

# CS 530 INTERNET WEB AND CLOUD SYSTEMS

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<b>GCP Cloud Storage #1 (USGS)</b>	<b>3</b>
<b>Cloud Storage access scope</b>	<b>4</b>
<b>USGS data and setup</b>	<b>4</b>
<b>Create and distribute earthquake image</b>	<b>4</b>
<b>Create service account</b>	<b>5</b>
<b>Create Compute Engine VM</b>	<b>5</b>
<b>Service account roles (Compute)</b>	<b>6</b>
<b>Service account roles (Storage)</b>	<b>7</b>
<b>View object</b>	<b>8</b>
<b>IAM and least privileges #4</b>	<b>8</b>
<b>Clean up</b>	<b>9</b>
<b>Obtain AWS credentials</b>	<b>10</b>
<b>Run the application</b>	<b>11</b>
<b>Run the application</b>	<b>12</b>
<b>Push the container image</b>	<b>13</b>
<b>Configure the Security Group</b>	<b>15</b>
<b>Run the application</b>	<b>15</b>
<b>Launch instance</b>	<b>16</b>
<b>Set up the instance</b>	<b>17</b>
<b>Visit the application</b>	<b>17</b>
<b>View the database</b>	<b>18</b>
<b>Clean-up</b>	<b>19</b>

<b>model_datastore</b>	<b>20</b>
<b>Obtain GCP credentials</b>	<b>21</b>
<b>Run the application</b>	<b>21</b>
<b>Run the application</b>	<b>22</b>
Push the container image	23
<b>Version 3: GCP Cloud Shell</b>	<b>24</b>
<b>Run the application</b>	<b>25</b>
<b>Configure service account</b>	<b>26</b>
<b>Set up the instance</b>	<b>26</b>
<b>Visit the application</b>	<b>27</b>
<b>View the database</b>	<b>27</b>
<b>Clean up</b>	<b>28</b>

## 05.1g: Storage, IAM

### GCP Cloud Storage #1 (USGS)

The screenshot shows the IAM permissions page for the project "cloud-CS-530-karinje-vkarinje". The page is titled "Permissions for project 'cloud-CS-530-karinje-vkarinje'" and includes a search bar and a "HELP ASSISTANT" button. The "PERMISSIONS" tab is selected, and the "VIEW BY PRINCIPALS" view is active. A table lists the permissions for the project, including the Compute Engine default service account, Google APIs Service Agent, and Varsha Karinje.

Type	Principal	Name	Role	Security insights	Inheritance
<input type="checkbox"/>	791612085972-compute@developer.gserviceaccount.com	Compute Engine default service account	Editor	6039/6041 excess permissions	
<input type="checkbox"/>	791612085972@cloudservices.gserviceaccount.com	Google APIs Service Agent	Editor	6018/6041 excess permissions	
<input type="checkbox"/>	vkarinje@pdx.edu	Varsha Karinje	Owner	6780/6959 excess permissions	

Answer the following questions for your lab notebook.

- What roles are attached to the Compute Engine default service account?

Ans: The Editor role is attached to the Compute Engine default service account.

- Would they be sufficient for the VM to perform its functions?

Ans: Yes. For the VM to perform its functions the Editor role would be sufficient

Answer the following questions for your lab notebook.

- What permissions are given by the default access scope to Cloud Storage?

Ans: Default-read-only access to Storage and Service management.

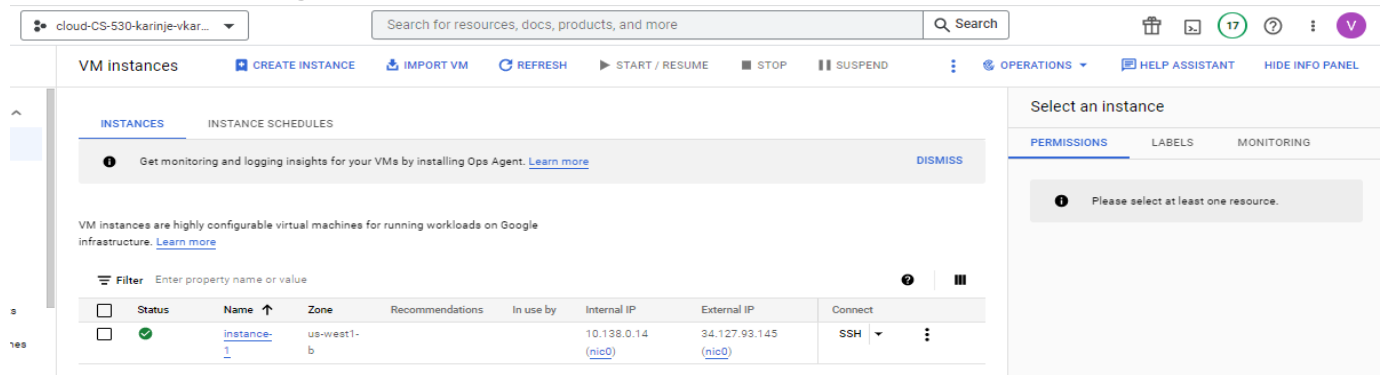
Write access to Stackdriver Logging and Monitoring

Read/Write access to Service Control.

- Would they be sufficient for the VM to perform its functions?

Ans: No, the default access scope restricts them while the roles are permissive. These won't be sufficient for the VM to perform its functions.

## Cloud Storage access scope



## USGS data and setup

```

vkarinje@instance-1:~/training-data-analyst/CPB100/lab2b$ head -2 earthquakes.csv
time,latitude,longitude,depth,mag,magType,nst,gap,dmin,rms,net,id,updated,place,type,horizontalError,depthError,magError,magNst,status,locationSource,magSource
2022-10-30T03:16:52.960Z,32.8625,-116.8603333,27.46,0.96,m1,8,125,0.03083,0.31,ci,ci40127127,2022-10-30T03:20:24.963Z,"6km E of Lakeside, CA",earthquake,1.66,2.38,0.216,11,automatic,ci,ci

```

Answer the following questions for your lab notebook.

- What time did the latest earthquake happen?

Ans: The latest earthquake happened on 2022-10-30T03:16:52.960Z

- What was the magnitude (mag)?

Ans: The magnitude was 0.96

- Where was the place it happened?

Ans: 6 km E of Lakeside, CA

## Create and distribute earthquake image

- Take a screenshot of the image that has been created for your lab notebook.

cloud-CS-530-karinje-vkar... cloud storage X Q Search HELP ASSISTANT

Object details

Buckets > vkarinje-bucket > earthquakes.png

LIVE OBJECT VERSION HISTORY

DOWNLOAD EDIT METADATA EDIT ACCESS DELETE

Overview

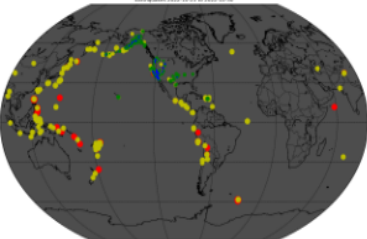
Type	Image/png
Size	213.8 KB
Created	Oct 29, 2022, 8:44:56 PM
Last modified	Oct 29, 2022, 8:44:56 PM
Storage class	Standard
Custom time	—
Public URL	Not applicable
Authenticated URL	<a href="https://storage.cloud.google.com/vkarinje-bucket/earthquakes.png">https://storage.cloud.google.com/vkarinje-bucket/earthquakes.png</a>
gsutil URI	gs://vkarinje-bucket/earthquakes.png

Permissions

Public access	Not public
---------------	------------

Protection

Hold status	None
Version history	—
Retention policy	None
Encryption type	Google-managed key



## Create service account

Service account					
<input type="checkbox"/>	<a href="mailto:gcs-lab@cloud-cs-530-karinje-vkarinje.iam.gserviceaccount.com">gcs-lab@cloud-cs-530-karinje-vkarinje.iam.gserviceaccount.com</a>	✓	gcs-lab	No keys	102296725729513422801

## Create Compute Engine VM

cloud-CS-530-karinje-vkar...

Search for resources, docs, products, and more

VM instances

CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP OPERATIONS HELP ASSISTANT HIDE INFO PANEL LEARN

INSTANCES INSTANCE SCHEDULES

Get monitoring and logging insights for your VMs by installing Ops Agent. [Learn more](#) DISMISS

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
✓	<a href="#">instance-1</a>	us-west1-b			10.138.0.14 ( <a href="#">nic0</a> )	34.127.93.145 ( <a href="#">nic0</a> )	SSH
✓	<a href="#">instance-2</a>	us-west1-b			10.138.0.15 ( <a href="#">nic0</a> )	104.196.243.93 ( <a href="#">nic0</a> )	SSH

Select an instance

PERMISSIONS LABELS MONITORING

Please select at least one resource.

## Service account roles (Compute)

Answer the following question for your lab notebook:

- What is the exact error message that is returned?

Ans: Compute.instances.list permission is required.

```
vkarinje@instance-2:~$ gcloud compute instances list
ERROR: (gcloud.compute.instances.list) Some requests did not succeed:
- Required 'compute.instances.list' permission for 'projects/cloud-cs-530-karinje-vkarinje'

vkarinje@instance-2:~$
```

- Take a screenshot of the output for your notebook.

```
vkarinje@instance-2:~$ gcloud compute instances list
NAME          ZONE    MACHINE_TYPE  PREEMPTIBLE  INTERNAL_IP  EXTERNAL_IP  STATUS
instance-1    us-west1-b  f1-micro             10.138.0.14   34.127.93.145  RUNNING
instance-2    us-west1-b  f1-micro             10.138.0.15   104.196.243.93  RUNNING

vkarinje@instance-2:~$
```

Answer the following question for your lab notebook.

- What role needs to be added to the service account's permissions for the VM to have access to list the project's Compute Engine instances?

Ans: The Compute Viewer role is needed for the VM to have access to list the project's Compute Engine instances.

## Service account roles (Storage)

Answer the following question:

- What is the exact error message that is returned?

Ans: There is no storage.objects.create access to the Google Cloud Storage object.

```
vkarinje@instance-2:~$ gsutil cp gs://vkarinje-bucket/earthquakes.png .
Copying gs://vkarinje-bucket/earthquakes.png...
/ [1 files] [313.8 KiB/313.8 KiB]
Operation completed over 1 objects/313.8 KiB.
vkarinje@instance-2:~$ cp earthquakes.png moonquakes.png
vkarinje@instance-2:~$ gsutil cp moonquakes.png gs://vkarinje-bucket/
Copying file://moonquakes.png [Content-Type=image/png]...
AccessDeniedException: 403 gcs-lab@cloud-cs-530-karinje-vkarinje.iam.gserviceaccount.com does not have storage.objects.create access to the Google Cloud S
torage object.
vkarinje@instance-2:~$
```

Go back to the VM and repeat the gsutil command until it succeeds. Take a screenshot of the output for your notebook.

```
vkarinje@instance-2:~$ gsutil cp moonquakes.png gs://vkarinje-bucket/
Copying file://moonquakes.png [Content-Type=image/png]...
/ [1 files] [313.8 KiB/313.8 KiB]
Operation completed over 1 objects/313.8 KiB.
vkarinje@instance-2:~$
```

Answer the following question:

- What role needs to be added to the service account's permissions for the VM to have access to add an object to the storage bucket?

Ans: Storage Object Creator role needs to be added to the service account's permissions for the VM to have access to add an object to the storage bucket.

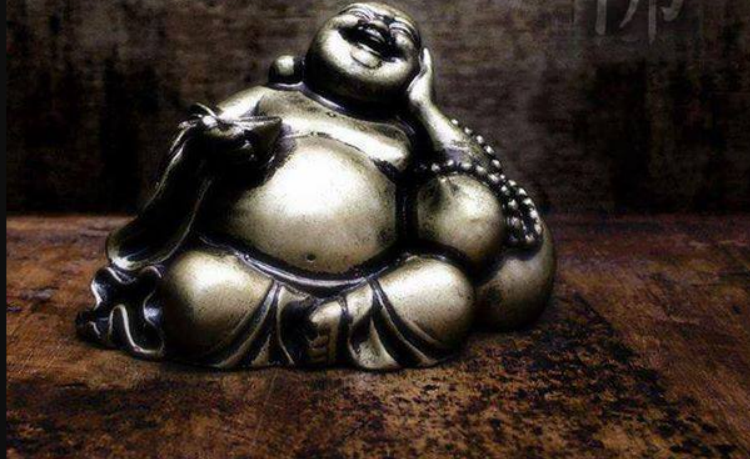
## View object

- Take a screenshot the shows the entire URL and the image that has been retrieved:

```
(env) vkarinje@cloudshell:~ (cloud-cs-530-karinje-vkarinje) $ python3
Python 3.9.2 (default, Feb 28 2021, 17:03:44)
[GCC 10.2.1 20210110] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> from google.cloud import storage
>>> storage_client = storage.Client()
>>> bucket = storage_client.get_bucket('vkarinje-bucket')
>>> blob = bucket.blob('gcs-lab-image.jpg')
>>> myImage = open('image.jpg', mode='rb')
>>> blob.upload_from_string(myImage.read(), content_type='image/jpeg')
>>> blob.make_public()
>>> blob.public_url
'https://storage.googleapis.com/vkarinje-bucket/gcs-lab-image.jpg'
```

[storage.googleapis.com/vkarinje-bucket/gcs-lab-image.jpg](https://storage.googleapis.com/vkarinje-bucket/gcs-lab-image.jpg)

**"Pain is inevitable.  
Suffering is optional." -Buddha**



## IAM and least privileges #4

- Take a screenshot that includes your project name in it.



## Least Privileges - Score

nonce: 196242671523

User: vkarinje

Congratulations, all Least Privileges levels are completed.

### Score Board

Level	Score
<a href="#">PrimitiveRole-Project</a>	10 / 10
<a href="#">PredefinedRole-Storage</a>	10 / 10
<a href="#">PredefinedRole-Compute</a>	10 / 10
<a href="#">PredefinedRole-Logging</a>	10 / 10
<a href="#">PredefinedRole-Datastore</a>	10 / 10
<a href="#">PredefinedRole-Vision</a>	10 / 10
<a href="#">CustomRole-Project</a>	10 / 10
<a href="#">CustomRole-Storage</a>	10 / 10
<a href="#">CustomRole-Compute</a>	10 / 10
<a href="#">CustomRole-Logging</a>	10 / 10
Sum / Total	100 / 100

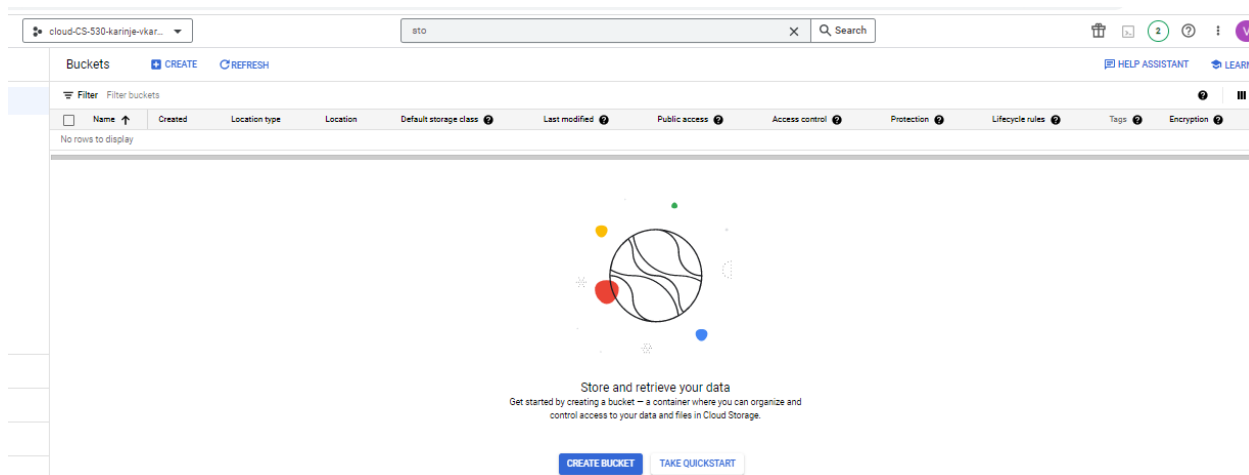
```

vkarinje@cloudshell:~/thunder-ctf (cloud-cs-530-vkarinje-lab5)$ python3 thunder.py destroy
Destroy the running instance of leastprivilege/roles? [y/n] y
Deleting entities
Deleting buckets and IAM entries
[7m 40s] Deployment operation in progress... Done
Deleting custom roles
projects/cloud-cs-530-vkarinje-lab5/roles/ct1_access_role_196242671523
projects/cloud-cs-530-vkarinje-lab5/roles/ct2_access_role_196242671523
projects/cloud-cs-530-vkarinje-lab5/roles/ct3_access_role_196242671523
projects/cloud-cs-530-vkarinje-lab5/roles/ct4_access_role_196242671523
Deleting nonce file
vkarinje@cloudshell:~/thunder-ctf (cloud-cs-530-vkarinje-lab5)$ |

```

## Clean up

- Delete the storage bucket



- Delete the Compute Engine VMs

cloud-CS-530-karinje-vkar...

com

VM instances

CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP SUSPEND RESET DELETE

OPERATIONS HELP ASSISTANT HIDE INFO PANEL LEARN

INSTANCES INSTANCE SCHEDULES

Get monitoring and logging insights for your VMs by installing Ops Agent. [Learn more](#) DISMISS

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

Related actions

- Explore Backup and DR **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

Select an instance

PERMISSIONS LABELS MONITORING

Please select at least one resource.

- Remove the gcs-lab service account

cloud-CS-530-karinje-vkar...

iam

Service accounts

CREATE SERVICE ACCOUNT DELETE MANAGE ACCESS REFRESH

HELP ASSISTANT LEARN

Service accounts for project "cloud-CS-530-karinje-vkarinje"

A service account represents a Google Cloud service identity, such as code running on Compute Engine VMs, App Engine apps, or systems running outside Google. [Learn more about service accounts.](#)

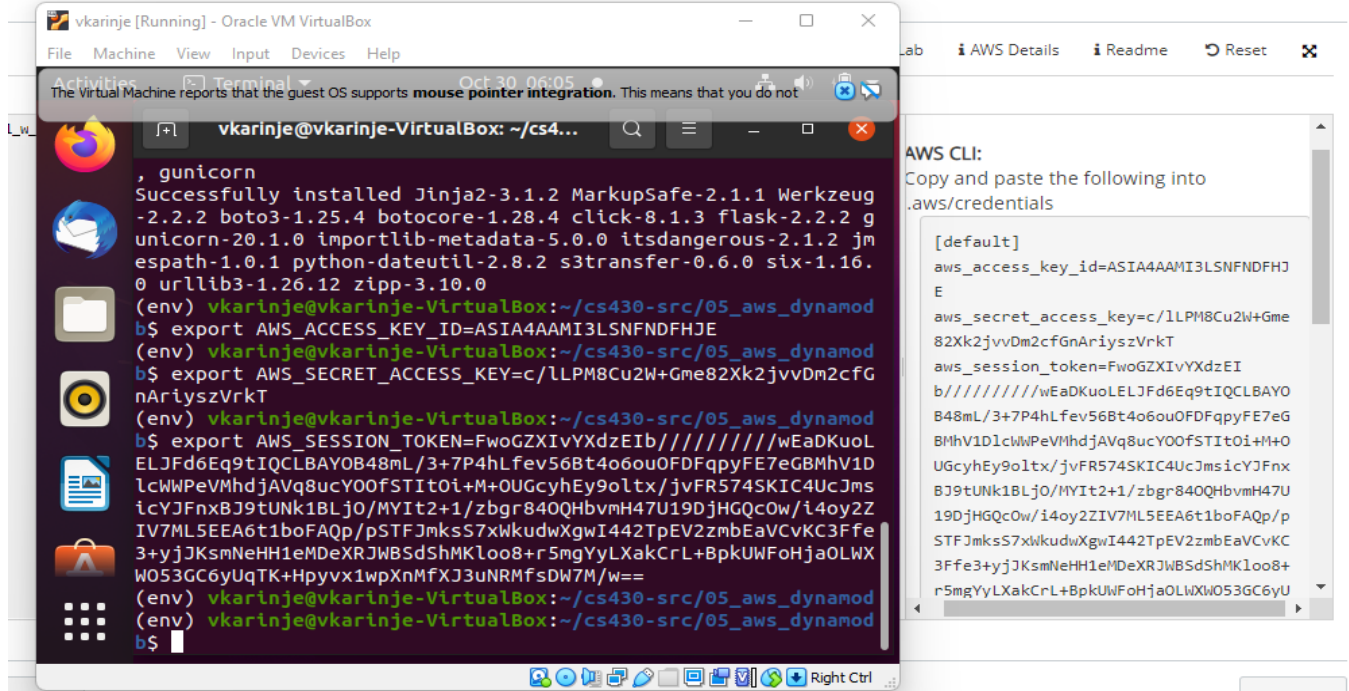
Organization policies can be used to secure service accounts and block risky service account features, such as automatic IAM Grants, key creation/upload, or the creation of service accounts entirely. [Learn more about service account organization policies.](#)

Filter Enter property name or value

Email	Status	Name	Description	Key ID	Key creation date	OAuth 2.0 Client ID	Actions
791612085972-compute@developer.gserviceaccount.com	✓	Compute Engine default service account		No keys		117064374750626319369	

## 05.2a: DynamoDB Guestbook

Obtain AWS credentials



## Run the application

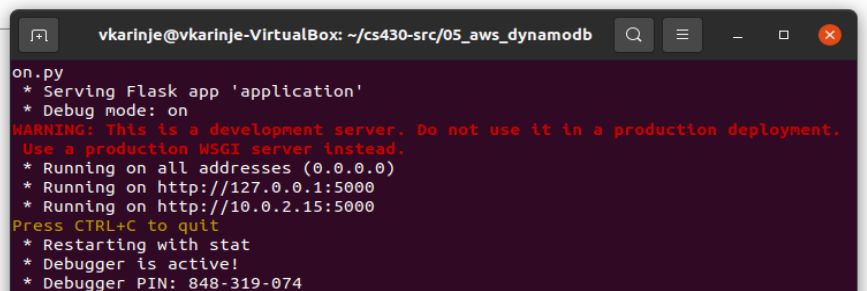
127.0.0.1:5000

### Guestbook

[Sign here](#)

### Entries

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 06:08:47.837999  
Hello DynamoDB



Not secure | 10.0.2.15:5000

## Guestbook

[Sign here](#)

### Entries

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 06:08:47.837999  
Hello DynamoDB

```

vkarinje@vkarinje-VirtualBox: ~/cs430-src/05_aws_dynamodb
on.py
* Serving Flask app 'application'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment.
Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://10.0.2.15:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 848-319-074

```

aws Services Search for services, features, blogs, docs, and more [Alt+S] N. Virginia voclabs/user2175716~vkarinje@pdx.edu @ 8246-5946-6980

**DynamoDB**

Dashboard  
Tables  
Update settings  
**Explore items**  
PartiQL editor [New](#)  
Backups  
Exports to S3  
Imports from S3 [New](#)  
Reserved capacity  
Settings [New](#)

**DAX**  
Clusters  
Subnet groups  
Parameter groups  
Events

DynamoDB > Items > guestbook

Autopreview View table details

**Scan/Query items**  
Expand to query or scan items.

Completed Read capacity units consumed: 0.5

Items returned (1)

	email	date	message	name
<input type="checkbox"/>	vkarinje@pdx.edu	2022-10-30 06:08:47....	Hello Dyna...	Varsha Karinje

vkarinje [Running] - Oracle VM VirtualBox  
File Machine View Input Devices Help  
Activities Terminal Oct 30 06:16  
vkarinje@vkarinje-VirtualBox: ~/cs43...

## Run the application

- Take a screenshot of the output for your lab notebook.

**Guestbook**

[Sign here](#)

**Entries**

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 06:08:47.837999  
Hello DynamoDB

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 13:33:21.969328  
Hello Docker DynamoDB

```

vkarinje@vkarinje-VirtualBox: ~/cs430-src/05_aws_dynamodb
DFqpyFE7eGBMhV1DlcWPeVMhdjAVq8ucY00fSTit0i+M+OUGcyhEy9oLtx
JFnxBJ9tUNK1BLjO/MYIt2+1/zbgr840QHbvmH47U19DjHGQcOw/i4oy2Z1
FJmksS7xWkudwXgwI442TpEV2zmbEaVCvKC3Ffe3+yjJKsmNeHH1eMDeXRJ
akCrL+BpkUWFOHjaOLWXW053GC6yUqTK+Hpyvx1wpXnMfXJ3uNRMfsDW7M/
"docker run" requires at least 1 argument.
See 'docker run --help'.

Usage:  docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

Run a command in a new container
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ d
ACCESS_KEY_ID=ASIA4AAMI3LSNFNDFHJE --env AWS_SECRET_ACCESS_K
k2jvvDm2cfGnAriyszVrkt --env AWS_DEFAULT_REGION=us-east-1 --
N=FwoGZXIVYXdzEib////////wEadKuoLELJf6Eq9tIQCLBAY0B48mL/
DFqpyFE7eGBMhV1DlcWPeVMhdjAVq8ucY00fSTit0i+M+OUGcyhEy9oLtx
JFnxBJ9tUNK1BLjO/MYIt2+1/zbgr840QHbvmH47U19DjHGQcOw/i4oy2Z1
FJmksS7xWkudwXgwI442TpEV2zmbEaVCvKC3Ffe3+yjJKsmNeHH1eMDeXRJ
akCrL+BpkUWFOHjaOLWXW053GC6yUqTK+Hpyvx1wpXnMfXJ3uNRMfsDW7M/
8000:80 aws_gb
[2022-10-30 13:31:55 +0000] [1] [INFO] Starting unicorn 20.1
[2022-10-30 13:31:55 +0000] [1] [INFO] Listening at: http://0
[2022-10-30 13:31:55 +0000] [1] [INFO] Using worker: gthrea
[2022-10-30 13:31:55 +0000] [7] [INFO] Booting worker with

```

Go back to the AWS DynamoDB console and see that a second item has been added to the table.

**DynamoDB**

Dashboard  
Tables  
Update settings  
[Explore items](#)  
PartiQL editor [New](#)

**Tables (1)**

Any table tag  
Find tables by table name

**guestbook**

Autopreview View table details

▶ Scan/Query items  
Expand to query or scan items.

Completed Read capacity units consumed: 0.5

Items returned (2)

email	date	message	name
vkarinje@pdx.edu	2022-10-30 06:08:47...	Hello Dyna...	Varsha Kari...
vkarinje@pdx.edu	2022-10-30 13:33:21...	Hello Docke...	Varsha Kari...

## Push the container image

Examine the container image you've built to see its size.

```

vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ docker images
REPOSITORY      TAG          IMAGE ID       CREATED        SIZE
aws_gb          latest       b1098bd1d7f2   15 minutes ago 144MB
ubuntu          20.04       680e5dfb52c7   5 days ago    72.8MB
<none>          <none>      06dde268928d   7 days ago    59.6MB
python          alpine      880fc229346e   2 weeks ago   48.7MB
ubuntu          18.04       71cb16d32be4   3 weeks ago   63.1MB
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$

```

- Take a screenshot of the container image on DockerHub.


```

vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ docker login
Authenticating with existing credentials...
WARNING! Your password will be stored unencrypted in /home/vkarinje/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ docker tag aws_gb vkarinje/aws_gb
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ docker push vkarinje/aws_gb
Using default tag: latest
The push refers to repository [docker.io/vkarinje/aws_gb]
c0caf7b13f8f: Pushed
fbccc6e4597c: Pushed
4da53ae893e1: Mounted from vkarinje/hw3small
b9a7a7381abe: Mounted from vkarinje/hw3small
2306fb7a5a47: Mounted from vkarinje/hw3small
6666686122fd: Mounted from vkarinje/hw3small
994393dc58e7: Mounted from vkarinje/hw3small
latest: digest: sha256:92c82e9dc30156a124b58cbe757ec1d261eed68090179490c6d0de42dde759b9 size: 1788
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$

```

hub.docker.com/u/vkarinje




**vkarinje**

Community User    Joined September 30, 2022

Repositories    Starred

Displaying 5 of 5 repositories

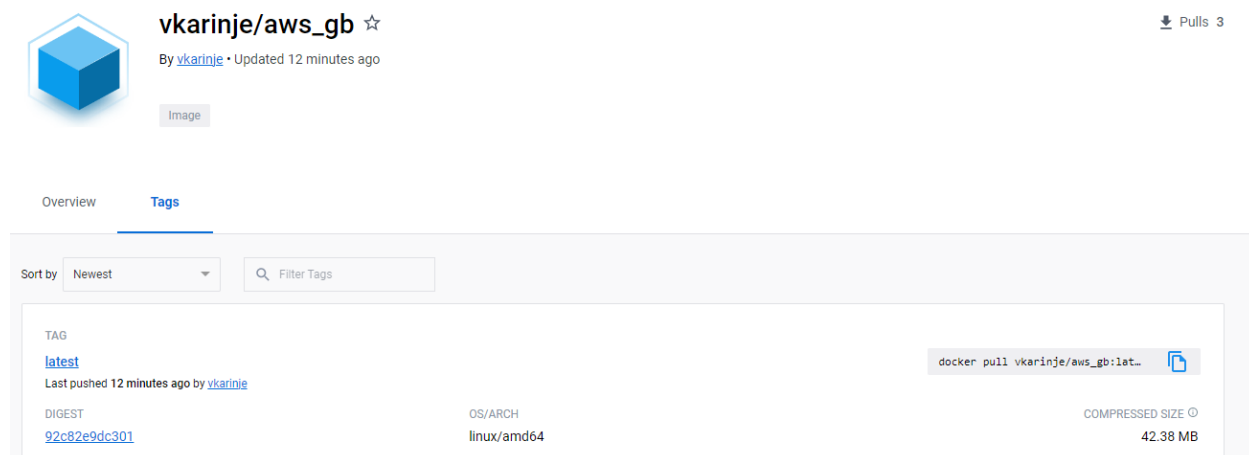


vkarinje/aws\_gb

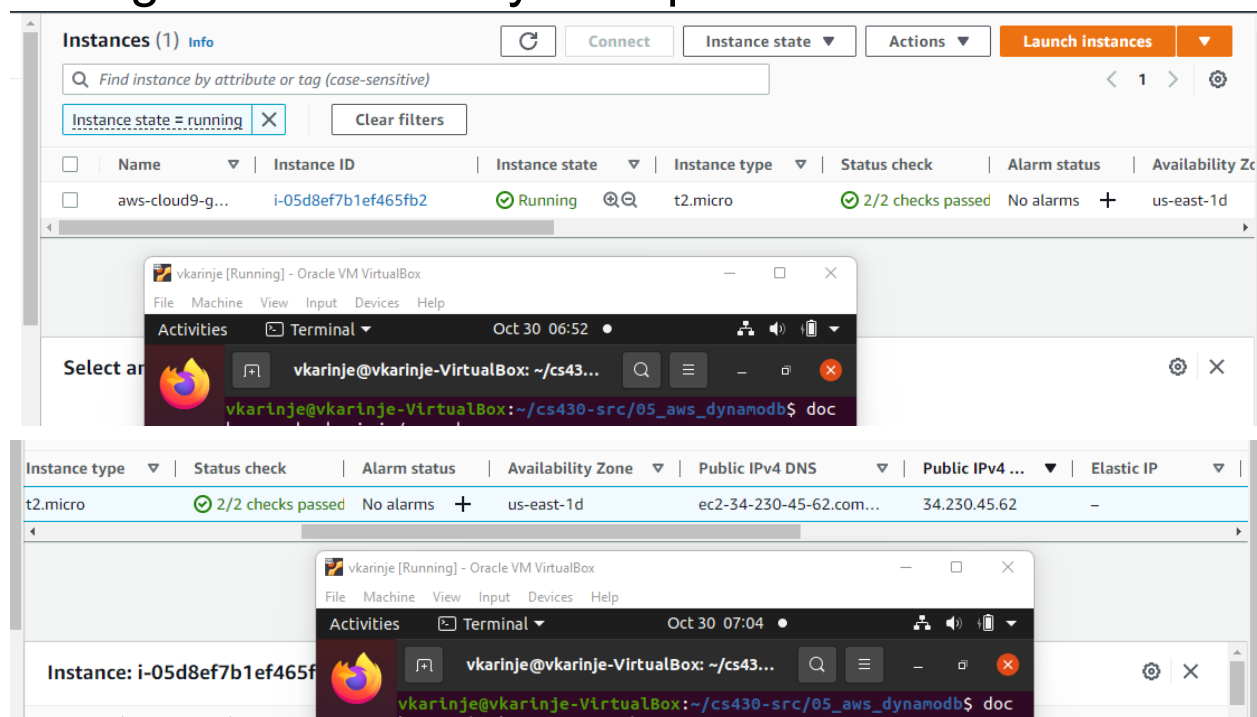
By [vkarinje](#) • Updated a minute ago

Image

0 Stars



## Configure the Security Group



## Run the application

- Take a screenshot as before that shows your entry and the IP address in the URL bar.

Not secure | 34.230.45.62:5000

# Guestbook

[Sign here](#)

## Entries

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 06:08:47.837999  
Hello DynamoDB

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 13:33:21.969328  
Hello Docker DynamoDB

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 14:06:25.364282  
Hello Cloud9!

```
vkarinje@vkarinje-VirtualBox: ~/cs430-src/05_aws_dynamodb$ fig.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#
Login Succeeded
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ doc
rlnje/aws_gb
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_aws_dynamodb$ doc
aws_gb
Using default tag: latest
The push refers to repository [docker.io/vkarinje/aws_gb]
c0caf7b13f8f: Pushed
fbccc6e4597c: Pushed
4da53ae893e1: Mounted from vkarinje/hw3small
b9a7a7381abe: Mounted from vkarinje/hw3small
2306fb7a5a47: Mounted from vkarinje/hw3small
6666686122fd: Mounted from vkarinje/hw3small
```

aws Services Search for services, features, blogs, docs, and more [Alt+S] N. Virginia voclabs/user2175716~vkarinje@pdx.edu @ 8246-5946-6980

### DynamoDB

Dashboard  
Tables  
Update settings  
[Explore items](#)  
PartiQL editor [New](#)  
Backups  
Exports to S3  
Imports from S3 [New](#)

DynamoDB > Items > guestbook

Tables (1)

Any table tag

Find tables by table name

1

guestbook

### guestbook

Autopreview View table details

► Scan/Query items  
Expand to query or scan items.

Completed Read capacity units consumed: 0.5

Items returned (3)

Actions Create item

	email	date	message	name
	vkarinje@pdx.edu	2022-10-30 06:08:47...	Hello Dyna...	Varsha Kari.
	vkarinje@pdx.edu	2022-10-30 13:33:21...	Hello Docke...	Varsha Kari.
	vkarinje@pdx.edu	2022-10-30 14:06:25...	Hello Cloud9!	Varsha Kari.

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```
vkarinje@vkarinje-VirtualBox: ~/cs430-src/05_aws_dynamodb$ doc
ker push vkarinje/aws_gb
Using default tag: latest
The push refers to repository [docker.io/vkarinje/aws_gb]
c0caf7b13f8f: Pushed
fbccc6e4597c: Pushed
```

## Launch instance



The screenshot shows the AWS Management Console for the us-east-1 region. The 'Instances' page displays two t2.micro instances in the us-east-1d availability zone. The instance i-0cc0b0e55f48295d3 is in the 'Running' state. A terminal window in the foreground shows the user vkarinje@vkarinje-VirtualBox: ~/cs430-src/05\_aws\_dynamo... running the command 'docker tag aws\_gb vk...'. The terminal output shows the Docker login process for 'vkarinje' on 'aws\_gb'.

## Set up the instance

The screenshot shows a terminal window on an EC2 instance with IP 172-31-87-209. The user is installing Docker and its dependencies. The output shows the installation of docker, pigz, libcgrouper, containerd, and runc. The user then runs 'sudo systemctl start docker' and 'sudo docker run --env AWS\_DEFAULT\_REGION=us-east-1 -p 80:80 vkarinje/aws\_gb latest'. The output shows the container pulling the image from the registry and starting the application.

```

Installing : docker-20.10.17-1.amzn2.0.1.x86_64 5/5
Verifying : pigz-2.3.4-1.amzn2.0.1.x86_64 1/5
Verifying : libcgrouper-0.41-21.amzn2.x86_64 2/5
Verifying : docker-20.10.17-1.amzn2.0.1.x86_64 3/5
Verifying : containerd-1.6.6-1.amzn2.0.2.x86_64 4/5
Verifying : runc-1.1.3-1.amzn2.0.2.x86_64 5/5

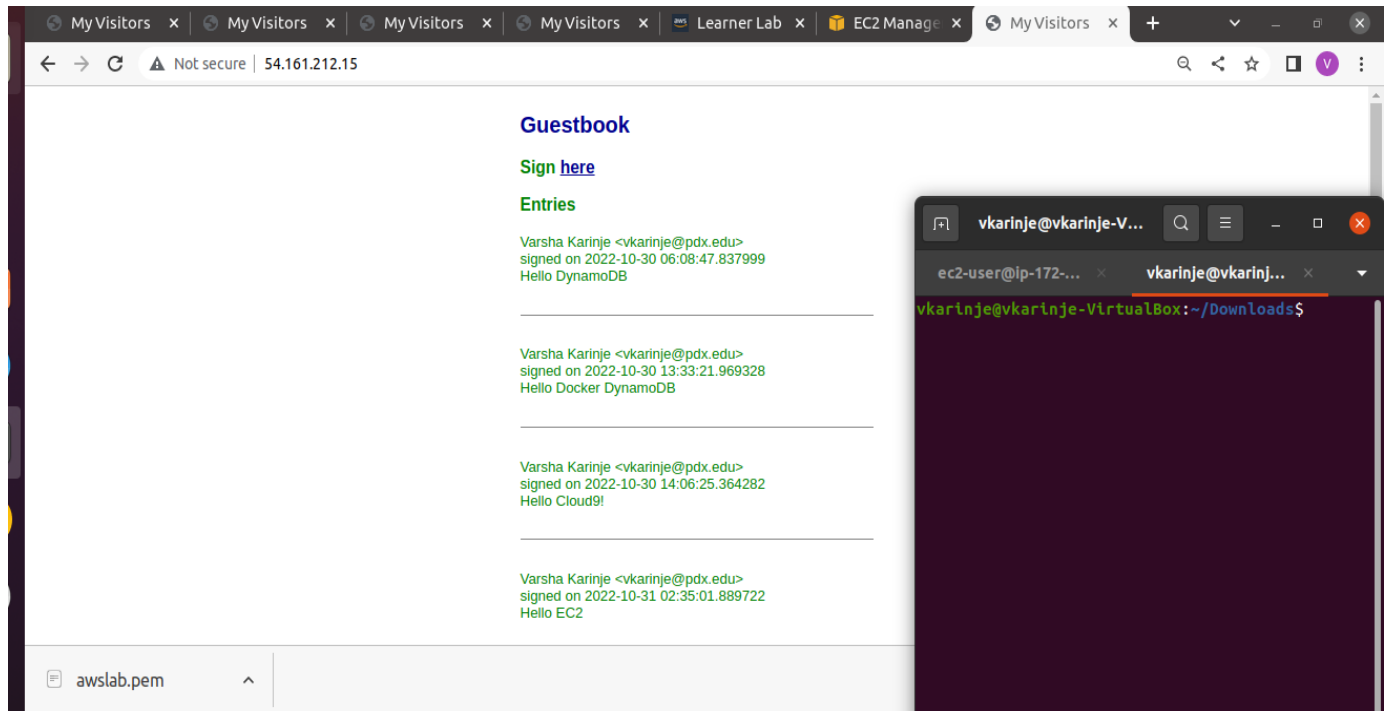
Installed:
  docker.x86_64 0:20.10.17-1.amzn2.0.1

Dependency Installed:
  containerd.x86_64 0:1.6.6-1.amzn2.0.2 libcgrouper.x86_64 0:0.41-21.amzn2 pigz.x86_64 0:2.3.4-1.amzn2.0.1 runc.x86_64 0:1.1.3-1.amzn2.0.2

Complete!
[ec2-user@ip-172-31-87-209 ~]$ sudo systemctl start docker
[ec2-user@ip-172-31-87-209 ~]$ sudo docker run --env AWS_DEFAULT_REGION=us-east-1 -p 80:80 vkarinje/aws_gb
Unable to find image 'vkarinje/aws_gb:latest' locally
latest: Pulling from vkarinje/aws_gb
213ec9aee27d: Pull complete
47858aee13bf: Pull complete
cfe0d6c6d05c: Pull complete
2df617b3dcd9: Pull complete
38da16a6ebe8: Pull complete
f4aa8b918d26: Pull complete
ad0aa1c0c5f7: Pull complete
Digest: sha256:92c82e9dc30156a124b58cbe75ec1d261eed68090179490c6d0de42dde759b9
Status: Downloaded newer image for vkarinje/aws_gb:latest
[2022-10-31 02:29:39 +0000] [1] [INFO] Starting gunicorn 20.1.0
[2022-10-31 02:29:39 +0000] [1] [INFO] Listening at: http://0.0.0.0:80 (1)
[2022-10-31 02:29:39 +0000] [1] [INFO] Using worker: gthread
[2022-10-31 02:29:39 +0000] [7] [INFO] Booting worker with pid: 7
  
```

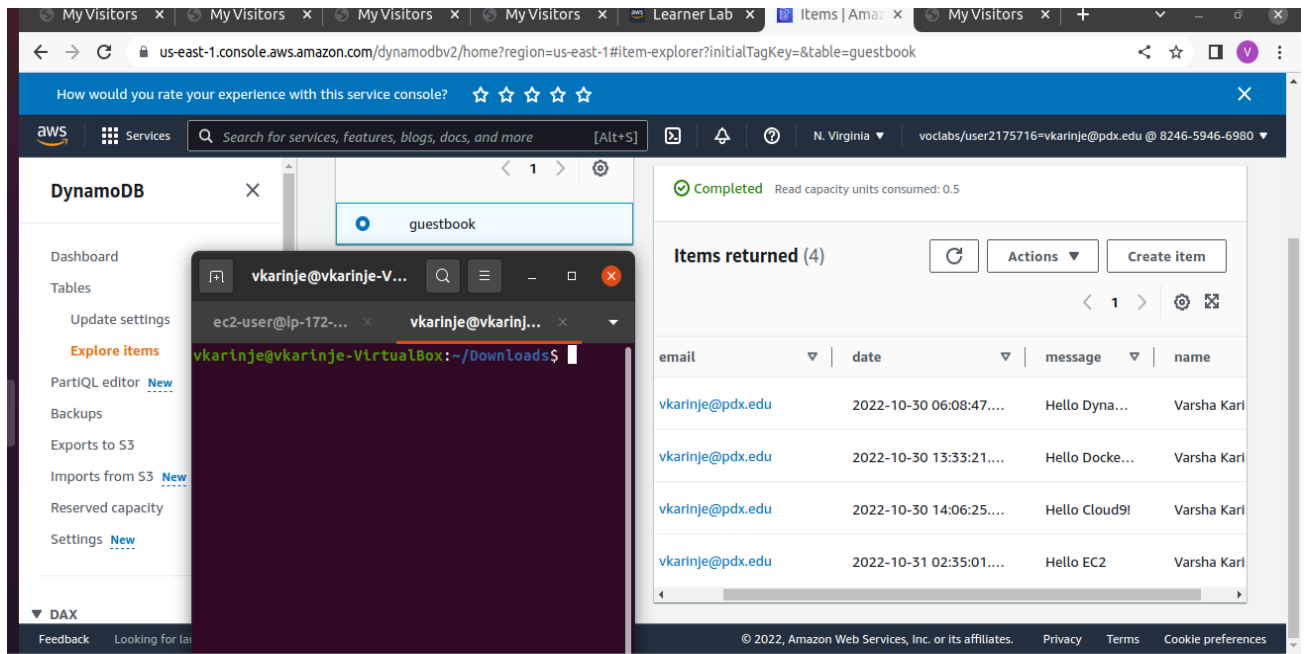
## Visit the application

- Take a screenshot as before that shows your entry and the IP address in the URL bar.

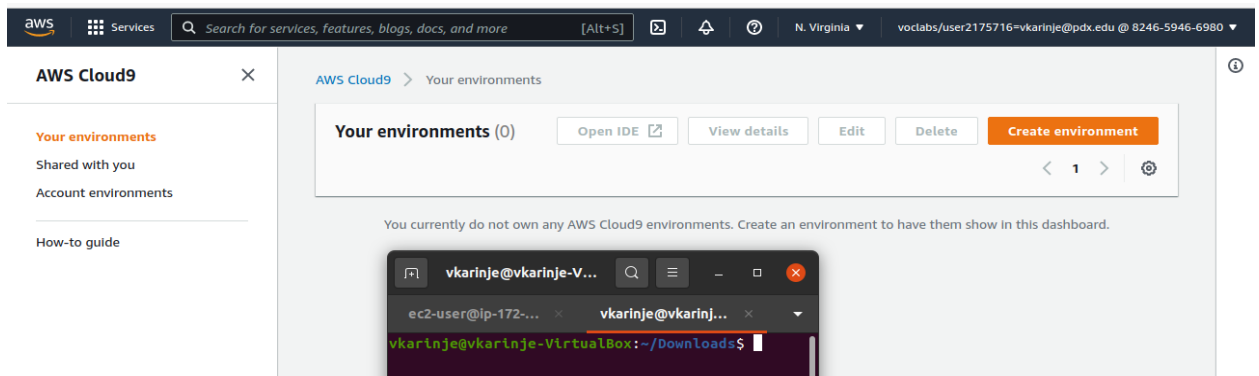


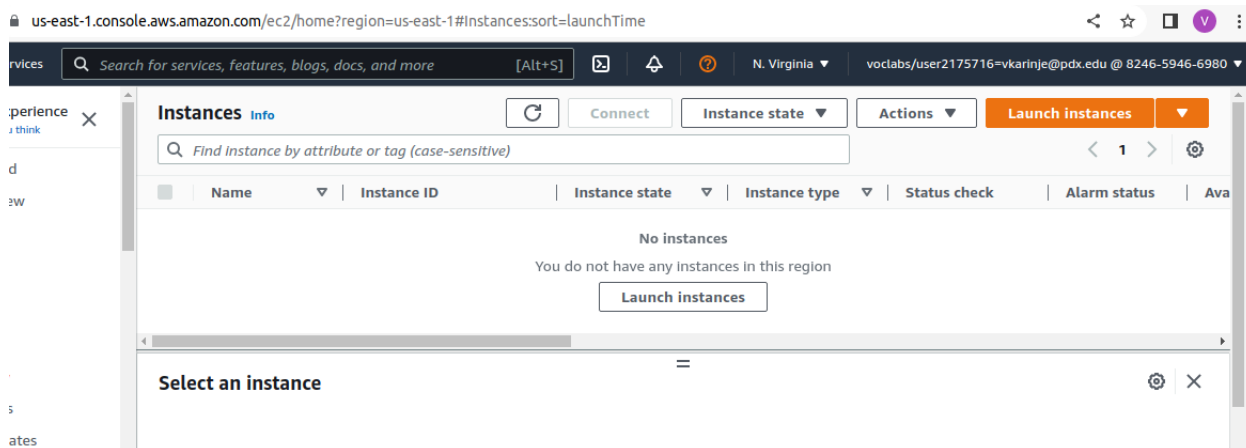
View the database

- Take a screenshot that shows all of the guestbook entries that you added to the DynamoDB table including their timestamps.



## Clean-up





## 05.2g: Cloud Datastore Guestbook

### model\_datastore

Edit `model_datastore.py` to change `YOUR_PROJECT_ID` to point to your project. Note that the project id should be all in lowercase letters.

```

23     Datastore typically returns:
24     [Entity{key: (kind, id), prop: val, ...}]
25
26     This returns:
27     [ name, email, date, message ]
28     where name, email, and message are Python strings
29     and where date is a Python datetime
30     """
31     if not entity:
32         return None
33     if isinstance(entity, list):
34         entity = entity.pop()
35     return [entity['name'], entity['email'], entity['date'], entity['message']]
36
37 class Model(Model):
38     def __init__(self):
39         self.client = datastore.Client('cloud-cs-530-karinje-vkarinje')
40
41     def select(self):
42         query = self.client.query(kind = 'Review')
43         entities = list(map(from_datastore, query.fetch()))
44         return entities
45
46     def insert(self, name, email, message):
47         key = self.client.key('Review')
48         rev = datastore.Entity(key)
49         rev.update( {
50             'name': name,
51             'email' : email,
52             'date' : datetime.today(),
53             'message' : message

```

# Obtain GCP credentials

Service accounts for project "cloud-CS-530-karinje-vkarinje"

A service account represents a Google Cloud service identity, such as code running on Compute Engine VMs, App Engine apps, or systems running outside Google. [Learn more about service accounts.](#)

Organization policies can be used to secure service accounts and block risky service account features, such as automatic IAM Grants, key creation/upload, or the creation of service accounts entirely. [Learn more about service account organization policies.](#)

Filter	Email	Status	Name ↓	Description	Key ID	Key creation date	OAuth 2 Client ID	Actions
	<a href="mailto:guestbook@cloud-cs-530-karinje-vkarinje.iam.gserviceaccount.com">guestbook@cloud-cs-530-karinje-vkarinje.iam.gserviceaccount.com</a>	✓	guestbook		No keys		107542574826556315491	⋮
	<a href="mailto:791612085972-compute@developer.gserviceaccount.com">791612085972-compute@developer.gserviceaccount.com</a>	✓	Compute Engine default service account		No keys		117064574750626319369	⋮

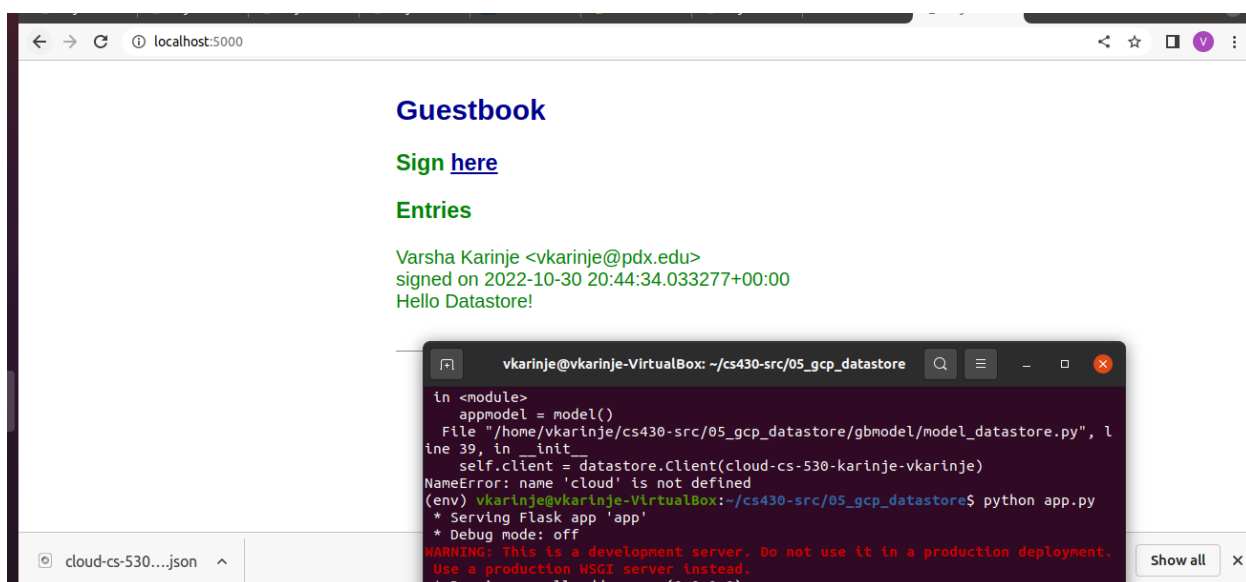
```

vkarinje@vkarinje-VirtualBox:~$ export GOOGLE_APPLICATION_CREDENTIALS=~/.Downloads/cloud-cs-530-karinje-vkarinje-85651247d058.json
vkarinje@vkarinje-VirtualBox:~$ env
SHELL=/bin/bash
SESSION_MANAGER=local/vkarinje-VirtualBox:@/tmp/.ICE-unix/17701,unix/vkarinje-VirtualBox:/tmp/.ICE-unix/17701
QT_ACCESSIBILITY=1
COLORTERM=truecolor
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
XDG_MENU_PREFIX=gnome-
GNOME_DESKTOP_SESSION_ID=this-is-deprecated
GNOME_SHELL_SESSION_MODE=ubuntu
SSH_AUTH_SOCK=/run/user/1000/keyring/ssh
XMODIFIERS=@im=ibus
DESKTOP_SESSION=ubuntu
SSH_AGENT_PID=17657
GTK_MODULES=gail:atk-bridge
PWD=/home/vkarinje
LOGNAME=vkarinje
XDG_SESSION_DESKTOP=ubuntu
XDG_SESSION_TYPE=x11
GOOGLE_APPLICATION_CREDENTIALS=/home/vkarinje/Downloads/cloud-cs-530-karinje-vkarinje-85651247d058.json

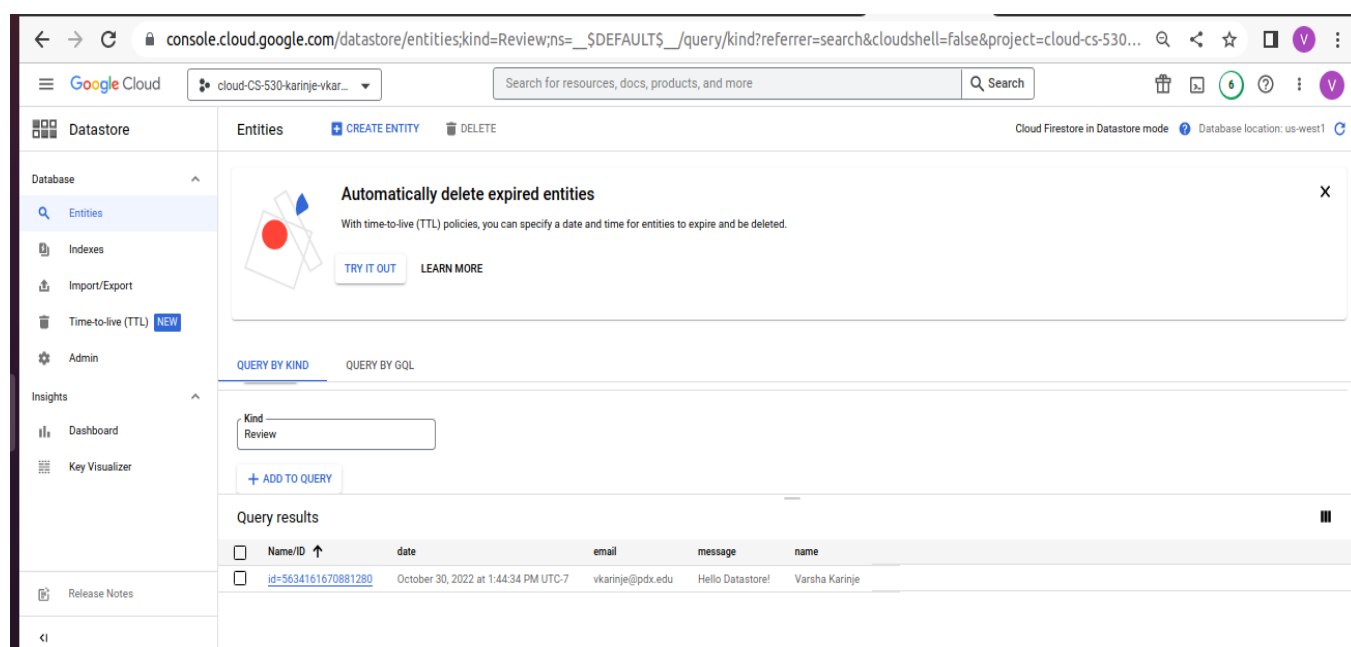
```

## Run the application

- Take a screenshot of the output for your lab notebook.



Then, from the web console for your cloud project, navigate to the Datastore service to find that this entity has been added to your "Review" kind as shown below.



Run the application

The terminal window shows the following commands and output:

```

vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ docker run -v $GOOGLE_APPLICATION_CREDENTIALS:/tmp/keys/cloud-cs-530-karinje-vkarinje-85651247d058.json:ro --env GOOGLE_APPLICATION_CREDENTIALS=/tmp/keys/cloud-cs-530-karinje-vkarinje-85651247d058.json -p 8000:8000 --env PORT=8000 --rm gcp_gb
[2022-10-31 21:14:56 +0000] [1] [INFO] Starting gunicorn 20.1.0
[2022-10-31 21:14:56 +0000] [1] [INFO] Listening at: http://0.0.0.0:8000 (1)
[2022-10-31 21:14:56 +0000] [1] [INFO] Using worker: gthread
[2022-10-31 21:14:56 +0000] [7] [INFO] Booting worker with pid: 7

```

The web browser shows a "Guestbook" application with the following content:

**Guestbook**

[Sign here](#)

**Entries**

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-31 21:23:02.741489+00:00  
Hello Docker Datastore!

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 20:44:34.033277+00:00  
Hello Datastore!

The Cloud Firestore console shows the following query results:

Name/ID	date	email	message	name
id=5071211717459968	October 31, 2022 at 2:23:02 PM UTC-7	vkarinje@pdx.edu	Hello Docker Datastore!	Varsha Karinje
id=5634161670881280	October 30, 2022 at 1:44:34 PM UTC-7	vkarinje@pdx.edu	Hello Datastore!	Varsha Karinje

Push the container image  
Examine the container image you've built to see its size.


```

vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
gcp_gb               latest             04313ac11780       17 hours ago       2.87GB
aws_gb               latest             b1098bd1d7f2       32 hours ago       144MB
vkarinje/aws_gb      latest             b1098bd1d7f2       32 hours ago       144MB
ubuntu               20.04             680e5dfb52c7       6 days ago         72.8MB
<none>               <none>            06dde268928d       8 days ago         59.6MB
google/cloud-sdk     latest             e368473a650a       13 days ago        2.83GB
python               alpine             880fc229346e       2 weeks ago        48.7MB
ubuntu               18.04             71cb16d32be4       3 weeks ago        63.1MB

```

hub.docker.com/r/vkarinje/gcp\_gb/tags

Explore vkarinje/gcp\_gb



**vkarinje/gcp\_gb** ☆
 Pulls 0

By [vkarinje](#) · Updated 4 minutes ago

Image

Overview **Tags**

Sort by Newest

TAG	DIGEST	OS/ARCH	COMPRESSED SIZE
<a href="#">latest</a>	<a href="#">d7bf1ab2f2c9</a>	linux/amd64	1.15 GB

Last pushed 4 minutes ago by [vkarinje](#)

`docker pull vkarinje/gcp_gb:lat...`

## Version 3: GCP Cloud Shell



Cloud Shell Editor

File Edit Selection View Go Run Terminal Help

EXPLORER

OPEN EDITORS

- model\_datastore.py M

GBMODEL

- \_\_init\_\_.py
- model\_datastore.py M
- model\_firestore.py
- model\_pylist.py
- model\_sqlite3.py
- Model.py

```

32
33 if isinstance(entity, list):
34     entity = entity.pop()
35     return [entity['name'], entity['email'], entity['date'], entity['message']]
36
37 class model(Model):
38     def __init__(self):
39         self.client = datastore.Client(['cloud-cs-530-karinje-vkarinje'])
40
41     def select(self):
42         query = self.client.query(kind = 'Review')
43         entities = list(map(from_datastore, query.fetch()))
44         return entities
45
46     def insert(self, name, email, message):
47         key = self.client.key('Review')
48         rev = datastore.Entity(key)
49         rev.update({

```

Ln 39, Col 72 LF UTF-8 Spaces: 4 Python

## Run the application

5000-cs-401029959521-default.cs-us-west1-wolo.cloudshell.dev

### Guestbook

[Sign here](#)

#### Entries

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-31 21:23:02.741489+00:00  
Hello Docker Datastore!

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 20:44:34.033277+00:00  
Hello Datastore!

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-31 23:54:31.594049+00:00  
Hello Cloud Shell!

vkarinje@vkarinje-VirtualBox: ~/cs430-src/05\_gcp\_datastore

```

latest: digest: sha256:d7bf1ab2f2c947f1bde54887245
378b58f13 size: 2425
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ git clone https://github.com/wu4f/cs430-src
Cloning into 'cs430-src'...
remote: Enumerating objects: 893, done.
remote: Counting objects: 100% (19/19), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 893 (delta 17), reused 15 (delta 15),
Receiving objects: 100% (893/893), 184.93 KiB | 4.8
Resolving deltas: 100% (461/461), done.
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ cd..
cd..: command not found
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ cd ..
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ git clone https://g
fatal: destination path 'cs430-src' already exists
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ ^C
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$ cd cs430-src/05_gcp_datastore
vkarinje@vkarinje-VirtualBox:~/cs430-src/05_gcp_datastore$

```

cloud-CS-530-karinje-vkar... data store X Search

Entities CREATE ENTITY DELETE Cloud Firestore in Datastore mode Database location: us-west1

**Automatically delete expired entities**  
With time-to-live (TTL) policies, you can specify a date and time for entities to expire and be deleted.  
[TRY IT OUT](#) [LEARN MORE](#)

QUERY BY KIND QUERY BY GQL

RUN CLEAR DOCUMENTATION

Kind  
Review  
[+ ADD TO QUERY](#)

Query results

<input type="checkbox"/>	Name/ID ↑	date	email	message	name
<input type="checkbox"/>	<a href="#">id=5071211717459968</a>	October 31, 2022 at 2:23:02 PM UTC-7	vkarinje@pdx.edu	Hello Docker Datastore!	Varsha Karinje
<input type="checkbox"/>	<a href="#">id=5634161670881280</a>	October 30, 2022 at 1:44:34 PM UTC-7	vkarinje@pdx.edu	Hello Datastore!	Varsha Karinje
<input type="checkbox"/>	<a href="#">id=5644004762845184</a>	October 31, 2022 at 4:54:31 PM UTC-7	vkarinje@pdx.edu	Hello Cloud Shell!	Varsha Karinje

## Configure service account

cloud-CS-530-karinje-vkar... VM X Search

VM instances CREATE INSTANCE IMPORT VM REFRESH START / RESUME STOP OPERATIONS HELP ASSISTANT HIDE INFO PANEL LEARN

INSTANCES INSTANCE SCHEDULES

Get monitoring and logging insights for your VMs by installing Ops Agent. [Learn more](#) DISMISS

VM instances are highly configurable virtual machines for running workloads on Google infrastructure. [Learn more](#)

Filter Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input type="checkbox"/>	✓	<a href="#">guestbook</a>	us-west1-b			10.138.0.17 (nic0)	<a href="#">35.203.128.46</a> (nic0)	SSH ▾

Select an instance

PERMISSIONS LABELS MONITORING

Please select at least one resource.

## Set up the instance

```

vkarinje@guestbook:~$ sudo docker run -p 80:80 --env PORT=80 vkarinje/gcp_gb
Unable to find image 'vkarinje/gcp_gb:latest' locally
latest: Pulling from vkarinje/gcp_gb
f606d8928ed3: Pull complete
b3bcc9486b94: Pull complete
d330bf6a71e6: Pull complete
fe0558a43a69: Pull complete
b808102dac4d: Pull complete
f82e2980e548: Pull complete
a8c58f6b744a: Pull complete
31eebb5cdd45: Pull complete
7983b37ac815: Pull complete
6d8a670cd678: Pull complete
Digest: sha256:d7bf1ab2f2c947f1bded54887245a01551d25060f59516b22de6f8a378b58f13
Status: Downloaded newer image for vkarinje/gcp_gb:latest
[2022-11-01 00:35:44 +0000] [1] [INFO] Starting unicorn 20.1.0
[2022-11-01 00:35:44 +0000] [1] [INFO] Listening at: http://0.0.0.0:80 (1)
[2022-11-01 00:35:44 +0000] [1] [INFO] Using worker: gthread
[2022-11-01 00:35:44 +0000] [7] [INFO] Booting worker with pid: 7

```

## Visit the application

Not secure | 35.203.128.46

**Guestbook**

[Sign here](#)

**Entries**

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-31 21:23:02.741489+00:00  
Hello Docker Datastore!

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-30 20:44:34.033277+00:00  
Hello Datastore!

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-10-31 23:54:31.594049+00:00  
Hello Cloud Shell!

---

Varsha Karinje <vkarinje@pdx.edu>  
signed on 2022-11-01 00:38:56.618939+00:00  
Hello Compute Engine!

---

vkarinje [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Activities Terminal Oct 31 17:40

vkarinje@vkarinje-VirtualBox: ~/cs430...

Cloning into 'cs430-src'...

remote: Enumerating objects: 893, done.

remote: Counting objects: 100% (19/19), done.

remote: Compressing objects: 100% (4/4), done.

remote: Total 893 (delta 17), reused 15 (delta 874)

Receiving objects: 100% (893/893), 184.93 KiB

one.

Resolving deltas: 100% (461/461), done.

vkarinje@vkarinje-VirtualBox: ~/cs430-src/05\_g

..

cd...: command not found

vkarinje@vkarinje-VirtualBox: ~/cs430-src/05\_g

..

vkarinje@vkarinje-VirtualBox: ~/cs430-src\$ cd

vkarinje@vkarinje-VirtualBox:~\$ git clone http

wu4f/cs430-src

f...tion path 'cs430-src' already e

Ubuntu Software togy

## View the database

[illegible]



