FUNDAMENTAL OF CLOUD COMPUTING AND BIG DATA

UNIT 1 : Introduction to cloud Computing

What is a Cloud ?

A cloud is a collaboration of networks, hardware, services, storage and interface that helps in delivering computing as a service.

It has three users :

- End users - (Us)
- Business Management Users - (Companies)
- Cloud service Provider -

→ Cloud Computing.

It is advance stage technology implemented so that the cloud provides the services globally as per the user requirements. It provides a method to access several servers worldwide.

National Institute of standards and Technology (NIST) (regulates the Cloud Computing) is an agency under the scope of US Department of commerce

Essential characteristics of Cloud Computing

- On demand self-service
- Broad Network access
- Resource pooling
- Rapid elasticity
- Measured services

Benefits of Cloud Computing

- Data backup and storage of data
- Powerful server capabilities
- Incremented productivity
- Cost effective and time saving

Types of Cloud Computing

- Public Cloud - Provisioned for open use for the public by a particular organisation who also hosts the services.
- Private Cloud - Used for a single organization; can be internally or externally hosted.
- Community Cloud - Shared by several organizations; typically externally hosted, but may be can be internally hosted by one of the organizations.
- Hybrid Cloud - Composition of two or more clouds (private, community or public) that remain unique entities but are bound together offering the benefits of multiple deployment models; is internally & externally hosted.

Cloud Service Models

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

- Infrastructure as a Service (IaaS)
  Offering hardware related services using the principles of cloud computing. These could include storage services (database or disk storage) or virtual servers
  Eg - Amazon EC2, Amazon S3, Rackspace Cloud Servers and Flexiscale

- Platform as a Service (PaaS)
  Offering a development platform on the cloud.
  Eg - Google's Application Engine, Microsofts Azure, Salesforce.com's force.com.

- Software as a Service (SaaS)
  Including a completed software offering the cloud. Users can access a software application hosted by the cloud vendor on pay per use basis. This is a

well established sector.
eg - Salesforce.com offering in the online Customer Relationship Management (CRM) space, Google's gmail and Microsoft's hotmail, Google docs.

AWS (Amazon Web Services)

- Elastic Compute Cloud - EC2 (IaaS)
- Simple Storage Service - S3 (IaaS)
- Elastic Block Storage - EBS (IaaS)
- Simple DB (SDB) (PaaS)
- Simple Queue Service - SQS (PaaS)
- Cloud Front (S3 based Content Delivery Network - PaaS)
- Consistent AWS Web Services API

What is Cloud Security?

- Cloud Security is the protection of data stored online from theft, leakage and deletion.
- Methods of providing cloud security include firewalls, penetration testing, obfuscation, tokenization, virtual private network (VPN) and avoiding public internet connections.
- Major threats to cloud ~~computing~~ security include data breaches, data loss, account hijacking, service traffic hijacking, insecure application program interfaces (APIs), poor choice of cloud storage providers and shared technology that can compromise cloud security.
- Distributed denial of service (DDoS) attacks are another threat to cloud security.

Cloud Service Providers.

A cloud service provider, or CSP, is a company that offers some components of cloud computing -- typically IaaS, SaaS, PaaS -- to other business or individuals.

eg- Google, Microsoft, Citrix, Joyent (San Francisco IaaS provider), CenturyLink, Amazon, IBM, Salesforce, Rackspace, Verizon Terremark.

* Open Stack is the best example for Open Source Cloud Computing *

→ List the platforms which are used for large scale Cloud Computing

Apache Hadoop and MapReduce

→ Explain the Security Management in terms of Cloud Computing.?

- The Identity Management access provides the authorization of application services.
- ~~Authoa~~ Access control permission is given to the users to have complete controlling access of another user who is entering into the cloud environment.
- Authentication and Authorization provides access to only the authorized and authenticated users only to access the data and applications.

→ Explain what is the full form and usage of "EUCALYPTUS" in Cloud Computing

- "EUCALYPTUS" full form stands for Elastic Utility Computing Architecture for linking Your Programs To Useful Systems.
- 'eucalyptus' is an open source software infrastructure in Cloud Computing, which enables us to implement clusters in cloud computing platform.
- It is mainly used to build public, hybrid and private clouds. It has the capabilities to produce your own data centre into a private cloud and provides to use its all functionality for various other organization.

→ Mention the name of some large cloud providers and databases

- Google Big Table
- Amazon Simple Database
- Cloud based SQL (Sequential Query Language)

→ Explain the difference between cloud and traditional datacenters.

- The expenditure of the traditional data centre is expensive due to heating and hardware/software issues.
- Cloud being scaled when there is an increase in demand.
- Mostly the expenditure is on the maintenance of the data centres, while this issues are not faced in cloud computing.

→ What are the uses of API's in Cloud Service?

- API's (Application Programming Interface) are used to eliminate the necessity to write the complete programs.
- The instructions are provided to make communication between one or more applications.
- Creation of applications is made easy and access for the link of cloud services with other systems.

→ List down the three basic functioning clouds in cloud computing

- Professional Cloud
- Personal Cloud
- Performance cloud.

→ What are the building blocks in cloud architecture?

- Reference Architecture
- Technical Architecture
- Deployment Operation Architecture