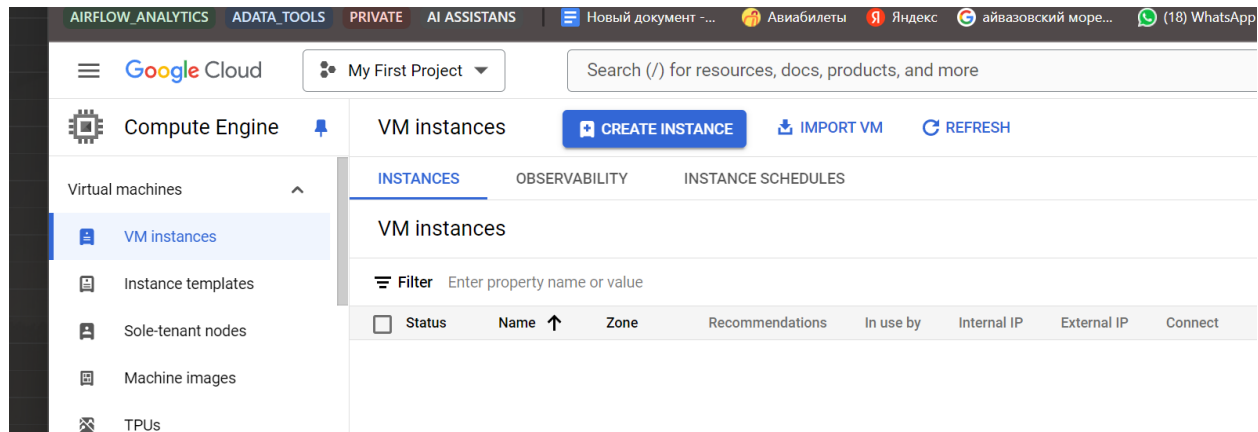


EXERCISE 3 (Exercises are unordered)

- What steps did you follow to create the VM?

Created using Compute Engine



With basic configurations

Machine configuration

NEW: Google Axion virtual machines in Preview ✕

Try Google Axion Arm-based Processors. Sign up for early access now [SIGN UP](#)

General purpose
Compute optimized
Memory optimized
Storage optimized
GPUs

Machine types for common workloads, optimized for cost and flexibility

	Series ?	Description	vCPUs ?	Memory ?	Platform
<input type="radio"/>	C4	Consistently high performance	2 - 192	4 - 1,488 GB	Intel Emerald Rapids
<input type="radio"/>	N4	Flexible & cost-optimized	2 - 80	4 - 640 GB	Intel Emerald Rapids
<input type="radio"/>	C3	Consistently high performance	4 - 192	8 - 1,536 GB	Intel Sapphire Rapids
<input type="radio"/>	C3D	Consistently high performance	4 - 360	8 - 2,880 GB	AMD Genoa
<input checked="" type="radio"/>	E2	Low cost, day-to-day computing	0.25 - 32	1 - 128 GB	Based on availability

- How did you connect to the VM, and what commands did you use to install the web server?

Connect to the VM using SSH

And installed apache with “sudo apt update && sudo apt -y install apache2”

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
kassym914@instance-20240926-164522:~$ sudo apt update && sudo apt -y install a
apache2
Get:1 file:/etc/apt/mirrors/debian.list Mirrorlist [30 B]
Get:5 file:/etc/apt/mirrors/debian-security.list Mirrorlist [39 B]
Get:7 https://packages.cloud.google.com/apt google-compute-engine-bookworm-sta
ble InRelease [1321 B]
Get:2 https://deb.debian.org/debian bookworm InRelease [151 kB]
Get:3 https://deb.debian.org/debian bookworm-updates InRelease [55.4 kB]
Get:8 https://packages.cloud.google.com/apt cloud-sdk-bookworm InRelease [1654
B]
Get:4 https://deb.debian.org/debian bookworm-backports InRelease [59.0 kB]
Get:6 https://deb.debian.org/debian-security bookworm-security InRelease [48.0
kB]
Get:9 https://packages.cloud.google.com/apt google-compute-engine-bookworm-sta
```

```
Processing triggers for man-db (2.11.2-2) ...
Processing triggers for libc-bin (2.36-9+deb12u8) ...
kassym914@instance-20240926-164522:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: en
   Active: active (running) since Thu 2024-09-26 16:49:53 UTC; 40s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 1880 (apache2)
     Tasks: 55 (limit: 2344)
    Memory: 10.9M
       CPU: 55ms
    CGroup: /system.slice/apache2.service
            └─1880 /usr/sbin/apache2 -k start
              └─1881 /usr/sbin/apache2 -k start
                └─1882 /usr/sbin/apache2 -k start

Sep 26 16:49:53 instance-20240926-164522 systemd[1]: Starting apache2.service>
Sep 26 16:49:53 instance-20240926-164522 systemd[1]: Started apache2.service >
log file: 
```

- What happens to the VM and its data when it is stopped versus when it is deleted?

Stop instance-20240926-164522?

You'll be billed only for these preserved resources:

- Persistent disks
- Static IP addresses

The VM will gracefully shut down in 90 seconds. If processes are still running, the VM will be forced to stop and files may get corrupted.

[CANCEL](#) [STOP](#)

Connection Failed

You cannot connect to the VM instance because of an unexpected error.
Wait a few moments and then try again.

[See troubleshooting docs.](#)

[Retry](#) [Troubleshoot](#)

When instance is stopped then:

Connection fails

But data is saved

Delete instance-20240926-164522?

Are you sure you want to delete instance `instance-20240926-164522`?

This will delete boot disk `instance-20240926-164522`

CANCEL

DELETE

billing

When instance Is deleted:

Data is lost

Exercise 5

Filter

Filter buckets

Name

↑

Default storage class

Last modified

Public access

Access control

assignment1kassym

Standard

Sep 26, 2024, 11:33:15 PM

Subject to object ACLs

Fine-grained

OBJECTS

CONFIGURATION

PERMISSIONS

PROTECTION

LIFECYCLE

OBSERVABILITY

INVENTORY REPORTING

Folder browser

assignment1kassym

Buckets

>

assignment1kassym

CREATE FOLDER

UPLOAD

TRANSFER DATA





Filter by name prefix only

Filter

Filter objects and folders

Show


Live objects only

	Name	Size	Type	Created	
	 SP-Stan-Stand-28_800x.png	24.7 KB	image/png	Sep 26, 2024	
	 test.txt	18 B	text/plain	Sep 26, 2024	

Public access

Subject to object ACLs

One or more objects in this bucket could be public to the internet if they grant access to **allUsers** or **allAuthenticatedUsers**. Check each object's permissions to see if they are public.

To streamline permissions, you can switch to uniform access control. If objects should never be publicly accessible, you should also prevent public access to this bucket. [Learn more](#) 

[PREVENT PUBLIC ACCESS](#)

Access control

Fine-grained: Object-level ACLs enabled

[SWITCH TO UNIFORM](#)

Edit or delete roles below, or select "Add Principal" to grant new access.

 [ADD PRINCIPAL](#)

☒ [Show inherited](#) roles in table

Move object

Source object path

assignment1kassym/SP-Stan-Stand-28_800x.png

Destination *



assignment1kassym/folder1/

BROWSE

☒ Keep source permissions ?

☐ Use default permissions at destination ?

✓ GSUTIL EQUIVALENT

MOVE

CANCEL

Delete 1 object?

Because a soft-delete policy is enabled for this bucket, deleted objects will be kept in a soft-deleted state for 7 days before being permanently deleted. While objects are in a soft-deleted state, they can be restored.

[CANCEL](#)

[DELETE](#)

Exercise 6

kassym_tets

QUERYSHARECOPYSNAPSHOTDELETEEXPORTREFRESH

<

SCHEMA

DETAILS

PREVIEW

TABLE EXPLORER

PREVIEW

INSIGHTS

LINEAGE

DATA PROFILE

DATA

>

Filter

Enter property name or value

	Field name	Type	Mode	Key	Collation	Default Value	Policy Tags	Description
<input type="checkbox"/>	year	INTEGER	NULLABLE	-	-	-	-	-
<input type="checkbox"/>	name	STRING	NULLABLE	-	-	-	-	-

EDIT SCHEMA

VIEW ROW ACCESS POLICIES

Job history

DEEDERL

Edit Schema

Current schema

ADD POLICY TAG

Filter

Enter property name or value

	Field name	Type	Mode	Collation	Default Value	Policy Tags	Description
No results to display							

New fields

☐ Edit as text

1

Field name *

year

Type *

INTEGER

Mode

NULLABLE

Description

2

Field name *

name

Type *

STRING

Mode

NULLABLE

Max length

Description

3

+

SAVE

CLOSE

Explorer + ADD IK

Search BigQuery resources

Viewing resources.
SHOW STARRED ONLY

- assignment1-436117 ☆
- kaspi-mobile ☆
 - Workflows
 - External connections
 - T_KASPI_TEST_DATA ☆
 - t_kaspi_test_data ☆

SUMMARY

Nothing currently selected

Untitled query RUN SAVE DOWNLOAD SHARE SCHEDULE OPEN IN MORE Query c

```
1 SELECT * FROM `kaspi-mobile.T_KASPI_TEST_DATA.t_kaspi_test_data` LIMIT 1000
```

Query results SAVE RESULTS EXPLORE DATA

Row	event_ts	fork	event_name	searcher_uid	searcher_city_name
1	2023-08-10T08:03:21	control	text_query_searched	45f0##2d72992fb19f##87cfd2...	kz/kg/karagande
2	2023-08-21T16:15:22	control	text_query_searched	4121##4163128c40ba##2dbc...	kz/alm/almaty
3	2023-08-30T03:15:18	control	text_query_searched	41C9##22673382BBEF##E05...	kz/alm/almaty
4	2023-08-12T11:44:08	test	text_query_searched	4100##F675ECFBF318##C514...	kz/akm/astana
5	2023-08-20T19:57:12	test	text_query_searched	41AB##F66A587539F4##B52...	kz/akm/astana
6	2023-08-04T07:54:53	test	text_query_searched	47E5##37EDD90CE900##73A...	kz/alm/almaty

assignment1 Search (/) for resources, docs, products, and more Search

Explorer + ADD IK

Search BigQuery resources

Viewing resources.
SHOW STARRED ONLY

- assignment1-436117 ☆
- kaspi-mobile ☆
 - Workflows
 - External connections
 - T_KASPI_TEST_DATA ☆
 - t_kaspi_test_data ☆

SUMMARY

Nothing currently selected

Untitled query RUN SAVE DOWNLOAD SHARE SCHEDULE OPEN IN MORE

```
1 SELECT searcher_city_name, count(*) FROM `kaspi-mobile.T_KASPI_TEST_DATA.t_kaspi_test_data` group by searcher_city_n
```

Query results SAVE RESULTS EXPLORE DATA

Row	searcher_city_name	f0	f1
51	kz/alm/zhapek-batyr	19	Kassym, in case you need som...
52	kz/sko/sergeevka	33	Kassym, in case you need som...
53	kz/alm/verhnyaya-kamenka	25	Kassym, in case you need som...
54	kz/alm/elaman	17	Kassym, in case you need som...
55	kz/kos/kamysty	19	Kassym, in case you need som...
56	kz/akt	3	Kassym, in case you need som...

Visualizing

Query results

[SAVE](#)[JOB INFORMATION](#)[RESULTS](#)[CHART](#)[JSON](#)[EXECUTION DETAILS](#)[EXECUTION GRAPH](#)

rank by Day



Job history

Отчеты Looker Studio - 26.09.2024, 23:56

Файл Изменить Просмотреть Вставить Страница Упорядочить Ресурс Справка

[Добавить страницу](#) [Добавить данные](#) [Добавить диаграмму](#) [Добавить элемент управ](#)

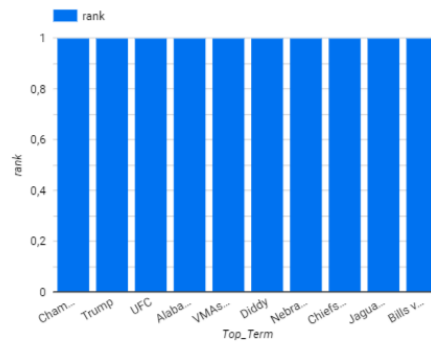
[+ Добавить быстрый фильтр](#)

[Сбросить](#)

top_terms

	Top_Term	rank
1.	Champions League	1
2.	Trump	1
3.	UFC	1
4.	Alabama football	1
5.	VMAs 2024	1
6.	Diddy	1
7.	Nebraska football	1
8.	Chiefs vs Falcons	1
9.	Jaguars vs Bills	1
10.	Bills vs Dolphins	1
11.	Hezbollah	1

1 - 13 / 13



EXERCISE 4

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to assignment1-436117.
Use "gcloud config set project (PROJECT_ID)" to change to a different project.
kassym914@cloudshell:~ (assignment1-436117) $ git clone https://github.com/GoogleCloudPlatform/kubernetes-engine-samples; cd kubernetes-engine-samples/quickstarts/hello-app
Cloning into 'kubernetes-engine-samples'...
remote: Enumerating objects: 11746, done.
remote: Counting objects: 100% (1793/1793), done.
remote: Compressing objects: 100% (434/434), done.
remote: Total 11746 (delta 1484), reused 1541 (delta 1332), pack-reused 9953 (from 1)
Receiving objects: 100% (11746/11746), 6.92 MiB | 4.11 MiB/s, done.
Resolving deltas: 100% (2363/2363), done.
kassym914@cloudshell:~ (assignment1-436117) $ export PROJECT_ID=assignment1-436117
kassym914@cloudshell:~ (assignment1-436117) $ echo $(PROJECT_ID)
assignment1-436117
kassym914@cloudshell:~ (assignment1-436117) $ gcloud artifacts locations list
LOCATIONS: africa-south1

LOCATIONS: asia

LOCATIONS: asia-east1

LOCATIONS: asia-east2

LOCATIONS: asia-northeast1

LOCATIONS: asia-northeast2
```

```
LOCATIONS: us-west1

LOCATIONS: us-west4
kassym914@cloudshell:~ (assignment1-436117) $ export REGION=us-west1
kassym914@cloudshell:~ (assignment1-436117) $ gcloud artifacts repositories create hello-repo --repository-format=docker --location=$(REGION) --description="Docker repository"
Create request issued for: [hello-repo]
Waiting for operation [projects/assignment1-436117/locations/us-west1/operations/43d41fab-54d0-45a7-b0ca-12ec66c44a7b] to complete....done.
Created repository [hello-repo].
kassym914@cloudshell:~ (assignment1-436117) $ docker build -t $(REGION)-docker.pkg.dev/$(PROJECT_ID)/hello-repo/hello-app:v1 .
[+] Building 45.3s (13/13) FINISHED
=> [internal] load build definition from Dockerfile                                0.0s
=> => transferring Dockerfile: 93B                                              0.0s
=> WARN: FromAsCasing: 'aa' and 'FROM' keywords' casing do not match (line 16)  0.0s
=> [internal] load metadata for gcr.io/distroless/base-debian11:latest          1.2s
=> [internal] load metadata for docker.io/library/golang:1.21.0                4.5s
=> [internal] load .dockerignore                                                0.0s
=> => transferring context: 2B                                                  0.0s
=> [builder 1/5] FROM docker.io/library/golang:1.21.0sha256:b490ae1f0ce153648d3c5d2b5e59a63f966b5f9e1311245c947de4506981aa 20.7s
=> => resolve docker.io/library/golang:1.21.0sha256:b490ae1f0ce153648d3c5d2b5e59a63f966b5f9e1311245c947de4506981aa 0.0s
=> => sha256:b490ae1f0ce153648d3c5d2b5e59a63f966b5f9e1311245c947de4506981aa 2.36kB / 2.36kB 0.0s
=> => sha256:b490ae1f0ce153648d3c5d2b5e59a63f966b5f9e1311245c947de4506981aa 49.50MB / 49.50MB 1.1s
=> => sha256:12359f96c430770039594ab88e6c87c0d2543f7b0907bf5443a5104270f404f 1.58kB / 1.58kB 0.0s
=> => sha256:43a1905832963d3ddafdfb5a5f329a0c0b78a3529c9d57259f0888e0fab373 7.06kB / 7.06kB 0.0s
=> => sha256:3d1b0196ecf04dfc78eca9d7b5d22f3c36a29f54ee88bd4e61b85539ae52 24.03MB / 24.03MB 0.7s
=> => sha256:261f514c2027597e2b20cf09a842e97f920a59ee374521e153c4d853462f 64.11MB / 64.11MB 1.4s
=> => sha256:2f744fb50e0cfa7e56d42f6f0776b4b6041b65af9435c1982e6cd5a477047652 92.27MB / 92.27MB 2.5s
=> => extracting sha256:b490ae1f0ce153648d3c5d2b5e59a63f966b5f9e1311245c947de4506981aa 3.6s
```

```
=> exporting to image
=> => exporting layers
=> => writing image sha256:f27edba7ac050f22033e4292998644553df658dab0a994b6821c08adfffb51
=> => naming to us-west1-docker.pkg.dev/assignment1-436117/hello-repo/hello-app:v1

2 warnings found (use docker --debug to expand):
- FromAsCasing: 'aa' and 'FROM' keywords' casing do not match (line 16)
- LegacyKeyValueFormat: "ENV key=value" should be used instead of legacy "ENV key value" format (line 25)
kassym914@cloudshell:~ (assignment1-436117) $ docker images
REPOSITORY                                TAG      IMAGE ID      CREATED      SIZE
us-west1-docker.pkg.dev/assignment1-436117/hello-repo/hello-app    v1       f27edba7ac    11 seconds ago    27.3MB
kassym914@cloudshell:~ (assignment1-436117) $ gcloud services enable artifactregistry.googleapis.com
kassym914@cloudshell:~ (assignment1-436117) $ gcloud auth configure-docker $(REGION)-docker.pkg.dev
WARNING: Your config file at [/home/kassym914/.docker/config.json] contains these credential helper entries:
{
  "credHelpers": {
    "gcr.io": "gcloud",
    "us.gcr.io": "gcloud",
    "eu.gcr.io": "gcloud",
    "asia.gcr.io": "gcloud",
    "staging-k8s.gcr.io": "gcloud",
    "marketplace.gcr.io": "gcloud",
    "africa-south1-docker.pkg.dev": "gcloud",
    "asia-docker.pkg.dev": "gcloud",
    "asia-east1-docker.pkg.dev": "gcloud",
    "asia-east2-docker.pkg.dev": "gcloud",
    "asia-northeast1-docker.pkg.dev": "gcloud",
  }
}
```

```
"docker.us-west4.rep.pkg.dev": "gcloud",
"us-west8-docker.pkg.dev": "gcloud",
"us-east7-docker.pkg.dev": "gcloud",
"docker.us-east7.rep.pkg.dev": "gcloud"
}
Adding credentials for: us-west1-docker.pkg.dev
gcloud credential helpers already registered correctly.
kassym914@cloudshell:~ (assignment1-436117) $ docker push $(REGION)-docker.pkg.dev/$(PROJECT_ID)/hello-repo/hello-app:v1
The push refers to repository [us-west1-docker.pkg.dev/assignment1-436117/hello-repo/hello-app]
20c1dcac21b0: Pushed
6835249f577a: Pushed
24aacbf97031: Pushed
8451c71f8c1e: Pushed
2388d21e8e2b: Pushed
c048279a7d9f: Pushed
```

155

OVERVIEW

OBSERVABILITY

COST OPTIMIZATION

Filter

Enter property name or value

?

≡

<input type="checkbox"/> Status	Name ↑	Location	Number of nodes	Total vCPUs	Total memory	Notifications	Labels
<input type="checkbox"/>	deployment-1-cluster	us-west1					— ⋮
<input type="checkbox"/>	hello-cluster	us-west1					— ⋮

Tu
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What's

Cle

Is system object : False Filter workloads

Name	Status	Type	Pods	Namespace	Cluster
deployment-1	OK	Deployment	1/1	default	deployment-1-cluster

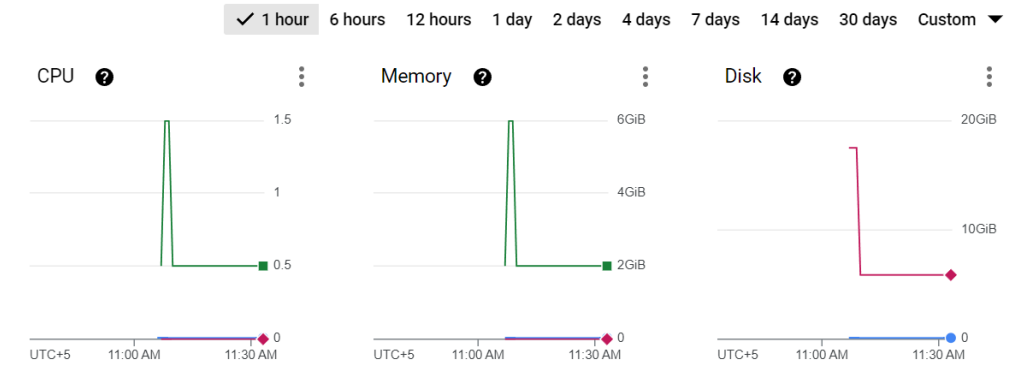
deployment-1

Set up an automated pipeline for this workload

SET UP DISMISS

To let others access your deployment, expose it to create a service

EXPOSE



Cluster	deployment-1-cluster
Namespace	default
Labels	app: hello-app
Logs	Container logs, Audit logs
Replicas	1 updated, 1 ready, 1 available, 0 unavailable
Pod specification	Revision 1, containers: hello-app-sha256-1
Horizontal Pod Autoscaler	OK
Vertical Pod Autoscaler	Not configured


Active revisions


Revision	Name	Status	Summary
1	deployment-1-d969f86bc	OK	hello-app-sha256-1: us-west1-docker.pkg.dev/assignment1-436117/hello-repo/hello-app@sha256:f190abddceb7f0dff45992f72e0ff663664cb019e494ec5b80619361e7

deployment-1

Waiting for load balancer with external IP



 Creating new service

 Waiting for load balancer with external IP

 [HIDE ALL STEPS](#)

then created repo by:

```
gcloud artifacts repositories create hello-repo \
  --repository-format=docker \
  --location=${REGION} \
  --description="Docker repository"
```

Then built it:

```
docker build -t ${REGION}-docker.pkg.dev/${PROJECT_ID}/hello-repo/hello-
app:v1 .
```

and pushed:

```
docker push ${REGION}-docker.pkg.dev/${PROJECT_ID}/hello-repo/hello-
app:v1
```

○ How did you verify that your application was successfully deployed and accessible?

got external IP

Region and PROJECT_ID assigned before

Exercise 1:

1. IaaS (Infrastructure as a Service)

- **Compute Engine:** Provides virtual machines and is highly customizable for infrastructure needs.
- **Cloud Storage:** Scalable object storage for any kind of data.

2. PaaS (Platform as a Service)

- **App Engine:** Fully managed platform for building and deploying scalable applications without managing infrastructure.
- **BigQuery:** Managed data warehouse optimized for large-scale data analytics.
- **Cloud Datastore:** NoSQL document database for web and mobile apps.
- **Cloud SQL:** Managed relational database service supporting MySQL, PostgreSQL, and SQL Server.

3. SaaS (Software as a Service)

- **Google Workspace (formerly G Suite):** Productivity tools including Gmail, Docs, Drive, and Calendar.
- **Google Cloud Identity:** Identity and access management platform.
- **Looker:** Business intelligence and data analytics platform for visualizing and analyzing data.
- **Google Maps Platform:** Location services for integrating real-time maps, geocoding, and routing into apps.

○ **Provide a real-world example where each cloud service model might be the most appropriate choice.**

1. IaaS (Infrastructure as a Service)

Scenario:

A large e-commerce company, such as **Amazon**, needs to build a highly customized website with full control over the infrastructure to handle fluctuating traffic, manage large-scale databases, and provide real-time analytics.

2. PaaS (Platform as a Service)

Scenario:

A startup developing a mobile app, such as **Instagram**, needs to focus on building and deploying their app without worrying about managing infrastructure. They want quick development and deployment cycles to stay agile.

3. SaaS (Software as a Service)

Scenario:

A large corporation, such as **Deloitte**, requires seamless communication and collaboration tools for their global workforce. They need software for email, document collaboration, video conferencing, and file storage.

EXERCISE 2

What is the primary use case of Compute Engine?

Compute Engine provides scalable virtual machines (VMs) that run on Google's infrastructure. It allows users to deploy and run custom applications in the cloud with complete control over the operating system, storage, and networking.

- How does Google Kubernetes Engine (GKE) simplify the management of containerized applications?

Google Kubernetes Engine (GKE) simplifies the management of containerized applications by automating key tasks and providing a fully managed, scalable environment.

- What advantages does Cloud Storage offer for data management?

Leading analytics and ML/AI tools

Automatic storage class transitions

Continental-scale and SLA-backed replication

Use Cloud Storage as a local filesystem

Manage your object storage with file inventory reports

- Why would a business choose BigQuery for their data analysis needs?

Business can power its data agents with Gemini

Bring multiple engines to a single copy of data

Manage all data types and open formats

Use built-in ML

Use built-in data governance