ENGR-E516 Engineering Cloud Computing

Format 360: Multi-Format File Conversion Engine on Google Cloud

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Introduction

- **Format 360** harnesses Google Cloud Platform's serverless architecture for an integrated, scalable file conversion service, bridging the market gap with its comprehensive and seamless functionality.

- **Format 360** uses GCP's serverless computing, including Cloud Run and Cloud Functions, to efficiently handle multiple file formats, for cost-effective flexibility.

Motivation

Addressing Market Gaps:
- Existing tools lack seamless integration and comprehensive format support.
- Format360 addresses the need for a unified solution that integrates seamlessly across different platforms, reducing dependency on multiple tools.

Utilizing Advanced Technology:
- Many tools fail to utilize the full potential of cloud computing.
- Format 360 exploits Google Cloud Platform's serverless infrastructure for improved efficiency and cost-effectiveness.

Related Work and Gap Analysis:

Existing Solutions Limitations:
- Current tools like Zamzar and CloudConvert lack scalability, integration, and support for multiple formats.

Identifying Market Deficiencies:
- Many tools fail to integrate into broader tech ecosystems, highlighting the need for a cohesive and adaptable tool like Format 360.
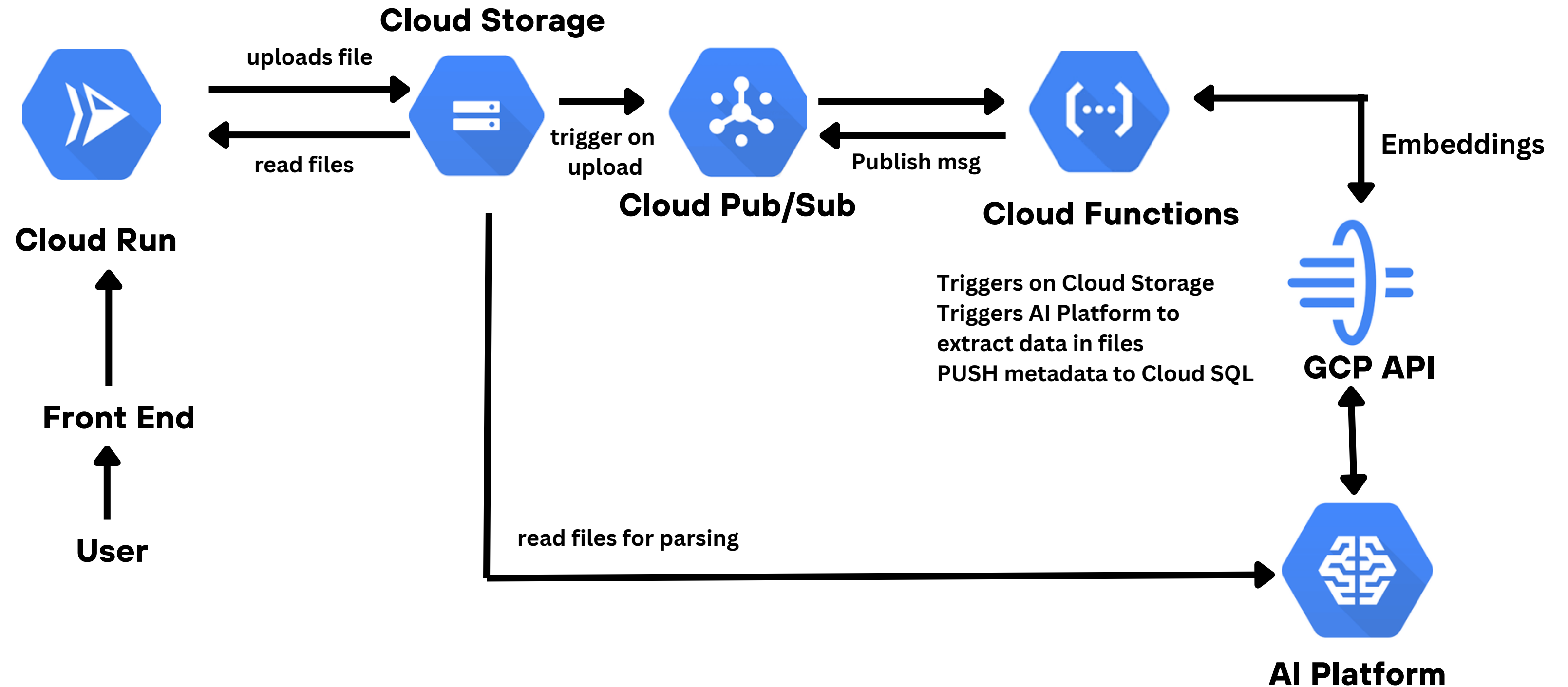
Technological Superiority:
- Utilizes Google Cloud's serverless computing to enhance scalability, maintain cost-effectiveness, and ensure high performance under diverse conditions.
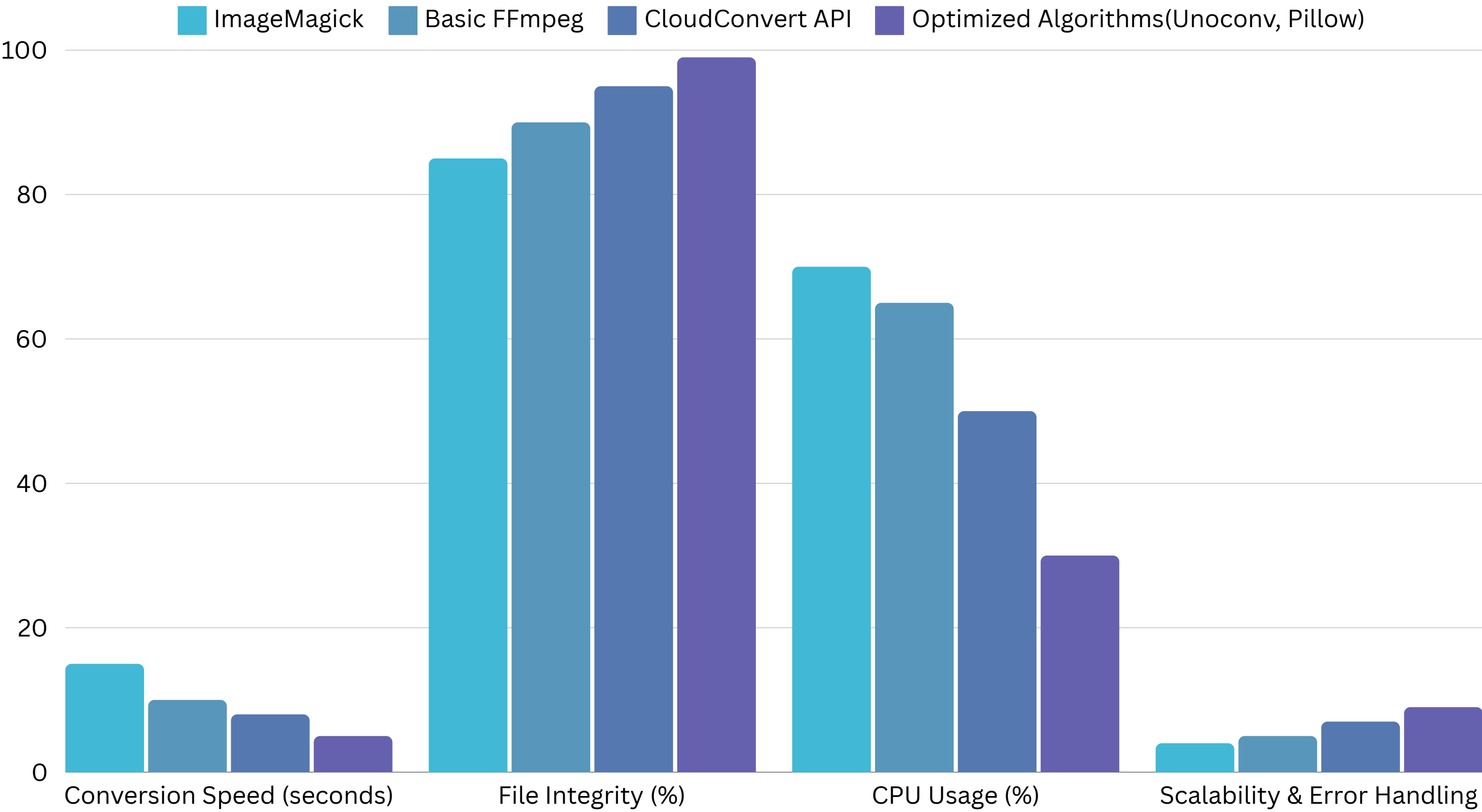
Achieved Result

- Scalable architecture that can accommodate an increase in conversion demands without compromising service quality.

- We utilized **Google Cloud Platform's** comprehensive infrastructure for Format 360, including **Cloud Run, Cloud Functions, Cloud Storage, and Cloud Pub/Sub**.

- Additionally, **Docker** containerized the application, ensuring consistency across development, testing, and production environments.
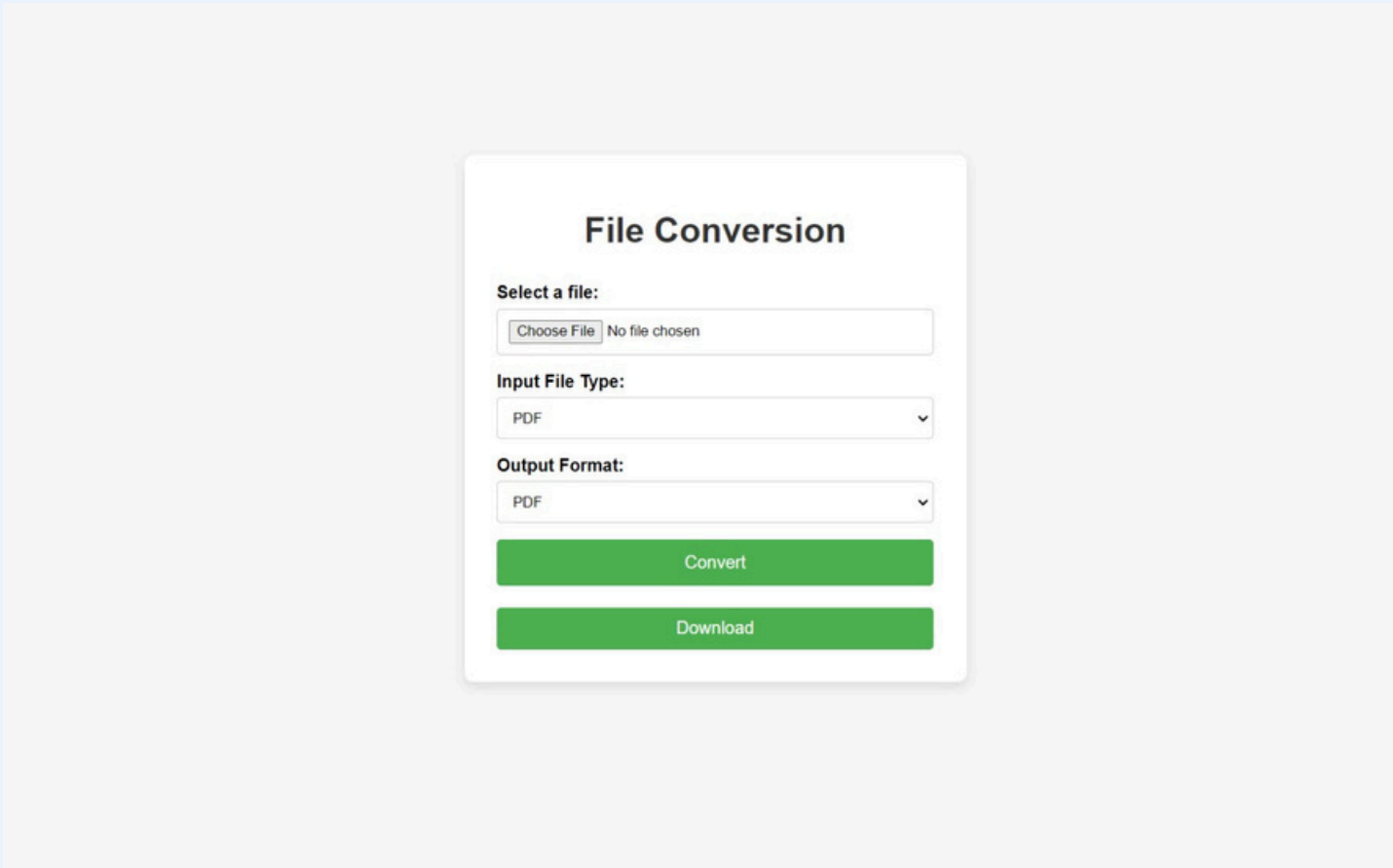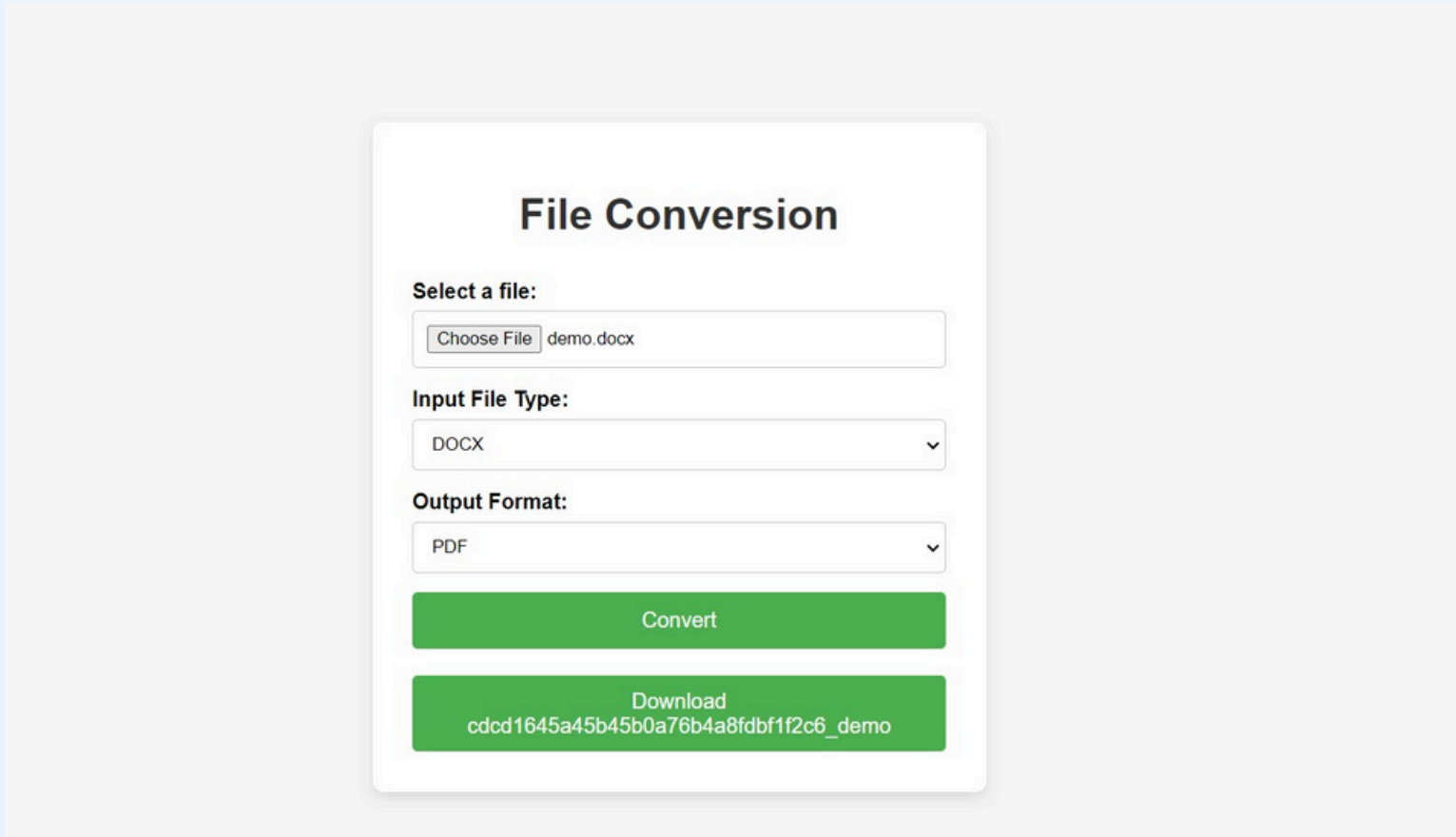
ARCHITECTURE FOR FORMAT 360

Cloud Storage

uploads file

read files

Cloud Run

Front End

User

trigger on upload

Cloud Pub/Sub

Publish msg

Cloud Functions

Embeddings

Triggers on Cloud Storage
Triggers AI Platform to extract data in files
PUSH metadata to Cloud SQL

GCP API

read files for parsing

AI Platform

Comparison :

Legend: ImageMagick | Basic FFmpeg | CloudConvert API | Optimized Algorithms(Unoconv, Pillow)

Categories (x-axis): Conversion Speed (seconds) | File Integrity (%) | CPU Usage (%) | Scalability & Error Handling
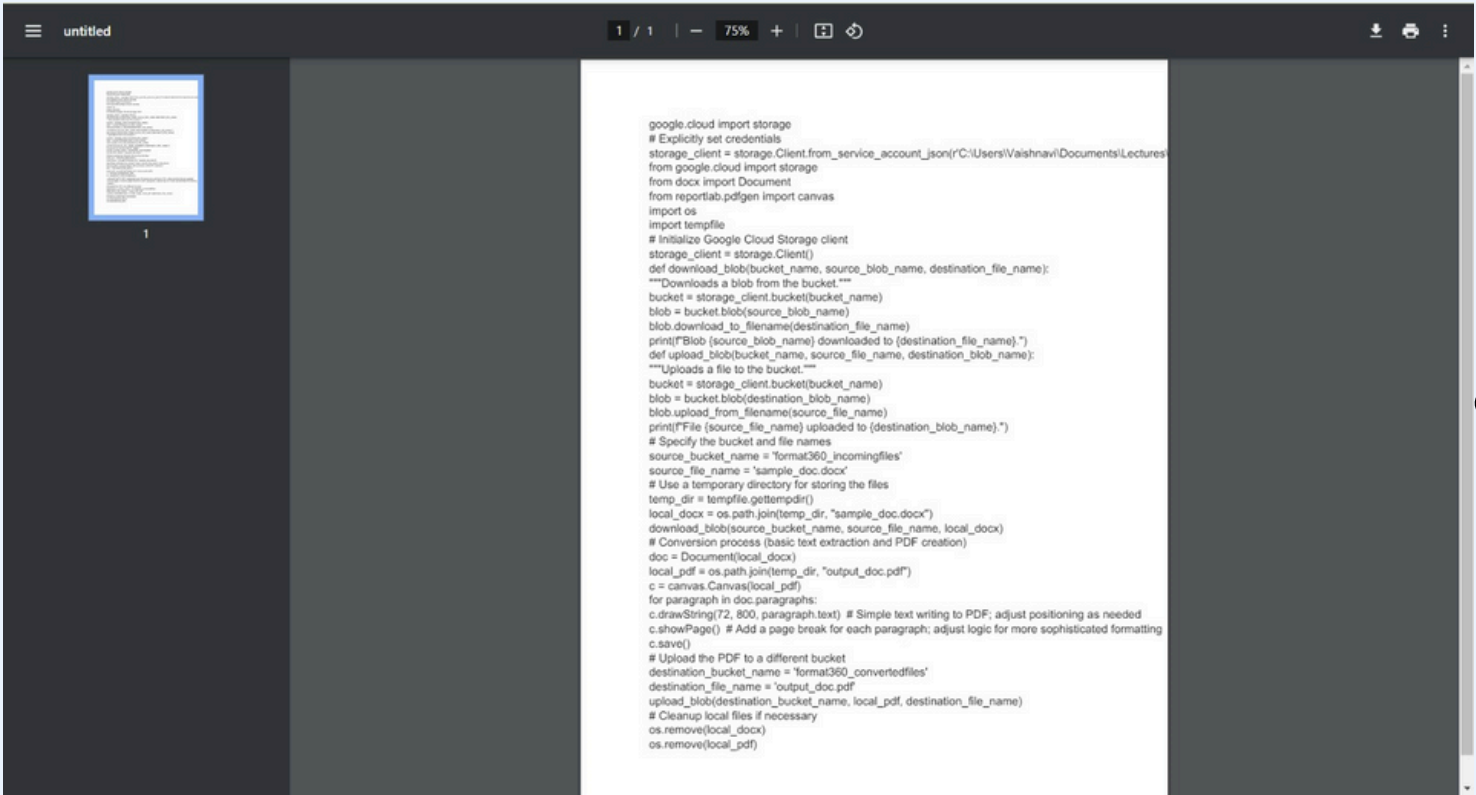
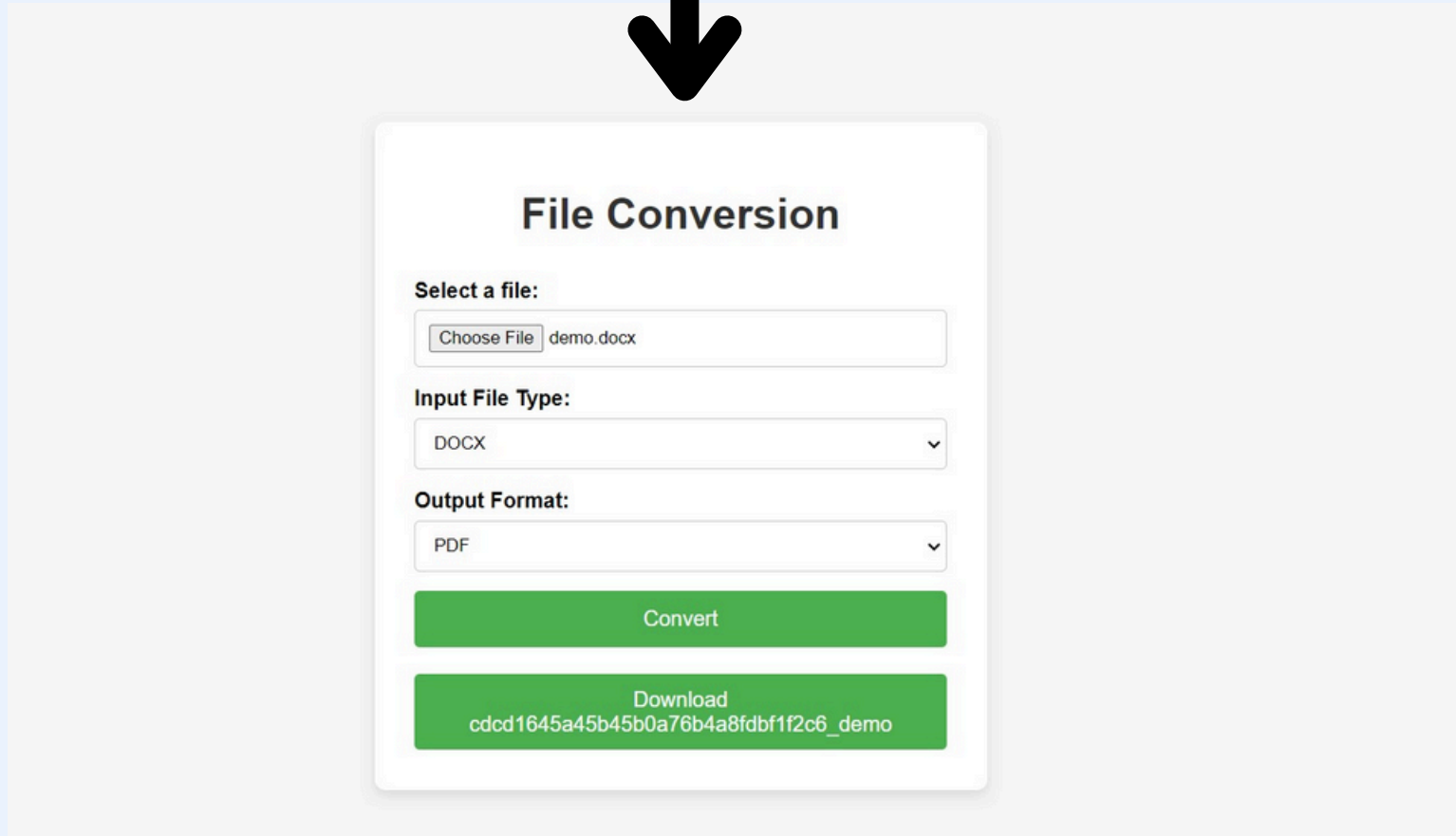# DEMO TIME!

RESULTS:

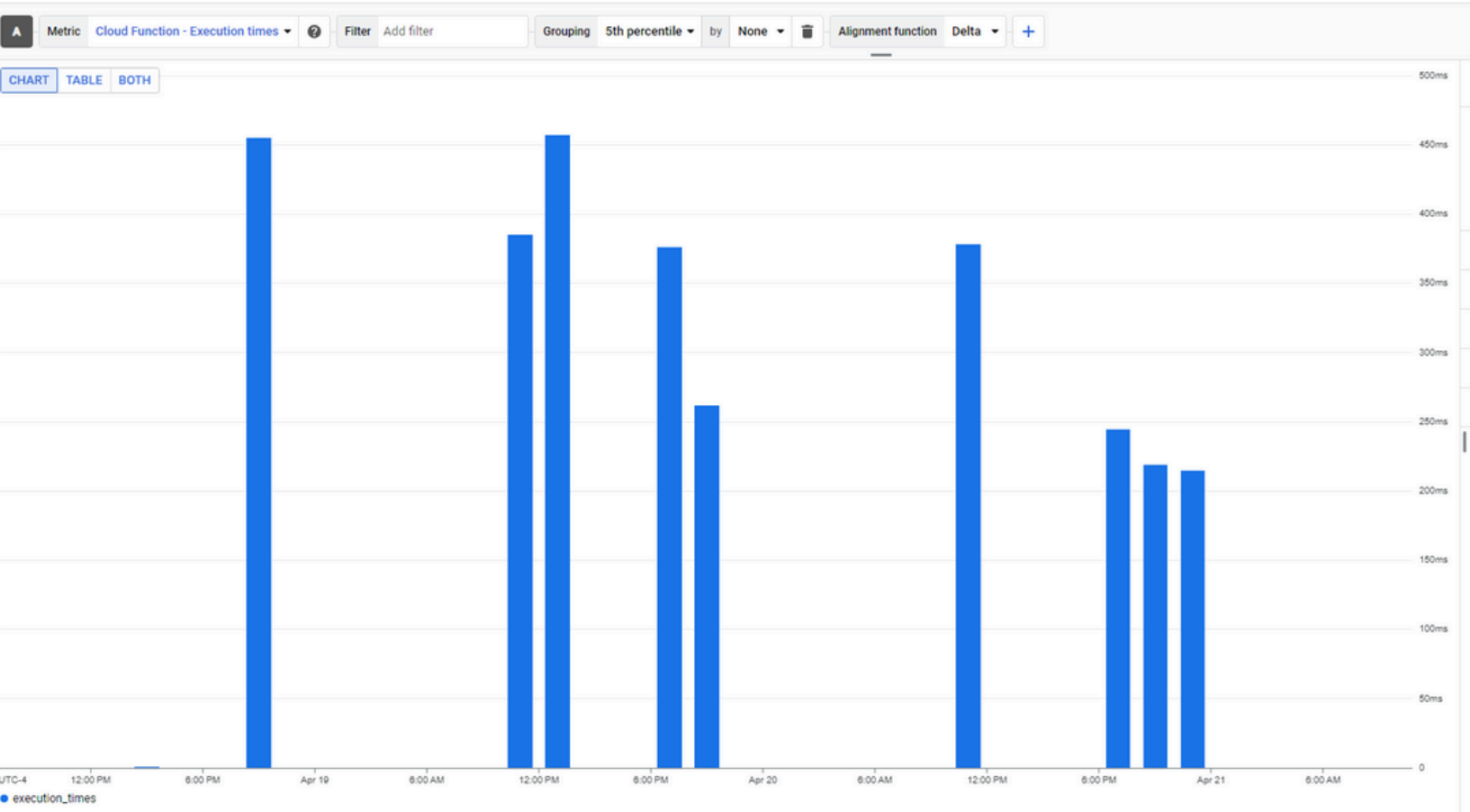**Main Page - Upload the File to Convert**

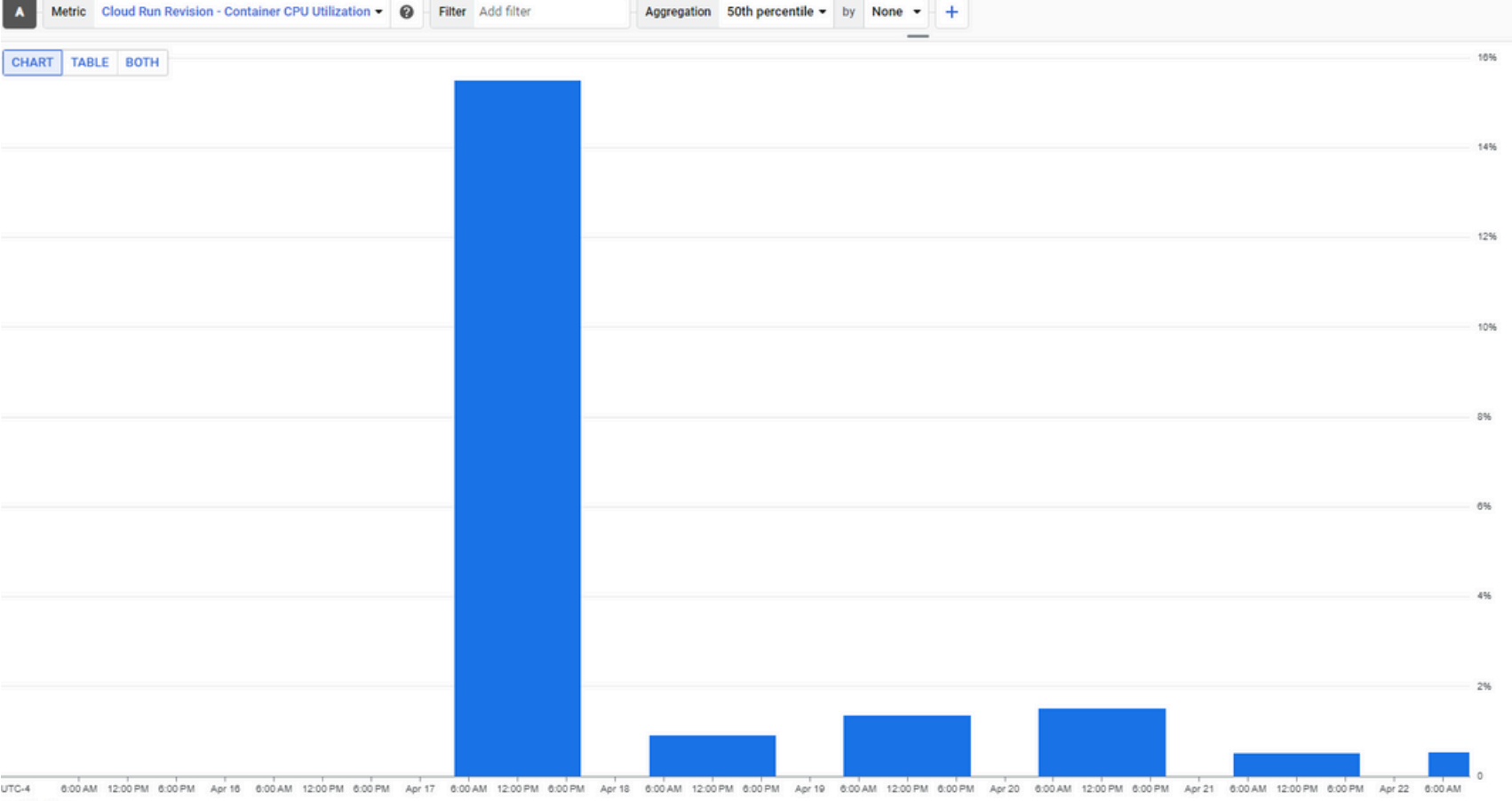**Main Page - Select the conversion Type & Convert**
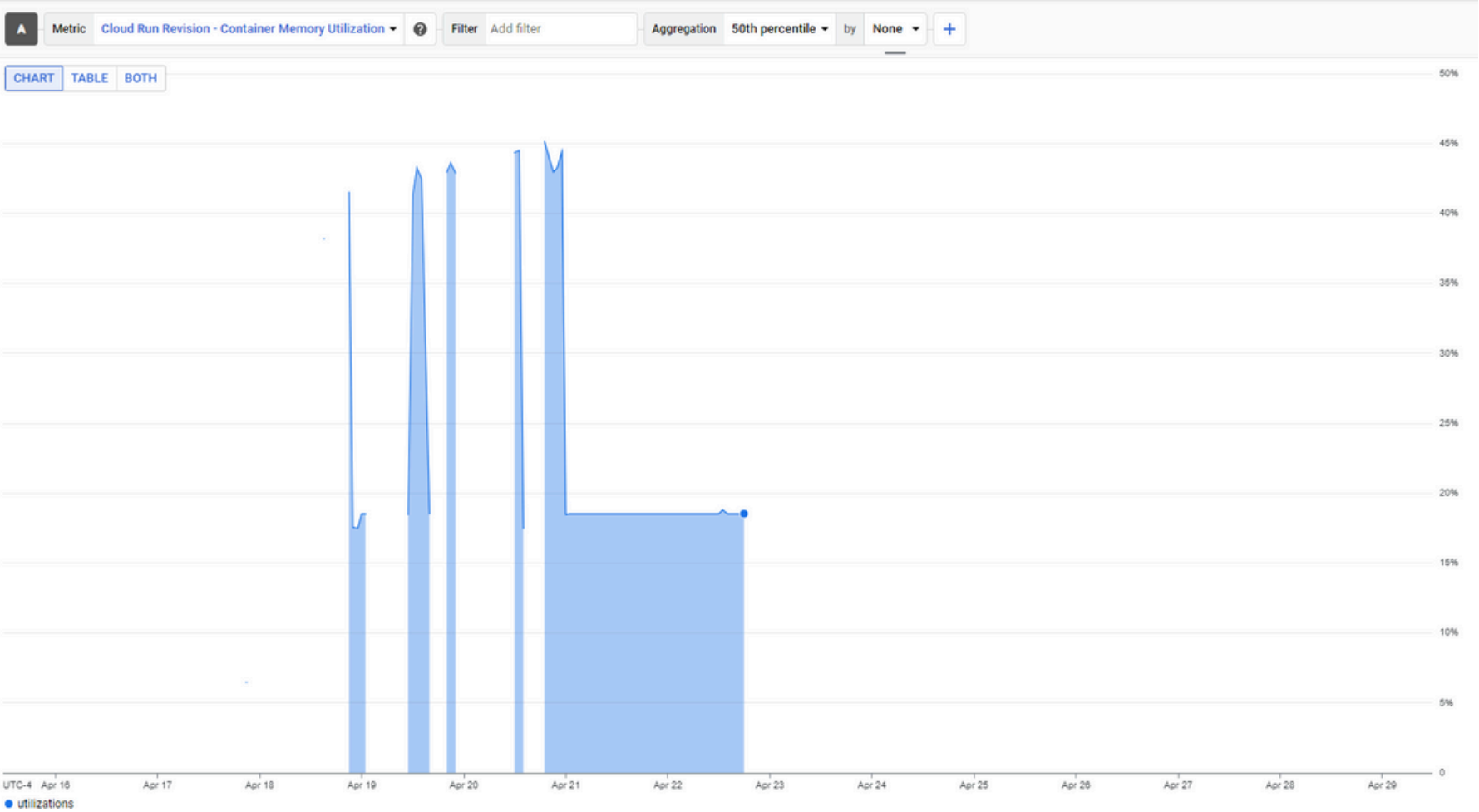

Download Preview & Download the file

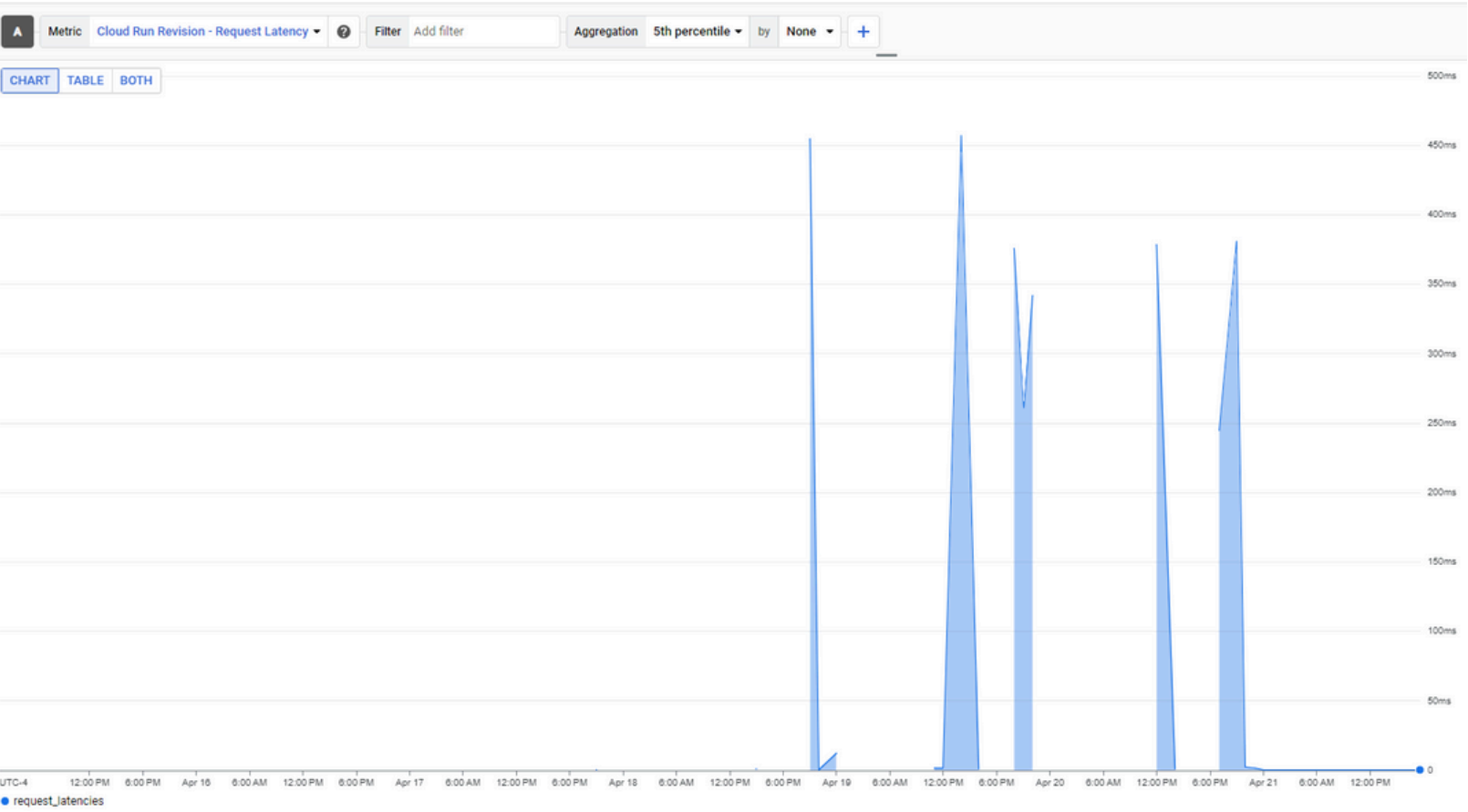**Main Page - Download the file**

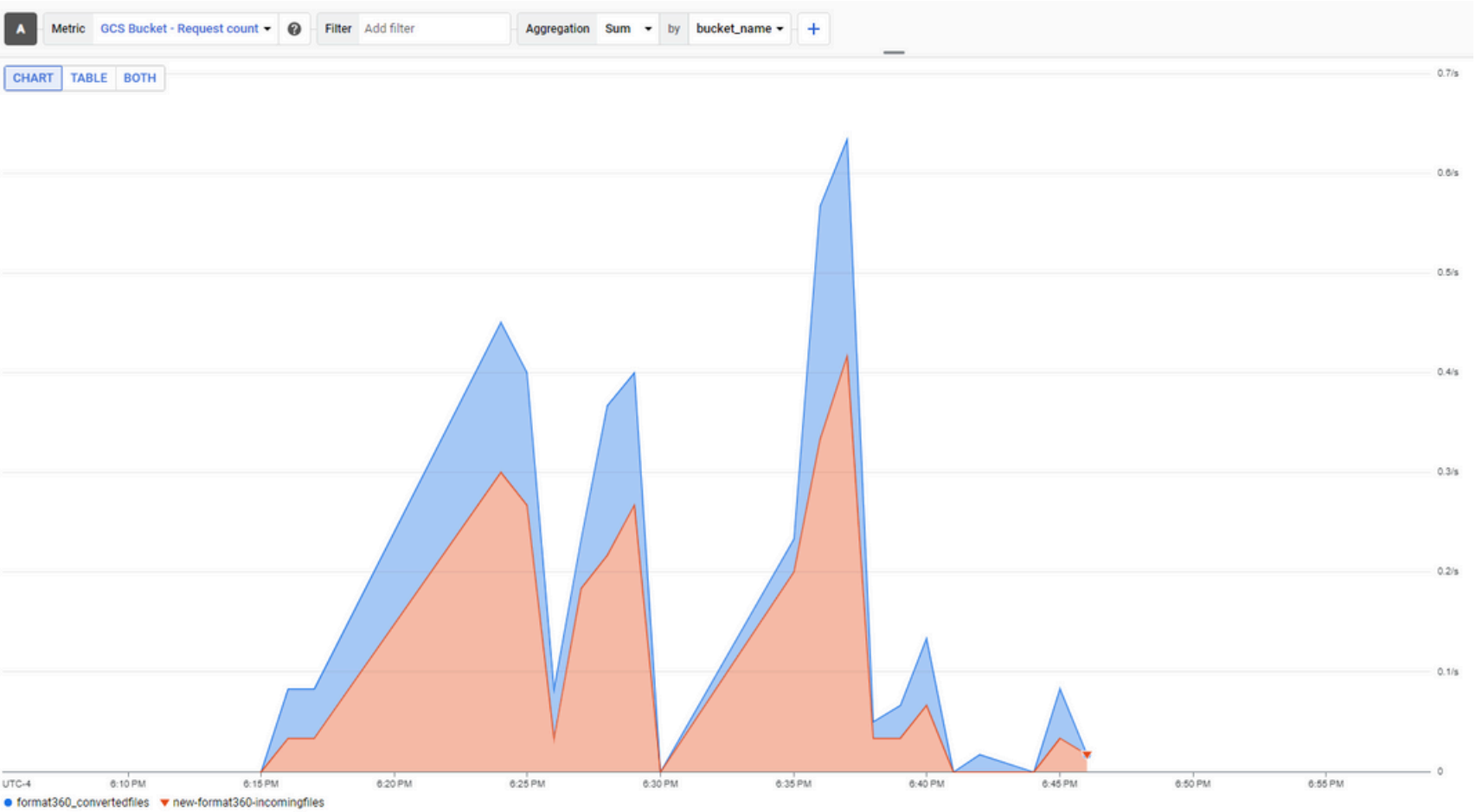**Cloud Function - Execution Time**
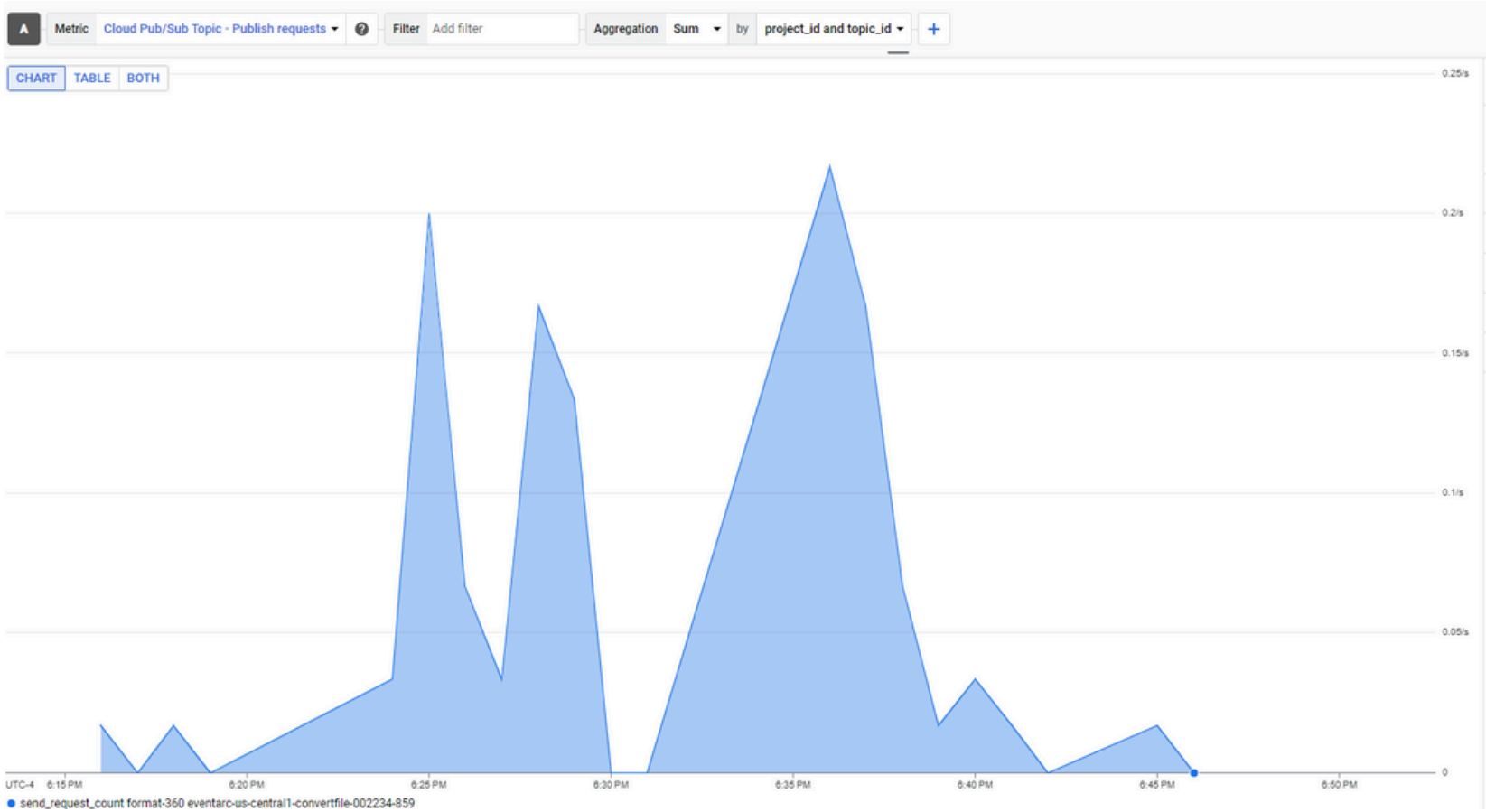
Cloud Run - Container CPU Utilization

Cloud Run - Container Memory Utilization

Request Latency

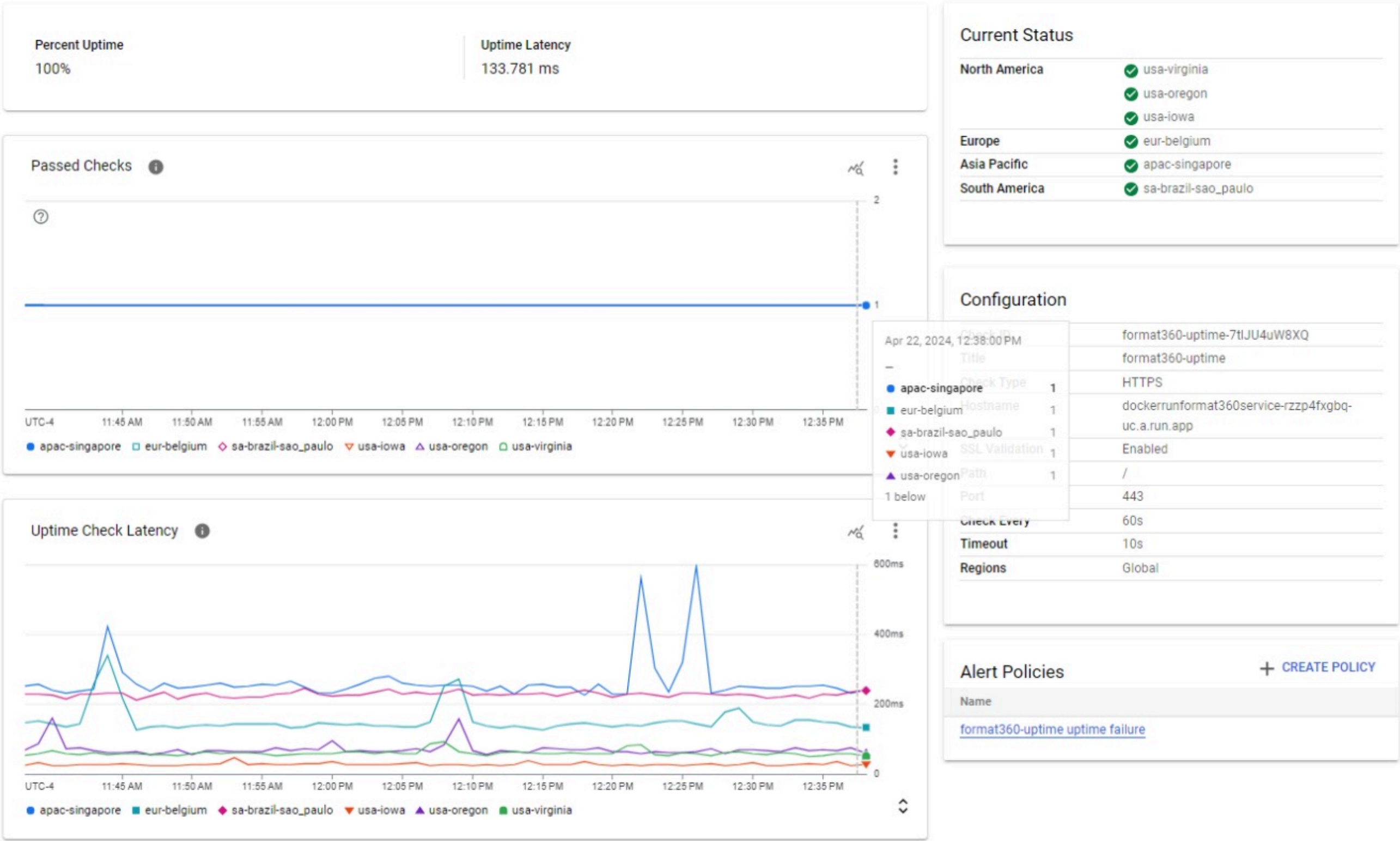**Bucket - Request Count**

Cloud Pub/Sub - Publish Message Count

format360-uptime

Percent Uptime	Uptime Latency
100%	133.781 ms

Current Status

North America	✓ usa-virginia
	✓ usa-oregon
	✓ usa-iowa
Europe	✓ eur-belgium
Asia Pacific	✓ apac-singapore
South America	✓ sa-brazil-sao_paulo

Passed Checks ⓘ

Apr 22, 2024, 12:38:00 PM
—
● apac-singapore   1
■ eur-belgium   1
◆ sa-brazil-sao_paulo   1
▽ usa-iowa   1
▲ usa-oregon   1
1 below

● apac-singapore   □ eur-belgium   ◇ sa-brazil-sao_paulo   ▽ usa-iowa   △ usa-oregon   ○ usa-virginia

Configuration

Check Id	format360-uptime-7tIJU4uW8XQ
Title	format360-uptime
Check Type	HTTPS
Hostname	dockerrunformat360service-rzzp4fxgbq-uc.a.run.app
SSL Validation	Enabled
Path	/
Port	443
Check Every	60s
Timeout	10s
Regions	Global

Uptime Check Latency ⓘ

● apac-singapore   □ eur-belgium   ◇ sa-brazil-sao_paulo   ▽ usa-iowa   △ usa-oregon   ○ usa-virginia

Alert Policies   + CREATE POLICY

Name
format360-uptime uptime failure

Uptime Check Latency

Scope for future development

1. **Enhanced Conversion Capabilities:**
   - Expand the range of supported file formats, including specialized formats used in industries like healthcare or engineering.

2. **Integration with Additional Cloud Services:**
   - Provide tighter integration with other GCP services, such as AI Platform for implementing machine learning-enhanced features.

3. **Security Features:**
   - Integrate more advanced security measures such as anomaly detection to protect against new and emerging threats.

Thank you