

Google™



# Google Storage for Developers

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May 19, 2010

view notes and ask questions via Wave at:

**<http://bit.ly/cb1Fua>**



# Introducing Google Storage

- Cloud-based binary object store
  - Structured as buckets and objects
  - Many buckets, many objects, large objects
- You control your data
  - Private, shared, or public
  - Get your data back out at any time
- For developers
  - RESTful API
  - Many SDKs + tools
  - Integration with other Google services

# Google Storage Benefits



High Performance and Scalability  
backed by Google infrastructure

Flexible Authentication &  
Sharing Models



Get Started Fast with  
Google & 3<sup>rd</sup> Party Utilities

# Demo: Get Started In < 1 Minute

- click emailed invitation link
- read & accept Terms Of Service
- start using GS Manager

# Google services using Google Storage



Partner Reporting



Data Liberation



Haiti Relief Imagery



Partner Reporting

Google  
BigQuery

Google  
Prediction API



# Some current users



# Partner Demo: U.S. Navy Visual News Service



Damon Moritz, U.S. Navy, Office of Information  
May 19, 2010



# Technical Overview

# Google Storage Overview

- Fast, scalable, highly available object store
  - Objects of any type and practically any size
  - Lots of objects, lots of buckets
  - All data replicated to multiple US data centers
  - Read-your-writes data consistency
- Easy, flexible authentication and sharing
  - Key-based authentication
  - Authenticated downloads from a web browser
  - Sharing with individuals and groups
- Google products and 3rd party tools/services
  - Compatible with many available tools and libraries
  - Getting started toolkit

# API Concepts

- RESTful API
  - Verbs: GET, PUT, POST, HEAD, DELETE
  - Resources: identified by URI
- Buckets
  - Flat containers
- Objects
  - Any type, practically any size
- Access Control for Google Accounts
  - Coming soon: Google Groups
- Two Ways to Authenticate Requests
  - Sign request using access keys
  - Web browser login

# Sample Signed Request

**PUT /mybucket/My/Long/Object/Name HTTP/1.1**

**Host: commondatastorage.googleapis.com:443**

**Accept-Encoding: identity**

**Date: Sat, 08 May 2010 19:04:21 GMT**

**Content-Length: 28**

**Content-Type: text/plain**

**Authorization:GOOG1**

**GOOG4622809698762217:J+y3mj5GThfI6Ed1MqLi7JpCq5Y=**

**This is my object's content.**

# Sharing and ACLs

- Data can be private or shared
- Bucket ACL determines:
  - who can list objects (READ)
  - who can create / delete objects (WRITE)
  - who can read / write bucket ACL (FULL\_CONTROL)
- Object ACL determines:
  - who can read objects (READ)
  - who can read / write object ACL (FULL\_CONTROL)

# Partner Demo: Syncplicity



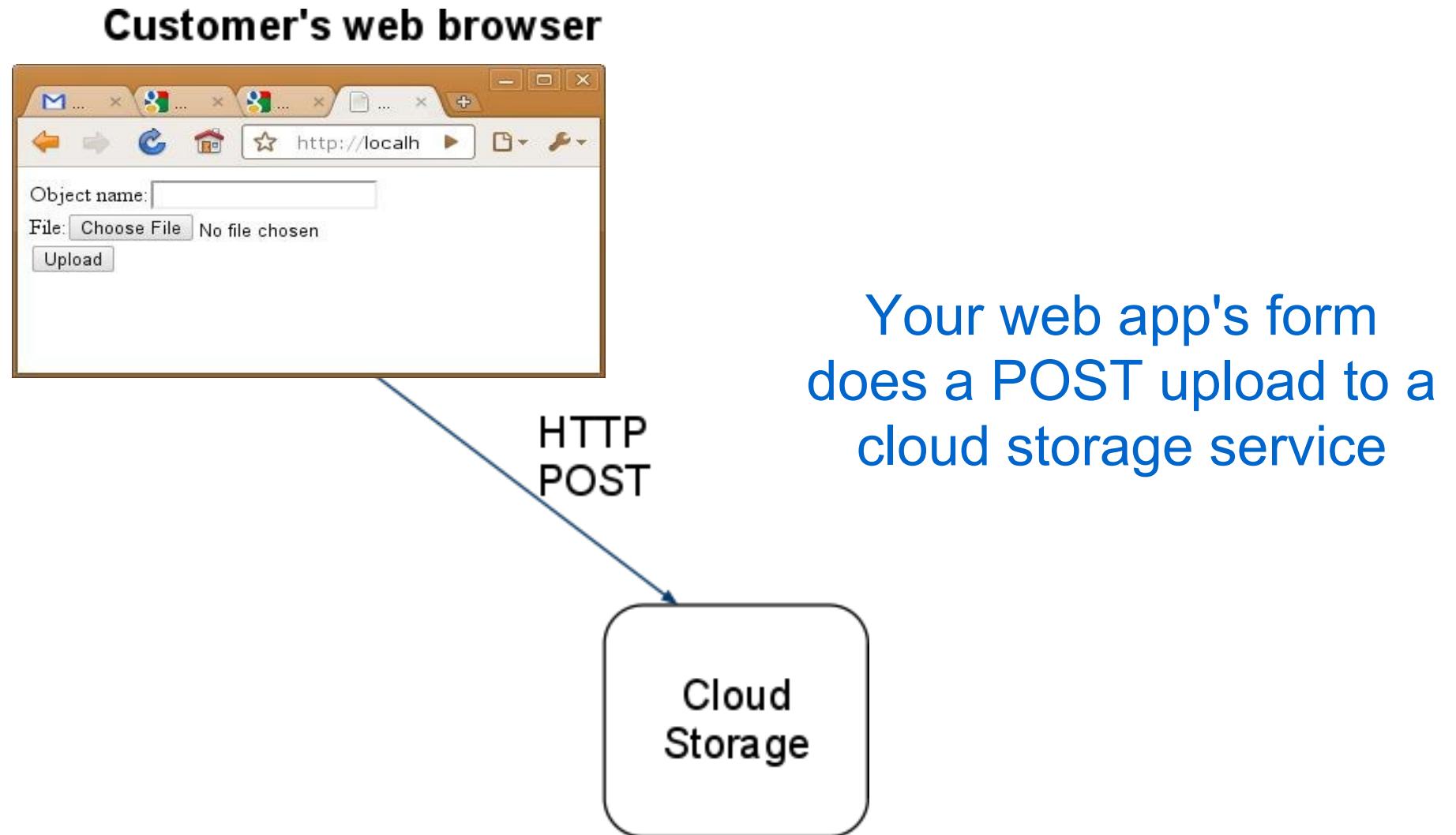
Leonard Chung, CEO  
May 19, 2010



# Read-Your-Writes Consistency

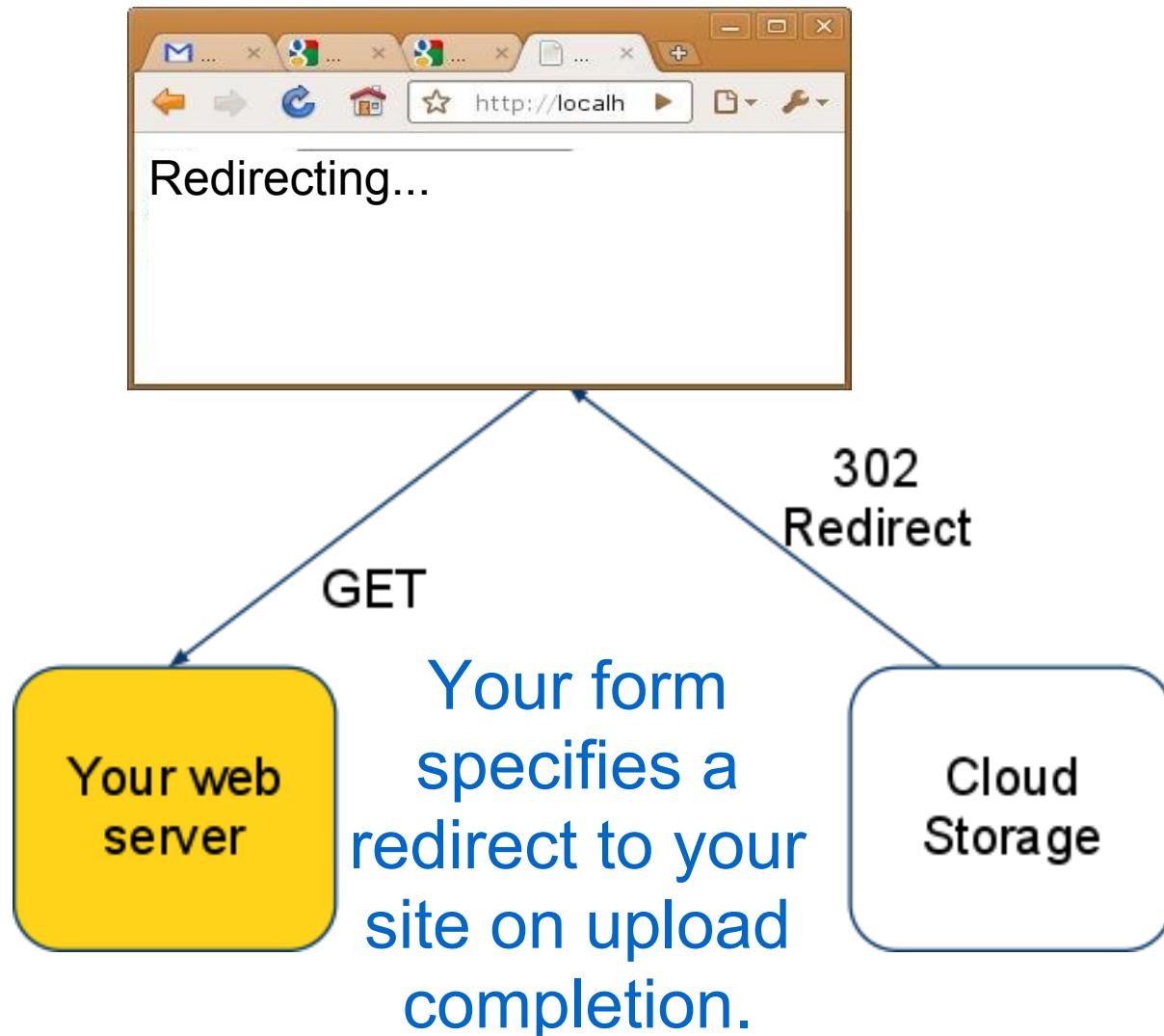
- Once a write succeeds, all future reads will see a snapshot that includes that write... no matter what replica they talk to
- Once any reader sees a result (even if the write previously appeared to fail) then all future readers will see a snapshot that includes the write

# Consistency: Why It Matters



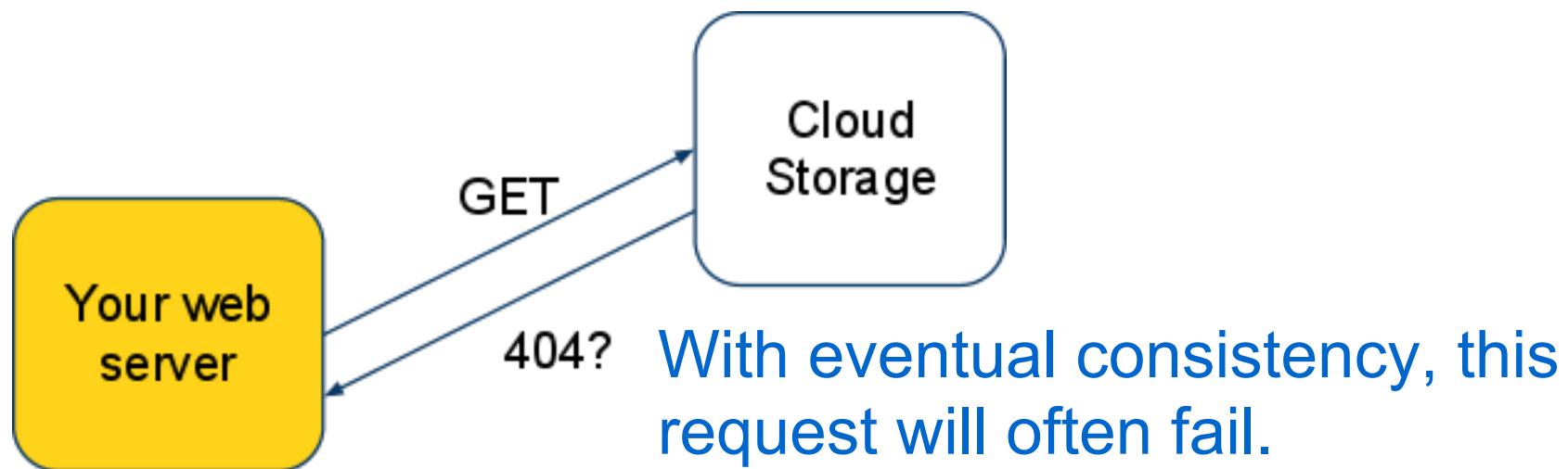
# Consistency: Why It Matters

## Customer's web browser



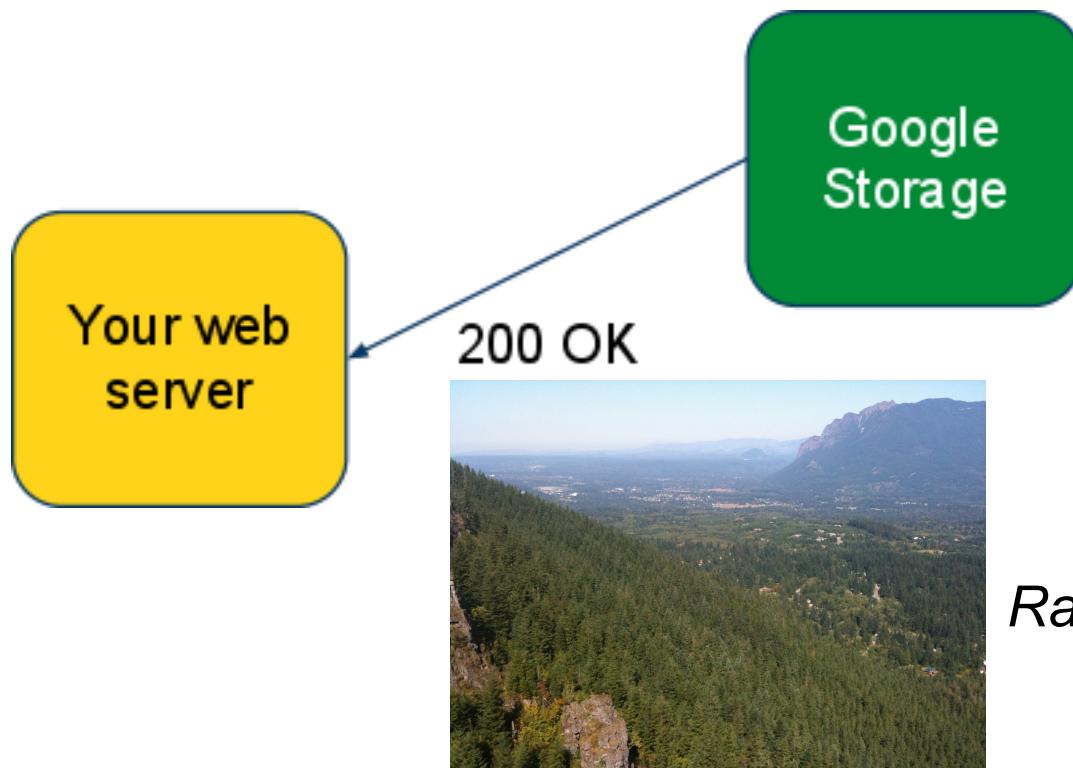
# Consistency: Why It Matters

Your web server requests the newly uploaded data, perhaps in another location.



# Consistency: Why It Matters

Strong consistency means you can immediately read the data from any Google Storage data center.



*Rattlesnake Ledge,  
near Seattle*

# Interoperability Gives You Choice

- Data Liberation
  - You shouldn't be locked in by your choice of storage provider
- Choice of tools
  - You should be able to use the same tools to manage your data, regardless of where you keep it

# Demo: Using Google Storage

## Tools



## SDKs



## Service



# Computing in the Cloud: App Engine Sample

```
os.environ['BOTO_CONFIG'] = 'boto.cfg'  
from boto import storage_uri  
# <other imports omitted>  
  
class MainPage(webapp.RequestHandler):  
    def get(self):  
        self.response.out.write('<html><body>')  
        uri = storage_uri('gs://pub/shakespeare/rose.txt')  
        poem = uri.get_contents_as_string()  
        self.response.out.write('<pre>' + poem + '</pre>')  
        self.response.out.write('</body></html>')  
  
    def main():  
        application = webapp.WSGIApplication([('\/', MainPage)])  
        run_wsgi_app(application)  
  
if __name__ == "__main__":  
    main()
```

# Pricing and Availability

- Pay as you go pricing
- Storage - \$0.17/GB/month
- Network
  - Upload data to Google
    - \$0.10/GB
  - Download data from Google
    - \$0.15/GB for Americas and EMEA
    - \$0.30/GB for APAC
- Requests
  - PUT, POST, LIST - \$0.01 per 1,000 Requests
  - GET, HEAD - \$0.01 per 10,000 Requests
- Free storage (up to 100GB) during preview period
  - No SLA
- <http://code.google.com/apis/storage>

# What's Coming Up

- Service Level Agreement
- Support
- Available to Premium Apps Customers
- Technical Features:
  - Group support in ACLs
  - Resumable uploads
  - Additional regions

# Get Your Google Storage Account Now

Request an invitation: <http://bit.ly/dbOB1f>

- Write “I/O Session” in Additional Information section
- Check your email for invitation

Questions  
via Google Wave:  
<http://bit.ly/cb1Fua>