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Assignment 1

1. What is cloud Computing? Write a note on Cloud Computing Reference model.

Ans:

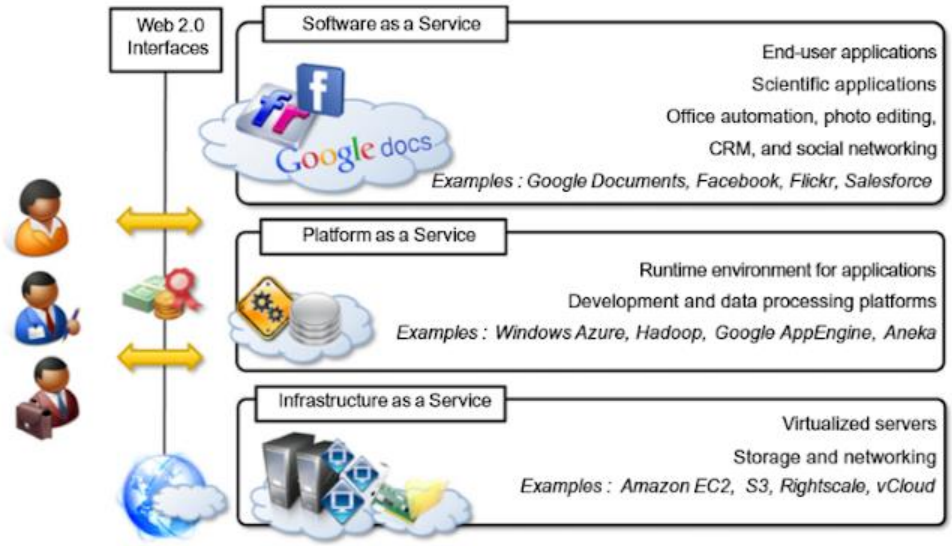
Cloud computing is the delivery of different services through the Internet, including data storage, servers, databases, networking, and software. Cloud-based storage makes it possible to save files to a remote database and retrieve them on demand.

Cloud computing is a popular option for people and businesses for a number of reasons including cost savings, increased productivity, speed and efficiency, performance, and security.

Cloud Computing Reference Model

A fundamental characteristic of cloud computing is the capability to deliver, on demand, a variety of IT services that are quite diverse from each other.

Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). 3 main types of cloud computing services



Types of Cloud Computing Refrence Model:

1.Infrastructure-as-a-Service (IaaS)

At the base of the stack, Infrastructure-as-a-Service solutions deliver infrastructure on demand in the form of virtual hardware, storage, and networking. Virtual hardware is utilized to provide

compute on demand in the form of virtual machine instances. These are created at users' request on the provider's infrastructure, and users are given tools and interfaces to configure the software stack installed in the virtual machine. The pricing model is usually defined in terms of dollars per hour, where the hourly cost is influenced by the characteristics of the virtual hardware. Virtual storage is delivered in the form of raw disk space or object store. The former complements a virtual hardware offering that requires persistent storage.

2. Platform-as-a-Service (PaaS)

Platform-as-a-Service solutions are the next step in the stack.It is another category of cloud computing reference model. Paas provides an environment for building, testing, and deploying software applications. The goal of PaaS is to help create an application as quickly as possible without having a focus on managing the underlying infrastructure. They deliver scalable and elastic runtime environments on demand and host the execution of applications. These services are backed by a core middleware platform that is responsible for creating the abstract environment where applications are deployed and executed.

3. Software-as-a-Service (SaaS)

At the top of the stack, Software-as-a-Service solutions provide applications and services on demand. Saas is software that is centrally hosted and managed for the end customer. It allows users to connect to and use cloud-based apps over the internet. Most of the common functionalities of desktop applications—such as office Runtime environment for applications Development and data processing platforms Examples : Windows Azure, Hadoop, Google AppEngine, Aneka Platform as a Service Virtualized servers Storage and networking Examples : Amazon EC2, S3, Rightscale, vCloud Infrastructure as a Service End-user applications Scientific applications Office automation, photo editing, CRM, and social networking Examples : Google Documents, Facebook, Flickr, Salesforce Web 2.0 Software as a Service.

2. Write a note on Cloud deployment models.

Aim:

1. Public Cloud

1. The public cloud makes it possible for anybody to access systems and services.
2. The public cloud may be less secure as it is open for everyone.
3. It is one in which cloud infrastructure services are provided over the internet to the general people or major industry groups.
4. Public cloud may be less secure because of its openness.
5. It is a type of cloud hosting that allows customers and users to easily access systems and services.
6. Public Cloud is a Minimal Investment because pay-per-use service.

7. Infrastructure Management is not required.
8. Google App Engine is example of public cloud.

2. Private Cloud

1. The private cloud deployment model is the exact opposite of the public cloud deployment model.
2. It's a one-on-one environment for a single user (customer). There is no need to share your hardware with anyone else.
3. It is also called the "internal cloud" & it refers to the ability to access systems and services within a given border or organization.
4. The cloud platform is implemented in a cloud-based secure environment that is protected by powerful firewalls and under the supervision of an organization's IT department.
5. It's suitable for storing corporate information to which only authorized staff have access.
6. This approach is designed to work with legacy systems that are unable to access the public cloud.
7. It is more secured because of its private nature.

3. Hybrid cloud

1. The hybrid cloud is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.
2. With a hybrid solution, you may host the app in a safe environment while taking advantage of the public cloud's cost savings.
3. Organizations can move data and applications between different clouds using a combination of two or more cloud deployment methods, depending on their needs.
4. Data is properly separated, the chances of data theft by attackers are considerably reduced.

4.Community Cloud

1. A community cloud is a multi-tenant platform which allows several companies work on the same platform, given that they have similar needs and concerns.
2. The community cloud allows systems and services to be accessible by a group of organizations.

3. One example of using a community cloud would be to test-drive some high-end security products or even test out some features of a public cloud environment.

3. Explain in brief about various cloud computing platforms.

Ans:

Amazon web services:

Amazon Web Services (AWS) is a platform that allows the development of flexible applications by providing solutions for elastic infrastructure scalability, messaging, and data storage. The platform is accessible through SOAP or RESTful Web service interfaces and provides a Web-based console where users can handle administration and monitoring of the resources required, as well as their expenses computed on a pay-as-you-go basis. AWS is well known for its storage and compute on demand services, named as Elastic Compute Cloud (EC2) and Simple Storage Service (S3). EC2 offers customizable virtual hardware to the end user which can be utilize as the base infrastructure for deploying computing systems on the cloud. It is likely to choose from a large variety of virtual hardware configurations including GPU and cluster instances. Either the AWS console, which is a wide-ranged Web portal for retrieving AWS services, or the web services API available for several programming language is used to deploy the EC2 instances.

Google AppEngine:

Google AppEngine is a distributed and scalable runtime for developing scalable Web applications based on Java and Python runtime environments. These are enriched with access to services that simplify the development of applications in a scalable manner. Developers and Engineers can build and test applications on their own systems by using the AppEngine SDK, which replicates the production runtime environment, and helps test and profile applications. On completion of development, Developers can easily move their applications to AppEngine, set quotas to containing the cost generated, and make it available to the world. Currently, the supported programming languages are Python, Java, and Go

Microsoft Azure:

Microsoft Azure is a Cloud operating system and a platform in which user can develop the applications in the cloud. Generally, a scalable runtime environment for web applications and distributed applications is provided. Application in Azure are organized around the fact of roles, which identify a distribution unit for applications and express the application’s logic. Azure provides a set of additional services that complement application execution such as support for storage, networking, caching, content delivery, and others.

4. Compare Parallel and Distributed computing.

Ans:

Parallel Computing

1.Parallel computing is a model that divides a task into multiple sub-tasks and executes them simultaneously to increase the speed and efficiency.

2. Parallel computing generally requires one computer with multiple processors.

3. In parallel computing multiple processors performs multiple tasks assigned to them simultaneously.

4. In parallel computing, the tasks to be solved are divided into multiple smaller parts. These smaller tasks are assigned to multiple processors.

5. Memory in parallel systems can either be shared or distributed.

6. Parallel computing provides concurrency and saves time and money.

Distributed Computing

1.Distributed computing is a field that studies distributed systems.

2. In distributed computing a single task is divided among different computers.

3. Distributed systems are systems that have multiple computers located in different locations.

4. In distributed computing, several computer systems are involved. Here multiple autonomous computer systems work on the divided tasks.

5. In distributed computing we have multiple autonomous computers which seems to the user as single system.

6. In distributed systems there is no shared memory and computers communicate with each other through message passing.

5. What is service oriented computing?

Ans:

1.Service orientation is the core reference model for cloud computing systems.

2. This approach adopts the concept of services as the main building blocks of application and system development.

3. Service-oriented computing (SOC) supports the development of rapid, low-cost, flexible, interoperable, and evolvable applications and systems

4. Service-oriented computing introduces and diffuses two important concepts, which are also fundamental to cloud computing: quality of service (QoS) and Software-as-a-Service (SaaS)

5. The SaaS approach reaches its full development with service-oriented computing (SOC), where loosely coupled software components can be exposed and priced singularly, rather than entire applications.

6. The primary goal of service-oriented computing is to make a collection of software services accessible via standardized protocols whose functionality can be automatically discovered and integrated into applications.

7. To build the service model, SOC relies on the service-oriented architecture (SOA), which is a way of reorganizing software applications and infrastructure into a set of interacting services.

8. SOA is built on computer engineering approaches that offer an architectural advancement towards enterprise system.

9. It describes a standard method for requesting services from distributed components and after that the results or outcome is managed.

6. Write a note on Virtualization.

Ans:

1. Virtualization is another core technology for cloud computing.
2. Virtualization allows the creation of a secure, customizable, and isolated execution environment for running applications, even if they are untrusted, without affecting other users' applications.
3. Virtualization scalable systems that can provision additional capability with minimum costs.
4. These environments are called virtual because they simulate the interface that is expected by a guest.
5. The most common example of virtualization is hardware virtualization.
6. Virtualization ment for not only executing applications but also for storage, memory, and networking.
7. This technology allows simulating the hardware interface expected by an operating system.
8. Hardware virtualization allows the coexistence of different software stacks on top of the same hardware.

9. These stacks are contained inside virtual machine instances, which operate in complete isolation from each other.
10. Virtualization approach is used in cloud computing to provide a platform for scaling applications on demand, such as Google AppEngine and Windows Azure.

7.Explain taxonomy of virtualization techniques.

Ans:

The term virtualization refers to technologies that are designed to provide a layer of abstraction between computer hardware systems and software running on them. ... With application virtualization, there is an abstraction layer between the operating system and application.

The taxonomy model demonstrates the various layers of a virtual server architecture and virtualization domains in a structured way. ... Combining this service with desktop virtualization and user state virtualization allows for a better desktop service offering.

8. Compare Full and para virtualization.

Ans:

1. Full Virtualization:

1. Full Virtualization was introduced by IBM in the year 1966.
2. It is the first software solution of server virtualization and uses binary translation and direct approach technique.
3. In full virtualization, guest OS is completely isolated by the virtual machine from the virtualization layer and hardware.
4. Microsoft and Parallels systems are examples of full virtualization.

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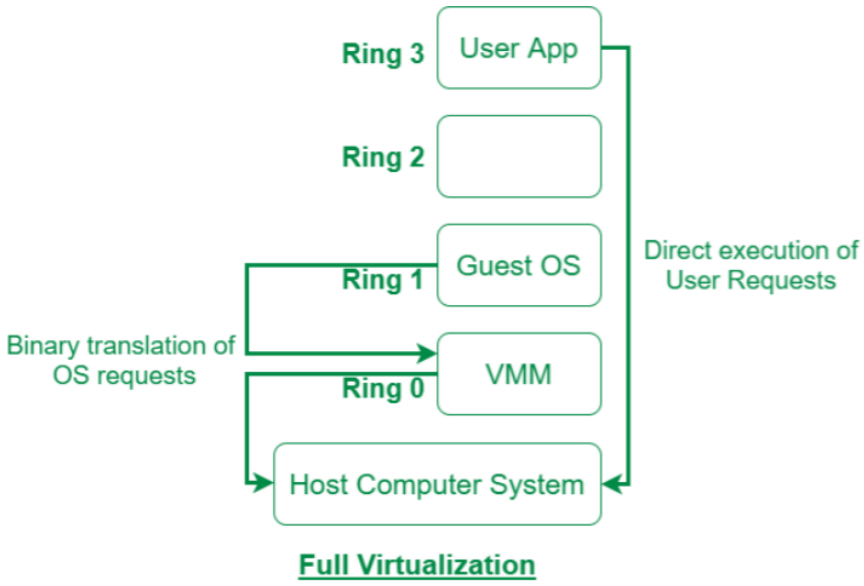

Full Virtualization

2. Paravirtualization:

1. Paravirtualization is the category of CPU virtualization which uses hypercalls for operations to handle instructions at compile time.
2. In paravirtualization, guest OS is not completely isolated but it is partially isolated by the virtual machine from the virtualization layer and hardware.
3. The major merit of paravirtualization is that it can easily reduce the virtualization overhead.
4. VMware and Xen are some examples of paravirtualization.

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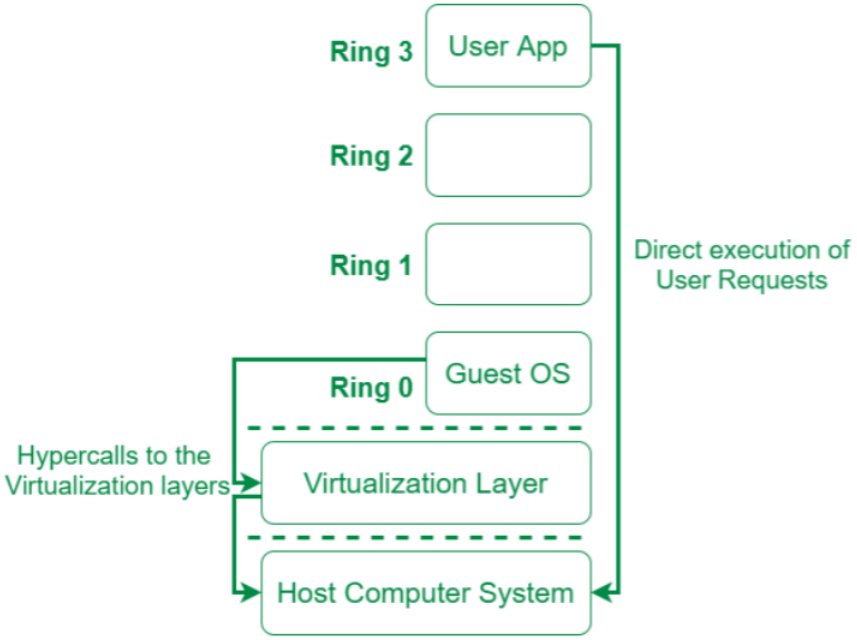

Paravirtualization