Part 1: Using the GCP Console (Web UI)

Step 1: Open Cloud Storage

1. Go to https://console.cloud.google.com/storage.
2. Make sure you've selected the right **Project** in the top navigation bar.

Step 2: Create a Bucket

1. Click **"Create Bucket"**.
2. Enter a **globally unique bucket name** (e.g., my-demo-bucket-2025).
3. Choose:
    - **Location type:** Region / Dual-region / Multi-region.
    - **Location:** e.g., us-central1.
4. Choose a **Storage class**:
    - Standard (frequent access)
    - Nearline (monthly access)
    - Coldline (quarterly access)
    - Archive (yearly access)
5. Choose **Access Control:**
    - Recommended: **Uniform bucket-level access**.
6. (Optional) Add labels for organization.
7. Click **Create**.

✅ Your bucket is ready.

Step 3: Upload Files

1. Click on your bucket name → **Upload files**.
2. Choose files from your system → Click **Upload**.
3. Files appear in the bucket with metadata (size, type, created date).

Step 4: Download or Delete Files

- To **download**, click on an object → choose **Download**.
- To **delete**, select objects → click **Delete**.

Step 5: Set Permissions (IAM)

1. Open **Permissions** tab in your bucket.
2. Click **Grant access** → Add members:
    - Member: your service account email or user.
    - Role: e.g., Storage Object Admin or Storage Object Viewer.
3. Click **Save**.

Step 6: Enable Public Access (Optional)

⚠️ Only for public assets (e.g., images, static website).

1. In **Permissions → Access Control**, disable "Enforce public access prevention".
2. Add member allUsers with role Storage Object Viewer.
3. Click **Save**.

You can now open the file via a public URL:

https://storage.googleapis.com/<bucket-name>/<object-name>

Step 7: Clean Up

To delete the bucket:

1. Go back to the bucket list.
2. Select your bucket → click **Delete**.
3. Confirm by typing the bucket name.

💻 **Part 2: Using gcloud CLI**

Step 1: Authenticate

gcloud auth login

Then select the project:

gcloud config set project <PROJECT_ID>

Step 2: Create a Bucket

```
gcloud storage buckets create gs://my-demo-bucket-2025 \
 --location=us-central1 \
 --uniform-bucket-level-access
```

Confirm creation:

gcloud storage buckets list

Step 3: Upload Files

gcloud storage cp ./local-file.txt gs://my-demo-bucket-2025/

Upload a folder:

gcloud storage cp -r ./my-folder gs://my-demo-bucket-2025/

Step 4: List Objects

gcloud storage ls gs://my-demo-bucket-2025

List details:

gcloud storage ls -L gs://my-demo-bucket-2025

Step 5: Download Files

gcloud storage cp gs://my-demo-bucket-2025/local-file.txt ./downloaded-file.txt

---

Step 6: Delete Files

gcloud storage rm gs://my-demo-bucket-2025/local-file.txt

Delete a bucket (must be empty):

gcloud storage buckets delete gs://my-demo-bucket-2025

Step 7: Grant IAM Permissions

gcloud projects add-iam-policy-binding <PROJECT_ID> \

--member="serviceAccount:my-service-account@<PROJECT_ID>.iam.gserviceaccount.com" \

--role="roles/storage.objectAdmin"

Step 8: View Bucket Metadata

gcloud storage buckets describe gs://my-demo-bucket-2025

Step 9: Enable Object Versioning (optional)

gcloud storage buckets update gs://my-demo-bucket-2025 --versioning

---

Step 10: Set Lifecycle Policy

Create a file lifecycle.json:

```
{
 "rule": [
  {
   "action": {"type": "Delete"},
   "condition": {"age": 30}
  }
 ]
}
```

Apply it:

gcloud storage buckets update gs://my-demo-bucket-2025 --lifecycle-file=lifecycle.json

This deletes objects older than 30 days.

🧠 **Best Practices**

Area	Best Practice
Security	Use uniform bucket-level access and IAM roles instead of ACLs
Keys	Avoid using service account keys in production; use Workload Identity or Cloud Run service accounts
Organization	Use consistent bucket naming (e.g., <env>-<project>-<purpose>)
Cost	Use lifecycle policies to auto-delete or move old data
Performance	Keep buckets in the same region as your compute resources
Backup	Use versioning for critical data

⚙️ **Quick Comparison**

Operation	Console	gcloud CLI
Create bucket	“Create bucket” UI	gcloud storage buckets create
Upload file	Drag-and-drop	gcloud storage cp

Operation	Console	gcloud CLI
List files	File list view	gcloud storage ls
Download file	Click “Download”	gcloud storage cp
Delete file	Delete icon	gcloud storage rm
Set IAM role	Permissions tab	gcloud projects add-iam-policy-binding