Do the following tasks:

* Download this sql-file on your system.
* Create a bucket on google storage, for each of the following:
  + - Hot
    - Cold
    - Multi-Region
* Upload the sql-file in each of the regions and compare the download from all the buckets.
* The bucket with the lowest latency, use it to import this database to Cloud SQL

So, let’s start the solving tasks:

1st Download SQL file that are given to usGraphical user interface, application, Word

Description automatically generated

2nd Task to create the Hot, Cold and Multi-Region Bucket classes on google storage: so, let’s understand the different type of storage type that are given to us

Storage class? - A storage class is a piece of metadata that is used by every object.

The storage class set for an object affects the object's availability and pricing model. We can change the storage class of an existing object either by rewriting the object or by using Object Lifecycle Management. When we create a bucket, we can specify a default storage class for the bucket. When we add objects to the bucket, they inherit this storage class unless explicitly set otherwise.

If we don't specify a default storage class when you create a bucket, that bucket's default storage class is set to Standard Storage. Changing the default storage class of a bucket does not affect any of the objects that already exist in the bucket.

Available storage classes:

|  |  |  |  |
| --- | --- | --- | --- |
| Storage Class | Name of API and gsutil | Minimum Storage duration | Typical monthly availability |
| Standard Storage | STANDARD | None | * >99.99% in multi-regions and dual regions * 99.99% in regions |
| Nearline Storage | NEARLINE | 30 Days | * >99.99% in multi-regions and dual regions * 99.99% in regions |
| Coldline Storage | COLDLINE | 90 Days | * >99.99% in multi-regions and dual regions * 99.99% in regions |
| Archive Storage | ARCHIVE | 365 Days | * >99.99% in multi-regions and dual regions * 99.99% in regions |

Class descriptions

The following aspects apply to all storage classes:

Unlimited storage with no minimum object size.

Worldwide accessibility and worldwide storage locations.

Low latency (time to first byte typically tens of milliseconds).

High durability (99.999999999% annual durability).

Geo-redundancy if the data is stored in a multi-region or dual region.

A uniform experience with Cloud Storage features, security, tools, and APIs.

**Standard Storage**

Standard Storage is best for data that is frequently accessed ("hot" data) and/or stored for only brief periods of time.

When used in a region, Standard Storage is appropriate for storing data in the same location as Google Kubernetes Engine clusters or Compute Engine instances that use the data. Co-locating your resources maximizes the performance for data-intensive computations and can reduce network charges.

When used in a dual region, you still get optimized performance when accessing Google Cloud products that are in one of the associated regions, but you also get the improved availability that comes from storing data in geographically separate locations.

When used in a multi-region, Standard Storage is appropriate for storing data that is accessed around the world, such as serving website content, streaming videos, executing interactive workloads, or serving data supporting mobile and gaming applications.

***Availability***

The availability of Standard Storage data is:

|  |  |  |
| --- | --- | --- |
| Location Type | Arability SLA | Typical Month availability |
| Multi-region | 99.95% | >99.99% |
| Dual-region | 99.95% | >99.99% |
| Region | 99.5% | 99.99% |

The availability SLA is the monthly uptime percentage backed by the Cloud Storage SLA. If Google fails to meet that uptime, customers are eligible to receive a credit as described in the Cloud Storage SLA.

**Nearline Storage**

Nearline Storage is a low-cost, highly durable storage service for storing infrequently accessed data. Nearline Storage is a better choice than Standard Storage in scenarios where slightly lower availability, a 30-day minimum storage duration, and costs for data access are acceptable trade-offs for lowered at-rest storage costs.

Nearline Storage is ideal for data you plan to read or modify on average once per month or less. For example, if you want to continuously add files to Cloud Storage and plan to access those files once a month for analysis, Nearline Storage is a great choice.

Nearline Storage is also appropriate for data backup, long-tail multimedia content, and data archiving. Note, however, that for data accessed less frequently than once a quarter, Coldline Storage or Archive Storage are more cost-effective, as they offer lower storage costs.

***Availability***

The availability of Nearline Storage data is:

|  |  |  |
| --- | --- | --- |
| Location Type | Arability SLA | Typical Month availability |
| Multi-region | 99.9% | 99.95% |
| Dual-region | 99.9% | 99.95% |
| Region | 99.0% | 99.9% |

**Coldline Storage**

Coldline Storage is a very-low-cost, highly durable storage service for storing infrequently accessed data. Coldline Storage is a better choice than Standard Storage or Nearline Storage in scenarios where slightly lower availability, a 90-day minimum storage duration, and higher costs for data access are acceptable trade-offs for lowered at-rest storage costs.

Coldline Storage is ideal for data you plan to read or modify at most once a quarter. Note, however, that for data being kept entirely for backup or archiving purposes, Archive Storage is more cost-effective, as it offers the lowest storage costs.

***Availability***

The availability of Coldline Storage data is:

|  |  |  |
| --- | --- | --- |
| Location Type | Arability SLA | Typical Month availability |
| Multi-region | 99.9% | 99.95% |
| Dual-region | 99.9% | 99.95% |
| Region | 99.0% | 99.9% |

**Archive Storage**

Archive Storage is the lowest-cost, highly durable storage service for data archiving, online backup, and disaster recovery. Unlike the "coldest" storage services offered by other Cloud providers, your data is available within milliseconds, not hours or days.

Like Nearline Storage and Coldline Storage, Archive Storage has a slightly lower availability than Standard Storage. Archive Storage also has higher costs for data access and operations, as well as a 365-day minimum storage duration. Archive Storage is the best choice for data that you plan to access less than once a year. For example:

Cold data storage - Archived data, such as data stored for legal or regulatory reasons, can be stored at low cost as Archive Storage, yet still be available if you need it.

Disaster recovery - In the event of a disaster recovery event, recovery time is key. Cloud Storage provides low latency access to data stored as Archive Storage.

***Availability***

The availability of Archive Storage data is:

|  |  |  |
| --- | --- | --- |
| Location Type | Arability SLA | Typical Month availability |
| Multi-region | 99.9% | 99.95% |
| Dual-region | 99.9% | 99.95% |
| Region | 99.0% | 99.9% |

**Additional classes**

Cloud Storage supports several additional storage classes; however, these classes cannot be set using the Cloud Console. Unless you already are using one of these additional classes, you should use Standard Storage instead.

Multi-Regional Storage: Equivalent to Standard Storage, except Multi-Regional Storage can only be used for objects stored in multi-regions or dual-regions.

Regional Storage: Equivalent to Standard Storage, except Regional Storage can only be used for objects stored in regions.

Durable Reduced Availability (DRA) Storage: Like Standard Storage except:

DRA has higher pricing for operations.

DRA has lower performance, particularly in terms of availability (DRA has a 99% availability SLA).

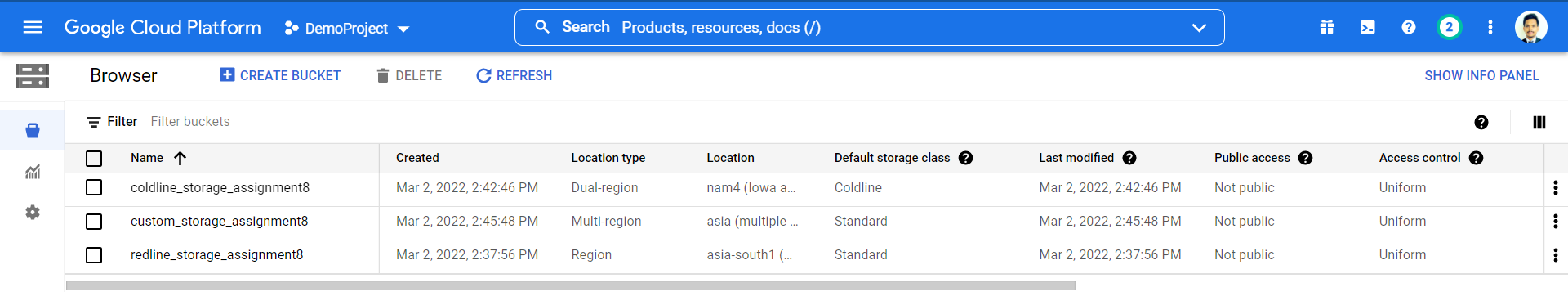
You can move your data from DRA to other storage classes by performing a storage transfer.

Now move forward to doing 3rd task and that is to create 3 storage buckets with 3 different storage class (Satnderd/redline, Coldline and Archive). I’m choosing cloud console to perform these tasks.

1. Hotline\_storage with location region asia-mumbaiGraphical user interface, text, application

   Description automatically generated
2. Coldline\_storage with location dual\_region (lova and south Carolina)Graphical user interface, text, application

   Description automatically generated
3. Custom\_storage with Location multiregionGraphical user interface, text, application

   Description automatically generatedfinal view is

As we know Location Regional have lowest latency and highest throughput

Now move towards 3rd task to perform import database to the Cloud SQL database using “redline\_storage\_assignment8” because its Location is Regional, and it have highest latency. Navigate through Menu->Sql and click on “create instance” and fill required details and region same as redline\_storage\_assignment8 bucket so that we can import the database from the bucket storage. Graphical user interface, application

Description automatically generatedselect SQL databaseGraphical user interface, text, application, email

Description automatically generatedGraphical user interface

Description automatically generatedcreating SQL instance taking bit time to up and runnign arount 10 to 15 minute. Now we have SQL database up and running and we have to import the sqlfile from bucket nowGraphical user interface, text, application, email

Description automatically generatedlet’s create a “demo-assignment8” Database to import SQL filesGraphical user interface, application

Description automatically generatednow import sqlfile from “redline\_storage\_assignment8” Graphical user interface, application

Description automatically generatedGraphical user interface, application, table, Excel

Description automatically generatedA picture containing graphical user interface

Description automatically generated

Now lets check the DATABASE in cloud shell “gcloud sql databases list -I INSTANCE\_NAME” Graphical user interface, text, application

Description automatically generated

PTO