

Evaluation of Google GCP Object Storage and Microsoft Azure Blob Storage

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Introduction

Cloud storage services have emerged as a popular choice for organizations seeking to store and manage their unstructured data effectively. Blob storage and Object storage are two common ways to store and access data in the cloud. **Microsoft Azure Blob Storage** is Microsoft's object storage solution for the cloud. **Google Cloud Platform (GCP) Cloud storage** is Google's object storage solution for the cloud. As organizations and individuals are increasingly rely on cloud storage solutions for storing unstructured data, there is a need to understand and compare the Performance, Cost, Security, and Vendor lock aspects of these two providers.

The scope of this research project is focused on comparing the performance, cost, security, and vendor lock aspects of GCP Object storage and Microsoft Azure Block Blob storage. The primary data source for this research will be the experiments conducted to evaluate the performance and vendor lock aspects. The secondary data sources which include books and online references will also be utilized to support and enhance the research for cost and security aspects.

Vendor Lock

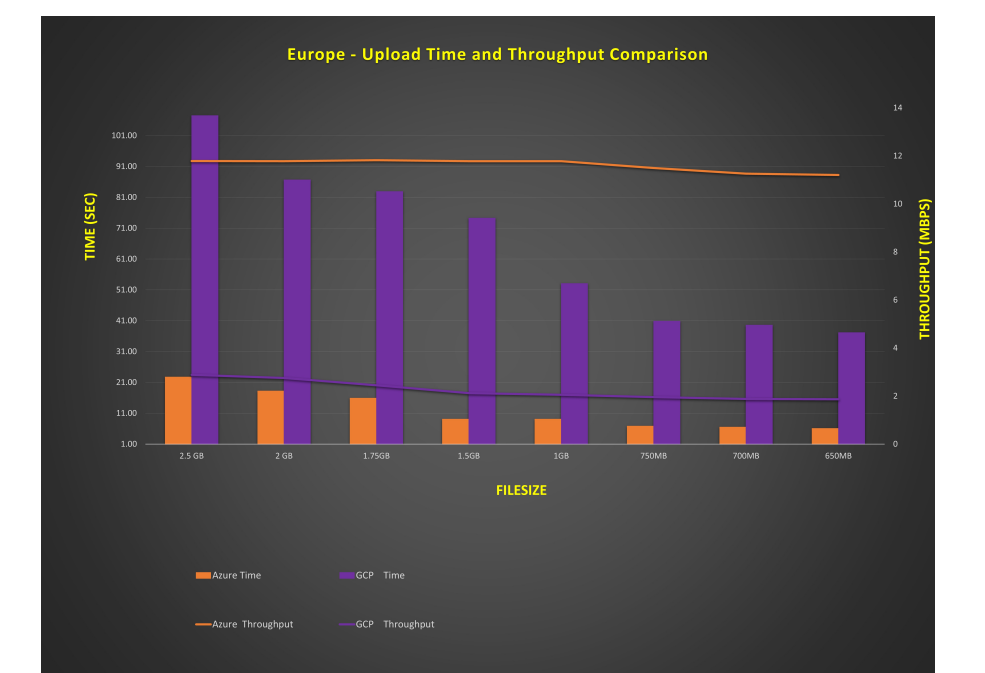
Migration and portability experiment was done using **Azure DataFactory Copy Data tool** and **GCP Transfer Job**. Azure to GCP Migration across two regions took double the time in Europe compared to Americas. File transfers between the two providers took almost same time in Americas. .



Performance

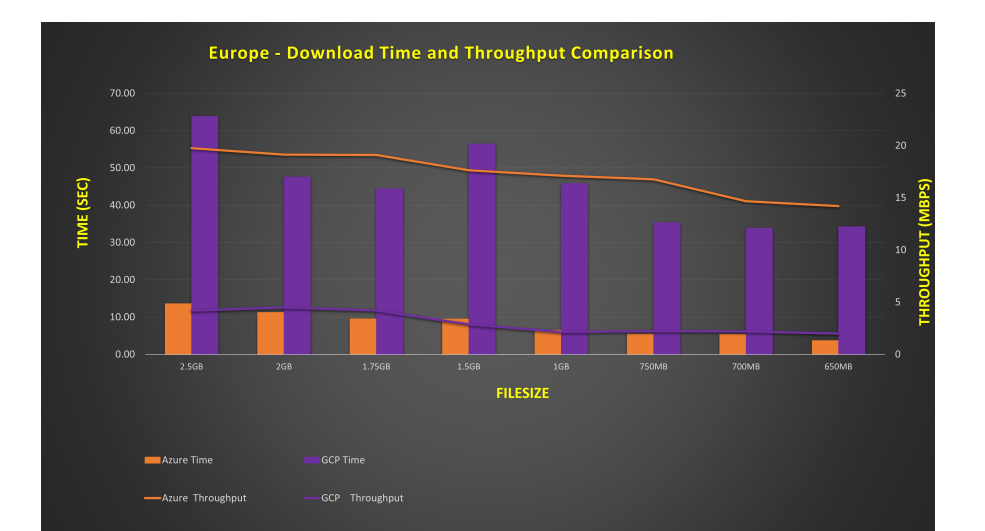
1. Upload and Download:

Azure upload throughputs are higher than GCP for all file sizes with an average of 6 times better throughput in Azure. Throughput to file size and Time to file size correlations follow similar patterns for both Azure and GCP. Azure continues to perform better on download throughputs too for all filesizes against GCP with an average of 14 time better throughput.



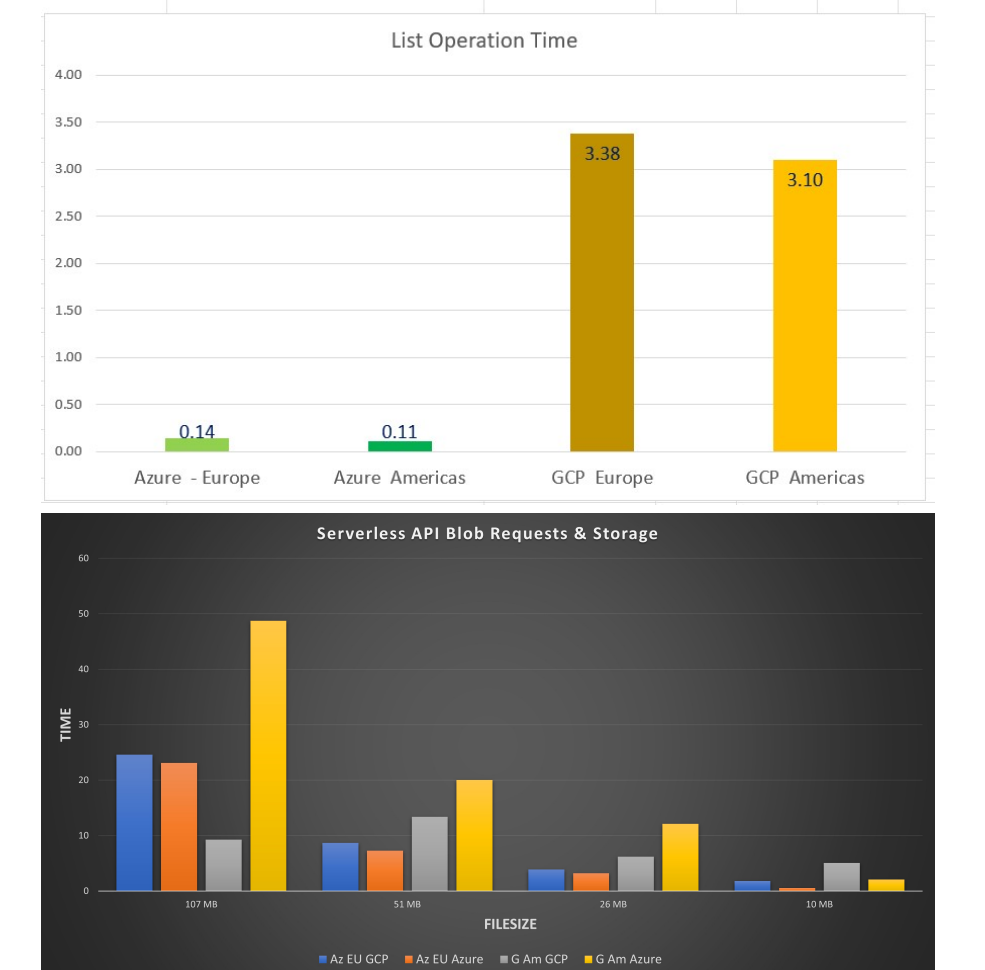
2. List and Concurrent Read/Write Operations:

In 5 runs, to list the 4 files of different sizes, Azure took around less than 15 milliseconds whereas GCP took around 3 secs. Azure takes around 2 secs compared to upto 12-17 secs for GCP for concurrent Write Read operation. Azure performs similar in Europe and Americas , whereas GCP performs better in Americas.



3. Serverless API:

By using **Azure App Service** and **GCP App Engine** serverless features, Azure Europe hosted Serverless API , File stored in Azure is taking similar download time to that in GCP for bigger file size sample whereas Azure taking lesser time than GCP for smaller file sizes. For GCP America hosted Serverless API, File stored in GCP is taking only less than half the time to download than its Azure counterpart for all file sizes.



Cost

Cloud providers charge you based on **Storage Cost**, **Data Transfer Cost** and **Data Request Cost**. Azure Cool fares are better in Asia , whereas Archive and Hot is cheapest in Europe. America is cheaper for all tiers in GCP. Standard, Coldline and Archive costs same in Europe and Asia. Nearline is most expensive in Asia. In terms of data operation and retrieval, price vary across different regions in both providers.

Security

Azure	GCP
DATA PROTECTION	
<ul style="list-style-type: none"> Versioning Soft Delete Point in time restore Blob change feed Snapshots 	<ul style="list-style-type: none"> Versioning Object Holds Retention policy Object Lifecycle Policies
BACKUP	
Azure Backup Center <ul style="list-style-type: none"> Continuous backups (Operational backup) Periodic backups(vaulted backup) 	<ul style="list-style-type: none"> No similar dedicated backup option for an object storage in GCP. Scheduled backups using scripts or Google Cloud Functions.
BACKUP COST	
No backup storage charges. However, you'll incur the source side cost, associated with Object replication.	No additional fee , but cost increases due to increase in replicating the objects.

Data Backup and Protection: Above summary table illustrates that data protection options in Azure Storage Accounts and GCP Buckets exhibit similarities, albeit expressed through their respective terminologies. From test experience backup option in Azure stands out for its user-friendly interface, offering a more intuitive experience compared to GCP.

	Azure	GCP
Storage Account Level	<ul style="list-style-type: none"> Access Key Shared access signature Encryption Access Control(IAM) 	
Container Level	<ul style="list-style-type: none"> Shared access tokens Access Policy Access Control(IAM) 	Bucket Level <ul style="list-style-type: none"> Identify and Access management (IAM) Public Access Access Control <ul style="list-style-type: none"> Uniform
Blob Level	<ul style="list-style-type: none"> Shared access tokens 	Object Level <ul style="list-style-type: none"> Access Control <ul style="list-style-type: none"> Fine-grained
Encryption Types for data at rest	<ul style="list-style-type: none"> 256-bit AES Encryption Key(DEK) Service-side encryption (SSE) DEKs Encrypted with Key Encryption Key (KEK). Microsoft-managed keys Customer-managed keys Customer-provided keys AES Client-side encryption 	Encryption Types for data at rest <ul style="list-style-type: none"> AES-256 Data Encryption Key (DEK). DEKs Encrypted with Key Encryption Key (KEK). Google-managed keys Customer-managed keys Customer-supplied keys Client-side encryption
Transport Protocol for data in transit	HTTPS	Transport Protocol for data in transit HTTPS

Data Security and Access Control: Above Security and Access Control options summary table shows the different security and access control settings for blob data at container/bucket, storage account level in Azure and GCP. Both exhibit a strong dedication to data security, employing comparable encryption strategies.

Conclusions and Future Work

Both GCP and Azure offer reliable and scalable storage options regardless of region. If you prioritizes performance in cloud blob content downloads and uploads from a client application running from cloud virtual machine as a key factor, Azure stands out as a preferred choice regardless of region. Businesses prioritizing efficient and speedy file retrieval may find GCP Americas App engine more favorable as a serverless solution. If cost-effectiveness is a primary consideration, especially storage expenses, GCP proves to be more economical, particularly in the America, where costs are lower across all tiers.

Future work: Performance tests of additional storage tiers offered by the Azure Cool and Archive tiers, GCP Nearline, Coldline and Archive tiers. CPU/Memory, scalability tests can be considered.

QR Code for Recording

