

# Cloud Computing (SOFE 4630U)

# **Project Milestone 2: Data Storage: KV + Relational**

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Due Date: February 2, 2025

#### **GitHub Link:**

https://github.com/rohanradadiya/Cloud-Computing-Project-MS-2

Video Link 1: https://youtu.be/Y4P54y7LERo Video Link 2: https://youtu.be/Fl31z1pZ5iA

#### **Screenshots:**

```
Cloud SHELL
Terminal (sodium-sublime-448820-jl) × + *

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to sodium-sublime-448820-jl.
Use 'goloud config set project [PROJECT ID]' to change to a different project.
Toharadadiya@cloudshell: (sodium-sublime-448820-jl) soloud config set compute/zone northamerica-northeast1-b
API [compute.googleapis.com] not enabled on project [sodium-sublime-448820-jl]. Would you like to enable and retry (this will take a few minutes)? (y/N)? y

Enabling service [compute.googleapis.com] on project [sodium-sublime-448820-jl]...
nn

Operation "operations/acf.p2-1030215290166-1e42d43f-7600-4515-8760-38197f052ee5" finished successfully.
WARNING: Property validation for compute/zone, was skipped.
Updated property (compute/zone).
roharadadiya@cloudshell:~ (sodium-sublime-448820-jl) $ nn
-hash: nn: command not found
roharadadiya@cloudshell:~ (sodium-sublime-448820-jl) $
```

```
reherassing@flowdselli: (restime smalline-448809-31) @ reload contains clusters create enti-6400 --me-redeer0
Mote: The Knote treatedly port (1255) is now deprecised. Flesse update your workload to use the recommended alternatives. See https://cloud.google.com/kubernetes-engine/docs/how-to/disable-kubelet-readonly-port for ways to check usage and for signation instructions.

Note: Your Food address range ('--cluster-jpyt-clar') can accommodate at most 1009 mode (0) ([bhormetes Control Blane is healthy)...dome.

Created [https://contains.googlepis.com/viprojects/godius-sublise-44820-j1/somes/monthmerics-northeasti-b/clusters/sofe4530u);
To inspect the contents of your cluster, go to: https://commode.cloud.google.com/kubernetes/workload_/goloud/morthmerics-northeasti-b/sofe4530u3project-sodium-sublise-44820-j1

Nacriza (Trial Address at-)

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```

```
roharadadiya@cloudshell:~/SOFE4630U-MS2/mySQL (sodium-sublime-448820-jl)$ mysql -uusr -psofe4630u -h34.47.52.145
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor. Commands end with; or \q.
Your MySQL connection id is 8
Server version: 8.0.32 MySQL Community Server - GPL

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> []
```

```
mysql> EXIT;
Bye
roharadadiya@cloudshell:~/SOFE4630U-MS2/mySQL (sodium-sublime-448820-j1)$
```

#### **Deploy Redis Using GKE:**

```
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis (sodium-sublime-448820-j1)$ kubectl get services

NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE
kubernetes ClusterIP 34.118.224.1 <none> 443/TCP 78m
mysql-service LoadBalancer 34.118.239.101 34.47.52.145 3306:30478/TCP 12m
redis LoadBalancer 34.118.238.121 34.47.49.77 6379:32170/TCP 72s
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis (sodium-sublime-448820-j1)$ redis-cli -h 34.47.49.77 -a sofe4630u
Warning: Using a password with '-a' or '-u' option on the command line interface may not be safe.

34.47.49.77:6379> []
```

```
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis (sodium-sublime-448820-j1)$ redis-cli -h 34.47.49.77 -a sofe4630U
Warning: Using a password with '-a' or '-u' option on the command line interface may not be safe.

34.47.49.77:6379> select 0
OK
34.47.49.77:6379> set var 100
OK
34.47.49.77:6379> get var
"100"
34.47.49.77:6379> keys *
1) "var"
34.47.49.77:6379> keys *
1) "var"
34.47.49.77:6379> keys *
(empty array)
34.47.49.77:6379> exit
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis (sodium-sublime-448820-j1)$
```

```
Downloading redis-5.2.1-py3-none-any.whl.metadata (9.1 kB)

Downloading redis-5.2.1-py3-none-any.whl (261 kB)

Image sentya@cloudshell:-/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1)$ python SendImage.py

roharadadiya@cloudshell:-/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1)$
```

```
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis (sodium-sublime-448820-j1)$ pip install redis

Defaulting to user installation because normal site-packages is not writeable

Collecting redis

Downloading redis-5.2.1-py3-none-any.whl.metadata (9.1 kB)

Downloading redis-5.2.1-py3-none-any.whl (261 kB)

redis-cli -h 34.47.49.77 -a sofe4630u keys *

Warning: Using a password with '-a' or '-u' option on the command line interface may not be safe. 49.77 -a sofe4630u keys *

(error) ERR wrong number of arguments for 'keys' command

Warning: Using a password with '-a' or '-u' option on the command line interface may not be safe. 49.77 -a sofe4630u keys '*'

Warning: Using a password with '-a' or '-u' option on the command line interface may not be safe. 49.77 -a sofe4630u keys '*'

I) "OntarioTech"

Image recieved, check //recieved.jpgMS2/Redis/code (sodium-sublime-448820-j1) % 1s -ln ReceiveImage.py

total 1016ya@cloudshell:-/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1) % 1s -l

-rw-rw-r-- 1 roharadadiya roharadadiya 275 Jan 30 21:21 ReceiveImage.py

-rw-rw-r-- 1 roharadadiya roharadadiya 275 Jan 30 21:21 ReceiveImage.py

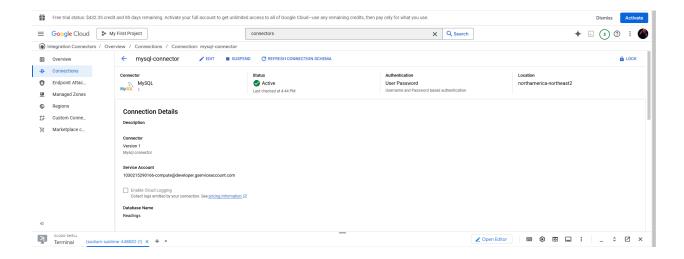
rw-rw-r-- 1 roharadadiya roharadadiya 246 Jan 30 21:21 ReceiveImage.py

roharadadiya@cloudshell:-/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1) $

Image recieved.jpg

-rw-rw-r-- 1 roharadadiya roharadadiya 275 Jan 30 21:21 ReceiveImage.py

rw-rw-r-- 1 roharadadiya roharadadiya 246 Jan 30 21:21 ReceiveImage.py
```



```
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1) $ mysql -uusr -psofe4630u -h 34.47.52.145 mysql: [Warning] Using a password on the command line interface can be insecure.

Welcome to the MySQL monitor. Commands end with ; or \g.

Your MySQL connection id is 22

Server version: 8.0.32 MySQL Community Server - GPL

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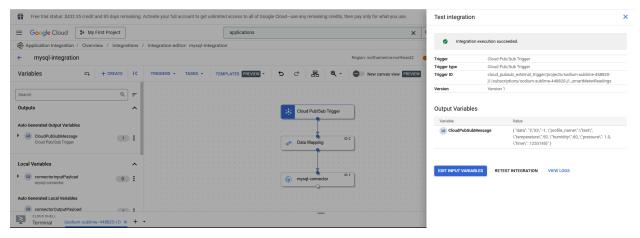
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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

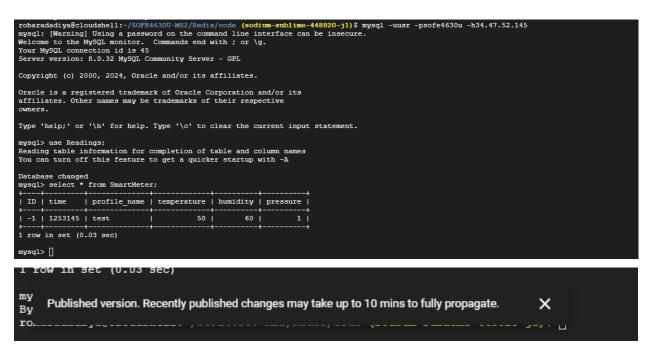
mysql> USE Readings;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A
```

```
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1)$ gcloud pubsub topics create smartMeterReadings Created topic [projects/sodium-sublime-448820-j1/topics/smartMeterReadings].
roharadadiya@cloudshell:~/SOFE4630U-MS2/Redis/code (sodium-sublime-448820-j1)$
```

# **Created topic smartMeterReadings:**



## Integration execution succeeded.



Published/deployed the integration.

```
PS C:\Users\normalized because rost and site-packages is not writeable
Collecting numpy
Downloading numpy-2.2.2-cp312-cp312-win_amd64.whl .metadata (60 k8)
Downloading numpy-2.2.2-cp312-cp312-win_amd64.whl .metadata (60 k8)
Downloading numpy-2.2.2-cp312-cp312-win_amd64.whl .liz.6 k8)

Installing collected packages: numpy
II.6.612.6 k8 5.4 k8/s et a 8:08:08

Installing collected packages: numpy
WMRIMS: The scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\roban\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are installed in 'C:\Users\robansis packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages in the scripts 7gyr.exe and numpy-config.exe are not packages and numpy-config.exe are n
```

# Messages being published successfully.

```
Downloading opentelemetry_semantic_conventions-0.50b0-py3-none-any.whl (166 kB)

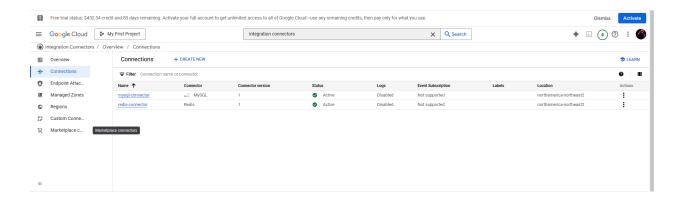
Installing collected packages: opentelemetry-semantic-conventions, opentelemetry-sdk, google-cloud-pubsub
Successfully installed google-cloud-pubsub-2.27.3 opentelemetry-sdk-1.29.0 opentelemetry-semantic-conventions-0.50b0
Toharadadiya@cloudshell:-/SOFE4630U-Ms2/MySQL-connector (sodium-sublime-448820-j1)$ python3 smartMeter.py

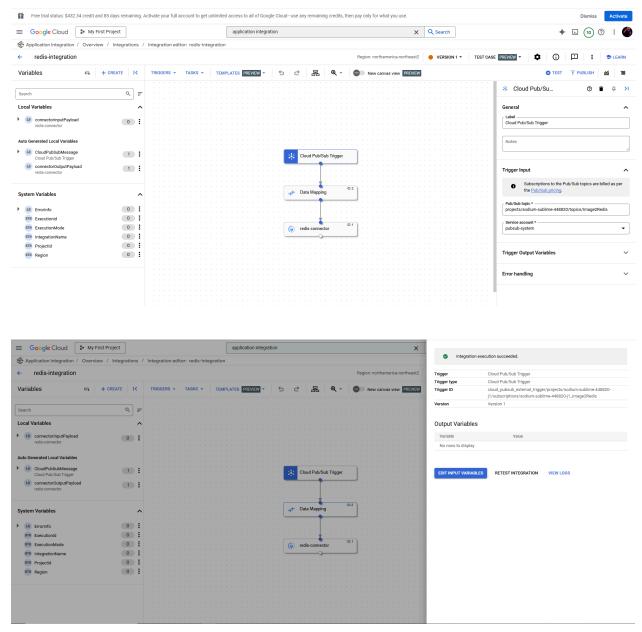
Traceback (most recent call last):

-connector/smartMeter.py", line 12, in <module>

"]=files[0];
connector (sodium-sublime-448820-j1)$ [
```

### It was unpublished after, as instructed to save credits on the account.





The final integration passed successfully.

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to sodium-sublime-448820-j1.
Use 'gcloud config set project [RONDECT ID] 'to change to a different project.
roharsdadiya@cloudshell: '(sodium-sublime-448820-j1) Fredis-cli 'h <Redis-IP> -a sofef630u
-hash: Redis-IP: No such file or directory
roharsdadiya@cloudshell: '(sodium-sublime-448820-j1) Rubbectl get services
NAME TYPE CLUSTRE-IP EXTENDAL-IP PORT(S) AGE
Rubbernetes ClusterIP 34.118.239.101 34.47.52.145 3306:30478/TCP 20h
redis LoadSalancer 34.118.239.101 34.47.49.77 6378:32170/TCP 19h
roharsdadiya@cloudshell: '(sodium-sublime-448820-j1) Fedis-cli -h 34.7.49.77 -a sofe6630u
Marning: Using a password with '-a' or '-u' option on the command line interface may not be safe.
34.47.49.77:6379> get test
*1234
34.47.49.77:6379> exit
roharadadiya@cloudshell: '(sodium-sublime-448820-j1) S []

Created secret 'redis-password' and added an initial version with the requested payload

X

Created secret 'redis-password' and added an initial version with the requested payload
```

```
PS C:\Users\rohan\Documents\CCMilestone2> python produceImage.py
Published messages with ordering keys to projects/sodium-sublime-448820-j1/topics/Image2Redis.
The messages has been published successfully
WARNING: All log messages before absl::Initializelog() is called are written to STDERR
E0000 00:00:1738343152.217504 20804 init.cc:232] grpc_wait_for_shutdown_with_timeout() timed out.

PS C:\Users\rohan\Documents\CCMilestone2>
```

```
PS C:\Users\rohan\Documents\COMilestone2> pip install redis
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: redis in c:\users\rohan\appdata\romaning\python\python312\site-packages (5.2.1)
PS C:\Users\rohan\Documents\COMilestone2> python ReceiveImage.py
Error: Image key not found in Redis.
PS C:\Users\rohan\Documents\COMilestone2> python produceImage.py
Published messages with ordering keys to projects/sodium-sublime-448820-j1/topics/Image2Redis.
Ph messages has been published successfully
WARNING: All log messages before absl::Initialize.og() is called are written to STDERR
F00000 00:00:01738340860 462000 11816 init.cc:232] grpc_wait_for_shutdown_with_timeout() timed out.
PS C:\Users\rohan\Documents\COMilestone2> python ReceiveImage.py

Image received, check ./received.jpg

PS C:\Users\rohan\Documents\COMilestone2>
PS C:\Users\rohan\Documents\COMilestone2>
```

#### produceImage.py and ReceiveImage.py files functioning as required.

#### **Discussion:**

#### 1. What's the difference between Source and Sink connectors?

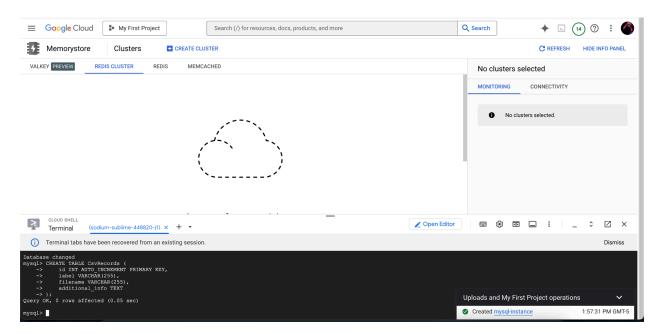
The main difference between a source connector and sink connector is that the source connector pulls data from external sources into the system, while the sink connector pushes data from the system to the external areas. For example, to ingest data from a MySQL database to put it somewhere else, you would use a source connector, whereas for a sink connector, you would use it to write the data from a topic to a SQL database.

#### 2. What's the applications of the connectors?

Connectors have many applications, such as data ingestion, to export data, for application integrations, etc. There are numerous applications of connectors.

# **Design:**

## New database and newly-created aspects:



```
Once finished, enter the verification code provided in your browser:
ERROR: There was a problem with web authentication.

BRROR: (gcloud.auth.login) Please supply either code or authorization_response parameters.

roharadadiya@cloudshell:~ (sodium-sublime-448820-j1)$ gcloud config set project sodium-sublime-448820-j1
Updated property [core/project].
opunted projectly [cost/project]. roharadadiya@cloudshell:~ (sodium-sublime-448820-j1)$ gcloud sql connect mysql-instance --user=root --quiet Allowlisting your IP for incoming connection for 5 minutes...done.

Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 40157
Server version: 8.0.37-google (Google)
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affiliates. Other names may be trademarks of their respective
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
mysql> CREATE DATABASE IF NOT EXISTS my_database;
Query OK, 1 row affected (0.05 sec)
mysql> USE my database;
 mysql> CREATE TABLE IF NOT EXISTS labels_records (
-> id INT AUTO INCREMENT PRIMARY KEY,
                Timestamp INT,
Carl Location X FLOAT,
Carl Location Y FLOAT,
Carl Location Z FLOAT,
Carl Location X FLOAT,
      ->
                 Car2_Location_Y FLOAT,
Car2_Location_Z FLOAT,
                 pedestrianLocationX_TopLeft INT,
pedestrianLocationY_TopLeft INT,
pedestrianLocationX_BottomRight INT,
      ->
                 pedestrianLocationY_BottomRight INT
      -> );
Query OK, 0 rows affected (0.06 sec)
mysql>
```

```
## Saport Cay

import time

1  # Search the current directory for the 350% file (daclading the service account key)

9  # to set the GOOGLE APPLICATION_CROBENTIALS environment variable.

10  # Files = plan, plant**. 5sco**

10  # Files = plan, plant**. 5sco**

PROBLEMS  ● OUTPUT DEBUG CONSOLE INDAMANA PORTS

| Posting | A new release of pip is available: 24.2 -> 24.3.1

PS C:\Users\rohan\Documents\COMilestonc> python SmartVeter.py

> Python was not found; run without arguments to install from the Microsoft Store, or disable this shortcut from Settings > Manage App Execution Aliases.

PS C:\Users\rohan\Documents\COMilestonc> python smartVeter.py

> Python san not found; run without arguments to install from the Microsoft Store, or disable this shortcut from Settings > Manage App Execution Aliases.

PS C:\Users\rohan\Documents\COMilestonc> python smartVeter.py

| Python 3.12.6
| Python 3.12.6
| Python 3.12.6
| Proceback (most recent call last):

| File 'C:\Users\rohan\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Documents\COMilestonc>\Docum
```

```
(vmv) PS C:Ubers/vohan/Documents/COEllestone2> python mysql_subscriber.py
Listening for messages on projects/sodium-sublime-448220-jl/subscriptions/csv@ecordsSQL-subscription...
Received message: bf 'Timestamp': 1736779604, 'Carl_Location_Y': -53.42165716, 'Carl_Location_Y': 143.0, 'Carl_Location_Z': 0.596902, 'Cacl_Location_X': -59.66908856, 'Car2_Location_Y': 140.0, 'Car2_Location_Z': 0.596902, 'Cacl_Location_X': -59.66908856, 'Car2_Location_Y': 140.0, 'Car2_Location_X': -59.66908856, 'Car2_Location_X': -59.6690856, 'Car2_Location_X': -59.6690856, 'Car2_Location_X': -59.6690856, 'Car2_Location_X': -59.6690856, 'Car2_Location_X': -59.6690856, 'Car2_Location_X': -59.669
```

```
prop processing excessing 203 (1909a); tota connection to MySQ, server during query (vern) PS C.NUsers/voham/Decuments/CONILestone22 bython cay produces, my orbital set one 25 bython cay produces, my orbital set of the project / solid set of the project
```

Clearly, the steps in the design section of the milestone are completed and the functionality is working as expected.