Unit 3: Introduction to Cloud computing delivery models and services

3.1 Iaas – Use, Merits and Demerits of Iaas, Characteristics,

Application of Iaas : Azure,

3.2 Paas – Use, Merits and Demerits ,Characteristics ,

Applications : Azure, Google AppEng

3.3 SaaS – Use, Merits and Demerits, Characteristics,

Application : Google Apps, Salesforce

Software as a Service - SaaS:

- SaaS is also known as "On-Demand Software".

- It is a software distribution model in which services are hosted by a cloud service provider.

- These services are available to end-users over the internet so, the end users do not need to install any software on their devices to access these services.

There are the following services provided by SaaS providers :

- **1. Business Services** - SaaS Provider provides various business services to start-up the business.

- The SaaS business services include ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), billing, and sales.

- **2. Document Management** - SaaS document management is a software application offered by a third party (SaaS providers) to create, manage, and track electronic documents.

- Example: Docs, Sheet, Slides, Forms by google

There are the following services provided by SaaS providers :

- **3. Social Networks** - As we all know, social networking sites are used by the general public, so social networking service providers use SaaS for their convenience and handle the general public's information.

- **4. Mail Services** - To handle the unpredictable number of users and load on e-mail services, many e-mail providers offering their services using SaaS.

Advantages of SaaS:

- It is a cloud computing service category providing a wide range of hosted capabilities and services.
- These can be used to build and deploy web-based software applications.
- It provides a lower cost of ownership than on-premises software.
- The reason is it does not require the purchase or installation of hardware or licenses.
- It can be easily accessed through a browser.
- No cost is required for initial setup.
- Low maintenance costs.
- Installation time is less, so time is managed properly.

Disadvantages of SaaS

- It has limited customization options.

- It has security and data concerns.

- Total Dependency on Internet Without an internet connection, most SaaS applications are not usable

- Low performance.

Platform as a Service – PaaS:

- Platform as a Service (PaaS) provides a runtime environment.
- It allows programmers to easily create, test, run, and deploy web applications.
- You can purchase these applications from a cloud service provider on a pay-as-per use basis and access them using the Internet connection.
- In PaaS, back end scalability is managed by the cloud service provider, so end- users do not need to worry about managing the infrastructure.
- PaaS includes infrastructure (servers, storage, and networking) and platform (middleware, development tools, database management systems, business intelligence, and more) to support the web application life cycle.

- Example: Google App Engine, Azure.
- PaaS providers provide the Programming languages, Application frameworks, Databases, and Other tools:
- **1. Programming languages** PaaS providers provide various programming languages for the developers to develop the applications.
- Some popular programming languages provided by PaaS providers are Java, PHP, Ruby, Perl.
- **2. Application frameworks** PaaS providers provide application frameworks to easily understand the application development.
- Some popular application frameworks provided by PaaS providers are Node.js, Drupal, Joomla, WordPress, Spring, Play, Rack, and Zend.
- **3. Databases** PaaS providers provide various databases such as ClearDB, MongoDB, and Redis to communicate with the applications.

Characteristics of PaaS:

- Accessible to various users via the same development application.

- Integrates with web services and databases.

- Builds on virtualization technology, so resources can easily be scaled up or down as per the organization's need.

- Support multiple languages and frameworks.

- Provides an ability to "Auto-scale".

Advantages of PaaS:

- Programmers need not worry about what specific database or language the application has been programmed in.
- It offers developers the to build applications without the overhead of the underlying operating system or infrastructure.
- Provides the freedom to developers to focus on the application's design while the platform takes care of the language and the database.
- It is flexible and portable.
- It is quite affordable.

Disadvantages of PaaS

- Data is not secure and is at big risk.

- As data is stored both in local storage and cloud, there are high chances of data mismatch while integrating the data.

Infrastructure as a Service – Iaas

- Iaas is also known as Hardware as a Service (HaaS).

- It is one of the layers of the cloud computing platform.

- It allows customers to outsource their IT infrastructures such as servers, networking, storage, virtual machines, and other resources.

- Customers access these resources on the Internet using a pay-as-per use model.

- In traditional hosting services, IT infrastructure was rented out for a specific period of time, with pre-determined hardware configuration.

- The client paid for the configuration and time, regardless of the actual use.

Infrastructure as a Service – Iaas

- With the help of the IaaS cloud computing platform layer, clients can dynamically scale the configuration to meet changing requirements and are billed only for the services actually used IaaS cloud computing platform layer eliminates the need for every organization to maintain the IT infrastructure .

IaaS provider provides the following services –

- 1. Compute: Computing as a Service includes virtual central processing units and virtual main memory for the VMs that is provisioned to the end users.

- 2. Storage: IaaS provider provides back-end storage for storing files.

- 3. Network: Network as a Service (NaaS) provides networking components such as routers, switches, and bridges for the VMs.

- 4. Load balancers: It provides load balancing capability at the infrastructure layer.

Characteristics of IaaS:

- Resources are available as a service
- Services are highly scalable
- Dynamic and flexible
- GUI and API-based access
- Automated administrative tasks

Advantages of IaaS

- The resources can be deployed by the provider to a customer's environment at any given time.
- Its ability to offer the users to scale the business based on their requirements.
- The provider has various options when deploying resources including virtual machines, applications, storage, and networks.
- It has the potential to handle an immense number of users.
- It is easy to expand and saves a lot of money.
- Companies can afford the huge costs associated with the implementation of advanced technologies.
- Cloud provides the architecture.

Disadvantages of IaaS

- Security issues are there.
- Service and Network delays are quite a issue in IaaS.

Basis Of	IAAS	PAAS	SAAS
Stands for	Infrastructure as a service.	Platform as a service.	Software as a service.
Uses	IAAS is used by network architects.	PAAS is used by developers.	SAAS is used by the end user.
Access	IAAS gives access to the resources like virtual machines and virtual storage.	PAAS gives access to run time environment to deployment and development tools for application.	SAAS gives access to the end user.

Model	It is a service model that provides virtualized computing resources over the internet.	It is a cloud computing model that delivers tools that are used for the development of applications.	It is a service model in cloud computing that hosts software to make it available to clients.
Technical understanding.	It requires technical knowledge.	Some knowledge is required for the basic setup.	There is no requirement about technicalities company handles everything.

Cloud services.	Amazon Web Services, sun, vCloud Express.	Facebook, and Google search engine.	MS Office web, Facebook and Google Apps.
Enterprise services.	AWS virtual private cloud.	Microsoft Azure.	IBM cloud analysis.
Outsourced cloud services.	Salesforce	Force.com, Gigaspaces.	AWS, Terremark
User Controls	Operating System, Runtime, Middleware, and Application data	Data of the application	Nothing

On-Premises	Infrastructure as a Service	Platform as a Service	Software as a Service
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

Assignment

1. What is IaaS used for?
2. What are the merits of IaaS?
3. What are the demerits of IaaS?
4. What are some key characteristics of IaaS?
5. Give an example of an application of IaaS.
6. What is PaaS used for?
7. What are the merits of PaaS?
8. What are the demerits of PaaS?
9. What are some applications of PaaS?
10. What are some examples of SaaS applications?