**Cloud Computing Model Types**

* Types of cloud computing.
* Usages and drawbacks.

**Description**

Cloud Computing generally consists of three models: private, public and hybrid.

#Public

* Public clouds are a type of cloud computing run by a third-party cloud provider. These cloud providers deliver cloud services to their clients over the public internet. A cloud provider keeps ownership and control of the cloud storage, hardware, infrastructure and resources. Some of the largest public cloud providers include Alibaba Cloud, Amazon Web Services (AWS), Google Cloud, IBM Cloud, and Microsoft Azure.

#Private

* Only one individual or business uses the resources and storage of a private cloud. Users access private cloud services over a private network that others can't access from the public internet. Private clouds can be physically located on a company's premises. Some third-party cloud providers may also offer clients a private cloud option for a higher price than a public cloud.

#Hybrid

* A hybrid cloud combines services of both public and private clouds. With a hybrid cloud, organizations can typically choose to combine various elements of both types of clouds. Since organizations can often customize hybrid clouds, this type of cloud deployment gives companies greater flexibility in their infrastructure and operations. Example: Cisco, NetApp

**Real World Application**

The largest public cloud providers include Alibaba Cloud, Amazon Web Services (AWS), Google Cloud, IBM Cloud, and Microsoft Azure. Companies which use private cloud are HPE, VMware etc., Cisco and NetApp are some companies which use hybrid cloud models.

**Implementation**

#There are many best practices to take into account when it comes to building a secure public cloud architecture. A few of these include:

* Identity and Access Management
* Detective controls
* Infrastructure protection
* Data protection
* Incident response

**4 Important Considerations for Private Cloud Deployment**

* Selecting Your Hardware
* Choosing Management Software
* Your Current Environment
* Private Cloud Deployment and Go-Live

#The following seven steps are the ways to setup a hybrid cloud:

* Determine cloud deployment model for applications and data
* Integrate with existing enterprise systems
* Address connectivity requirements
* Develop governance policies and service agreements
* Assess and resolve security and privacy challenges
* Manage the cloud environment
* Consider a backup, archive and data recovery plan

**Summary**

* Public clouds are a type of cloud computing run by a third-party cloud provider.
* A private cloud is an on-demand cloud deployment model in which the cloud computing services and infrastructure are hosted privately within a company’s intranet.
* A hybrid cloud is one in which applications are running in a combination of different environments.(public & private)

**Cloud Computing Service Types**

* What is cloud computing?
* Different types of cloud models.

**Description**

IaaS (Infrastructure as a Service): IaaS products allow organizations to manage their business resources — such as their network, servers, and data storage — on the cloud.

* Benefits of using IaaS
* Its pay-as-you-go model allows businesses to only pay for the resources they use.
* Organizations have complete control over their infrastructure.

PaaS (Platform as a Service): PaaS products allow businesses and developers to host, build, and deploy consumer-facing apps.

* Advantages in PaaS are:
* Programmers need not worry about what specific database or language the application has been programmed in.
* It allows developers to build applications without the overhead of the underlying operating system or infrastructure.

SaaS (Software as a Service): By far the most common cloud service, SaaS products offer both consumers and businesses cloud-based tools and applications for everyday use.

* The following are the advantages of using 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.

**Real World Application**

AWS, Azure, and GCP are the best examples of the IaaS service model. Heroku cloud application provides developers with a PaaS service model. Dropbox and Jira are a few examples of SaaS cloud models.

**Summary:**

* IAAS is means of delivering computing infrastructure as on-demand services.
* PAAS is a cloud delivery model for applications composed of services managed by a third party.
* SAAS allows users to run existing online applications and it is a model software that is deployed as a hosting service

**Cloud Computing Service Models**

IaaS, PaaS, and SaaS are all types of cloud service offerings. The "aaS" stands for "as a Service" which refers to the key difference between traditional IT and cloud computing. With traditional IT, the company that demands software needs to manage/purchase their own hardware, softare, development tools, etc. With cloud computing, companies pay for these services on a subscription basis and gain access to the services via the Internet. The key advantage of cloud computing is that you only have to pay for what you use, and leave the management of the assets to the company that provides the cloud computing services.

**IaaS**

IaaS (Infrastructure as a Service) refers to on-demand access to cloud-hosted physical and virtual servers, storage, and networking resources. IaaS is flexible and lets customers scale up their storage during spikes in traffic or scale down when traffic is slowed.

**Benefits of IaaS**

1. Availability - IaaS allows customers to create redundant servers easily as well as ensure servers are running in varied geographic locations. Both contribute to the availability of the infrastructure.
2. Good performance - Due to the flexibility and geographic capabilities of IaaS, companies can ensure that their data centers are closer to users, therefore decreasing latency and maximizing performance.
3. Security - Data centers have a high level of security, so companies are often guaranteed more security than if they hosted the infrastructure themselves.

**Use Cases of IaaS**

1. Ecommerce - because ecommerce applications experience many spikes in traffic (around holidays, etc.), the ability to scale up with IaaS is essential.
2. Startup Companies - Newer companies that don't have the resources to invest in their own infrastructure can use IaaS and only pay for what is needed.
3. Artificial Intelligence, Event Processing, Internet of Things - Applications that require large amounts of data can use IaaS to store the data.

**PaaS**

PaaS (Platform as a Service) provides a platform for developing, running, and managing applications. It includes everything from the application lifecycle such as coding, integration, testing, delivery, development, and feedback.

**Benefits of PaaS**

1. Faster Time to Market - PaaS allows development teams to create production environments in much less time than if they were to create/manage their own platform.
2. New Technologies - PaaS platforms are usually up to date with the latest technologies, allowing developers to test out these new technologies in their applications.
3. Less to Manage - Developers don't need to worry about infrastructure management, patches, updates, and other administrative tasks. These are left to the cloud service provider.
4. Scalable - Companies can purchase more resources for building, testing, or running applications when they need it.

**Use Cases of PaaS**

1. API Development - PaaS lets developers create and manage APIs.
2. Agile Development and DevOps - PaaS usually cover all of the requirements of a DevOps toolchain and provide automation that supports CI/CD.

**SaaS**

SaaS (Software as a Service) is cloud-hosted application software, including all of the infrastructure required to deliver it (servers, storage, networking, middleware, application software, data storage).

**Benefits of SaaS**

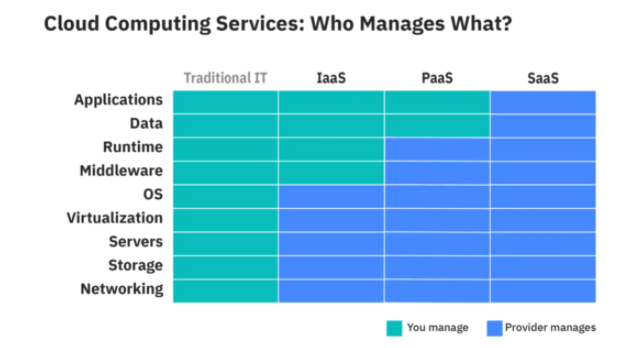
1. Ease of Use - All the user has to do is create an account, pay the fee, and start the application. The vendor handles the rest.
2. Minimal Risk - Many SaaS products offer a free trial, allowing customers try it out before committing.
3. Scalable - Very simple/easy to add new users
4. Availability - All you need to access an SaaS app is a device with a browser and internet connection.

**SaaS Use Cases**

"Today, just about any personal or employee productivity application is available as SaaS".

**Comparing the Three**

Choosing whether to use IaaS, Paas, SaaS is a balancing act between ease of use and control. IaaS provides the most control but requires the customer to manage many aspects of the application. SaaS alleviates the need to manage resources, but removes a lot of control.



**Cloud Computing Definition**

* What is cloud computing?
* Advantages of cloud computing.
* Usages of cloud computing.
* Types of cloud.
* Different services in cloud.

**Description**

**What is Cloud Computing?**

"The cloud" refers to servers that are accessed over the Internet, and the software and databases that run on those servers. Cloud servers are located in data centers all over the world. By using cloud computing, users and companies do not have to manage physical servers themselves or run software applications on their own machines.

* Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing.
* You typically pay only for cloud services you use, helping lower your operating costs, run your infrastructure more efficiently and scale as your business needs change.
* Unlike the old traditional server methods, cloud computing brings ease in deploying and maintaining applications.

**Advantages of Cloud Computing**

* Back up and restore data Once the data is stored in the cloud, it is easier to get back up and restore that data using the cloud.
* Improved collaboration Cloud applications improve collaboration by allowing groups of people to quickly and easily share information in the cloud via shared storage.
* Excellent accessibility Cloud allows us to quickly and easily access store information anywhere, anytime in the whole world, using an internet connection. An internet cloud infrastructure increases organization productivity and efficiency by ensuring that our data is always accessible.
* Low maintenance cost Cloud computing reduces both hardware and software maintenance costs for organizations.
* Mobility
* Cloud computing allows us to easily access all cloud data via mobile.
* Unlimited storage capacity
* Cloud offers us a huge amount of storage capacity for storing our important data such as documents, images, audio, video, etc. in one place.
* Data security
* Data security is one of the biggest advantages of cloud computing. Cloud offers many advanced features related to security and ensures that data is securely stored and handled.

**Real World Application**

Cloud Computing has now become a commonly used way of deploying applications, and many tech giants like Google, Netflix etc., uses cloud computing for various purposes.

**Some real time examples for which cloud computing is used for is as follows:**

* Create cloud-native applications
* Test and build applications
* Store, back up and recover data
* Analyse data
* Stream audio and video
* Embed intelligence
* Deliver software on demand

#Create cloud-native applications Quickly build, deploy and scale applications—web, mobile and API. Take advantage of cloud-native technologies and approaches, such as containers, Kubernetes, microservices architecture

#Test and build applications Reduce application development cost and time by using cloud infrastructures that can easily be scaled up or down.

#Store, back up and recover data Protect your data more cost-efficiently—and at massive scale—by transferring your data over the Internet to an offsite cloud storage system that is accessible from any location and any device.

#Analyse data Unify your data across teams, divisions and locations in the cloud. Then use cloud services, such as machine learning and artificial intelligence, to uncover insights for more informed decisions.

#Stream audio and video Connect with your audience anywhere, anytime, on any device with high-definition video and audio with global distribution.

#Embed intelligence Use intelligent models to help engage customers and provide valuable insights from the data captured.

#Deliver software on demand Also known as software as a service (SaaS), on-demand software lets you offer the latest software versions and updates around to customers—anytime they need, anywhere they are.

**Implementation**

* There are also three main types of cloud computing services:
* Infrastructure-as-a-Service (IaaS), Platforms-as-a-Service (PaaS), and Software-as-a-Service (SaaS).
* The different kinds of cloud models available are public, private and hybrid clouds.
* Few of the companies which use cloud computing are Airbnb, Adobe, Reddit etc.,
* Some of the widely used cloud providers are AWS, GCP, Azure.

**Summary**

* Cloud computing is a pay-to-go model for delivery IT resources.
* On comparing to traditional servers, cloud computing gives more functionality and flexibility.
* Advantages of using cloud computing are low cost, easy scalability, increased speed, no need of maintaing servers, can go global in minutes.
* We can use cloud to deploy naive applications, build and test applications, store data efficiently, data analytics etc.,
* Three types of services available on cloud are PaaS, SaaS and IaaS.
* The different types of cloud are private, public and hybrid.

***Thank you***