

Assignment 1

Exercise 1.

Cloud service model	Control	Flexibility	Use cases
Infrastructure as a Service (IaaS)	This model provides high control over infrastructure components (storage, virtual machine, networking). User can manage applications and operating system.	The most flexible. Users can set up, control and manage everything above the hypervisor.	Suitable for unique, custom applications and infrastructure, situations requiring complete resource management and legacy app migrations.
Platform as a Service (PaaS)	This model provides control over applications. The cloud provider is responsible for the underlying infrastructure (middleware, OS, runtime).	The flexibility is moderate. Developers can concentrate on code and application logic without worrying about management or infrastructure setup.	Perfect for developers that want to quickly build and deploy applications, focus on the app rather than the infrastructure.
Software as a Service (SaaS)	This model provides no control over platform or infrastructure. Users can only modify application configuration settings.	The least flexible. End customers engage directly with the software, with minimal customization.	Suitable for ready-to-use applications (email, productivity tools).

GCP examples:

- IaaS: Cloud Storage, Google Compute Engine, Virtual Private Cloud.
- PaaS: Google Cloud Functions, Cloud Run, Google App Engine.
- SaaS: Google Cloud Identity, Google Analytics, Google Workplace.

Exercise 2.

- Compute Engine
 - Purpose: Provides scalable virtual machines (VMs) using Google's infrastructure. It enables users to execute a wide range of applications with complete flexibility over configurations, including operating systems, networking and storage.

- Business use case: A corporation can utilize Compute Engine to host a website or applications. An e-commerce business can use VMs to scale its web service during peak traffic periods.
- Google Kubernetes Engine (GKE)
 - Purpose: It streamlines the deployment, scaling and maintenance of containerized applications. Kubernetes is particularly beneficial for microservice architecture.
 - Business use case: It allows a software development company to launch and manage its microservices applications. This would ease upgrades, scalability and load balancing for numerous services, increasing deployment efficiency.
- App Engine
 - Purpose: Allows developers to create and deploy applications without having to manage the underlying infrastructure. It automatically scales applications based on traffic demand.
 - Business use case: It is suitable for startups and small enterprises that require the rapid deployment of web applications. A SaaS firm can develop a web application for user management and use App Engine for automated server scalability and management.
- Cloud Storage
 - Purpose: It is a highly scalable object storage solution that stores unstructured data including movies, photos and backups. It offers various storage classes based on access frequency and cost requirements.
 - Business use case: It enables a media organization to store and serve video files to millions of users. By choosing the right storage class, the organization can save costs for frequently accessed films versus archival content.
- BigQuery
 - Purpose: It is a fully managed, serverless data warehouse intended for large-scale data processing. It enables the querying of big databases with SQL without the requirement for infrastructure administration.
 - Business use case: A marketing organization can utilize BigQuery to evaluate customer behavior data across many channels (e.g., mobile, social media, online) in real time, generating insights that might help improve customer engagement strategies.

Exercise 3.

Created VM Instance:

VM instances

Filter Enter property name or value									
<input type="checkbox"/> Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect		
<input type="checkbox"/>	vm-instance-assignment1	asia-northeast1-a			10.146.0.2 (nic0)	35.200.52.164 🔗 (nic0)	SSH ▾	⋮	

Installed Apache on VM via SSH:

```
gaukhar_satbekova@vm-instance-assignment1:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Fri 2024-09-27 08:33:43 UTC; 2min 32s ago
     Docs: https://httpd.apache.org/docs/2.4/
    Main PID: 1887 (apache2)
      Tasks: 55 (limit: 4682)
    Memory: 9.0M
       CPU: 66ms
    CGroup: /system.slice/apache2.service
            └─1887 /usr/sbin/apache2 -k start
              └─1888 /usr/sbin/apache2 -k start
                └─1889 /usr/sbin/apache2 -k start

Sep 27 08:33:43 vm-instance-assignment1 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Sep 27 08:33:43 vm-instance-assignment1 systemd[1]: Started apache2.service - The Apache HTTP Server.
```

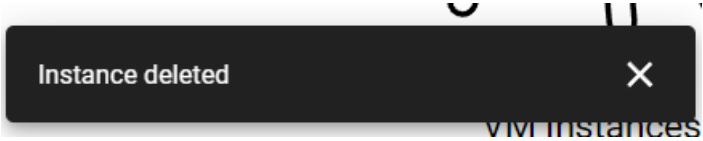
Stopping VM through the console:

1
START / RESUME
STOP
SUSPEND
RESET
CREATE A GROUP BASED ON THIS VM
DELETE
LABELS
PERMISSIONS

Filter
Enter property name or value

<input checked="" type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP	Connect
<input checked="" type="checkbox"/>		vm-instance-assignment1	asia-northeast1-a			10.146.0.2 (nic0)		SSH

Deleting VM through the console:



Exercise 5.

Creating new Bucket:

Bucket details
GO TO PATH
REFRESH
LEARN

OBJECTS
CONFIGURATION
PERMISSIONS
PROTECTION
LIFECYCLE
OBSERVABILITY
INVENTORY REPORTS
OPERATIONS

Folder browser
assignment1-buckettt

Buckets > assignment1-buckettt

CREATE FOLDER
UPLOAD
TRANSFER DATA
OTHER SERVICES

Filter by name prefix only
Filter
Filter objects and folders
Show Live objects only

<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last modified	Public access	Version history	Encryption
No rows to display									

Uploading various files to the Bucket:

CREATE FOLDER UPLOAD TRANSFER DATA OTHER SERVICES

Filter by name prefix only		Filter		Filter objects and folders		Show Live objects only			
<input type="checkbox"/>	Name	Size	Type	Created		Storage class	Last modified		
<input type="checkbox"/>	N1 (Stage 1) - Light Sleep (5%).txt	1.5 KB	text/plain	Sep 27, 2024, 3:52:48 PM		Standard	Sep 27, 2024, 3:52:48 PM	Download	More
<input type="checkbox"/>	img1.jpg	14.7 KB	image/jpeg	Sep 27, 2024, 3:52:34 PM		Standard	Sep 27, 2024, 3:52:34 PM	Download	More
<input type="checkbox"/>	img2.jpg	68.6 KB	image/jpeg	Sep 27, 2024, 3:52:35 PM		Standard	Sep 27, 2024, 3:52:35 PM	Download	More

Uploads and My First Project operations

✓ N1 (Stage 1) - Light Sleep (5%).txt

Complete

✓ Uploading 2 files

Complete

✓ img2.jpg

Complete

✓ img1.jpg

Complete

Adding permission for public access:

Grant access to "assignment1-buckettt"

Grant principals access to this resource and add roles to specify what actions the principals can take. Optionally, add conditions to grant access to principals only when a specific criteria is met. [Learn more about IAM conditions](#)

Resource
assignment1-buckettt

Add principals
Principals are users, groups, domains, or service accounts. [Learn more about principals in IAM](#)

New principals *
allUsers

Assign roles
Roles are composed of sets of permissions and determine what the principal can do with this resource. [Learn more](#)

Role *
Storage Object Viewer

IAM condition (optional)
+ ADD IAM CONDITION

Grants access to view objects and their metadata, excluding ACLs. Can also list the objects in a bucket.

+ ADD ANOTHER ROLE

SAVE CANCEL

assignment1-buckettt



Public to internet: This bucket is publicly accessible because allUsers or allAuthenticatedUsers have one or more permissions. Remove these principals to stop public access.

[EDIT ACCESS](#)[DISMISS](#)

Location	Storage class	Public access	Protection
asia-northeast1 (Tokyo)	Standard	Public to internet	Soft Delete

After setting permission for public access, any object is accessible with any browser via their Public URL.

Deleting 'allUsers' from access for certain object to make it private again.

[← Bucket details](#)

assignment1-buckettt

Location	Storage class	Public access	Protection
asia-northeast1 (Tokyo)	Standard	Not public	Soft Delete

OBJECTS CONFIGURATION **PERMISSIONS** PROTECTION LIFECYCLE OBSERVABILITY INVENTORY REPORTS

Public access

Not public

This bucket is not publicly accessible. If you know objects should never be exposed on the public internet, you should also prevent public access to this bucket. [Learn more](#)

[PREVENT PUBLIC ACCESS](#)

Access control

Uniform: No object-level ACLs enabled

90 days left to change this setting

All object access is controlled by bucket permissions and objects cannot have their own access control lists (ACLs). To allow per-object access, you can switch to fine-grained access within 90 days. [Learn more](#)

[SWITCH TO FINE-GRAINED](#)

Permissions

Removed allUsers



Активация
Чтобы активировать
"Параметры".

After changing the access to private, file is no longer accessible from the browser (unless user is logged in account that has correct permission).

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Error>
  <Code>AccessDenied</Code>
  <Message>Access denied.</Message>
  <Details>Anonymous caller does not have storage.objects.get access to the Google Cloud Storage object. Permission 'storage.objects.get' denied on resource (or it may not exist).</Details>
</Error>
```

Exercise 6.

Writing and executing queries in BigQuery using "Google Trends" public dataset:

Untitled query
top_terms
*Untitled query

Untitled query
RUN
SAVE
DOWNLOAD
SHARE
SCHEDULE

```

1 SELECT
2   DISTINCT(term)
3 FROM
4   `bigquery-public-data.google_trends.top_terms`
5 WHERE
6   EXTRACT(YEAR FROM week) = 2024
7 LIMIT 100;

```

Query results

JOB INFORMATION		RESULTS	CHART	JSON	EXECUTION DETAILS	EXECUTION GRA
Row	term					
1	Andy Beshear					
2	Jets					
3	Menendez brothers					
4	Palworld					
5	Beetlejuice Michael Keaton					

Untitled query
top_terms
*Untitled query

Untitled query
RUN
SAVE
DOWNLOAD
SHARE

```

1 SELECT
2   EXTRACT(YEAR FROM week) AS year,
3   EXTRACT(MONTH FROM week) AS month,
4   SUM(score) AS search_interest
5 FROM
6   bigquery-public-data.google_trends.top_terms
7 WHERE
8   term = "Germany"
9 GROUP BY
10  year, month
11 ORDER BY
12  year, month;

```

Query results

JOB INFORMATION		RESULTS	CHART	JSON	EXECUTION DETAIL
Row	year	month	search_interest		
1	2019	9	27853		
2	2019	10	24339		
3	2019	11	24990		
4	2019	12	29509		
5	2020	1	26190		