Creating best in class storage solutions with Google Cloud Storage
University of Michigan
Agenda

Over the next hour, we’ll be diving deep into how you can make Cloud Storage work for you.

Demo
GCS Features
Finding Answers
Evaluating GCS
Q&A
Cloud Storage Functionality
Google Cloud Storage is...

Cloud Storage is unified object storage for developers and enterprises, from live data serving to data analytics/ML to data archiving.

Featuring a consistent API, latency, and speed across storage classes, learn why Google’s infrastructure is the best online cloud storage for your most critical data.
Cloud Storage Classes

<table>
<thead>
<tr>
<th>Class</th>
<th>Multi-regional</th>
<th>Regional</th>
<th>Nearline</th>
<th>Coldline</th>
</tr>
</thead>
<tbody>
<tr>
<td>For data that is...</td>
<td>Frequently accessed</td>
<td>Frequently accessed</td>
<td>Accessed less than</td>
<td>Accessed less than</td>
</tr>
<tr>
<td></td>
<td>across regions</td>
<td>within region</td>
<td>once a month</td>
<td>once a year</td>
</tr>
<tr>
<td>Durability</td>
<td>99.999999999%</td>
<td>99.999999999%</td>
<td>99.999999999%</td>
<td>99.999999999%</td>
</tr>
<tr>
<td>Availability</td>
<td>99.95%</td>
<td>99.90%</td>
<td>99.00%</td>
<td>99.00%</td>
</tr>
<tr>
<td>Access</td>
<td>Google Cloud Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APIs (XML/JSON),</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>gsutil, console</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latency</td>
<td></td>
<td>Time to first byte:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tens of milliseconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage price</td>
<td>$.026/GB/month</td>
<td>$.020/GB/month</td>
<td>$.010/GB/month</td>
<td>$.007/GB/month</td>
</tr>
<tr>
<td>Retrieval price</td>
<td>Egress charges, transfer charges</td>
<td>Egress &amp; access charges, transfer charges</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Security

Your business can rely on Google grade security to protect your most critical assets. Your data travels through Google’s private network and is stored on the same infrastructure Google itself relies on, delivering unmatched business continuity for your enterprise.

- Encryption
- IAM permissions
- ACLs
- Signed URLs
- Firebase security rules
Cloud Storage provides many ways to bring your data to the cloud. Google Cloud Platform Console, the gsutil command-line tool, GCS’s JSON API, or use 3rd-party services optimized for massive data uploads.

- Interactive
- GCP integrations
- 3rd-party integrations
- Appliances
- 3rd-party services
Data Out

Serve streaming audio or video directly to your users apps or websites, feed data analytics pipelines, or provide digital downloads to your customers.

- Interactive
- GCP integrations
- Proxied web access
- Direct web serving
Managing your data

Cloud Storage offers consistent access APIs across the entire range of storage classes.

- Consistent APIs
- Lifecycle management
- Object versioning
- Object change notification
“What could you do with Cloud Storage?”
“Thanks to Google Cloud Platform and the Google Genomics team, the greatest minds in science from around the world will be able to study trillions of data points in one single database.”

- **Uploaded**: 100 TERABYTES of data from more than 1,300 WHOLE GENOMES to Google Cloud Storage
- **Up to**: 200 GIGABYTES PER RAW GENOME
- **MSSNG project could easily surpass a PETABYTE of data**

Making MSSNG world’s largest single repository of autism-related DNA sequencing data

Autism Speaks
Where to Look for Info About Cloud Storage
Start with search

The easiest way to find information on Cloud Storage is to search using the following phrasing:

- google cloud storage <topic>
- gsutil <action>
Browse the docs

Documentation for each GCP product follow a common layout that’s easy to navigate once you know it.

Often, searching will lead you to a How-to Guide, and you can easily jump to main page.
Best Practices for Evaluating Cloud Storage
Be purposeful

**Decision criteria**

Decide at the beginning what questions you need answered in order to make go/no-go decisions.

For each criterion, decide on what the minimum "success" threshold is *before* you begin testing.

**How to test**

Determine what you need to build in order to get the data required to make decisions.

This typically includes listing specific use cases, scoping the minimum build required to get meaningful data, and selecting data set sizes.

**Who’s on the team?**

Make sure you have the right people involved. Key roles/activities include:

- Architecture
- Operations
- Reporting
- Decision-making
Follow a timeline

One month per use case evaluated is a good place to start your planning. Obviously, this changes depending on the complexity of your evaluation projects and how many resources you invest in the project.
Resources

Product Documentation
https://cloud.google.com/storage/

Try it yourself!
https://goo.gl/xlXTjC
https://goo.gl/yZp9zS
(Google Cloud Storage Tutorials)
Thanks