

# Google App Engine

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*Abstract-Google App Engine was released by Google as a beta version in April 2008. Google App Engine is a cloud computing technology. It is a system to expose Google's scalable infrastructure to your server side applications and that too free of cost. It allows the user to run his software on the Google servers somewhere in the Google cloud. It is highly secure and reliable. It is highly reliable because even in the case of server failure, it will neither affect the performance of the users nor the services of the Google. Google takes care of the hardware and network while you have to concentrate on building your application and the users around your application.*

**Index Terms:** Scalable, Data store.

## I. INTRODUCTION

Google App Engine is a way to write your own web applications and have them hosted on Google servers. It enables developers to build their web applications on the same scalable system that power Google applications. It focus on two things i.e. Easy to start (starting from a great idea to running it live on the web) and Easy to scale (once you get to a point where there is serious traffic i.e millions of users you have to be sure that your infrastructure is able to handle that increased load). Building and maintaining the applications using the App Engine is easy. It is also easy to scale when the traffic and the data storage requirements increase. Using the App Engine there are even no servers to maintain, all one has to do is to upload the application and the rest is taken care by the Google. One can serve the app from own domain name using Google Apps or using a free name on the appspot.com domain. Google App provides several security features in order to keep the data safe, secure and in control of the developer. The applications can be shared with the world, or limited to the members of an organization. It also serve its users with exceptionally secure data centers. With the App Engine the developers need to pay only for what they use. To begin with, there are no set-up costs or recurring fees. The resources used by the applications like storage, bandwidth etc are measured by the gigabyte and billing is done at competitive rates. As the developer is the one who controls the maximum of the resource amount that an app can consume it always stay within the budget. In other words, App Engine costs nothing to get started.

## II. WHY GOOGLE BUILD APP ENGINE?

The purpose behind the creation of the App Engine is to make web better by empowering several new developers to build web applications for the web. As a result of opening App Engine to the public, several bright developers will be allowed to check, test, poke, find problems and suggest fixes and improvements. And even

though, if other companies enter application cloud market, they will be playing catch-up.

## III. GOOGLE APPS

Apps is an acronym for abbreviation. An app is a piece of software which can run on the computer, internet, phone or any other electronic device. Google refers to their online services as Apps. They also sell a specific suite of services known as Google Apps.

## IV. SOME GOOGLE APPS

**EMAIL**-is designed to work on any computer or a mobile using a data connection. Its offline support keeps you working even when you are disconnected. Wherever you maybe, your email is always there.

**GOOGLE DOCS**-One can create, edit or view awesome presentations, documents and spreadsheets. It also allows team members to work on the same document simultaneously.

**CALENDAR**- Calendar sharing provides an easy way to find time with the people you are working with, it also has a smart scheduling feature which suggests meeting times that suits everyone.

**GOOGLE DRIVE**-Using this application, you have an access to the up to date version of your files from anywhere. E.g. PC's, Mac, Phones. There are many more Google apps such as Google Voice, Google Now, Google Reader, Ad Sense, Ad Words, Google Maps, and YouTube etc.

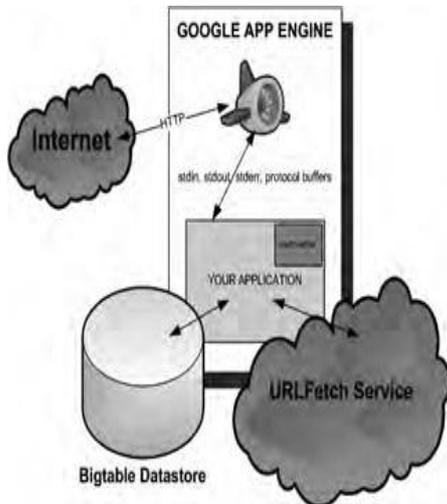
## IV. APPLICATION ENVIRONMENT

The application runtime environment consist of the interpreter which executes the code (it can be either the Python interpreter or the Java virtual machine), the application's memory, a read-only file system along with application's resource files, and APIs to the App Engine services. It also comprises of the request handler API, defining the server and the handler communication regarding the request and response, and the handler emitting messages to the App Engine logging system.

## V. APP ENGINE ARCHITECTURE

The App Engine is designed to address your concerns regarding scalability and reliability. It is built on the concept of horizontal scaling which means instead of running your application on a powerful hardware it runs your application on the Google data centers. The Fig. shows your App Engine application running as an isolated entity inside the structure of the multitenant environment. App Engine shares the available resources among multiple applications, but isolates the data and security between each application as well. Your

application is allowed to use some of the Google services, like URL Fetch, Memcache, and Mail to execute processes on its behalf. Consider an example i.e. Suppose there is an apartment building (App Engine) with heating and central air controls. You being a tenant (your App Engine application) in this building can not directly adjust the temperature because that would affect the other tenants (other App Engine applications) also. So, you have to send a request to the building super to change the temperature on your behalf (URLFetch, Memcache, Mail, Bigtable query, XMPP, or any other Google App Engine service). This is essentially what is happening with App Engine. Running these services on behalf of your application is not something Google App Engine handles without any restrictions. Your application has a daily limit on each and every type of request. It is recorded and then subtracted from the daily allotment. Let's have a look at these quotas in detail [2].



**Fixed and Billable Quotas:** The Google App Engine outlines two types of quotas. These are shown in the table below:

**App Engine Quota Types**

Most applications will place well under the fixed quota limit of the free version of the Google App Engine. When you enable billing on your App Engine application, it increases your quota limits ahead of what is provided with the free version. An increase will be seen in the fixed allotment of resources. And, still if more is required, you can define a budget and then allocate resources.

**VI. THE APP ENGINE DATASTORE**

Developers who have no knowledge about the relational databases will highly appreciate the fact that the Models (as in Model-View-Controller) are quite simpler to use in comparison to relational databases. The Google Data store can be scaled well beyond a million users. Using Models makes storage easier.

**VI. APP ENGINE SERVICES**

The App Engine offers a number of services that enable you to perform several common operations when managing your application. The following APIs are available to access these services:

- **Mail**  
Using the mail API, the developers can send email messages.
- **Memcache**  
The Memcache service gives the users the benefit of working efficiently by providing high retrieval speed, even when multiple users access the same application at the same instance of time.
- **Image Manipulation**  
The Image service allows you to manipulate images of your application. With the use of this API, you can resize, crop, rotate and flip images in JPEG and PNG formats.

**VII. ADVANTAGES AND DISADVANTAGES**

**ADVANTAGES**

- **Automatic Scalability**-Automatic scaling is built - in App Engine, all you have to do is write your application code and Google will do the rest.
- **Security**-Google apps offer several security features to keep your data safe, secure and under your control.
- **No maintenance** -There is no need of buying any servers or server space.
- **Free** -up to a certain limit of consumed resources.
- **Easy to Build** - Building web applications used to be for experienced programmers but with Google App Engine anyone can create a dynamic web presence.
- **Speed**-It is hosted on Google servers which load the applications very fast.

Quota Type	Description
Billable Quota	<ul style="list-style-type: none"> <li>• Maximums are set by the user</li> <li>• Budget-based</li> <li>• Vary by application and can be set by the administrator</li> </ul>
Fixed Quota	<ul style="list-style-type: none"> <li>• Maximums are set by App Engine</li> <li>• System-based</li> <li>• for all applications</li> </ul> Same on App Engine

**DISADVANTAGES**

- **Programming Languages**-At present, the Google App Engine supports only Python and Java.
- **File/system access**-As you run your app in a somewhat restricted environment, you have no direct access to the server. All you can do is upload files and migrate databases, but your code will have no write access to the file system.

- The size of the app must be such that it can be loaded into the memory in not more than 30seconds as the space allocated to your app on the cloud is limited.

### VIII. SCOPE FOR IMPROVEMENT

- More space for large files – in uploading and downloading
- Data store - import and export for large volumes of data
- Pay-as-you-go billing - for resource usage over free quota
- More languages may be used for writing the applications

### IX. CONCLUSION

By using the Google App Engine for your application, you will have the biggest advantage of running it in the Google's best data centers around the world. You need to worry about a few things only like whether your application works well, makes optimum use of resources and at the same time makes your users happy or not. If the traffic on your application increases, the Google engineer's make sure that you have all the required resources and make the best possible use of them in the Google Data centers scattered around the world. But, if your application is meant to be shared among limited number of people such as your friends, Google lets you use their production infrastructure for free.

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