Cloud Computing Fundamentals: A Review on Cloud Computing Service Providers

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Introduction

Cloud computing provides companies with huge computing services to improve the development of organizations. The basic requirement of this technology is the Internet, but compared with the Internet, it provides higher functions. Cloud computing is a combination of computing, software, data access, and also provides storage services. In Cloud, users do not know the storage and storage location of data. Cloud computing uses the concepts of virtualization, service-oriented architecture, autonomy and practical computing**.**

The literature review report

a) Comparative Evaluation

Service model

SaaS, PaaS and IaaS are just three ways to describe how to use the cloud in the enterprise. These are called service models of cloud computing.

PaaS: Hardware and software tools available on the Internet.

IaaS: Cloud-based services, pay-as-you-go, for storage, networking, and virtualization services.

SaaS: Software available through third parties via the Internet.

In general, infrastructure as a service (IaaS) provides users with more control and flexibility, while platform as a service (PaaS) tends to be more self-righteous, but there are fewer things to maintain and support.

AWS Elastic Compute Service o**r EC2 i**s IaaS. This is because Amazon is responsible for networking, storage, servers, and virtualization, while users are responsible for managing the operating system, middleware, runtime, data, and applications. PaaS as a service, users only need to take care of data and applications, and the management of the remaining layers is in the hands of the service provider. AWS Elastic Beanstalk is PaaS.

Google Cloud's platform as a service (PaaS). IaaS provides more control in the hands of users, while PaaS is mainly controlled by service providers.

Virtual Machine (VM) instance

Notes on **Amazon EC2** performance evaluation. Amazon EC2 provides a large number of options for different instance types. Each with one or more size options, and they are organized into six different instance series optimized for different types of applications. Amazon EC2 P4 instances are the latest generation of GPU-based instances that provide the highest performance for machine learning training and high-performance computing in the cloud.

Google Cloud Platform (GCP) is where all Google Cloud services are located and can be used through its console page. You will access the Compute Engine service on GCP to create virtual machine (VM) instances. You can access SRA data for free in any region of the United States and any region within the United States. This guide will help you get started with basic examples to familiarize yourself with the whole process. The following contains useful tips on creating sample instances with default settings.

There are a variety of **Microsoft Azure** VM types optimized to meet various needs. The machine type is dedicated and varies with virtual CPU (vCPU), disk capabilities, and memory size, providing many options to match any workload. The instance type name is just a series from A to N. Finding the right type of machine for your load will always depend on your needs.

Storage

Gateway provides a secondary archive storage option and combines Glacier**, Amazon's** only backup feature. Users can choose to use S3 for simple object storage, or use large containers with flexible block functions for block storage; this is used in conjunction with E2B. In addition, flexible file storage expands your capabilities

Azure provides a dedicated storage option called Blob storage. This is reserved for REST-based unstructured object warehouses. Like AWS, they also provide solutions for large-scale data storage and large-volume critical workloads through Queue Storage and Data Lake Store. The platform provides users the largest database .They support three different SQL based formats and its data warehouse provides you with room for growth. Azure's support for SQL is not limited to storage. Their Server Stretch database is a hybrid database that provides internal and external storage for companies that use Microsoft SQL Server as the enterprise edition but may take advantage of other protocols in the cloud.

Google Cloud Platform provides basic storage and database support, but nothing more. Their storage solutions are similar to those provided by GCP for customers in the computing department, and they provide both SQL and NoSQL database support. They do have transfer equipment similar to AWS Snowball and can use multiple online transfer services.

OS environmental offer

Amazon EC2 supports multiple operating systems, such as RedHat Linux, Windows Server and SUSE Linux. They are trying to add more operating systems day by day.

Google Cloud Platform includes public cloud infrastructure, Google Workspace called G Suite, enterprise versions of Android and Chrome OS, application programming interfaces for machine learning and also Corporate graphics services.

Azure computing functions rely on virtual machine networks to enable a range of computing solutions, including development, testing, data center expansion, and application deployment. It is based on an open source platform compatible with Linux, Windows Server, SQL Server, Oracle and SAP. Azure also

provides a hybrid model that combines local and public clouds and can be integrated into global load balancing.

Pricing model

AWS pricing: -There is definitely not a ton of transparency here, in spite of the fact that the stage furnishes its clients with a cost calculator. The estimating structure is so complex; we suggest utilizing an outsider administration application to assist you with exploring your alternatives and contain costs. They do offer 750 hours of EC2 administration every month for up to 12 month as a component of their free tier.

Azure pricing: -This is another stage where it will profit you to acquire master direction. The valuing alternatives are fundamentally situational with an end goal to take into account the novel requirements of every client. Like AWS, Azure offers 750 hours of the Windows or Linux B1S expansion of their essential process stage, Virtual Machines, every year (it's allowed to attempt, which is pleasant for any business who needs to test the cloud "waters").

***Google pricing*: -** Estimating is one area where Google attempts to stand separated from the group by making their valuing structure somewhat less obscure and more client inviting. They endeavor to beat the rundown costs offered by most cloud administrations suppliers and give steep limits and different motivating forces to win business. Google's free tier motivator incorporate one F1-miniature example every month for as long as one year. In case you're searching for a simple to explore, financial plan inviting help that shows promising development potential, this is the stage for you.

Monitoring tools/service provided

AWS	*AZURE*	*GOOGLE*
Developer and Management tools	Big data and predictive analytics	Data management and storage
Machine learning and predictive analytic.	Game and app development	App development
Database and storage solution	Scalable data warehousing	SMB business analytics And AI
Business productivity tools	Blockchain technology	Productivity and Workload management tools
App intergration	Devops	
Compute	Iot intergration	

Compare between Amazon EC2 Google Cloud Platform and Microsoft Azure in their security system

GCP is exceptionally youthful somehow but very old in others. It's based on Google's impressive long term designing and worldwide activities, which are madly amazing.

Like Azure, GCP is better unified, on the grounds that numerous capacities were arranged out from the beginning — contrasted with AWS highlights which were just added a couple of years prior. Inside your record Projects are disengaged from one another with the exception of where you associate

administrations. Generally speaking GCP isn't as experienced as AWS, however a few administrations — strikingly compartment the board and AI — are class pioneers.

The most effortless approach to consider GCP security is on a continuum somewhere close to AWS and Azure. It offers association wide logging yet inclusion isn't finished. It has more granular IAM which can be simpler to oversee midway, however a few parts of custom strategies are as yet in beta. This is all simply a question of development. GCP additionally by and large defaults to make sure about designs however doesn't generally have a similar scope of security includes as AWS.

GCP remembers some great worked for security instruments. The Cloud Security Command Center is their variant of the Azure Security Center or the AWS Security Hub. Stack driver Logging works incredible, and Google offers the open source forseti for overseeing security setups.

Performance and scalability

Amazon Web Services: – With a huge tool set that keeps on developing dramatically, Amazon's capacities are unequaled. However its cost structure can be confusing, and its solitary spotlight on open cloud instead of half and half cloud or private cloud implies that interoperating with your server farm isn't AWS's main concern.

Microsoft Azure: – A nearby contender to AWS with a particularly competent cloud framework. In case you're an undertaking client, Azure communicates in your language – not many organizations have the enterprise foundation (and Windows uphold) as Microsoft. Azure realizes you actually run a server farm, and the Azure stage strives to interoperate with server farms; half breed cloud is a genuine strength.

Google Cloud: – A very much supported dark horse in the opposition, Google entered the cloud market later and doesn't have the undertaking center that helps draw corporate clients. However, its specialized mastery is significant, and its industry-driving apparatuses in profound learning and computerized reasoning, AI and information investigation are huge preferences.

AMAZON WEB SERVICE (AWS)	• AWS Mobile Hub supports Android and IOS and gives assistance to regarding the mobile app. Features like Developing, testing and controlling the mobile applications are the key advantage of using AWS Mobile web. Dynamo DB, S3, Lambda are AWS which gives direct access to your app. This feature is	• The limitation of Amazon EC2 is a major problem. It sets default limits on recourses. Thus, limited information consisting of photos, volume, snapshots are provided. • Major security issues which can never be resolved are- In EC2, 100 permissions are allocated for each security group and range

	named as AWS Mobile SDK. Android, IOS, Web and many more users can enjoy this service. • AWS Serverless cloud gives the user tension free service to build up an application. Amazon API and Amazon Gateways makes users to run code easily by managing the whole process. Patching, scaling, administration of the infrastructure is managed very effectively by AWS. • The security system and compliance of Amazon Web Service is very dedicated following four rules: Protocol, Type, Port Range and Source. The users pay only according to the services they use and also get maximum data security from AWS.	is up to 100 security groups per VPC. • Developer, Business and Enterprise are the technical support fees can be opted for providing intermediate AWS support.
MICROSOFT AZURE	• It allows to build up apps with your preferable language, use any framework or tool. • Access to 150+ app connectors is given within the Microsoft	• Microsoft Azure offers services to 54 regions in the world. Speed range is not same in all regions. In South Frica, Brazil South is accessible region. It's a

	family of products. It also works with google services, drop box, twitter and many more. • It has multiple redundancies to maintain access data. Thus, it becomes easier to access alternative data.	problematic issue for accessing data with slower speed if there isn't a close region. • Graphical User Interface is not flexible to use with the slow Microsoft Azure.
GOOGLE CLOUD PLATFORM (GCP)	• Goggle Cloud platform helps in providing the maximum level of IOPS or Input/output operations per second than any other providers. • Goggle cloud is very cost efficient. • GCP helps in providing live migrations of Virtual Machines. • The time of loading and processing files in GCP are really low which makes it faster and quicker for user to use. • The security system of Goggle cloud Platform is quite good and reliable as it is handling other big platforms or applications like Gmail, Goggle docs, Goggle Search Engine etc. • Goggle Cloud Platform has high level	• There is lack of managed services in Goggle Cloud Platform. • Goggle Cloud Platform is a little backdated compared to some other Cloud services. • Most of the Core products like Big Query, Datastore, Spanner of GCP is good to use but it has really limited customizations. • The support service cost of Goggle Cloud Platform is comparatively high

	availability over many regions as it has been updating their infrastructure throughout the world.	

b) OPINION:

Following some of the advantageous features of cloud computing like Amazon Web Service, Google Cloud Platform and Microsoft Azure, it is found that Google cloud computing is mostly preferable worldwide. Its service achieved people's trust and dependency over the years. So, I will definitely choose Google cloud service for my software development.

The reasons for which I will select GCP:

- As a startup, I will be needing a collaborative working toolkit and make easy for me to manage organization roles and meet the requirement with natural choices. And **GCP** provides the best service by interacting with the corporate **G-Suite** accounts instantly.
- Its free **open-source** opportunity to switch from AWS with whole documentation will be convenient for me.
- For a **QuickStart,** GCP provides facilities like free trial, consultation, training, starting bonuses and many more.
- The more IOPS with lesser than one-third of the cost than other clouds. As known, the more IOPS, the better performance.

CONCLUSION:

Cloud computing provides relentless service by storing, accessing and programing over the internet on behalf of computer hard drive. The renowned cloud platforms like AWS, Microsoft Azure, GCP provides multiple hosted services with as-pay-as you go. The unlimited storage availability, mobility, high speed, backing up and restoring data, cost savings are the biggest benefits of using cloud computing services. Thus, cloud computing platforms are flexible, effective and reliable source for most of the IT companies.

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