



CLOUD COMPUTING COURSE WORK III

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Highlights of achieved requirements

- ▶ I used both GAE, AWS EC2 and AWS Lambda.
- ▶ My system offers a persistent front-end.
- ▶ Google charts showing the time series of Adjacent close and Return series.
- ▶ Monte Carlo analysis running on AWS EC2 and AWS Lambda.
- ▶ Historical and Covariance also running on AWS EC2 and AWS Lambda.
- ▶ Dynamic use of Scalable services.
- ▶ Specification of Investment, T, M and R Values via Front-end.
- ▶ Loading Data to system
- ▶ Additional scalable service, AWS S3
- ▶ All of the above requirements were meet with regards to the coursework
- ▶ hudd-157916.appspot.com

Highlights I want to clarify

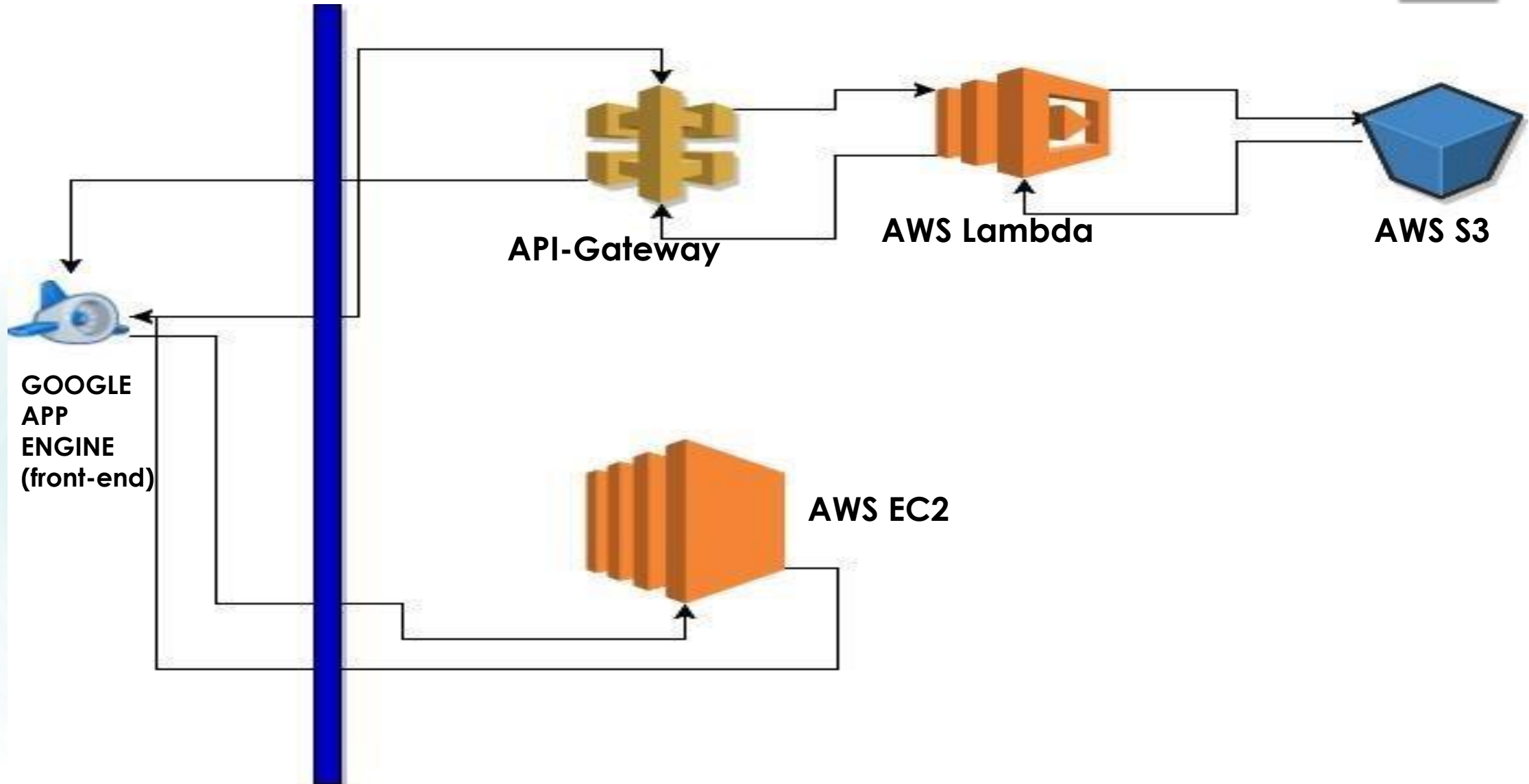
- GAE, AWS EC2 and were all requirements, I choose AWS Lambda to the other scalable service because, I for one found it user friendly due to it's ability to deploy and run code at ease. Connection is facilitated because of its integration ability with the AWS API-Gateway. It summarises the steps to a task of 1000 steps.
- GAE bears the persistent Frontend, it takes inputs from a given user and outputs the results(Google chart time series and means).
- Monte Carlo analysis are calculated in AWS Lambda and AWS EC2 with respect R, I wrote down a script to compute historical, covariance and monte Carlo on both services. Since it would be comfortable for me to have all analysis on one script to help me debug.
- AWS S3 is an additional service I added, since I could not think of any other way to send data to AWS Lambda. With the use of the python module "urllib2" I was able to download the data from S3.
- Data into the system, will be via AWS S3 or via AWS EC2.

Improvements I should have made.

- ▶ *Cost reduction*
- ▶ *Sound Security implementation*
- ▶ More descriptive Front-end (Usability).
- ▶ *Efficient Data upload via Frontend.*
- ▶ Error Checking (Handling).
- ▶ Implementation of Backup and recovery

Demonstration the system I

Diagram showing the structure of implementation
and scalable services used



THE SYSTEM

- ▶ THE GOOGLE APP ENGINE (GAE)

This service houses the website or is the frontend to the system, from which inputs are keyed in and results are displayed. It also houses a python scripts which I would call the main controller, since it uses the "R" to determine the number of resources to be invoked.

- ▶ THE AWS API-GATEWAY

This service is used to label my lambda function which helps to push it online by making it accessible with a url. It facilitates the passage and transfer of information between GAE and AWS Lambda.

- ▶ AWS LAMBDA

Lambda runs a python script (Historical, Covariance and MC.), it connects with GAE via the API-Gateway

- ▶ AWS EC2

EC2 runs a python CGI script (Historical, Covariance and MC.) together with an apache server, which allows the passage of information e.g. Inputs between GAE and EC2.

- ▶ AWS S3

The Datasets (CSV) files are stored here. It also contains back up scripts for the system. It serves as the main source of data supply to AWS Lambda.

For some given parameters (M, T, R and Investment)

Select a Company:

- ☐ IBM
- ☐ Google
- ☐ Apple
- ☒ Amazon
- ☐ Oracle

Input Parameters for Computations :

Monte Samples (M)

Data Points (T)

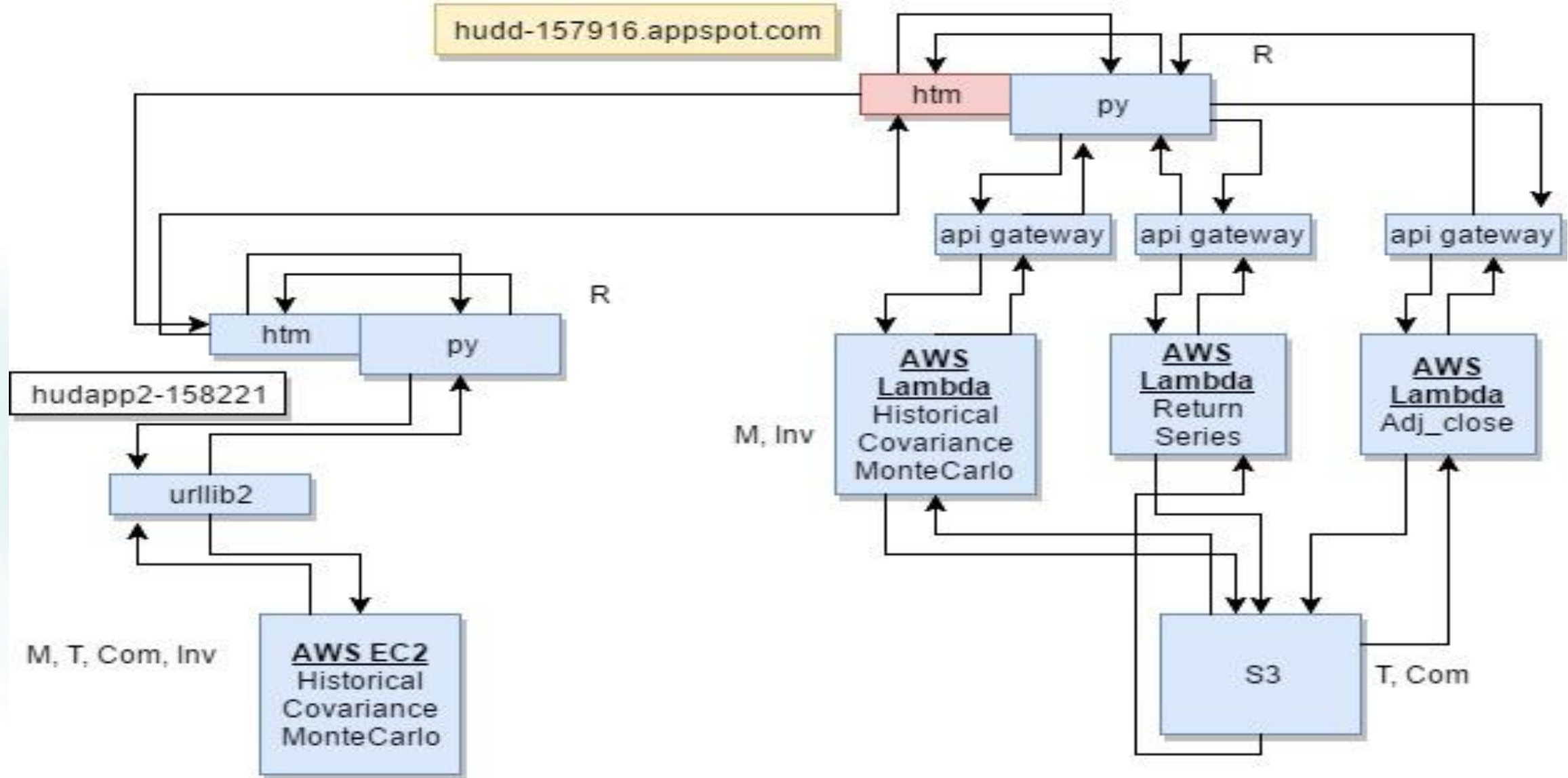
AMT Of Investment (\$)

Number Of (R) Resources

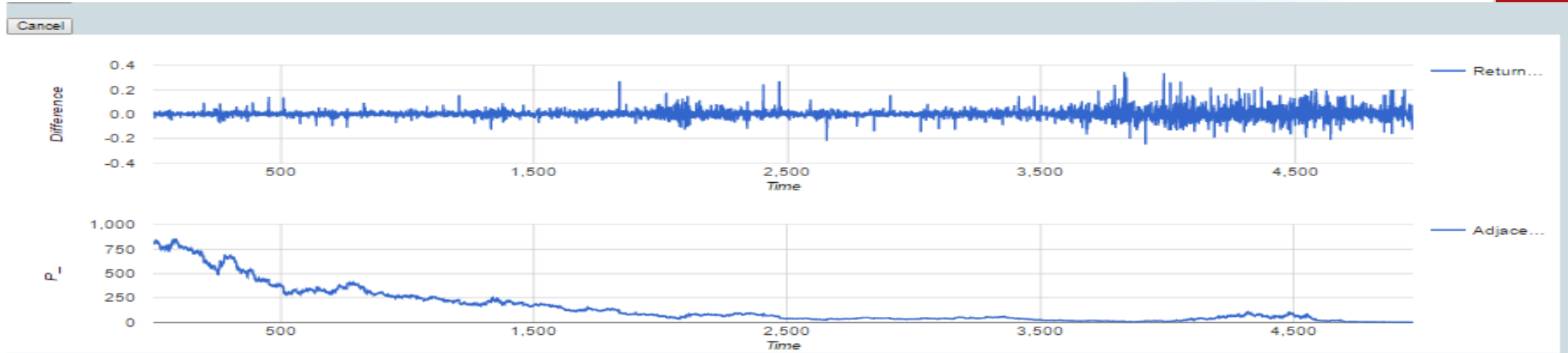
- A given user selects a company “Amazon”.
- The user inputs the required parameters
- M, T, Investment and R.
- With M being the number of monte Carlo samples, “10000”.
- T is the Data points or length of the dataset with respect to rows, “4969”.
- An investment value of “10000”
- And R is the number of resources to be used, hence “3”, there for M/R , which is “3333.3”.
- Therefore each R will burden a load of 3333.3 samples

Detailed Demonstration of the system ii

Note : this is not an official schematic diagram. This diagram is to help me explain and elaborate more



Results



Results of Mean "Average" computation with regards to VAR over R"

Hence below is the final collated results for 6 VaR results

Historical at 95% is : -531.437125749

Historical at 99% is : -1056.90926829

Covariance at 95% is : -671.911244006

Covariance at 99% is : -940.547200354

Monte Carlo, historical at 95% is : -863.73622409

Monte Carlo, historical at 99% is : -1224.65275164

- The screen capture above shows the illustration of the "time series" using the return series and adjacent close, utilizing parameters "T and Company".
- Below the time series are the results (mean)of the R values at 95%, and the mean of R values at 99%.