MOHAMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT Park, Chennai-603103

DEPARTMENT OF INFORMATION TECHNOLOGY

IV YEAR CSE & IT

CS8791 – Cloud Computing

EPC QUESTION BANK

PART A (2 Marks)

UNIT I

1. Define Cloud Computing
   The U.S. National Institute of Standards and Technology (NIST) defines cloud computing as: Cloud computing is a model for **enabling ubiquitous**, **convenient, on-demand network access** to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

2. What is the difference between parallel and distributed computing?

S.No.	Parallel Computing	Distributed Computing
1.	Many operations are performed simultaneously	System components are located at different locations
2.	Single computer is required	Uses multiple computers
3.	Multiple processors perform multiple operations	Multiple computers perform multiple operations
4.	It may have shared or distributed memory	It has only distributed memory

3. **Define Ubiquitous computing**

Ubiquitous computing means **"anywhere, anytime and anyplace computing"** and refers to computing with pervasive devices at any place and time using wired or wireless communication. The Internet of Things (IoT) is a networked connection of everyday objects including computers, sensors, humans, etc. The IoT is supported by Internet clouds to achieve ubiquitous computing with any object at any place and time.

4. **List any four Cloud Service Providers (CSP)**
   - Amazon Web Services (AWS)
   - Microsoft Azure.
   - Google Cloud.
   - Salesforce

5. **List the five essential characteristics of Cloud**
   - On-demand self-service

- Broad network access
- Rapid elasticity
- Resource pooling
- Measured service

6. **List the three types of service models available in cloud**
   - Infrastructure-as-a-service (IaaS)
   - Platform-as-a-service (PaaS)
   - Software-as-a-service (SaaS)

7. **What is meant by on-demand provisioning? State its purpose in cloud**
   Resource Provisioning means the selection, deployment, and run-time management of software (e.g., database server management systems, load balancers) and hardware resources (e.g., CPU, storage, and network) for ensuring guaranteed performance for applications.
   By provisioning the resources, the QoS parameters like availability, throughput, security, response time, reliability, performance etc must be achieved without violating SLA

8. **What is SLA?**
   SLA stands for service level agreement. The cloud tenants (customers) and cloud service providers (CSP) sign a mutual agreement called SLA to meet and satisfy the customer requirements.

9. **What are the parameters for resource provisioning?**

- Response time
- Minimize Cost
- Revenue Maximization
- Fault tolerant
- Reduced SLA Violation
- Reduced Power Consumption

10. **List the types of Dynamic Provisioning**
    1. Local On-demand Resource Provisioning
    2. Remote On-demand Resource Provisioning

11. **What is the role pay-as-you-go model?**

    The pay-as-you-go (PAYG) pricing model means that **users pay based on how much they consume**. For example, a cloud storage service provider could charge based on the amount of storage used, while many phone carriers bill based on minutes used.

12. **Define Private Cloud**

    The private cloud is built within the domain of an intranet owned by a single organization. Therefore, they are client owned and managed. Their access is limited to the owning clients and their partners. Their deployment was not meant to sell capacity over the Internet through publicly accessible interfaces. Private clouds give local users a flexible and agile private infrastructure to run service workloads within their administrative domains

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UNIT II

1. **Define SOA**

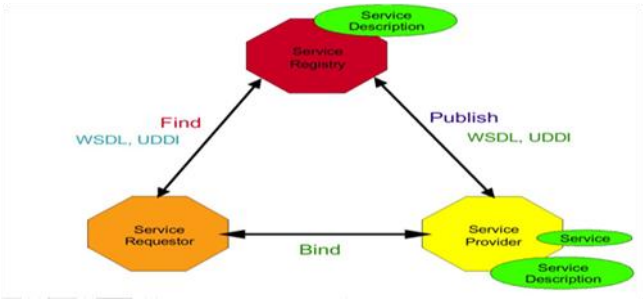
   Service-oriented architecture (SOA) is **a method of software development that uses software components called services to create business applications**. Each service provides a business capability, and services can also communicate with each other across platforms and languages.

2. **State any two differences between Type 1 and Type 2 Hypervisor**

   Type-1 Hypervisor-This runs directly on the host machine's physical hardware, so it's also known as a bare-metal hypervisor.

   Type-2 Hypervisor– runs on the operating system of the physical host machine, hence they are also called hosted hypervisors.

3. **Draw the components of SOA Model**



4. **List the four principles of REST architectural style**

   The REST architectural style is based on four principles:

   - Resource Identification through URIs
   - Uniform, Constrained Interface
   - Self-Descriptive Message
   - Stateless Interactions

5. **Define Virtualization**

   Virtualization is a technique, which allows to share single physical instance of an application or resource among multiple organizations or tenants (customers). Virtualization is a technique of how to separate a service from the underlying physical delivery of that service. It is the process of creating a virtual version of something like computer hardware.

6. **What is WSDL and UDDI?**

   Universal Description, Discovery, and Integration **(UDDI)** specification **defines a way to publish and discover information about Web services**.

   WSDL stands for **Web Services Description Language**; **WSDL** is used to describe web services; **WSDL** is written in XML.

7. **List the four types of virtualization in cloud**
   - Network virtualization
   - Storage virtualization
   - Desktop virtualization
   - Application virtualization

8. **State the responsibilities of VMM**

VMM stands for Virtual Machine Monitor/Manager. VMM It is a software program which allows management, governance, and creation of VM (Virtual Machines). It provides network virtualization, including support for creating and manage virtual networks and network gateways.

9. **What are the major roles within SOA?**

SOA is about how to design a software system that makes use of services of new or legacy applications through their published or discoverable interfaces. SOA enables the development of applications that are easier to handle and more secure, since it provides a common infrastructure and documentation to develop services, with the opportunity to add new features.

10. **Define Web Services**

Web services are XML-based information exchange systems that use the Internet for direct application-to-application interaction. Web service is often referred to a self-contained, self-describing, modular application designed to be used and accessible by other software applications across the web. A web service has an interface described in a machine-executable format (specifically Web Services Description Language or WSDL).

11. **What is disaster recovery?**

Disaster recovery (**DR**) is an organization's ability to respond to and recover from an event that negatively affects business operations. It is the process of resuming normal operations following a disaster by regaining access to data, hardware, software, networking equipment, power and connectivity.

12. **Define Publish Subscribe Model**

i. Publishers produce information in form of events, which are then consumed by subscribers.
ii. Subscribers can declare their interest on a subset of the whole information issuing subscriptions.

Publishers:

Broadcast messages, with no knowledge of the subscribers.

Subscribers:

They 'listen' out for messages regarding topic/categories that they are interested in without any knowledge of who the publishers are.

UNIT III

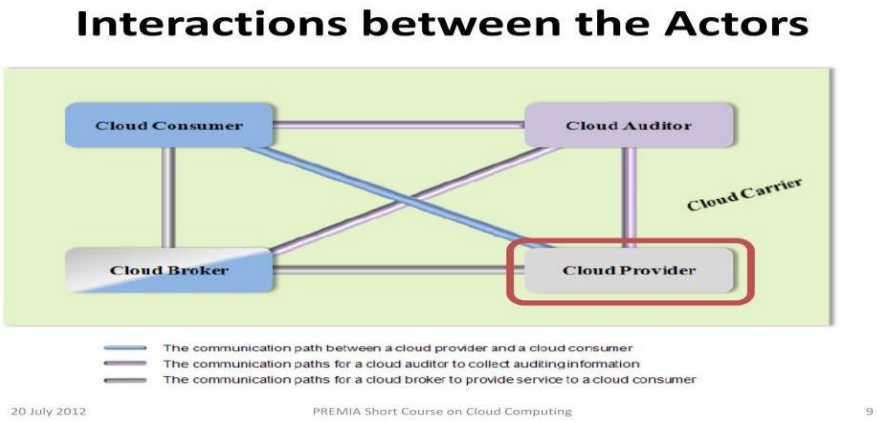
1. **Define Internet Cloud**

An Internet cloud is envisioned as a public cluster of servers provisioned on demand to perform collective web services or distributed applications using data-center resources.

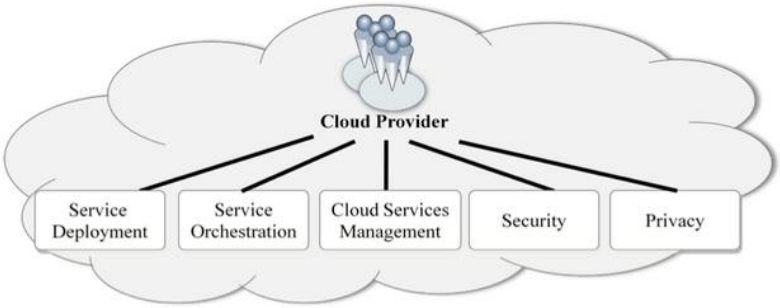
- ❖ Cloud Platform Design Goals
- ❖ Enabling Technologies for Clouds
- ❖ A Generic Cloud Architecture

2. Differentiate between Security and Privacy in Cloud

3. Draw the interactions between Actors in Cloud Computing



4. Illustrate the five major activities of a Cloud Provider



5. Why do we need hybrid cloud?

Hybrid cloud allows companies to combine their own data center and/or private cloud setup with public cloud resources such as Software as a Service, or SaaS. In the Hybrid cloud, non-critical activities are performed by the public cloud and critical activities are performed by the private cloud. The best hybrid cloud provider companies are **Amazon, Microsoft, Google, Cisco,** and **NetApp**

6. What is Cloud Orchestration?

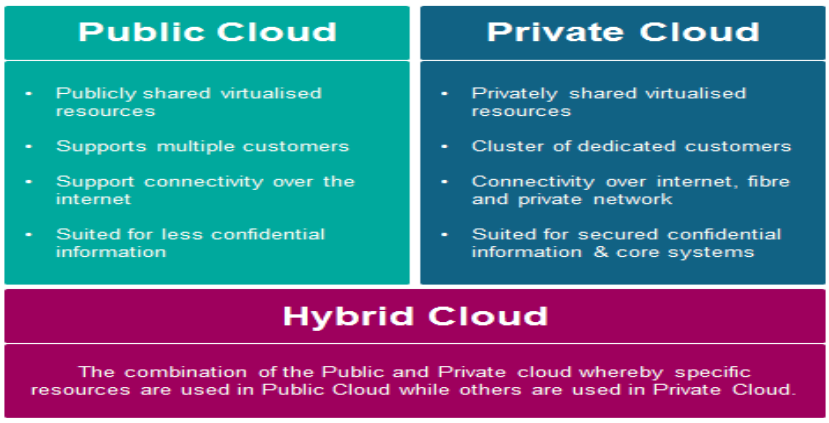
Cloud Orchestration is the process of automating the tasks needed to manage connections and operations of workloads on private and public clouds. Cloud orchestration technologies integrate automated tasks and processes into a workflow to perform specific business functions.

Cloud orchestration refers to the arrangement and coordination of automated tasks resulting in a consolidated process or workflow.

7. List the QoS parameters in cloud

- Availability, time, throughput and response

8. Differentiate Public cloud and Private cloud



9. Point out the role of cloud auditor in cloud

A cloud auditor is a third party who examines controls of cloud computing service providers. Cloud auditor performs an audit to verify compliance with the standards and expressed his opinion through a report. An entity that can conduct independent assessment of cloud services, information system operations, performance and security of the cloud.

10. Identify the key features of S3

Amazon S3 supports both **server-side encryption.** Amazon S3 offers flexible security features to block unauthorized users from accessing your data. It configures and enforce data access controls, secure data against unauthorized users, run big data analytics, monitor data at the object and bucket levels, and view storage usage and activity trends.

11. Compare service aggregation and service arbitrage

Service arbitrage is similar to service aggregation, except that the services being aggregated are not fixed. Service arbitrage means a broker has the flexibility to choose services from multiple Providers, depending upon the characteristics of the data or the context of the service.

12. Why does one choose public cloud over private cloud? Analyze

Public clouds have better Scalability, unlimited on demand services, resource optimization and Simplified disaster recovery than private clouds. Private clouds may be less secure and dependable than public cloud services. Private clouds are better for workloads that have high compliance or security needs.

UNIT IV

1. **What are the security challenges in cloud computing?**

- Data Loss
- Interference of Hackers and Insecure API's
- Changing Service Provider
- User Account Hijacking
- Denial of Service (DoS) attack

2. **Define VM security**

Virtual machine security in cloud computing allows an enterprise to maintain a secure network without a large increase in infrastructure. The VMM also isolates the **virtual machines** from one another, preventing them from accessing each other's memory or disk space.

3. **Analyze the security awareness in cloud**

Cloud security awareness is **a method of educating employees about computer system protection**. With cloud computing services, you can protect data from criminals' threats. Moreover, it is a way to provide an overview of policies that explain how cloud security works.

4. **Identify the phases of SecSDLC**

- Investigation
- Analysis
- Logical Design
- Physical Design
- Implementation
- Maintenance

5. **What is IGG? List the three steps of resource allocation from IGG cluster**

IGG(InterGridGateway) allocates resources from an organization or cloud provider.InterGrid is used for interconnecting distributed computing infrastructures.Intergrid gateway (IGG) allocates resources from a local cluster three steps:
(1) Requesting the VMs(Resources)
(2) Enacting (Validate) the leases
(3) Deploying (install) the VMs as requested.

6. **Summarize password assurance testing**

If the SaaS security team or its customers want to periodically test password strength by running password "crackers," they can use cloud computing to decrease crack time and pay only for what they use.

7. **What is meant by vulnerability assessment?**

• Vulnerability assessment classifies network assets to more efficiently prioritize vulnerability-mitigation programs, such as patching and system upgrading.
• It measures the effectiveness of risk mitigation by setting goals of reduced vulnerability exposure and faster mitigation.

8. **Give the diagram for evolution of cloud services**

Evolution of services:

- MSP (Managed Service Provider) — IaaS — PaaS — SaaS

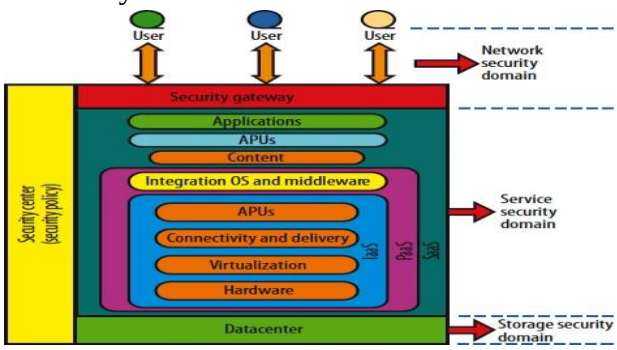
9. **Illustrate the security images**

• Virtualization-based cloud computing provides the ability to create "Gold image" VM secure builds and to clone multiple copies.
• Gold image VMs also provide the ability to keep security up to date and reduce exposure by patching offline.

10. **Design a suitable security architecture for cloud**

A security architecture framework should be established with the following consideration

1. Authentication
2. Authorization
3. Availability
4. Confidentiality
5. Integrity
6. Privacy



11. **Define IAM**

Identity and access management architecture(IAM). IAM is not a monolithic solution that can be easily deployed to gain capabilities immediately. It is as much an aspect of architecture as it is a collection of technology components, processes, and standard practices. Standardenterprise IAM architecture encompasses several layers of technology, services, and processes.

12. **List the three storage services available in cloud**

- GFS (Google File System)
- HDFS (Hadoop Distributed File System)
- Amazon S3 & EBS

UNIT V

1. **What is the use of cloud Watch in Amazon EC2?**

Amazon CloudWatch to collect and track metrics on performance.CloudWatch enables you to monitor your complete stack (applications, infrastructure, and services) and use alarms, logs, and events data to take automated actions and reduce mean time to resolution (MTTR).CloudWatch enables real-time monitoring of AWS resources such as Amazon Elastic Compute Cloud (EC2) instances, Amazon Elastic Block Store (EBS) volumes.

2. **Outline the main services that are offered by AWS**

1. Amazon EC2 (Elastic Compute Cloud) ·
2. Amazon RDS (Relational Database Services) ·
3. Amazon S3 (Simple Storage Service)
4. Amazon Cloud Front

3. **Differentiate name node with data node in hadoop file system**

The main difference between NameNode and DataNode in Hadoop is that the NameNode is the master node in Hadoop Distributed File System that manages the file system
metadata while the DataNode is a slave node in Hadoop distributed file system that stores the actual data as instructed by the NameNode.

4. Illustrate Amazon EC2 and its basic features

Amazon EC2 allows the users to access its resources to design fault-tolerant applications. Amazon EC2 provides the broadest and deepest instance choice to match your workload's needs. General purpose, compute optimized, memory optimized, storage optimized, and accelerated computing instance types are available that provide the optimal compute, memory, storage, and networking balance for your workloads.

5. What is a bucket? What type of storage does it provide?

A bucket is a container for objects. To store your data in Amazon S3, you first create a bucket and specify a bucket name and AWS Region. Then, you upload your data to that bucket as objects in Amazon S3. Each object has a key (or key name), which is the unique identifier for the object within the bucket. You can store any number of objects in a bucket and can have up to 100 buckets in your account.

6. State and discover the core components of AppEngine

The App Engine hierarchy has four components - application, services, versions, and instances. An application that the customer needs is a combination of multiple services, where each service can have various versions that are deployed in instances. Google App Engine (GAE) is a service, a scalable environment, and a cloud computing technology that Google provides for building and hosting applications.

7. Point out the use Amazon elastic block store

Amazon Elastic Block Store provides raw block-level storage that can be attached to Amazon EC2 instances and is used by Amazon Relational Database Service. It is one of the two block-storage options offered by AWS, with the other being the EC2 Instance Store. Amazon Elastic Block Store (Amazon EBS) is an easy-to-use, scalable, high-performance block-storage service designed for Amazon Elastic Compute Cloud.

8. List the functional models of GAE

It is a platform for developing and hosting web applications in Google-managed data cen- ters.Google App Engine is cloud computing technology. The GAE module enables Google App Engine support for your application. It wraps common GAE services in play basic services whenever possible (Logging, Mail, Cache...) and exposes directly other Google specific services (User services, Datastore...)

9. Define SQS and SNS services of AWS cloud

The Amazon Simple Queue Service (SQS) and the Amazon Simple Notification Service (SNS) are important “glue” components for scalable computing. Amazon Simple Queue Service (SQS) lets you send, store, and receive messages between software components at any volume, without losing messages. Amazon Simple Notification Service (Amazon SNS) is a managed service that provides message delivery from publishers to subscribers (also known as producers and consumers).

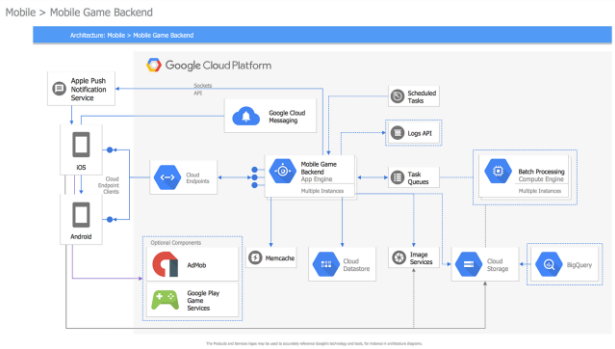
10. Analyze the open stack components

An **OpenStack** deployment contains a number of **components** providing APIs to access infrastructure resources.The components are:
Nova, Swift, Cinder, Neutron, Horizon, Keystone, etc.

11. Give some of the Applications of GAE

Google App Engine is a cloud computing platform as a service for developing and hosting web applications in Google-managed data centers. The App Engine standard environment is based on container instances running on Google's infrastructure. Containers are preconfigured with one of several available runtimes. It provides fully managed, pay-as-you-go services. Java programming language can be used in GAE for developing a fully automated cloud environment.

12. Give the diagram for Google cloud platform and its major building blocks.



Load balancing, Google Cloud DNS, Dynamic server and Static server

PART B & C – (12 MARKS)

UNIT I

1. State the uses of cloud computing and also explain the evolution of cloud in detail
2. Explain in detail about the underlying principles of parallel and distributed computing
3. Explain in detail about the characteristics of cloud and various deployment models in cloud
4. Explain the cloud computing architecture in detail with a suitable diagram
5. Write in detail about the four hardware architectures for parallel processing with suitable diagrams.
6. Explain in detail about Elasticity in Cloud with a suitable example.
7. Illustrate in detail about parallel and distributed computing.

UNIT II

1. State the purpose and characteristics of web services in cloud computing
2. Enumerate the differences between SOAP and REST web services in detail
3. Explain in detail about the Virtualization concept in cloud
4. Write about the REST interaction between user and server in HTTP specification with a suitable diagram
5. Write in detail about the Virtualization of CPU, Memory and I/O devices with suitable diagrams.
6. Explain in detail about the features of SOA in Cloud with a suitable diagram.
7. Describe in details the tools and mechanisms for virtualization.

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UNIT III

1. Write about the Amazon Simple Storage Service (S3) cloud service provider in detail
2. Explain the Interactions between the Actors in Cloud Computing with different example usage scenarios
3. Outline the various deployment models of Cloud with a neat sketch and identify which among them could be applied to formulate cloud structure for a small firm
4. Write about the Market-oriented Cloud Architecture in detail with a suitable diagram
5. Explain in detail about the Cloud Computing Reference Architecture with a suitable diagram
6. Explain in detail about the Architectural Design Challenges in Cloud with suitable examples
7. Describe in detail about the cloud Storage with example

UNIT IV

1. Describe in detail with neat diagram in detail about inter cloud resource management.
2. i. What is resource provisioning?
   ii. Discuss different types of resource provisioning.
3. Explain the following in detail:
   i. Demand-Driven Resource Provisioning
   ii. Event-Driven Resource Provisioning
   iii. Popularity-Driven Resource Provisioning
4. Describe the Secure Software Development Life Cycle with neat diagram.
5. Explain the baseline Identity and access Management(IAM) factors to be practiced by the stakeholders of cloud services and common key privacy issues likely to happen in the environment
6. Summarize the following:
   i. Security governance
   ii. Security monitoring
   iii. Risk management
7. Analyze the methods for providing data security and virtual machine security in cloud.

UNIT V

1. Discuss in detail about the working process of Google App Engine
2. i. Write the functional Modules of GAE
   ii. Discuss in detail about GAE Applications
3. Compare and contrast Google App Engine and Amazon AWS
4. Explain in detail about how to set up a private cloud for an academic university using any one of the cloud environments
5. i) Discuss mapreduce with suitable diagrams
   ii) Express in detail about the phases of map and reduce.
6. Explain Cloud federation, benefits and implementation with neat diagram.
7. i. Discuss about OpenStack
   ii. Describe in detail about on Hadoop framework.