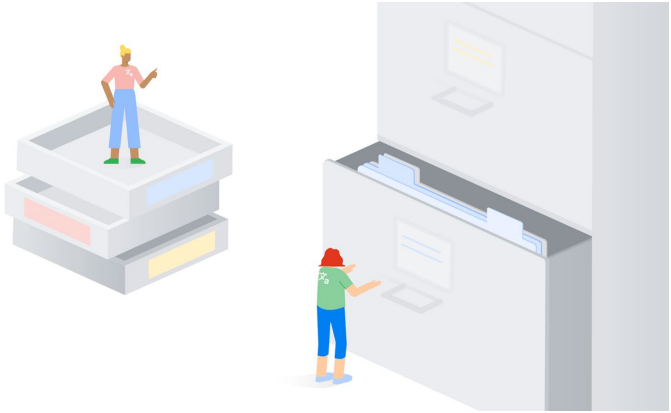
Proprietary + Confidential

Google Cloud

Digital Preservation
Solutions in Google Cloud

Designing Storage Architectures
Library of Congress

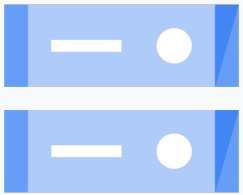


Law Library Archive Migration

- Migration completed between 2019 - 2020
- Data center decommissioning project
- Maintain NDSA level 2 compliance
- File provenance records & fixity checks

Georgetown University

Google Cloud Storage



Highly available and simple to use object storage

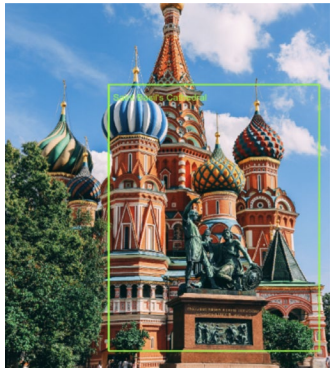
Usability: a consistent API, latency, and speed across storage classes simplifies development and experience.

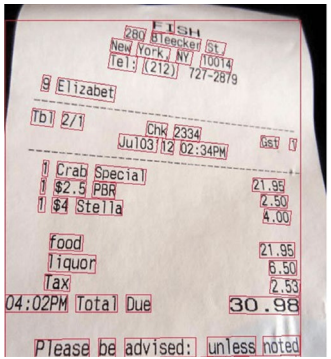
Reliability: Storage in geo-redundant locations offers 99.99% availability with transparent failover.

Costs: Cold storage as low as $0.0012 per GB/month. Still accessible in ms and with geo-redundant options.

Security: Data is encrypted at rest and in transit through various mechanisms; governed using Identity & Access Management

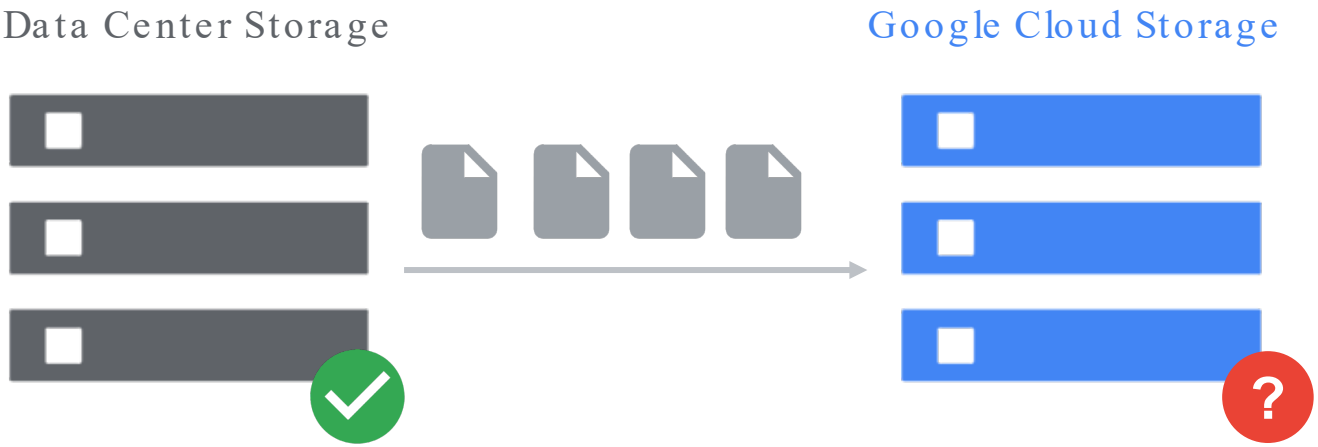
Proprietary + Confidential





Cloud Vision API

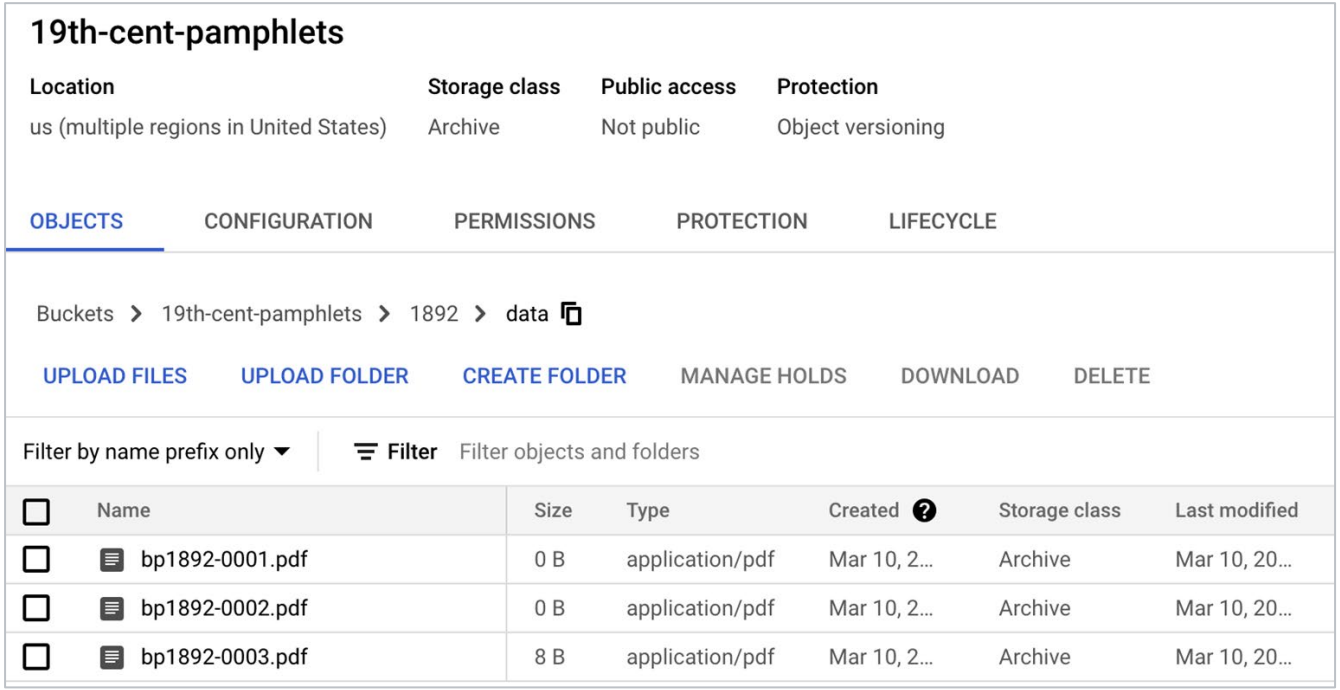
- Detect image characteristics, including dominant colors and crop hints
- Detect labels, landmarks and logos within images
- Read, extract, and translate text in documents, including images and handwritten text
- Perform content analysis in videos and extract metadata


Data Center Storage
Google Cloud Storage
?

```
$ md5sum archive/data/bp1892-0001.pdf
fcea3e2968c9a192e4d228668cc32256
$ bagit archive/
archive
├── data
│   ├── bp1892-0001.pdf
│   ├── bp1892-0002.pdf
│   └── bp1892-0003.pdf
├── manifest-md5.txt
└── bagit.txt
```

Traditional File System

Google Cloud



Google Cloud Storage

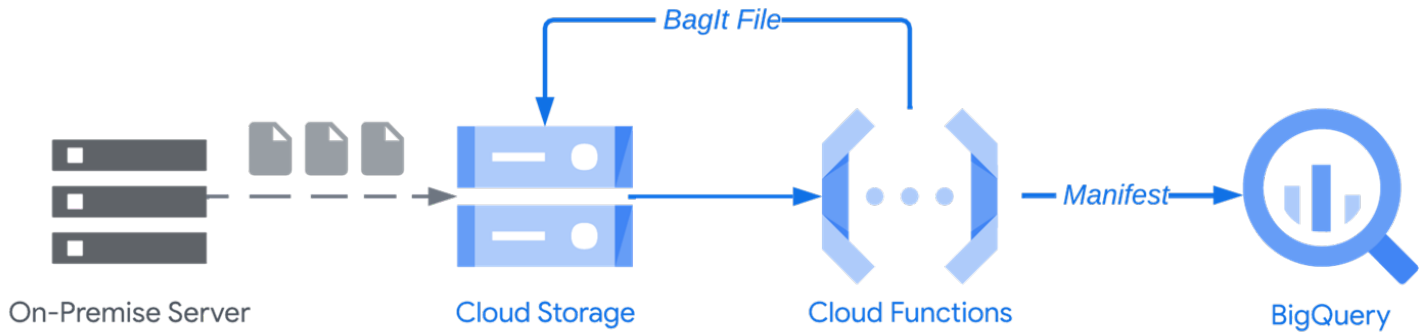
Google Cloud

```
gsutil stat gs://19th-cent-pamphlets/1892/data/bp1892-0003.pdf

gs://19th-cent-pamphlets/1892/data/bp1892-0003.pdf:
    Creation time:          Thu, 10 Mar 2022 21:26:07 GMT
    Update time:            Thu, 10 Mar 2022 21:26:07 GMT
    Storage class:          ARCHIVE
    …
    Hash (crc32c):          okryTg==
    Hash (md5):             hRM8VqzPTuDfc1ljwL757A==
```

Google Cloud Storage

Google Cloud



Automated Appoach

https://github.com/GoogleCloudPlatform/professional-services/tree/main/examples/gcs-fixity-function

Google Cloud

Proprietary + Confidential

“Fixity, in the preservation sense, means the assurance that a digital file has remained unchanged, i.e. fixed.”

Proprietary + Confidential

Best Practices for NDSA Level 2 Compliance

Geographic Redundancy

Store files in multiple geographic locations across the United States

Audit & Access Logs

Record each user action, including object upload and retrieval with Access Logs

Checksums

Checksums are generated for each file and can be retrieve via API

Object Versioning

Supports retrieval of objects that have been deleted or overwritten