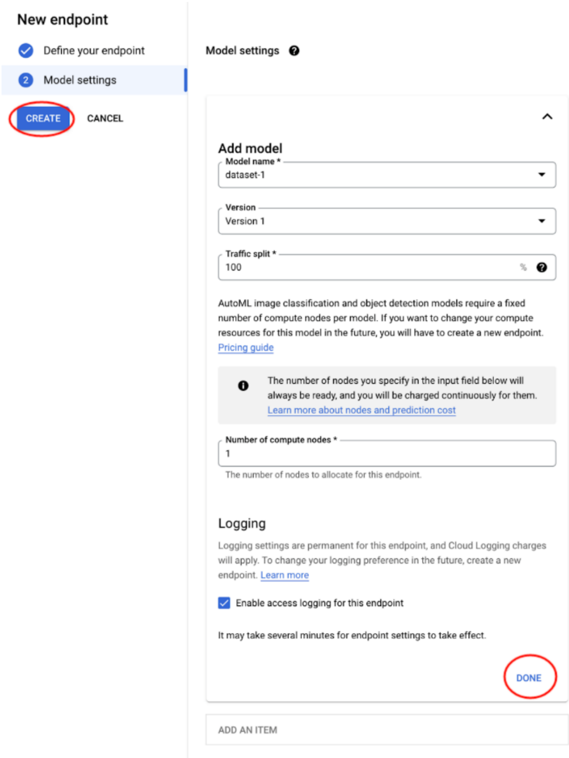

Train new model
Training method
2 Model details
3 Explainability (optional)
4 Compute and pricing
START TRAINING
CANCEL
Dataset *
dataset-1 (20 images)
Annotation set *
dataset-1_icn
Objective
Image classification (Single-label)
Please refer to the pricing guide for more details (and available deployment options) for each method.
Model training method
AutoML
Train high-quality models with minimal effort and machine learning expertise. Just specify how long you want to train. Learn more
AutoML Edge
Train a model that can be exported for on-prem/on-device use. Typically has lower accuracy. Learn more
Custom training (advanced)
Run your TensorFlow, scikit-learn, and XGBoost training applications in the cloud. Train with one of Google Cloud's pre-built containers or use your own. Learn more
CONTINUE


Train new model
Training method
Model details
Explainability (optional)
4 Compute and pricing
START TRAINING
CANCEL
Train new model
Creates a new model group and assigns the trained model as version 1
Train new version
Trains model as a version of an existing model
Name *
dataset-1
Description
Data split
Randomly assigned
Manual (Advanced)
Your dataset will be automatically randomized and split into training, validation, and test sets using the following ratios. Learn more
Training
80
%
Validation
10
%
Test
10
%
Training: 80%
Validation: 10%
Test: 10%
Default: 0%
Encryption
Use a customer-managed encryption key (CMEK)
SHOW LESS
CONTINUE


Train new model
Training method
Model details
Explainability (optional)
4 Compute and pricing
START TRAINING
CANCEL
Enter the maximum number of node hours you want to spend training your model.
You can train for as little as 8 node hours. You may also be eligible to train with free node hours. Pricing guide
Budget *
10
Maximum node hours
Estimated completion date: Apr 20, 2022 11 AM GMT-4
Enable early stopping
Ends model training when no more improvements can be made and refunds leftover training budget. If early stopping is disabled, training continues until the budget is exhausted.


Google Cloud Platform
Vertex AI - Demo Documentation
Vertex AI
Endpoints
CREATE ENDPOINT
Dashboard
Datasets
Features
Labeling tasks
Workbench
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Matching Engine
Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.
To create an endpoint, you need at least one machine learning model. Learn more
Region
us-central1 (Iowa)
Filter
Enter a property name
Name
ID
Status
Models
Region


New endpoint
1 Define your endpoint
2 Model settings
CREATE
CANCEL
Endpoint name *
MRI Endpoint
Location
Region
us-central1 (Iowa)
Access
Determines how your endpoint can be accessed. By default, endpoints are available for prediction serving through a REST API. Endpoint access can't be changed after the endpoint is created.
Standard
Makes the endpoint available for prediction serving through a REST API. AutoML and custom-trained models can be added to standard endpoints.
Private
Create a private connection to this endpoint using a VPC network and private services access. Only custom-trained and tabular models can be added to private endpoints.
Learn more
ADVANCED OPTIONS
CONTINUE



Sample Request

REST PYTHON

You can now execute queries using the command line interface (CLI).

1. Make sure you have the Google Cloud SDK installed.
2. Run the following command to authenticate with your Google account.

```
$ gcloud auth application-default login
```

3. Create a JSON object to hold your image data. Your image data should be a base64-encoded string.

```
{
  "instances": [{
    "content": "YOUR_IMAGE_BYTES"
  }],
  "parameters": {
    "confidenceThreshold": 0.5,
    "maxPredictions": 5
  }
}
```

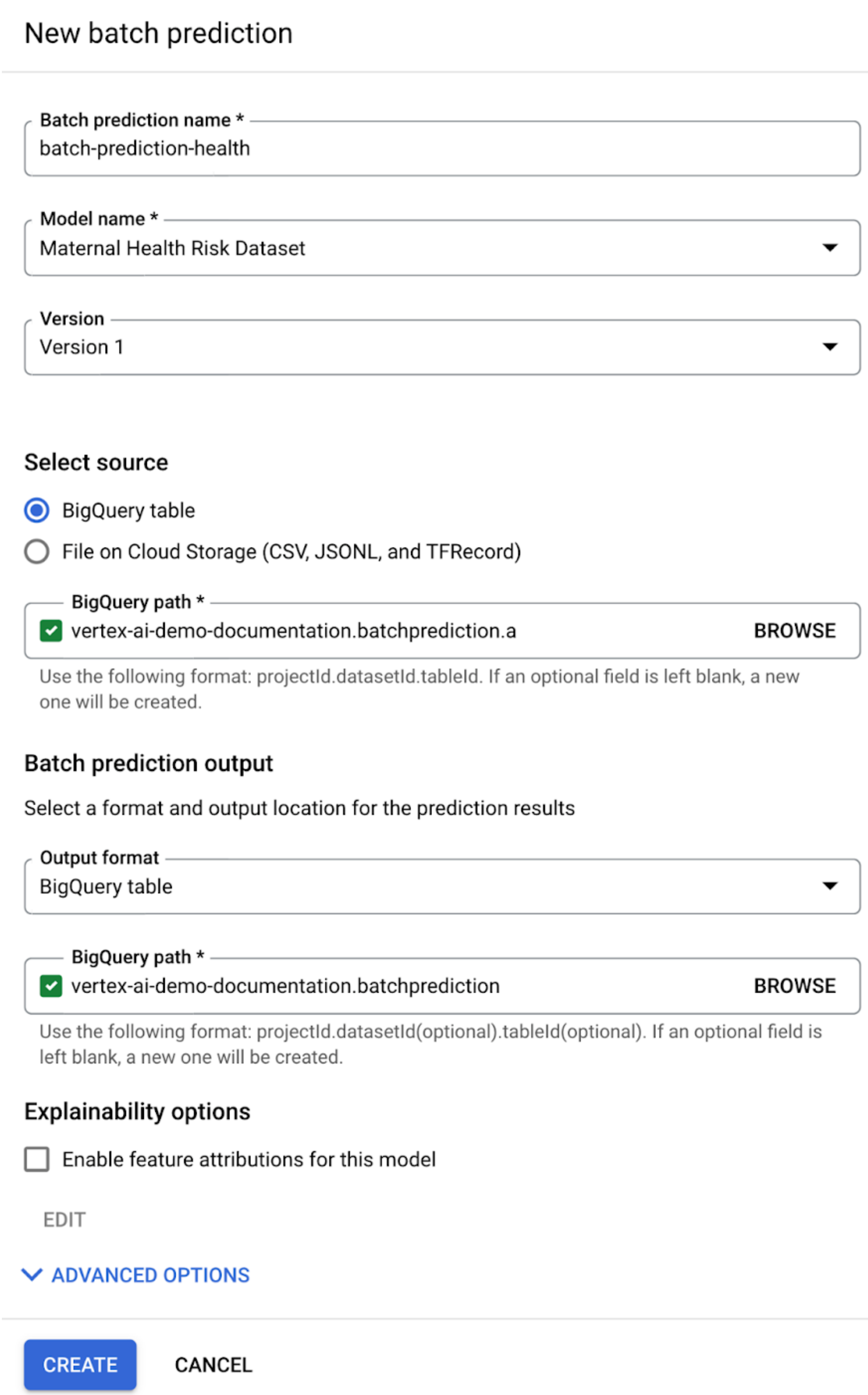
4. Create environment variables to hold your endpoint and project IDs, as well as your JSON object.

```
$ ENDPOINT_ID="6619420639025430528"
  PROJECT_ID="vertex-ai-demo-documentation"
  INPUT_DATA_FILE="INPUT-JSON"
```

5. Execute the request.

```
$ curl \
  -X POST \
  -H "Authorization: Bearer $(gcloud auth print-access-
  -H "Content-Type: application/json" \
  https://us-central1-aiplatform.googleapis.com/v1/proj
  -d "@${INPUT_DATA_FILE}"
```

DONE


New batch prediction
Batch prediction name *
batch-prediction-health
Model name *
Maternal Health Risk Dataset
Version
Version 1
Select source
BigQuery table
File on Cloud Storage (CSV, JSONL, and TFRecord)
BigQuery path *
vertex-ai-demo-documentation.batchprediction.a
BROWSE
Use the following format: projectId.datasetId.tableId. If an optional field is left blank, a new one will be created.
Batch prediction output
Select a format and output location for the prediction results
Output format
BigQuery table
BigQuery path *
vertex-ai-demo-documentation.batchprediction
BROWSE
Use the following format: projectId.datasetId(optional).tableId(optional). If an optional field is left blank, a new one will be created.
Explainability options
Enable feature attributions for this model
EDIT
ADVANCED OPTIONS
CREATE
CANCEL

New notebook

Notebook name *
netobook-demo
63-char limit with lowercase letters, digits, or '-' only. Must start with a letter. Cannot end with a '-'.

Region *
us-west1 (Oregon)

Zone *
us-west1-b

Notebook properties

Environment	Python 3 (with Intel® MKL)
Machine type	4 vCPUs, 15 GB RAM
Boot disk	100 GB Standard persistent disk
Data disk	100 GB Standard persistent disk
Subnetwork	default(10.138.0.0/20)
External IP	Ephemeral(Automatic)
Permission	Compute Engine default service account
Estimated cost	$102.70 monthly, $0.141 hourly

ADVANCED OPTIONS   CANCEL   CREATE

Create entity type

On May 11, 2022 at 3:00:00 AM UTC-4, feature value monitoring will begin billing and remove feature-level monitoring configurations. Learn more about feature monitoring changes

Entity types group and contain related features. For example, a "movies" entity type might contain features like "title" and "genre". Learn more

Region
us-central1 (Iowa)

Featurestore *

Entity type name *
Must start with a letter or underscore. Can use letters, numbers, and underscores.

Description
Optional text description of the entity type

Feature monitoring PREVIEW
Provides descriptive statistics and distribution shapes. Enables feature monitoring for all features in the entity type. You can also edit feature monitoring at the feature level, which will override this setting.

Disabled

Monitoring time interval
1 days

CREATE   CANCEL

Overview

This Colab introduces Vertex AI Feature Store, a managed cloud service for machine learning engineers and data scientists to store, serve, manage and share machine learning features at a large scale.

This Colab assumes that you understand basic Google Cloud concepts such as Project, Storage and Vertex AI. Some machine learning knowledge is also helpful but not required.

Dataset

This Colab uses a movie recommendation dataset as an example throughout all the sessions. The task is to train a model to predict if a user is going to watch a movie and serve this model online.

Objective

In this notebook, you will learn how to:

```
* How to import your features into Vertex AI Feature Store.
* How to serve online prediction requests using the imported features.
* How to access imported features in offline jobs, such as training jobs.
```

Costs

This tutorial uses billable components of Google Cloud:

- Vertex AI
- Cloud Storage
- Cloud Bigtable

Set your project ID

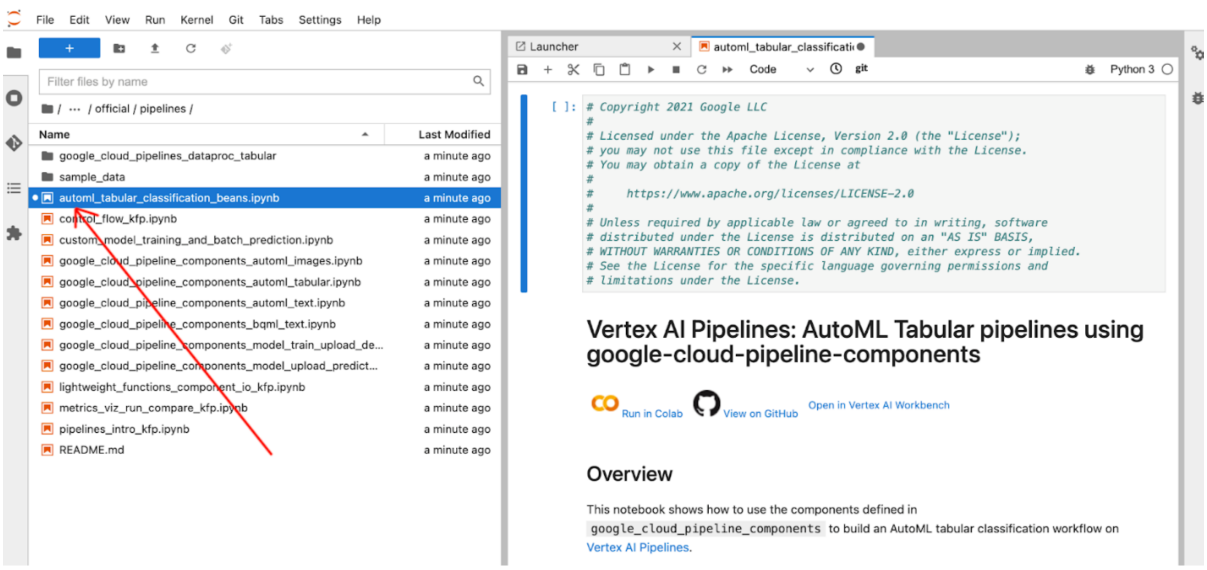
If you don't know your project ID, you may be able to get your project ID using `gcloud`.

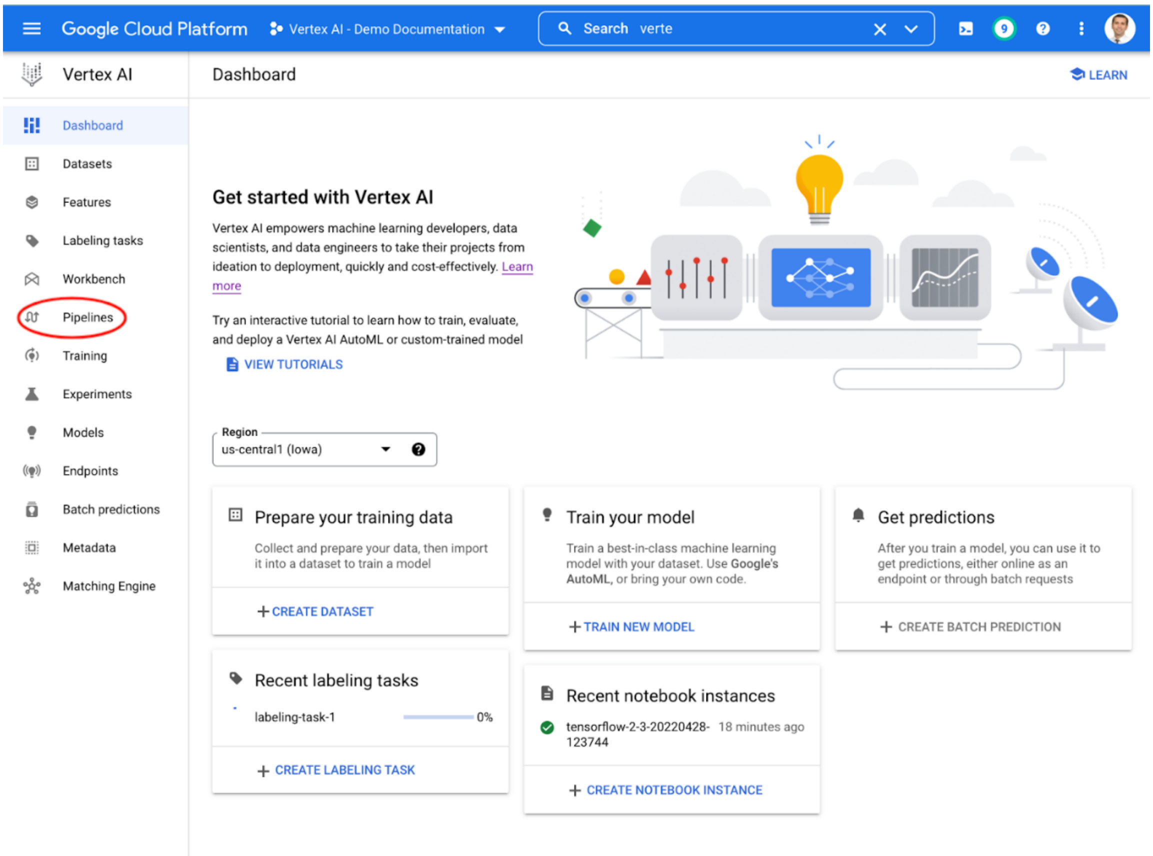
```
[1]: import os

     PROJECT_ID = ""

     # Get your Google Cloud project ID from gcloud
     if not os.getenv("IS_TESTING"):
         shell_output = !gcloud config list --format 'value(core.project)' 2>/dev/null
         PROJECT_ID = shell_output[0]
         print("Project ID: ", PROJECT_ID)
```

```
Project ID:  vertex-ai-demo-documentation
```

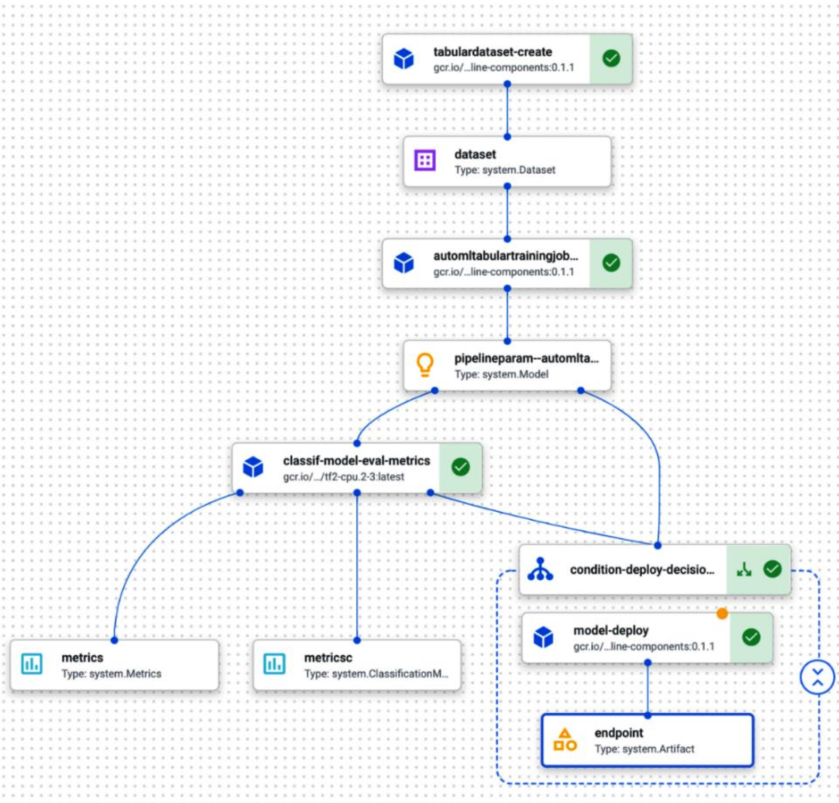
Otherwise, set your project ID here.

```
[2]: if PROJECT_ID == "" or PROJECT_ID is None:
         PROJECT_ID = "python-docs-samples-tests"  # @param {type:"string"}
```





Google Cloud Platform
Vertex AI - Demo Documentation
Search verte
Vertex AI
Dashboard
LEARN
Dashboard
Datasets
Features
Labeling tasks
Workbench
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Matching Engine
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
Try an interactive tutorial to learn how to train, evaluate, and deploy a Vertex AI AutoML or custom-trained model
VIEW TUTORIALS
Region
us-central1 (Iowa)
Prepare your training data
Collect and prepare your data, then import it into a dataset to train a model
CREATE DATASET
Train your model
Train a best-in-class machine learning model with your dataset. Use Google's AutoML, or bring your own code.
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
Recent labeling tasks
labeling-task-1
0%
CREATE LABELING TASK
Recent notebook instances
tensorflow-2-3-20220428-123744
18 minutes ago
CREATE NOTEBOOK INSTANCE



tabulardataset-create
gcr.io/...line-components:0.1.1
dataset
Type: system.Dataset
automltabulartrainingjob...
gcr.io/...line-components:0.1.1
pipelineparam--automlta...
Type: system.Model
classif-model-eval-metrics
gcr.io/.../tf2-cpu.2-3:latest
condition-deploy-decisio...
model-deploy
gcr.io/...line-components:0.1.1
metrics
Type: system.Metrics
metricsc
Type: system.ClassificationM...
endpoint
Type: system.Artifact

Artifact info

VIEW LINEAGE

Name	dataset
Type	system.Dataset
URI	aiplatform://v1/projects/462141068491/locations/us-central1/datasets/460712964224188416

Artifact info

VIEW LINEAGE

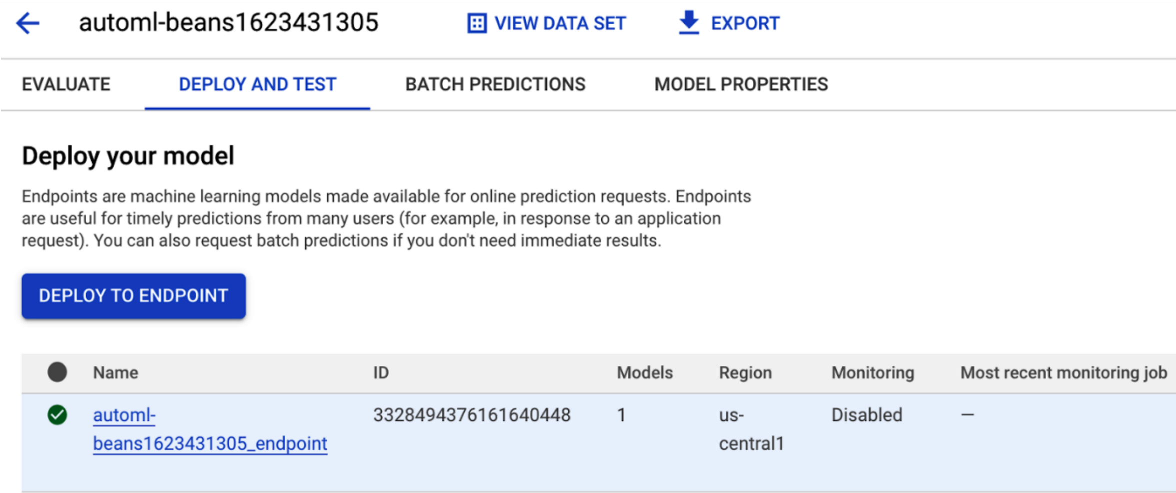
Name	metricsc
Type	system.ClassificationMetrics
URI	gs://sara-vertex-demos-bucket/pipeline_root/your-user-id/462141068491/automl-tab-beans-training-v2-20210611170830/classif-model-eval-metrics_6318374355340361728/metricsc

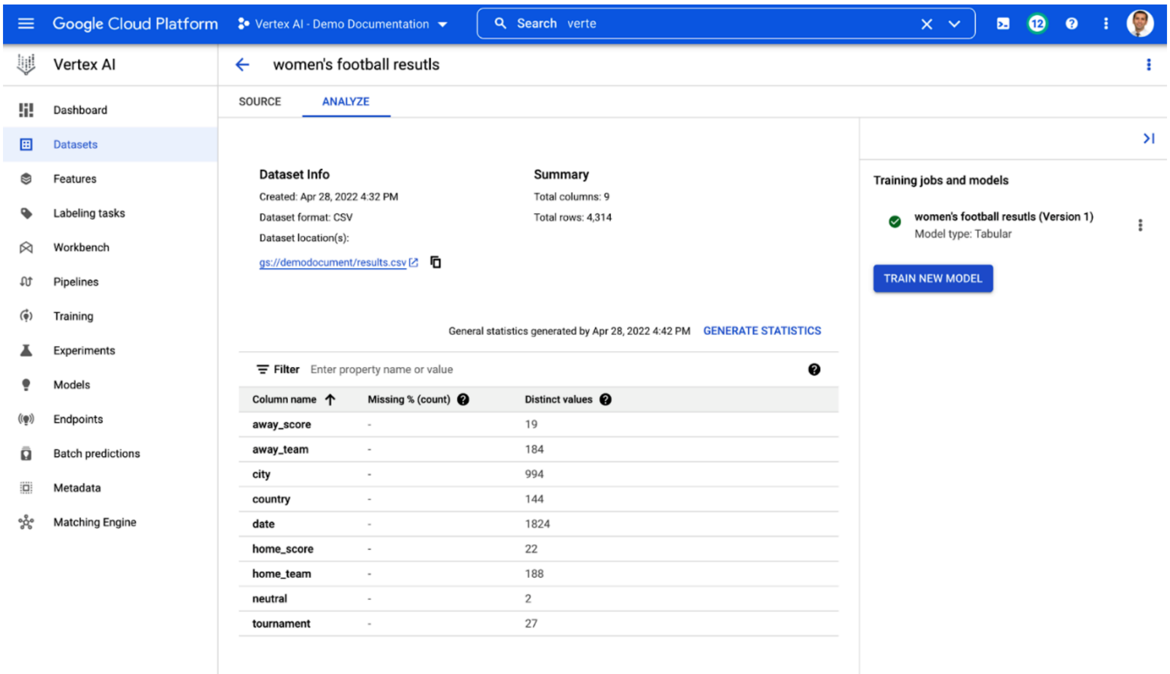
Confusion matrix

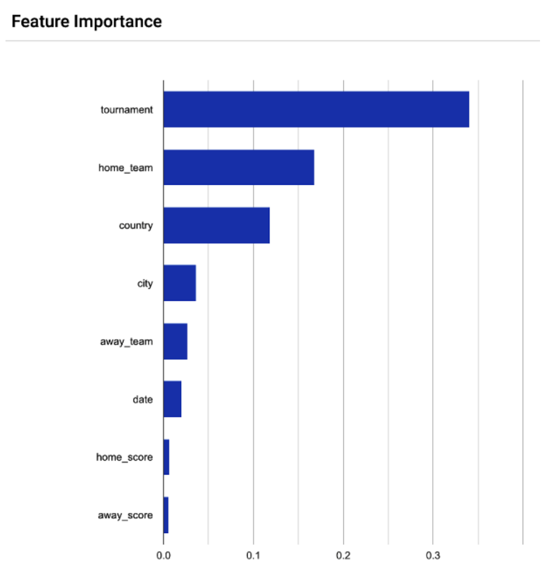
Item counts

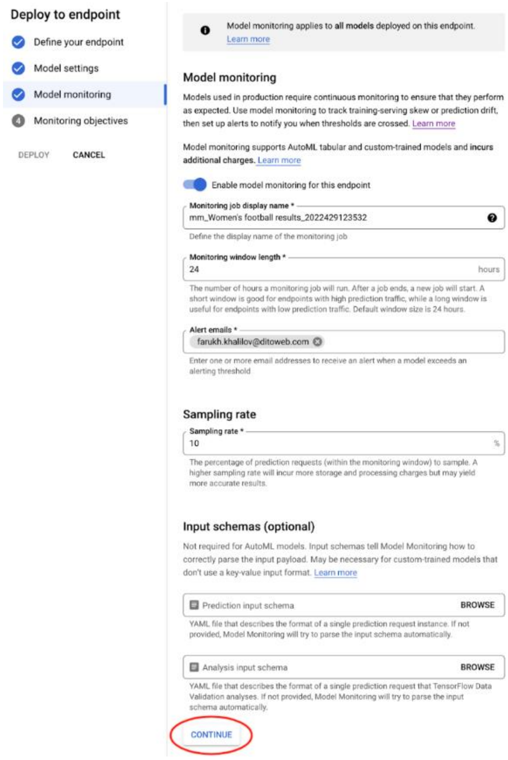
This table shows how often the model classified each label correctly (in blue), and which labels were most often confused for that label (in gray).

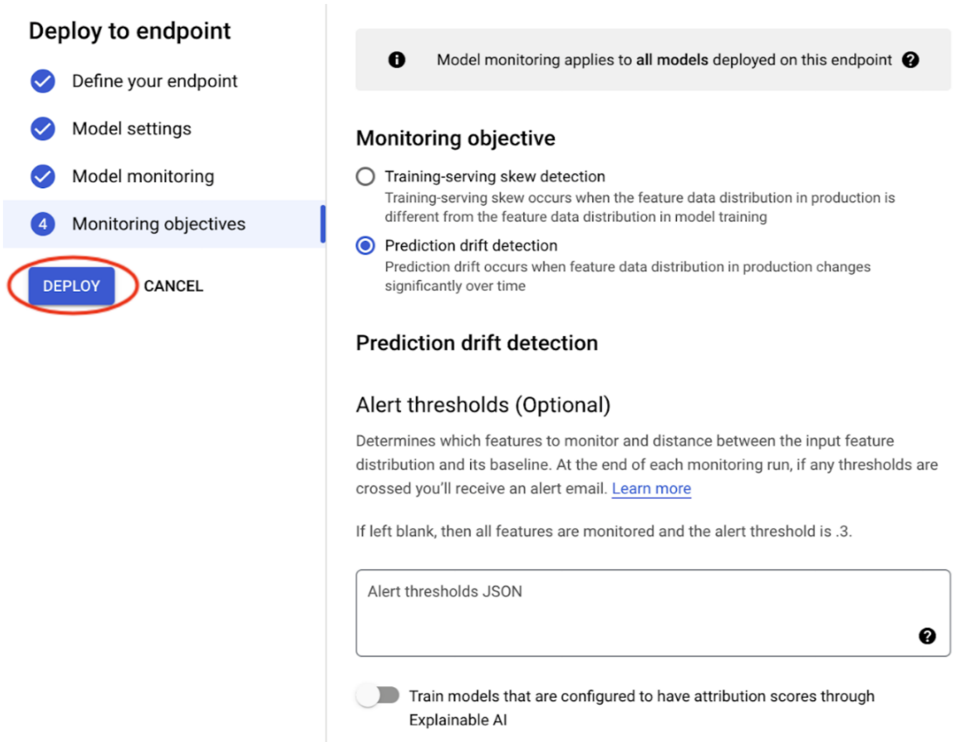
True label \ Predicted label	BARBUNYA	BOMBAY	CALI	DERMASON	HOROZ	SEKER	SIRA
BARBUNYA	94%	—	5%	—	—	1%	1%
BOMBAY	—	100%	—	—	—	—	—
CALI	2%	—	96%	—	1%	1%	1%
DERMASON	—	—	—	94%	—	1%	6%
HOROZ	—	—	—	1%	96%	—	3%
SEKER	0%	—	—	1%	—	96%	3%
SIRA	1%	—	—	9%	—	1%	90%


automl-beans1623431305
VIEW DATA SET
EXPORT
EVALUATE
DEPLOY AND TEST
BATCH PREDICTIONS
MODEL PROPERTIES
Deploy your model
Endpoints are machine learning models made available for online prediction requests. Endpoints are useful for timely predictions from many users (for example, in response to an application request). You can also request batch predictions if you don't need immediate results.
DEPLOY TO ENDPOINT
Name
ID
Models
Region
Monitoring
Most recent monitoring job
automl-beans1623431305_endpoint
3328494376161640448
1
us-central1
Disabled
—

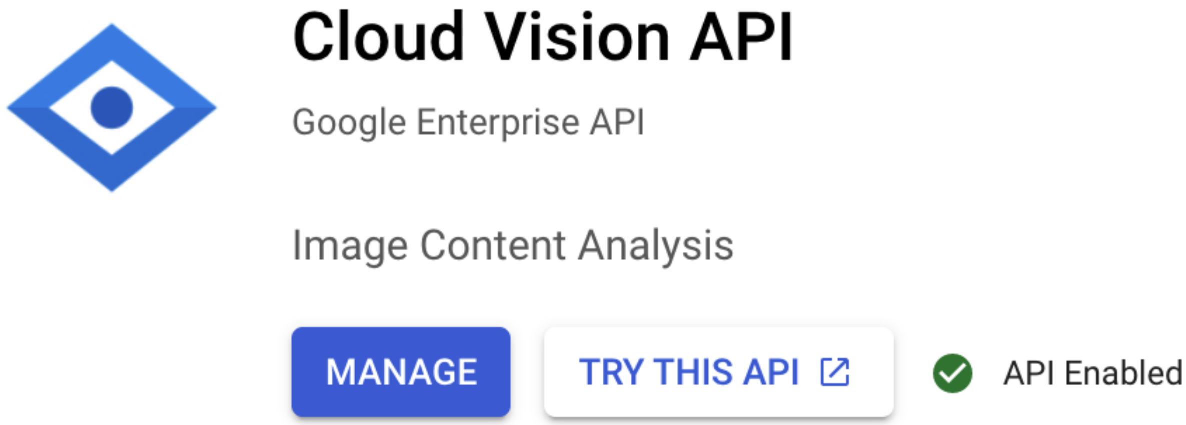

Google Cloud Platform
Vertex AI - Demo Documentation
Search verte
Vertex AI
women's football resutls
SOURCE
ANALYZE
Dashboard
Datasets
Features
Labeling tasks
Workbench
Pipelines
Training
Experiments
Models
Endpoints
Batch predictions
Metadata
Matching Engine
Dataset Info
Created: Apr 28, 2022 4:32 PM
Dataset format: CSV
Dataset location(s):
gs://demodocument/results.csv
Summary
Total columns: 9
Total rows: 4,314
Training jobs and models
women's football resutls (Version 1)
Model type: Tabular
TRAIN NEW MODEL
General statistics generated by Apr 28, 2022 4:42 PM
GENERATE STATISTICS
Filter
Enter property name or value
Column name
Missing % (count)
Distinct values
away_score - 19
away_team - 184
city - 994
country - 144
date - 1824
home_score - 22
home_team - 188
neutral - 2
tournament - 27

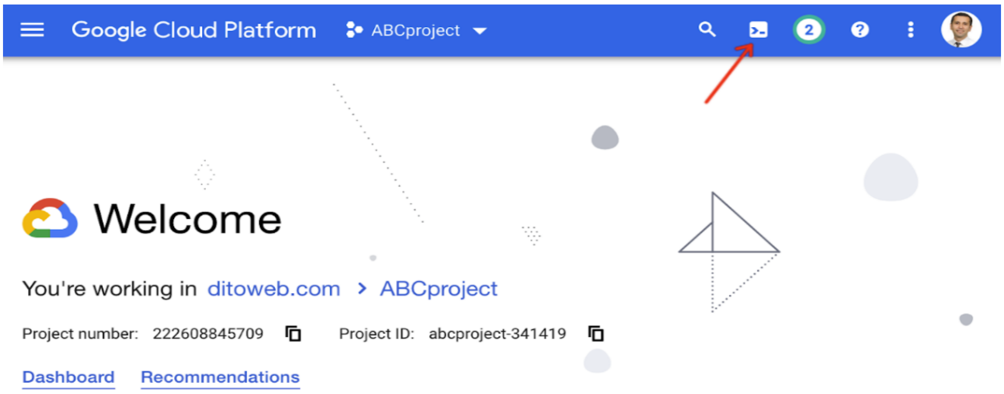

Feature Importance
tournament
home_team
country
city
away_team
date
home_score
away_score
0.0
0.1
0.2
0.3

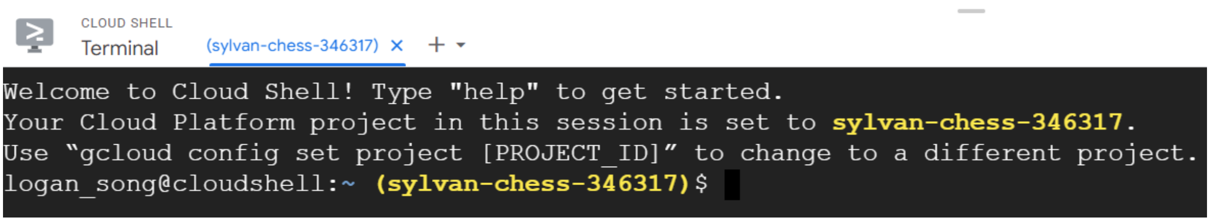

Deploy to endpoint
Define your endpoint
Model settings
Model monitoring
Monitoring objectives
DEPLOY
CANCEL
Model monitoring applies to all models deployed on this endpoint.
Learn more
Model monitoring
Models used in production require continuous monitoring to ensure that they perform as expected. Use model monitoring to track training-serving skew or prediction drift, then set up alerts to notify you when thresholds are crossed. Learn more
Model monitoring supports AutoML tabular and custom-trained models and incurs additional charges. Learn more
Enable model monitoring for this endpoint
Monitoring job display name *
mm_Women's football results_2022429123532
Define the display name of the monitoring job
Monitoring window length *
24
hours
The number of hours a monitoring job will run. After a job ends, a new job will start. A short window is good for endpoints with high prediction traffic, while a long window is useful for endpoints with low prediction traffic. Default window size is 24 hours.
Alert emails *
farukh.khalilov@ditoweb.com
Enter one or more email addresses to receive an alert when a model exceeds an alerting threshold
Sampling rate
Sampling rate *
10
%
The percentage of prediction requests (within the monitoring window) to sample. A higher sampling rate will incur more storage and processing charges but may yield more accurate results.
Input schemas (optional)
Not required for AutoML models. Input schemas tell Model Monitoring how to correctly parse the input payload. May be necessary for custom-trained models that don't use a key-value input format. Learn more
Prediction input schema
BROWSE
YAML file that describes the format of a single prediction request instance. If not provided, Model Monitoring will try to parse the input schema automatically.
Analysis input schema
BROWSE
YAML file that describes the format of a single prediction request that TensorFlow Data Validation analyses. If not provided, Model Monitoring will try to parse the input schema automatically.
CONTINUE


Deploy to endpoint
Define your endpoint
Model settings
Model monitoring
4 Monitoring objectives
DEPLOY
CANCEL
Model monitoring applies to all models deployed on this endpoint
Monitoring objective
Training-serving skew detection
Training-serving skew occurs when the feature data distribution in production is different from the feature data distribution in model training
Prediction drift detection
Prediction drift occurs when feature data distribution in production changes significantly over time
Prediction drift detection
Alert thresholds (Optional)
Determines which features to monitor and distance between the input feature distribution and its baseline. At the end of each monitoring run, if any thresholds are crossed you'll receive an alert email. Learn more
If left blank, then all features are monitored and the alert threshold is .3.
Alert thresholds JSON
Train models that are configured to have attribution scores through Explainable AI

Appendix 5 - Practicing with Google Cloud ML API







Privacy Policy · Terms of Service

(abcproject-341419) × + ▾ | Open Editor

```
-341419.
Use "gcloud config set project [PROJECT_ ... a diff
erent project.
farukh_khalilov@cloudshell:~ (abcproject
```

Restart
Upload
Download
Default Mode
Safe Mode
Ephemeral Mode

```
farukh_khalilov@cloudshell:~ (abcproject-341419)$ gcloud ml vision detect-objects tree.jpeg
```


```
{
  "responses": [
    {
      "localizedObjectAnnotations": [
        {
          "boundingPoly": {
            "normalizedVertices": [
              {
                "x": 0.35709468,
                "y": 0.16453059
              },
              {
                "x": 0.9865663,
                "y": 0.16453059
              },
              {
                "x": 0.9865663,
                "y": 0.7795686
              },
              {
                "x": 0.35709468,
                "y": 0.7795686
              }
            ]
          },
          "mid": "/m/0c9ph5",
          "name": "Flower",
          "score": 0.77939504
        }
      ]
    }
  ]
}
```


```
farukh_khalilov@cloudshell:~ (abcproject-341419)$
```

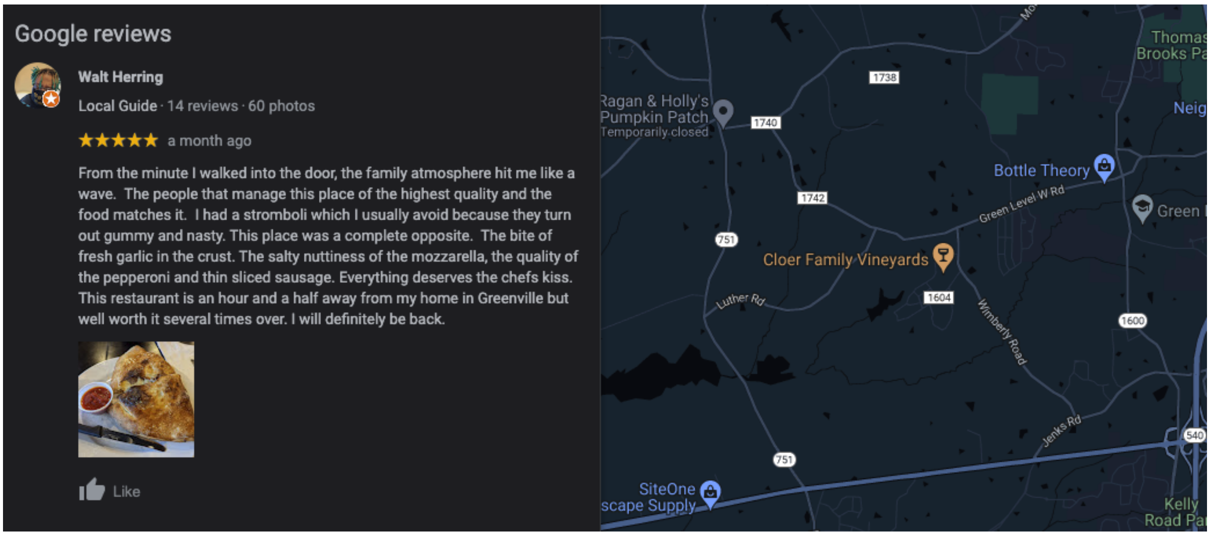
```
farukh_khalilov@cloudshell:~ (abcproject-341419)$ gcloud ml vision detect-logos glogo.jpeg
{
  "responses": [
    {
      "logoAnnotations": [
        {
          "boundingPoly": {
            "vertices": [
              {
                "x": 68,
                "y": 57
              },
              {
                "x": 1212,
                "y": 57
              },
              {
                "x": 1212,
                "y": 1183
              },
              {
                "x": 68,
                "y": 1183
              }
            ]
          },
          "description": "Google",
          "mid": "/m/045c7b",
          "score": 0.97997874
        }
      ]
    }
  ]
}
farukh_khalilov@cloudshell:~ (abcproject-341419)$
```



```
farukh_khalilov@cloudshell:~ (abcproject-341419)$ gcloud ml vision detect-text glogo.jpeg
{
  "responses": [
    {
      "fullTextAnnotation": {
        "pages": [
          {
            "blocks": [
              {
                "blockType": "TEXT",
                "boundingBox": {
                  "vertices": [
                    {
                      "x": 309,
                      "y": 149
                    },
                    {
                      "x": 1126,
                      "y": 212
                    },
                    {
                      "x": 1063,
```



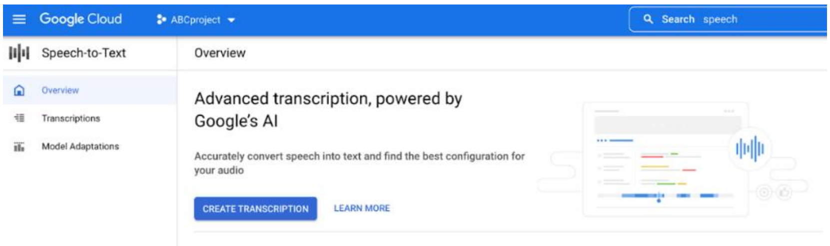
```
  "categories": [
    {
      "confidence": 0.98,
      "name": "/People & Society/Social Issues & Advocacy"
    },
    {
      "confidence": 0.89,
      "name": "/Sensitive Subjects"
    }
  ]
}
```

```
"documentSentiment": {
  "magnitude": 6.9,
  "score": 0.4
},
"language": "en",
"sentences": [
  {
    "sentiment": {
      "magnitude": 0.8,
      "score": 0.8
    },
    "text": {
      "beginOffset": 0,
      "content": "From the minute I walked into the door, the family atmosphere hit me like a wave."
    }
  },
  {
    "sentiment": {
      "magnitude": 0.9,
      "score": 0.9
    },
    "text": {
      "beginOffset": 83,
      "content": "The people that manage this place of the highest quality and the food matches it."
```


C# Go Java Node.js PHP Python Ruby

For more information, see Setting Up a Python Development Environment.




```
{
  "config": {
      "encoding":"FLAC",
      "languageCode": "en-US"
  },
  "audio": {
      "uri":"gs://cloud-samples-data/speech/brooklyn_bridge.flac"
  }
}
```

```
{
  "results": [
    {
      "alternatives": [
        {
          "transcript": "how old is the Brooklyn Bridge",
          "confidence": 0.98216057
        }
      ],
      "resultEndTime": "1.770s",
      "languageCode": "en-us"
    }
  ],
  "totalBilledTime": "15s"
}
```

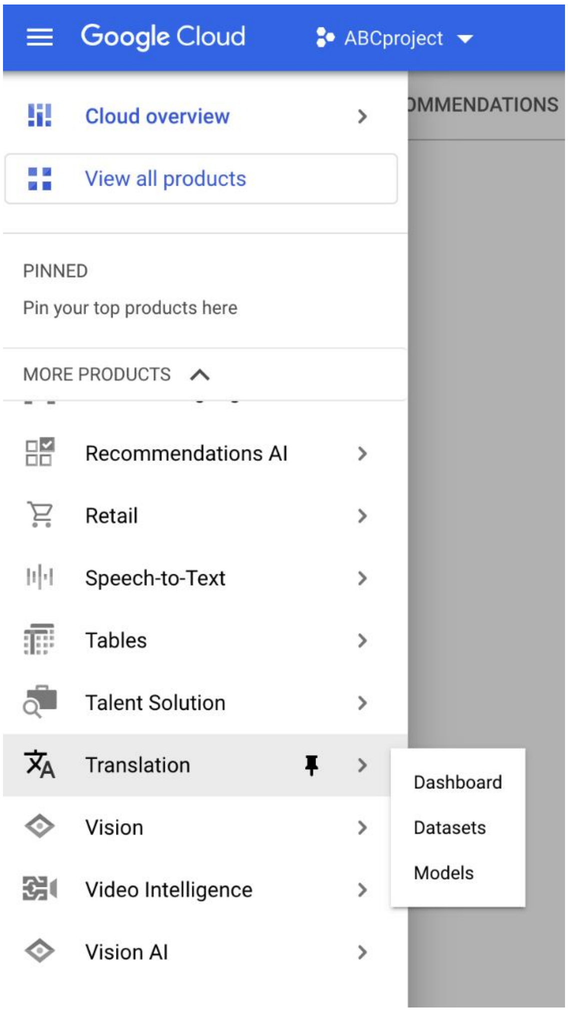

Cloud Text-to-Speech API

Google Enterprise API

Synthesizes natural-sounding speech by applying powerful neural network models.

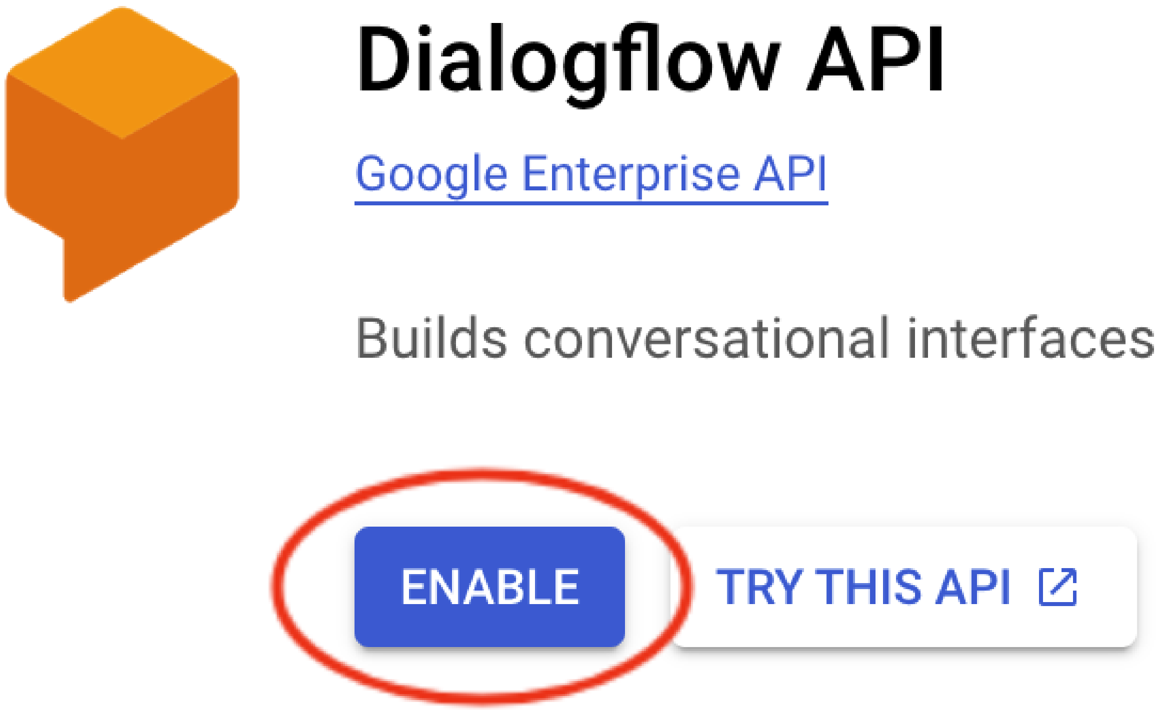
ENABLE TRY THIS API

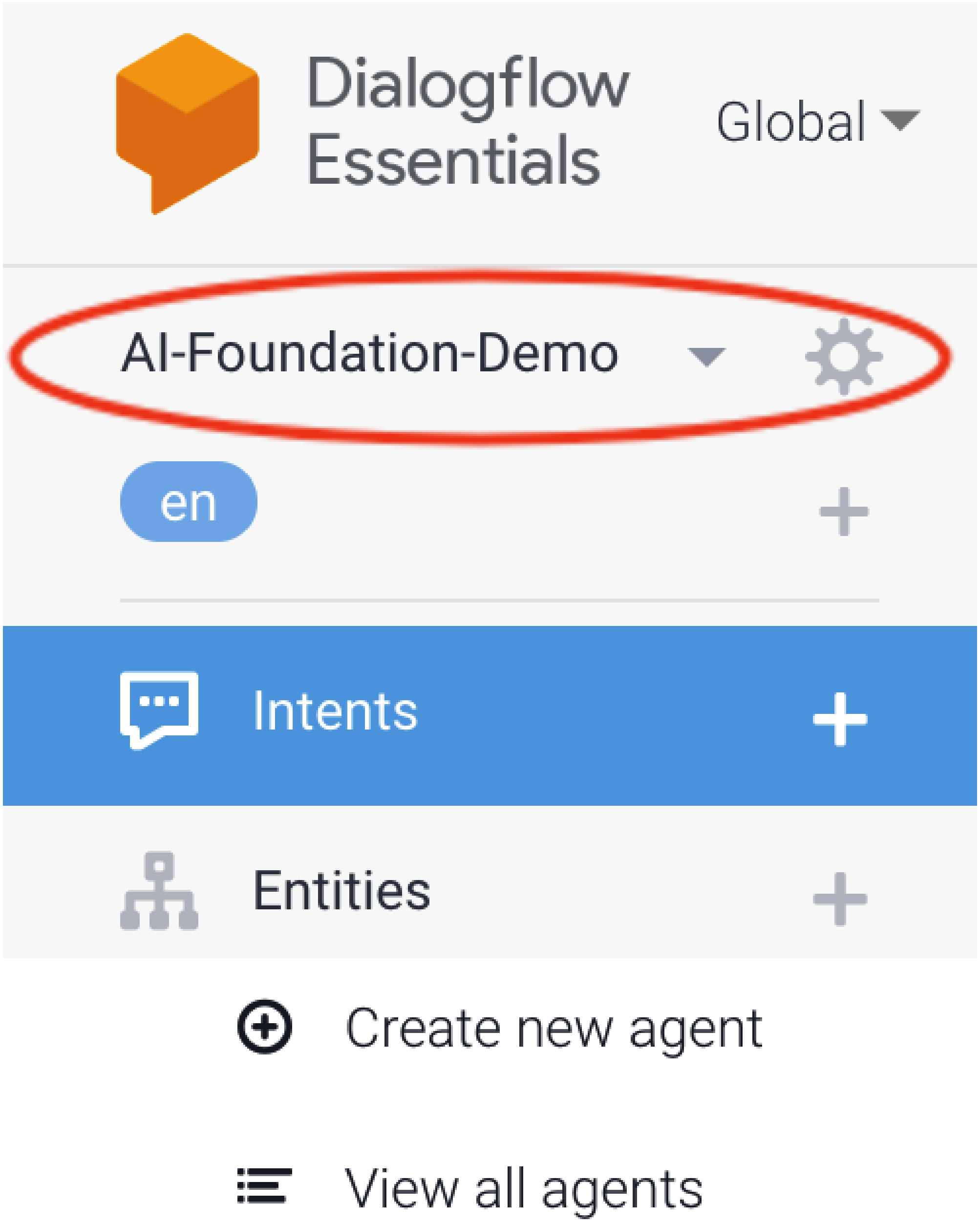
```
{
  "languageCodes": [
    "en-US"
  ],
  "name": "en-US-Standard-B",
  "ssmlGender": "MALE",
  "naturalSampleRateHertz": 24000
},
{
  "languageCodes": [
    "en-US"
  ],
  "name": "en-US-Standard-C",
  "ssmlGender": "FEMALE",
  "naturalSampleRateHertz": 24000
},
```

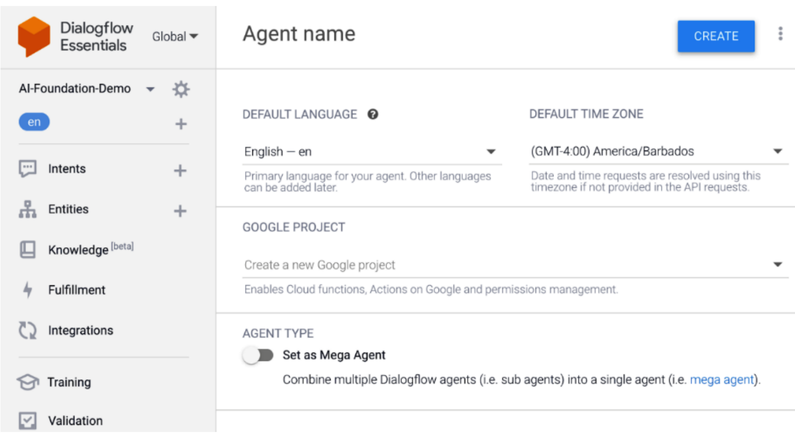



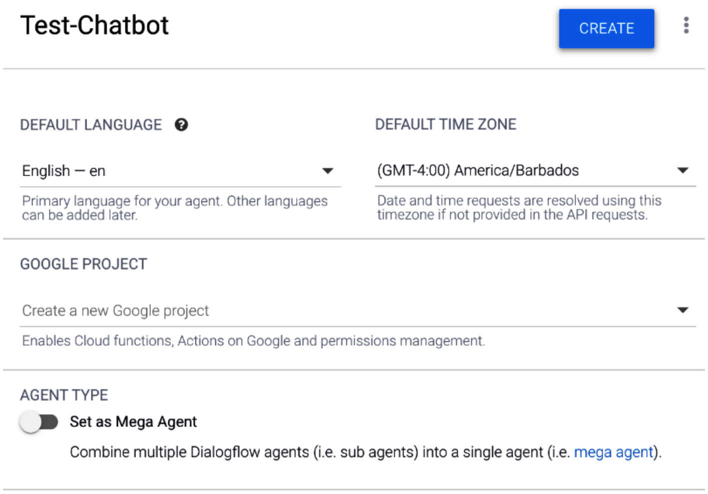
```
{
  "data": {
    "translations": [
      {
        "translatedText": "Это демонстрационная документация",
        "detectedSourceLanguage": "en"
      }
    ]
  }
}
```

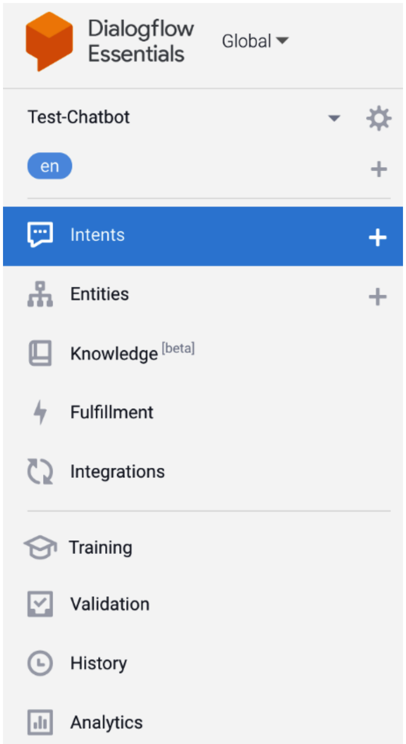
```
{
  "data": {
    "detections": [
      [
        {
          "language": "tr",
          "confidence": 1,
          "isReliable": false
        }
      ],
      [
        {
          "language": "ru",
          "confidence": 1,
          "isReliable": false
        }
      ]
    ]
  }
}
```

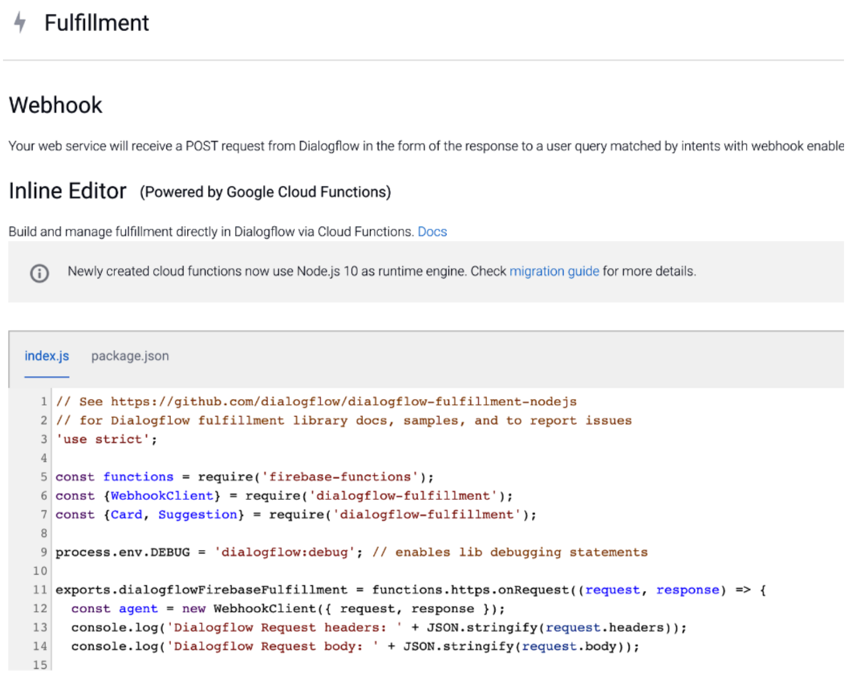




Dialogflow
Essentials
Global
AI-Foundation-Demo
en
Intents
Entities
Create new agent
View all agents


Dialogflow
Essentials
Global
AI-Foundation-Demo
en
Intents
Entities
Knowledge [beta]
Fulfillment
Integrations
Training
Validation
Agent name
CREATE
DEFAULT LANGUAGE
English — en
Primary language for your agent. Other languages can be added later.
DEFAULT TIME ZONE
(GMT-4:00) America/Barbados
Date and time requests are resolved using this timezone if not provided in the API requests.
GOOGLE PROJECT
Create a new Google project
Enables Cloud functions, Actions on Google and permissions management.
AGENT TYPE
Set as Mega Agent
Combine multiple Dialogflow agents (i.e. sub agents) into a single agent (i.e. mega agent).

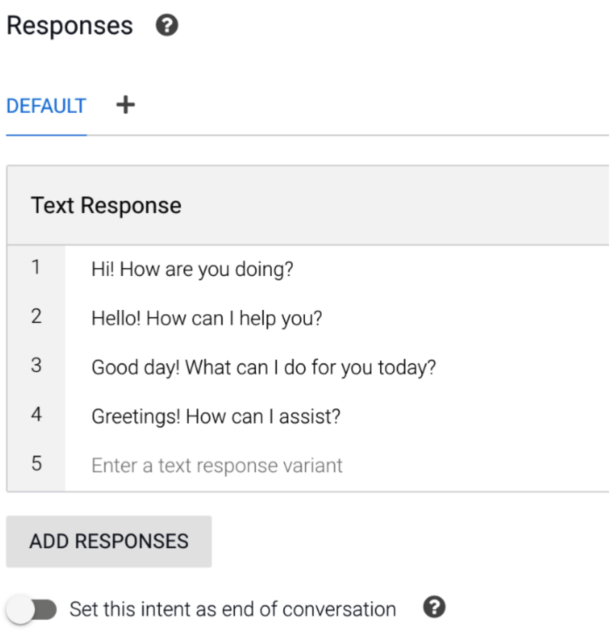

Test-Chatbot
CREATE
DEFAULT LANGUAGE
English — en
Primary language for your agent. Other languages can be added later.
DEFAULT TIME ZONE
(GMT-4:00) America/Barbados
Date and time requests are resolved using this timezone if not provided in the API requests.
GOOGLE PROJECT
Create a new Google project
Enables Cloud functions, Actions on Google and permissions management.
AGENT TYPE
Set as Mega Agent
Combine multiple Dialogflow agents (i.e. sub agents) into a single agent (i.e. mega agent).


Dialogflow Essentials
Global
Test-Chatbot
en
Intents
Entities
Knowledge [beta]
Fulfillment
Integrations
Training
Validation
History
Analytics



Fulfillment
Webhook
Your web service will receive a POST request from Dialogflow in the form of the response to a user query matched by intents with webhook enable
Inline Editor (Powered by Google Cloud Functions)
Build and manage fulfillment directly in Dialogflow via Cloud Functions. Docs
Newly created cloud functions now use Node.js 10 as runtime engine. Check migration guide for more details.
index.js
package.json
// See https://github.com/dialogflow/dialogflow-fulfillment-nodejs
// for Dialogflow fulfillment library docs, samples, and to report issues
'use strict';
const functions = require('firebase-functions');
const {WebhookClient} = require('dialogflow-fulfillment');
const {Card, Suggestion} = require('dialogflow-fulfillment');
process.env.DEBUG = 'dialogflow:debug'; // enables lib debugging statements
exports.dialogflowFirebaseFulfillment = functions.https.onRequest((request, response) => {
const agent = new WebhookClient({ request, response });
console.log('Dialogflow Request headers: ' + JSON.stringify(request.headers));
console.log('Dialogflow Request body: ' + JSON.stringify(request.body));

Intents
CREATE INTENT
Search intents
Default Fallback Intent
Default Welcome Intent



Responses
DEFAULT
Text Response
1 Hi! How are you doing?
2 Hello! How can I help you?
3 Good day! What can I do for you today?
4 Greetings! How can I assist?
5 Enter a text response variant
ADD RESPONSES
Set this intent as end of conversation

Responses

DEFAULT +

Text Response	
1	I didn't get that. Can you say it again?
2	I missed what you said. What was that?
3	Sorry, could you say that again?
4	Sorry, can you say that again?
5	Can you say that again?
6	Sorry, I didn't get that. Can you rephrase?
7	Sorry, what was that?
8	One more time?
9	What was that?
10	Say that one more time?
11	I didn't get that. Can you repeat?
12	I missed that, say that again?
13	Enter a text response variant

ADD RESPONSES

Set this intent as end of conversation

Intents

CREATE INTENT

Search intents

Default Fallback Intent

Default Welcome Intent

opening_times

SAVE

Contexts

Events

Training phrases

Train the intent with what your users will say

Provide examples of how users will express their intent in natural language. Adding numerous phrases with different variations and parameters will improve the accuracy of intent matching. Learn more

ADD TRAINING PHRASES

Add user expression

Are you open every day?

When are you open?

Opening times

What are your opening times?

Responses

Execute and respond to the user

Respond to your users with a simple message, or build custom rich messages for the integrations you support. Learn more

ADD RESPONSE

Responses

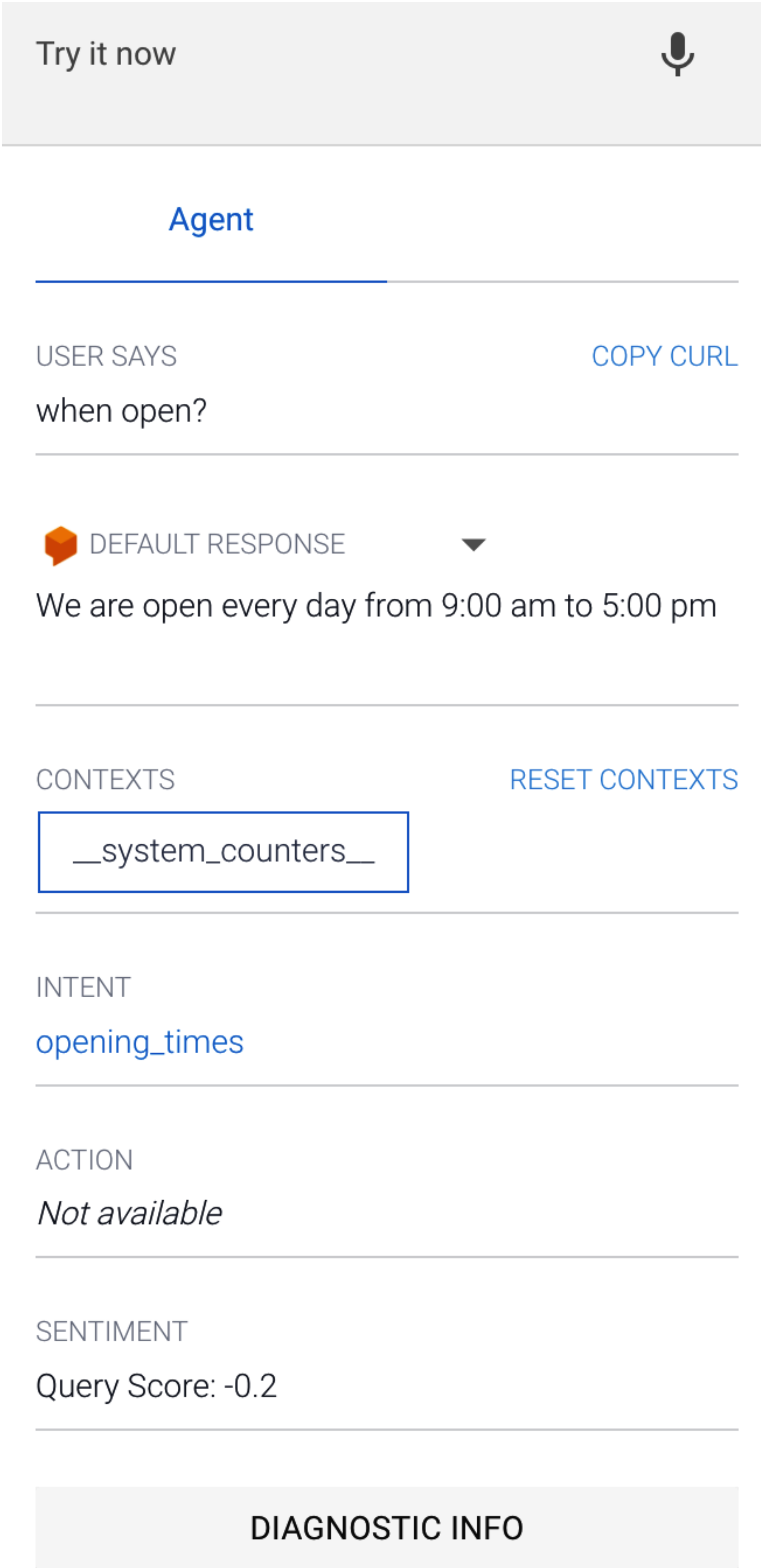
DEFAULT +

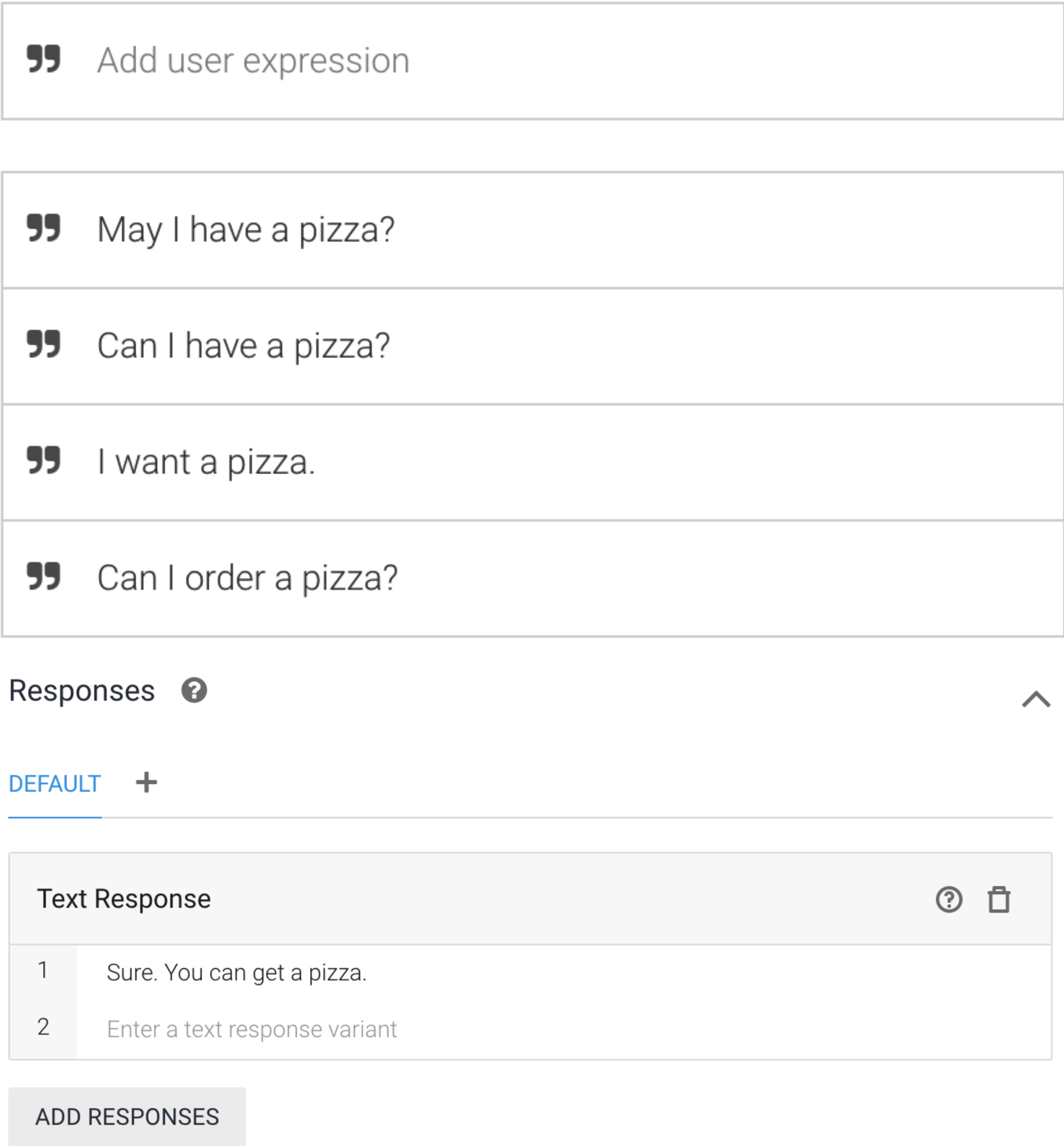
Text Response

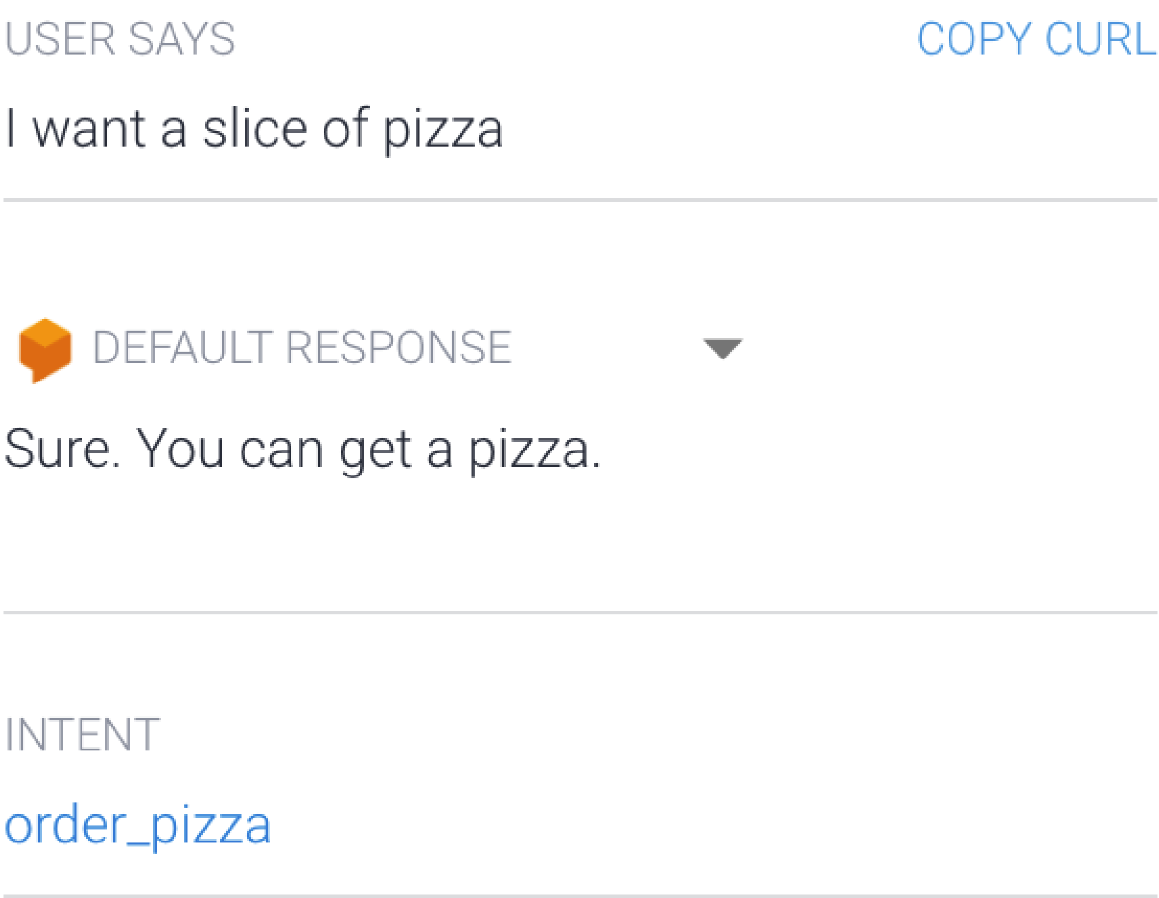
1	We are open every day from 9:00 am to 5:00 pm
2	Enter a text response variant

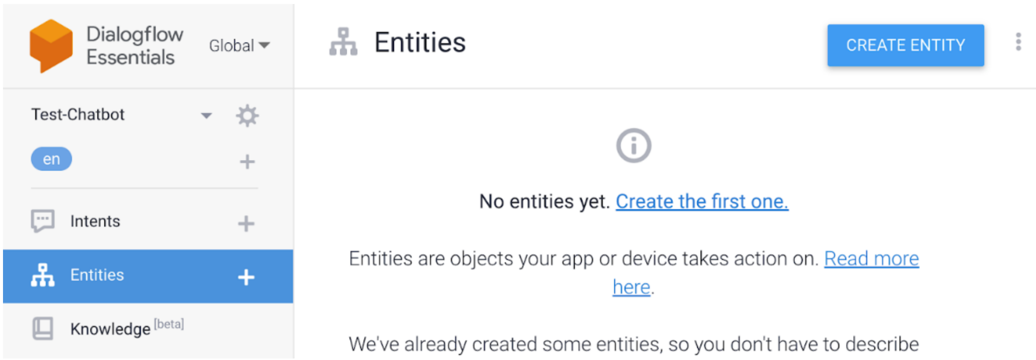
ADD RESPONSES

Set this intent as end of conversation


Try it now
Agent
USER SAYS
COPY CURL
when open?
DEFAULT RESPONSE
We are open every day from 9:00 am to 5:00 pm
CONTEXTS
RESET CONTEXTS
__system_counters__
INTENT
opening_times
ACTION
Not available
SENTIMENT
Query Score: -0.2
DIAGNOSTIC INFO


Add user expression
May I have a pizza?
Can I have a pizza?
I want a pizza.
Can I order a pizza?
Responses
DEFAULT
Text Response
1 Sure. You can get a pizza.
2 Enter a text response variant
ADD RESPONSES


USER SAYS
COPY CURL
I want a slice of pizza
DEFAULT RESPONSE
Sure. You can get a pizza.
INTENT
order_pizza


Dialogflow Essentials
Global
Entities
CREATE ENTITY
Test-Chatbot
en
Intents
Entities
Knowledge [beta]
No entities yet. Create the first one.
Entities are objects your app or device takes action on. Read more here.
We've already created some entities, so you don't have to describe

topping

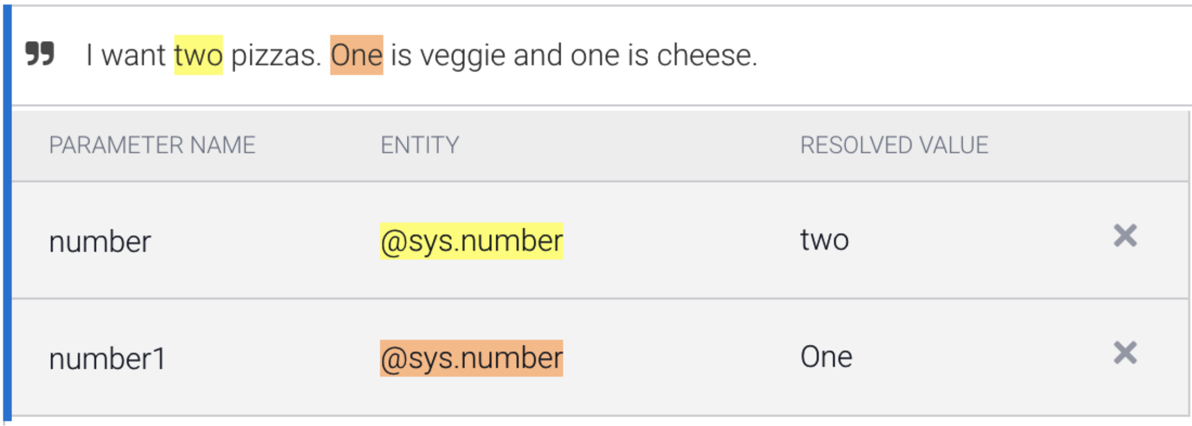
SAVE

☑ Define synonyms ☐ Allow automated expansion

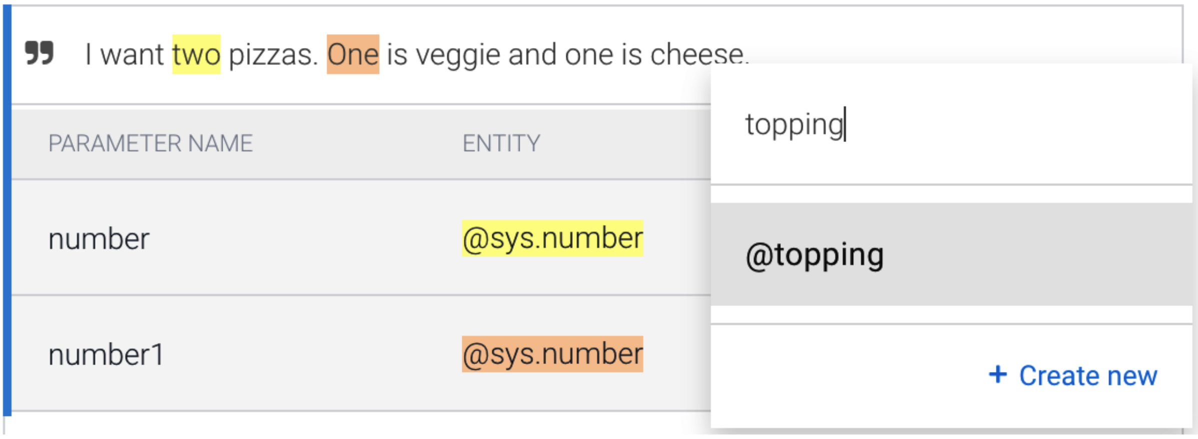
Separate synonyms by pressing the **enter**, **tab** or ; key.

cheese	cheese
veggie	veggie, vegetarian, Enter synonym
pineapple	pineapple
beef	beef
ham	ham

- I want two pizzas. One is veggie and one is cheese.
- Can I have a pizza with bacon and pinapple
- I want to order cheese pizza
- May I have a pizza?
- Can I have a pizza?
- I want a pizza.
- Can I order a pizza?



English (en)	@sys.cardinal	ten	10
English (en)	@sys.ordinal	tenth	10
English (en)	@sys.number-integer	12	12
English (en)	@sys.number-sequence	1 2 2003	123
English (en)	@sys.flight-number	LH4234	LH 4234
English (en)	@sys.unit-area	ten square feet	{"amount":10,"unit":"sq ft"}
English (en)	@sys.unit-currency	5 dollars 25 pounds	{"amount":5,"currency":"USD"} {"amount":25,"currency":"GBP" }
English (en)	@sys.unit-length	ten meters	{"amount":10,"unit":"m"}



- I want two pizzas. One is veggie and one is cheese.
- Can I have a pizza with bacon and pinapple

PARAMETER NAME	ENTITY	RESOLVED VALUE
topping	@topping	bacon
topping1	@topping	pinapple

- I want to order cheese pizza
- May I have a pizza?
- Can I have a pizza?
- I want a pizza.
- Can I order a pizza?

Action and parameters

Enter action name

REQUIRED	PARAMETER NAME	ENTITY	VALUE	IS LIST
☐	number	@sys.number	$number	☐
☐	topping	@topping	$topping	☑
☐	Enter name	Enter entity	Enter value	☐

Responses

DEFAULT +

Text Response

1 Sure. You can get a pizza with $topping

2 Enter a text response variant

USER SAYS COPY CURL

Can I have a cheese pizza?

DEFAULT RESPONSE

Sure. You can get a pizza with cheese

INTENT

order_pizza

Action and parameters

Enter action name

REQUIRED	PARAMETER NAME	ENTITY	VALUE	IS LIST	PROMPTS
☐	number	@sys.number	$number	☐	–
☑	topping	@topping	$topping	☑	Define prompts...
☐	Enter nam	Enter entit	Enter	☐	–

Prompts for "topping"

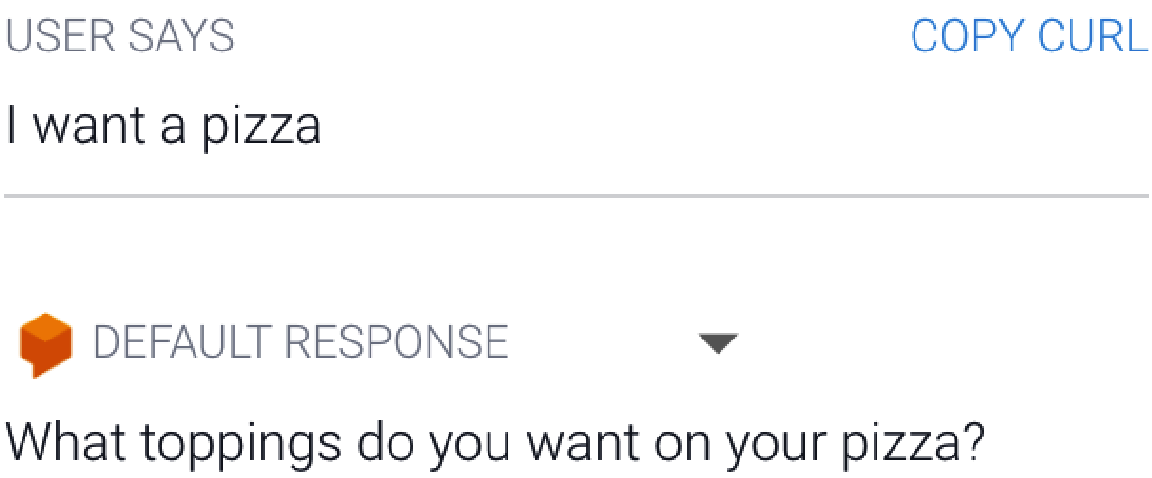
NAME	ENTITY	VALUE
topping	@topping	$topping

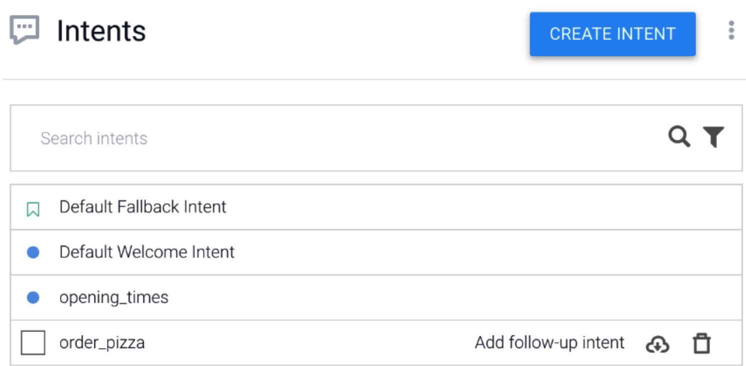
PROMPTS

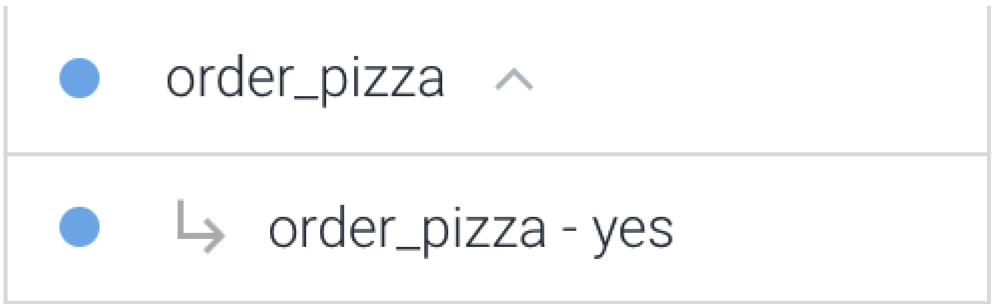
1 What toppings do you want on your pizza?

2 Enter a prompt variant

CLOSE


USER SAYS
COPY CURL
I want a pizza
DEFAULT RESPONSE
What toppings do you want on your pizza?


Intents
CREATE INTENT
Search intents
Default Fallback Intent
Default Welcome Intent
opening_times
order_pizza
Add follow-up intent


order_pizza
order_pizza - yes

order_pizza.upsell_pizza - yes

SAVE

- why not
- yes that's alright
- yes I do
- exactly
- of course
- yep that's ok
- okay
- ok

1 OF 5

Action and parameters

order_pizza.order_pizza-yes

REQUIRED	PARAMETER NAME	ENTITY	VALUE	IS LIST
☐	Enter name	Enter entity	Enter value	☐

+ New parameter

Responses

DEFAULT +

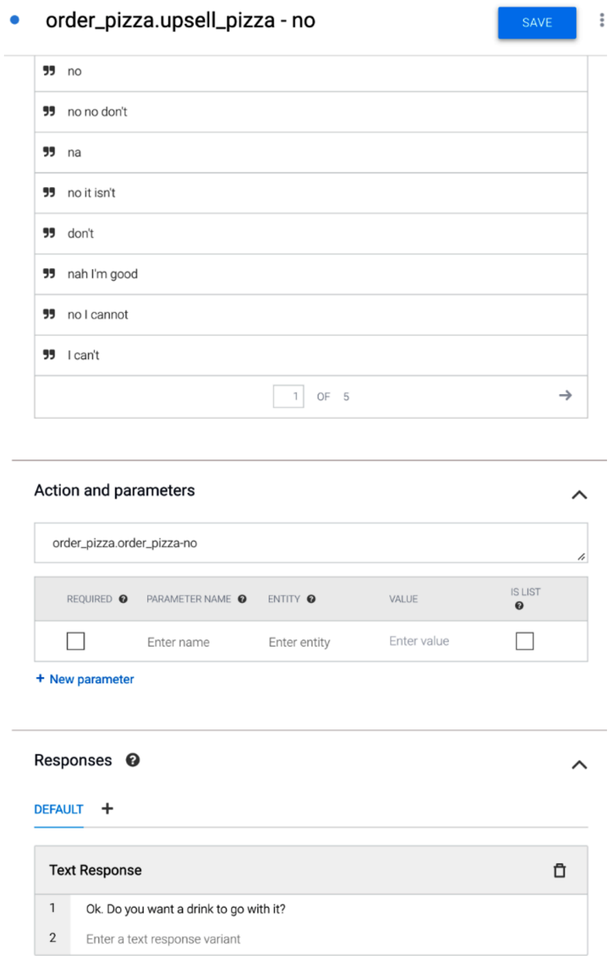
Text Response

1 Great! What topping do you want on your pizza?

2 Enter a text response variant

ADD RESPONSES

Set this intent as end of conversation


order_pizza.upsell_pizza - no
SAVE
no
no no don't
na
no it isn't
don't
nah I'm good
no I cannot
I can't
1 OF 5
Action and parameters
order_pizza.order_pizza-no
REQUIRED
PARAMETER NAME
ENTITY
VALUE
IS LIST
Enter name
Enter entity
Enter value
+ New parameter
Responses
DEFAULT
Text Response
1 Ok. Do you want a drink to go with it?
2 Enter a text response variant