

<b>Lab 07.1a</b>	<b>2</b>
4. Launching configuration	2
6. Adding ssh access	3
8. View the Guestbook	3
<b>Lab 07.1g</b>	<b>4</b>
4. Launching configuration	4
5. Adding an external IP address	5
6. Adding ssh access	6
7. Adding the Guestbook application	6
8. View the Guestbook	6
<b>Lab 07.2g</b>	<b>7</b>
4. Create Kubernetes cluster	7
5. Prepare a container image	7
7. Deploy the configuration	7
8. View the Guestbook	8
12. Deploy and view application	10
<b>Lab 07.3g</b>	<b>11</b>
2. Code	11
3. Code	11
8. Test the command	12
<b>Lab 07.4g</b>	<b>13</b>
3. Vision	13
4. Speech	14
5. Translate	14
6. Natural Language	15
8. Code	15
9. Test integration	16
13. Video Intelligence	16
16. Application	17
17. Code	18

# Lab 07.1a

## 4. Launching configuration

us-east-1 ✕ us-east-1 ✕

```
+ user_data_replace_on_change      = false
+ vpc_security_group_ids           = (known after apply)
}
```

**Plan:** 1 to add, 0 to change, 0 to destroy.

Changes to Outputs:

```
+ ec2instance = (known after apply)
```

**Do you want to perform these actions?**  
Terraform will perform the actions described above.  
Only 'yes' will be accepted to approve.

Enter a value: yes

aws\_instance.guestbook: Creating...  
aws\_instance.guestbook: Still creating... [10s elapsed]  
aws\_instance.guestbook: Still creating... [20s elapsed]  
aws\_instance.guestbook: Creation complete after 22s [id=i-06c3fa06893f67cdb]

**Apply complete! Resources: 1 added, 0 changed, 0 destroyed.**

**Outputs:**

```
ec2instance = "44.202.159.183"
[cloudshell-user@ip-10-130-72-144 tf]$ odinID: nbui
```

Intel Links | Youtube | Dashboard | (3) Facebook | Intel tools | Github | Slack | general | pdx... | Udemy | capstone | OdinID: nbui | AWS Academy | CS430P

aws | Services | Search | [Alt+S] | N. Virginia | voclabs/user2806574=nbui@pdx.edu @ 3797-0302-0715

Cognito | API Gateway | CloudWatch | Lambda | S3

EC2 Dashboard | EC2 Global View | Events | Console-to-Code | Preview

Instances

Instances (1) Info | Connect | Instance state | Actions | Launch instances

Find Instance by attribute or tag (case-sensitive) | Any state

Instance state = running | Clear filters

Instance ID	Instance state	Instanc...	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public IPv4 address
i-06c3fa06893f67cdb	Running	t2.micro	Initializing	View alarms	us-east-1b	ec2-44-202-159-183.co...	44.202.159.183

## 6. Adding ssh access

```

AWS CloudShell

us-east-1 ✕  us-east-1 ✕

* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:        https://ubuntu.com/advantage

System information as of Sun Feb 18 00:53:35 UTC 2024

System load:  0.02           Processes:            105
Usage of /:   18.6% of 7.69GB Users logged in:       0
Memory usage: 21%           IPv4 address for eth0: 172.31.81.15
Swap usage:   0%

1 update can be applied immediately.
To see these additional updates run: apt list --upgradable

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

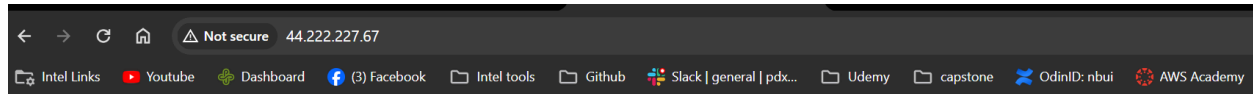
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-81-15:~$ odinID: nbui
```

## 8. View the Guestbook



### Guestbook

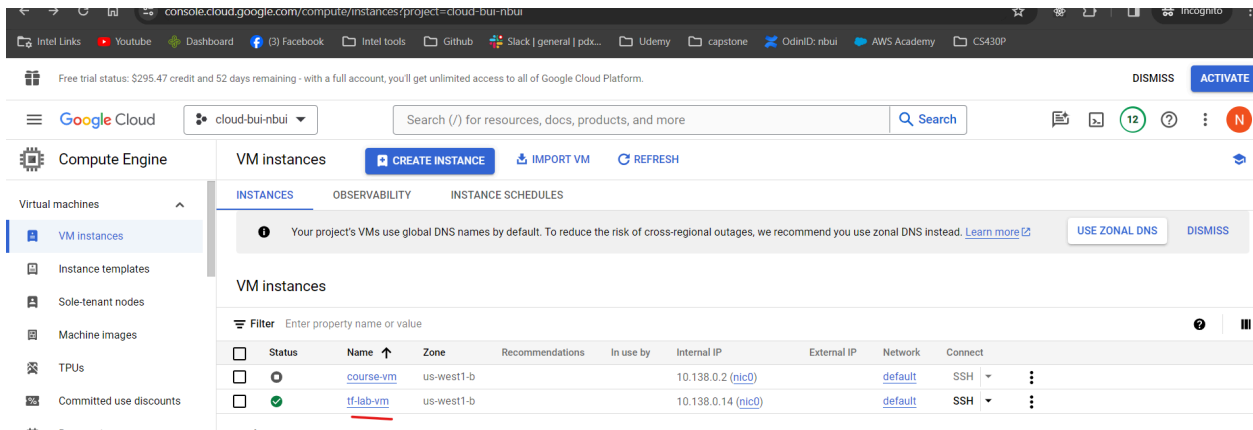
Sign [here](#)

#### Entries

Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-18  
Hello Terraform on AWS!

# Lab 07.1g

## 4. Launching configuration



The screenshot shows the Google Cloud Platform console for the project 'cloud-bui-nbui'. The left sidebar lists 'Compute Engine' as the active section, with 'Virtual machines' expanded and 'VM instances' selected. The main content area displays the 'VM instances' page with tabs for 'INSTANCES', 'OBSERVABILITY', and 'INSTANCE SCHEDULES'. A notification banner at the top of the main area states: 'Your project's VMs use global DNS names by default. To reduce the risk of cross-regional outages, we recommend you use zonal DNS instead. [Learn more](#)'. Below this, a table lists the VM instances:

Filter	Enter property name or value									
<input type="checkbox"/>	Status	Name	Zone	Recommendations	In use by	Internal IP	External IP	Network	Connect	
<input type="checkbox"/>		<a href="#">course-vm</a>	us-west1-b			10.138.0.2 (nic0)		<a href="#">default</a>	SSH	⋮
<input type="checkbox"/>		<a href="#">tf-lab-vm</a>	us-west1-b			10.138.0.14 (nic0)		<a href="#">default</a>	SSH	⋮

## 5. Adding an external IP address

- Take a screenshot showing the completion of the command including its output

```
Changes to Outputs:
+ ip = (known after apply)

Do you want to perform these actions?
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.

Enter a value: yes

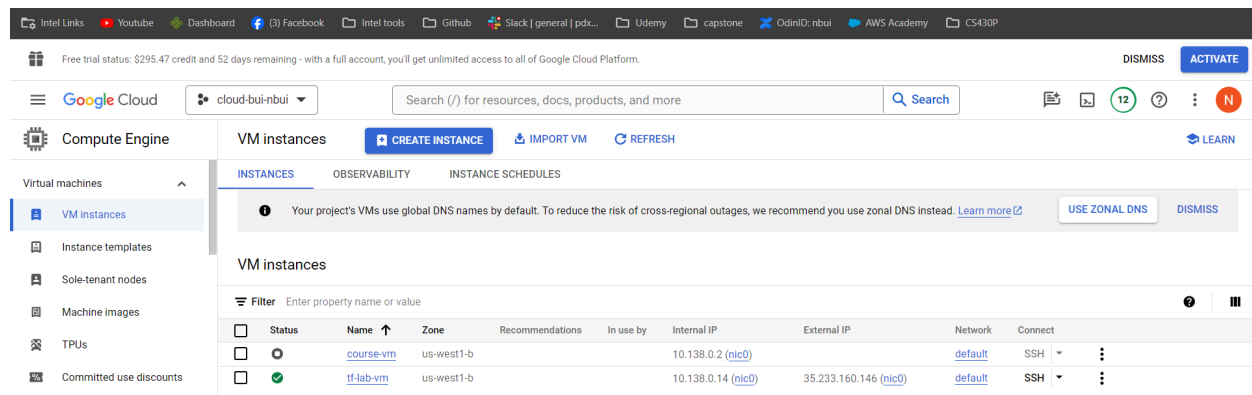
google_compute_address.static: Creating...
google_compute_address.static: Still creating... [10s elapsed]
google_compute_address.static: Creation complete after 11s [id=projects/cloud-bui-nbui/regions/us-west1/addresses/ipv4-address]
google_compute_instance.default: Modifying... [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm]
google_compute_instance.default: Still modifying... [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm, 10s elapsed]
google_compute_instance.default: Modifications complete after 11s [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm]

Apply complete! Resources: 1 added, 1 changed, 0 destroyed.

Outputs:

ip = "35.233.160.146"
nbui@cloudshell:~/tf (cloud-bui-nbui) $
```

- Take a screenshot that includes the VM's IP addresses



The screenshot shows the Google Cloud Platform console for the project 'cloud-bui-nbui'. The 'Compute Engine' section is active, displaying a list of VM instances. A notification banner at the top suggests using zonal DNS names. The table below lists the instances:

Status	Name	Zone	Internal IP	External IP	Network	Connect
	course-vm	us-west1-b	10.138.0.2 (nic0)		default	SSH
	tf-lab-vm	us-west1-b	10.138.0.14 (nic0)	35.233.160.146 (nic0)	default	SSH

## 6. Adding ssh access

```
CLOUD SHELL
Terminal (cloud-bui-nbui) x + -
Open Editor

Enter a value: yes

google_compute_instance.default: Modifying... [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm]
google_compute_instance.default: Still modifying... [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm, 10s elapsed]
google_compute_instance.default: Modifications complete after 11s [id=projects/cloud-bui-nbui/zones/us-west1-b/instances/tf-lab-vm]

Apply complete! Resources: 0 added, 1 changed, 0 destroyed.

Outputs:

ip = "35.233.160.146"
nbui@cloudshell:~/tf (cloud-bui-nbui)$ ssh 35.233.160.146
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1051-gcp x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

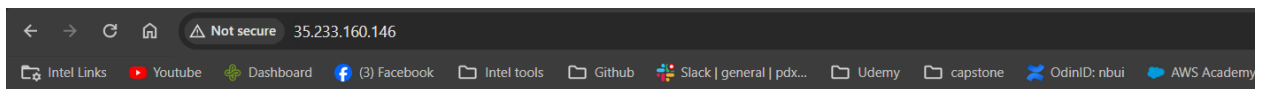
Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.
```

## 7. Adding the Guestbook application

- What resources are being added, changed, or destroyed?
  - Google\_compute\_instance.default will be destroyed and created again.
    - Metadata\_startup\_script, "Http-server" tag, ipv6\_access\_type, and ipv6\_address are added
    - Shielded\_instance\_config and scheduling are destroyed
- What part of the configuration forces a replacement to occur?
  - Metadata\_startup\_script forced replacement

## 8. View the Guestbook



### Guestbook

[Sign here](#)

#### Entries

Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-17  
Hello Terraform on GCP!

# Lab 07.2g

## 4. Create Kubernetes cluster

- What is the name of the Instance Template dynamically generated to create the two nodes (VMs)?
  - [gke-guestbook-default-pool-44f19f26](#)
- What is the name of the Instance Group dynamically generated that the two nodes belong to?
  - gke-guestbook-default-pool-44f19f26-grp
- What are the names of the two nodes?
  - Gke-guestbook-default-pool-44f19f26-r3z5
  - Gke-guestbook-default-pool-44f19f26-hxfr

## 5. Prepare a container image

gcp\_gb

gcr.io > cloud-bui-nbui > gcp\_gb

---

Filter Enter property name or value

<input type="checkbox"/>	Name	Tags	Virtual Size	Created	Uploaded	
<input type="checkbox"/>	<a href="#">f0425fce4256</a>	latest	1.2 GB	5 minutes ago	Just now	

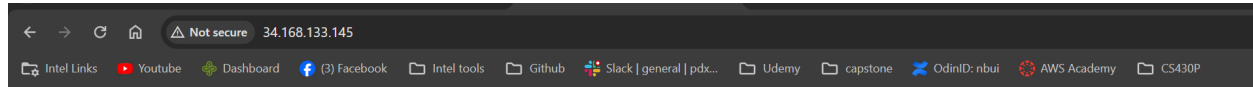
## 7. Deploy the configuration

```
nbui@cloudshell:~/cs430-src/05_gcp_datastore (cloud-bui-nbui)$ kubectl get pods
NAME                                READY   STATUS              RESTARTS   AGE
guestbook-replicas-2f6ss            0/1     ContainerCreating   0           12s
guestbook-replicas-bt5cf            0/1     ContainerCreating   0           13s
guestbook-replicas-kxv98            0/1     ContainerCreating   0           12s
nbui@cloudshell:~/cs430-src/05_gcp_datastore (cloud-bui-nbui)$
```

```
nbui@cloudshell:~/cs430-src/05_gcp_datastore (cloud-bui-nbui)$ kubectl get services
NAME          TYPE           CLUSTER-IP   EXTERNAL-IP   PORT(S)          AGE
guestbook-lb  LoadBalancer  10.20.6.57   34.168.133.145  80:31989/TCP     2m2s
kubernetes    ClusterIP      10.20.0.1    <none>        443/TCP          29m
nbui@cloudshell:~/cs430-src/05_gcp_datastore (cloud-bui-nbui)$
```

## 8. View the Guestbook

- Take a screenshot of the Guestbook including the URL with the entry in it.



Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-15 22:40:42.168459+00:00  
Hello Cloud Run!

Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-18 06:04:09.777540+00:00  
Hello Kubernetes!

- Take a screenshot of the managed guestbook pods and the service being exposed.

**Replication Controller details**

Labels: app: guestbook, tier: frontend

Annotations: Not set

Logs: Container logs, Audit logs

Pods: 3 current / 3 desired

Label selector: app = guestbook, tier = frontend

**Pod specification**

Labels: app: guestbook, tier: frontend

Termination grace period: 30

Restart policy: Always

Containers: guestbook-app

**Managed pods**

Name	Status	Restarts	Created on
guestbook-replicas-bt5cf	Running	0	Feb 17, 2024, 9:59:33 PM
guestbook-replicas-kxv98	Running	0	Feb 17, 2024, 9:59:34 PM
guestbook-replicas-2f6ss	Running	0	Feb 17, 2024, 9:59:34 PM

**Exposing services**

Name	Type	Endpoints
guestbook-lb	Load balancer	34.168.133.145:80

- Take a screenshot of the load balancer and its details



## Load balancer details

EDIT

DELETE

VIEW IN NETWORK TC

**a3789bd42edfd4843be044d651192b60**

Target-pool Network Load Balancer

## Frontend

Protocol ↑	IP version	IP:Port	Network Tier ?
TCP	IPv4	34.168.133.145:80	Premium

## Backend

Name	Region	Health check
a3789bd42edfd4843be044d651192b60	us-west1	<a href="#">k8s-58ab25df8566c77c-node</a>

- Take a screenshot of the addresses allocated and indicate the ones associated with nodes versus the one associated with the load balancer.
  - The last one is associated with the load balancer

## IP addresses

RESERVE EXTERNAL STATIC IP ADDRESS

RESERVE INTERNAL STATIC IP ADDRESS

REFRESH

RELEASE STATIC ADDRESS

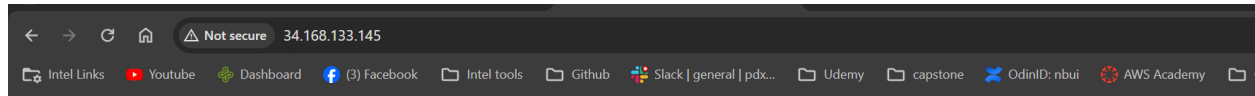
SHOW INFO PANEL

ALL INTERNAL IP ADDRESSES EXTERNAL IP ADDRESSES IPV4 ADDRESSES IPV6 ADDRESSES

Filter Enter property name or value

<input type="checkbox"/>	Name	IP address	Access type	Region	Type ↓	Version	In use by	Subnetwork	VPC Network	Network Tier ?	Labels
<input type="checkbox"/>	—	10.138.0.2	Internal	us-west1	Ephemeral	IPv4	VM instance <a href="#">course-vm</a> (Zone us-west1-b)	<a href="#">default</a>	<a href="#">default</a>		
<input type="checkbox"/>	—	10.138.0.17	Internal	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-default-pool-44f19f26-h7fx</a> (Zone us-west1-b)	<a href="#">default</a>	<a href="#">default</a>		
<input type="checkbox"/>	—	10.138.0.18	Internal	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-default-pool-44f19f26-r3z5</a> (Zone us-west1-b)	<a href="#">default</a>	<a href="#">default</a>		
<input type="checkbox"/>	—	34.83.48.240	External	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-default-pool-44f19f26-r3z5</a> (Zone us-west1-b)	<a href="#">default</a>	<a href="#">default</a>	Premium	
<input type="checkbox"/>	—	34.83.92.179	External	us-west1	Ephemeral	IPv4	VM instance <a href="#">gke-guestbook-default-pool-44f19f26-h7fx</a> (Zone us-west1-b)	<a href="#">default</a>	<a href="#">default</a>	Premium	
<input type="checkbox"/>	—	34.168.133.145	External	us-west1	Ephemeral	IPv4	Forwarding rule <a href="#">a3789bd42edfd4843be044d651192b60</a>			Premium	

## 12. Deploy and view application



---

Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-11 07:13:05.467421+00:00  
Hello Datastore

---

Nathan Bui <nbui@pdx.edu>  
signed on 2024-02-18 06:26:02.156269+00:00  
Hello Cloud Build!

---

# Lab 07.3g


## 2. Code

- Does Google provide a Python package specifically for accessing the Knowledge Graph API?
  - No, it doesn't. We can only use its API endpoints


## 3. Code

- Show the source line that constructs the query we wish to send to the Knowledge Graph API.
  - Line 105: `kg_search_response = make_search_request(request.form("text"))`
- Show the source line that then executes the query and saves the response. What is the name of the method that sends the query to the Knowledge Graph API?
  - The code is defined in "make\_search\_request" method, from line 89 - 92
  - The response is saved in the `kg_serach_response` variable in line 105
- What is the Python data type that is used to represent the formatted message?
  - A dictionary
- What are the three main attributes of the formatted message passed back to Slack?
  - `Response_type`, `text`, and `attachments`

## 8. Test the command

**nbui** 10:13 PM


/kg chatgpt


**cs430bot** APP 10:13 PM

Query: chatgpt

**ChatGPT: Software**

ChatGPT is a chatbot developed by OpenAI and launched on November 30, 2022. Based on a large language model, it enables users to refine and steer a conversation towards a desired length, format, style, level of detail, and language. (5 kB) ▾



 Hello, team!

What's everyone working on today?

×

# Lab 07.4g

## 3. Vision

- Show the output for your lab notebook

```
(env) nbui@cloudshell:~ (cloud-bui-nbui) $ cd ~/python-docs-samples/vision/snippets/detect
(env) nbui@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-bui-nbui) $ python detect.py labels-uri gs://cloud-samples-data/ml-api-codelab/birds.jpg
Labels:
Bird
Ratite
Cloud
Sky
Beak
Plant
Green
Neck
Ostrich
Casuariiformes
(env) nbui@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-bui-nbui) $
```

- What is the name of the function?
  - `detect_labels_uri`
- What type of Vision client is instantiated in it?
  - `ImageAnnotatorClient`
- What method is invoked in the Vision client to perform the detection?
  - `label_detection(image=image)`
- What is the name of the attribute in the response object that contains the results we seek?
  - `Label_annotations`
- Take a screenshot of the output for the above commands

```
(env) nbui@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-bui-nbui) $ python detect.py logos logo_img
Logos:
Harvard University
(env) nbui@cloudshell:~/python-docs-samples/vision/snippets/detect (cloud-bui-nbui) $
```

- What method is invoked in the Vision client to perform the detection?
  - `logo_detection(image=image)`

## 4. Speech

- Show the output for your lab notebook

```
(env) nbui@cloudshell:~/python-docs-samples/speech/snippets (cloud-bui-nbui)$ python transcribe.py resources/audio.raw
Transcript: how old is the Brooklyn Bridge
(env) nbui@cloudshell:~/python-docs-samples/speech/snippets (cloud-bui-nbui)$
```

- What is the name of the function?
  - `transcribe_file`
- What method is invoked in the Speech client to perform the detection?
  - `recognize(config=config, audio=audio)`
- What is the name of the attribute in the response object that contains the results we seek?
  - `result.alternatives[0].transcript`

## 5. Translate

- Show the output for your lab notebook

```
(env) nbui@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-bui-nbui)$ python snippets.py translate-text en '你有沒有帶外套'
Text: 你有沒有帶外套
Translation: did you bring a coat
Detected source language: zh-TW
(env) nbui@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-bui-nbui)$
```

- What is the name of the function?
  - `translate_text`
- What method is invoked in the Translate client to perform the detection?
  - `translate(text, target_language=target)`
- What is the name of the attribute in the response object that contains the results we seek?
  - `translatedText`

## 6. Natural Language

```
(env) nbui@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-bui-nbui)$ vim language.py
(env) nbui@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-bui-nbui)$ python language.py 'homework is awful!'
python language.py 'homework is ok'
python language.py 'homework is awesome?'
python language.py 'homework is awesome!'
python language.py 'The protestors in Oregon put on gas masks and wore yellow t-shirts'
"homework is awful!" has sentiment=-0.800000011920929
Entities are:
name: homework
"homework is ok" has sentiment=0.30000001192092896
Entities are:
name: homework
"homework is awesome?" has sentiment=0.4000000059604645
Entities are:
name: homework
"homework is awesome!" has sentiment=0.8999999761581421
Entities are:
name: homework
"The protestors in Oregon put on gas masks and wore yellow t-shirts" has sentiment=-0.6000000238418579
Entities are:
name: protestors
name: gas masks
name: Oregon
name: t-shirts
(env) nbui@cloudshell:~/python-docs-samples/translate/samples/snippets (cloud-bui-nbui)$
```

## 8. Code

- What is the name of the function that performs the transcription?
  - Transcribe\_gcs
- What is the name of the function that performs the translation?
  - translate\_text
- What is the name of the function that performs the entity analysis on the translation?
  - entities\_text
- What is the name of the function that performs the entity analysis on the image?
  - Detect\_labels\_uri

## 9. Test integration

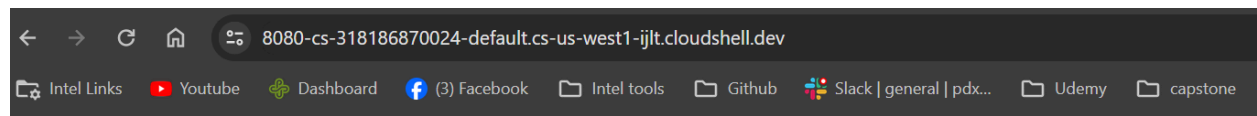
- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
  - The program should convert strings to ALL uppercase or lowercase letters, then check if the string labels contain the entities' strings and vice versa
- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
  - We should train the program to recognize the synonym/acronym words in the program or using another ML entity at the comparison step
- If the program deems them unrelated, then based on the results from the APIs, what must be changed in the program to address this?
  - The program should convert strings to ALL uppercase or lowercase letters, then check if the string labels contain the entities' strings and vice versa
  - Implement another ML entity at the comparison step to recognize word's single/plural forms

## 13. Video Intelligence

- What are the 3 labels with the highest confidence that the Video Intelligence API associates with the video and what are the confidences for each?
  - Sports : 0.9218811392784119
  - Basketball: 0.9137870669364929
  - Player: 0.8446521162986755
- What is the name of the client class in the package that is used?
  - VideoIntelligenceServiceClient
- What method is used in that class to perform the annotation?
  - Annotate\_video



## 16. Application



### Google Cloud Platform - Face Detection Sample

This Python Flask application demonstrates App Engine Flexible, Google Cloud Storage, Datastore, and the Cloud Vision API.

Upload File:  No file chosen



joy-face.jpg was uploaded 2024-02-20 23:06:25.363920+00:00.

Joy Likelihood for Face: Very Likely

## 17. Code

- What line of code creates the query for previous detections?
  - `query = datastore_client.query(kind="Faces")`
- What line of code sends the query to Cloud Datastore?
  - `image_entities = list(query.fetch())`
- Show the line that retrieves the name of the storage bucket to use.
  - `bucket = storage_client.get_bucket(CLOUD_STORAGE_BUCKET)`
- What form field is used to specify the uploaded photo?
  - `file`
- Show the line that copies the photo's contents to the storage bucket.
  - `blob.upload_from_string(photo.read(),  
content_type=photo.content_type)`
- What method in Vision's annotation client is used to perform the analysis?
  - `face_detection(image=image).face_annotations`
- What fields are stored in Cloud Datastore for each image?
  - `blob_name`
  - `Image_public_url`
  - `timestamp`
  - `joy`
- What happens at the end of the `upload_photo` route?
  - It uploads the new entity to the db and redirects the user back to the home page