CLOUD COMPUTING

Cloud session timeline

Start of session
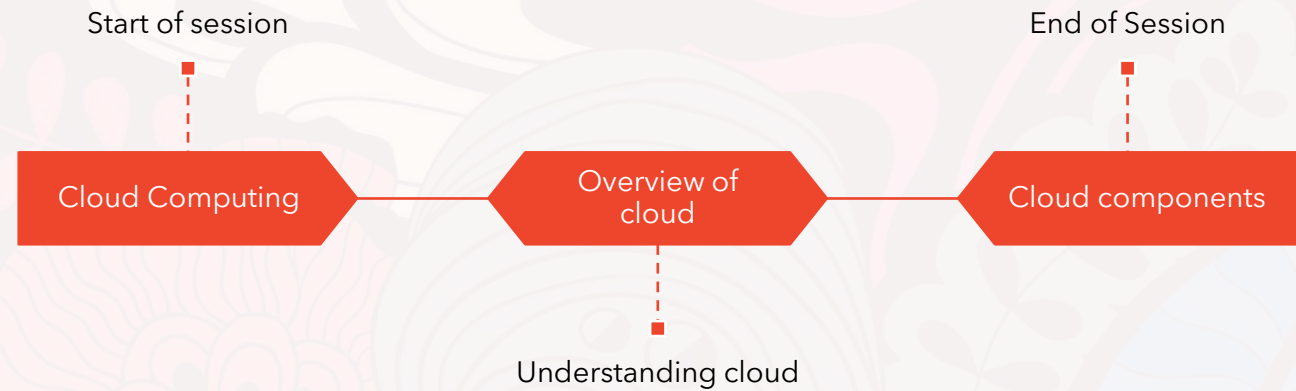
End of Session

Cloud Computing

Overview of cloud

Cloud components

Understanding cloud

Cloud computing

◦ Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis (Amazon)

◦ Simply put, cloud computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the Internet ("the cloud") to offer faster innovation, flexible resources, and economies of scale. 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.(Microsoft Azure)

World before cloud

Client on other side

Maintaining
Network
Website
Security
Data

Network
Administrator
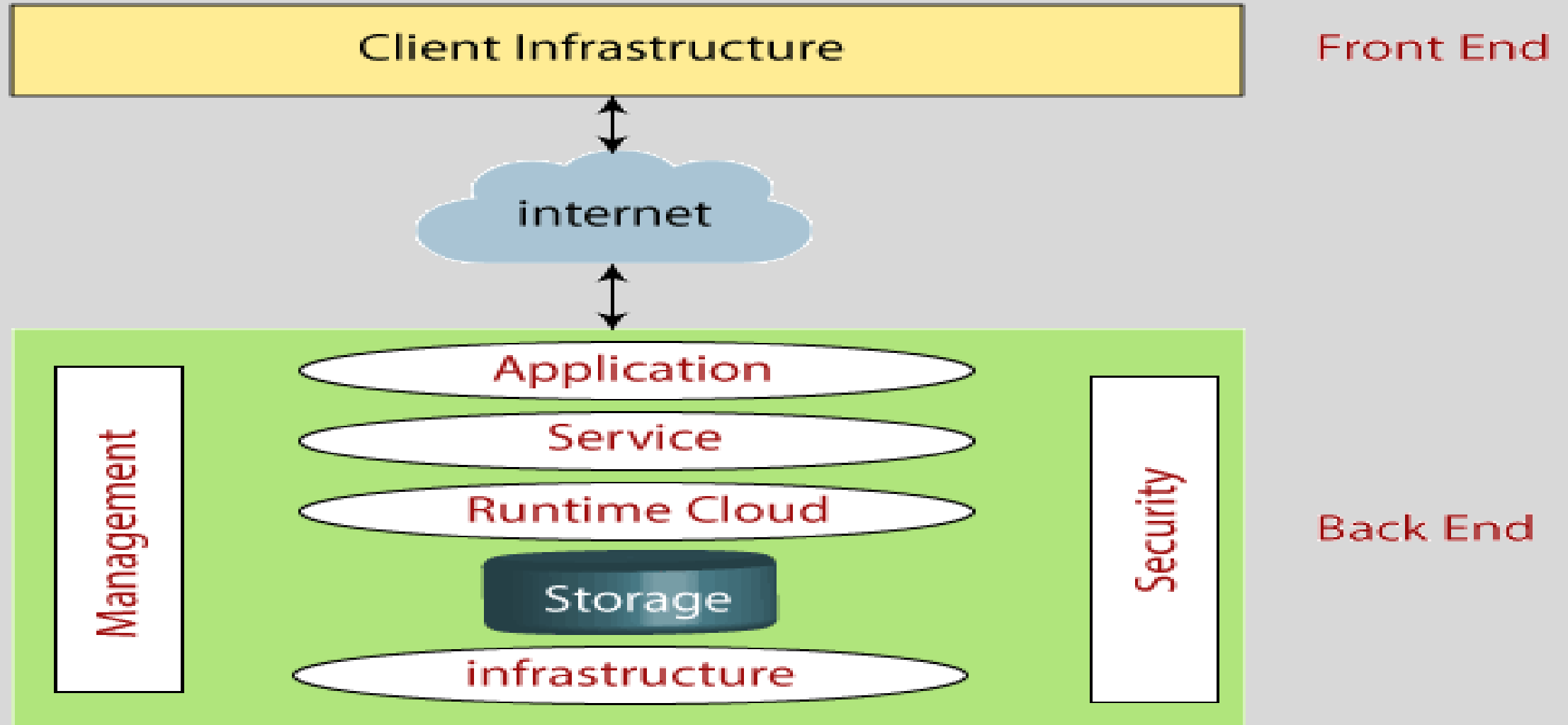
Technology has become pervasive

All the activity is shifting to cloud

Architecture of Cloud Computing

Client Infrastructure

Front End

internet

Application

Service

Runtime Cloud

Storage

infrastructure

Management

Security

Back End

Different Deployments of Cloud

- Public

- Community

- Hybrid

- Private

Public Cloud

○ In this type of cloud ,a service provider makes resources available to public via Internet

○ Services may Include storage capacity ,applications ,virtual machines and other infrastructure

○ Public cloud mostly include all those services that are commonly required by organizations like storage service

○ Public cloud allows some amount of services for free and then charges as per different plans

○ Some of the cloud services like Google ,provide for free services up to a limit

Private Cloud

- A Private Cloud provides services only to limited users through internet or through a private network

- It is also known as internal or corporate cloud

- A private cloud provides all the benefits of public cloud in a secured and trusted environment

- Creation of private cloud involves all the cost that is required to maintain a datacenter. The staff at the organization is responsible of maintenance ,scaling and security of private cloud

- Having a dedicated cloud computing resources over the premise , that is customizable and ready available is one benefit of private ,and cost and risk involved in maintenance of such a resource is a drawback

- An organization has to assess whether it requires such an infrastructure for it's operations ,before investing in private cloud

Hybrid Cloud

- A hybrid cloud is a mix of public and private cloud

- Hybrid cloud is created when requirement of an organization goes beyond an on premise private cloud

- It gives combined benefits of private and public cloud ,like security and trusted environment ,availability and low maintenance

- Organizations can choose between services that need to be kept on private cloud and those that can be left to public cloud

Community Cloud

- In a community cloud ,resources are shared among a group of organizations from a specific community

- These services can be managed internally or by a third party

- The services on a community cloud can be community specific

- An example of community cloud could be different government organizations under a government can share a common cloud ,restricted to their usage

- Community cloud can reduce cost of maintenance for organization because there is a concept of sharing responsibility is involved

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Services on cloud

- IaaS
- PaaS
- SaaS
- FaaS

IaaS

◦ Infrastructure as a service (IaaS) is a type of cloud computing service that offers essential compute, storage and networking resources on demand, on a pay-as-you-go basis. IaaS is one of the four types of cloud services, along with software as a service (SaaS), platform as a service (PaaS) and serverless.

IaaS

○ In computing, infrastructure refers to the computers and servers that run code and store data, and the wires and appliances that make connections between those machines. For example, servers, hard drives, and routers are all part of infrastructure.
Before cloud computing was an option, most businesses hosted their own infrastructure and ran all their applications on-premise.

○ Infrastructure-as-a-Service, or IaaS for short, is when a cloud computing vendor hosts the infrastructure on behalf of their customers. The vendor hosts the infrastructure in "the cloud" – in other words, in various data centers. Their customers access this cloud infrastructure over the Internet. They can use it to build and host web applications, store data, run business logic, or do anything else that could be done on traditional on-premise infrastructure, but often with more flexibilit

On-Premises Infrastructure   Infrastructure-as-a-Service
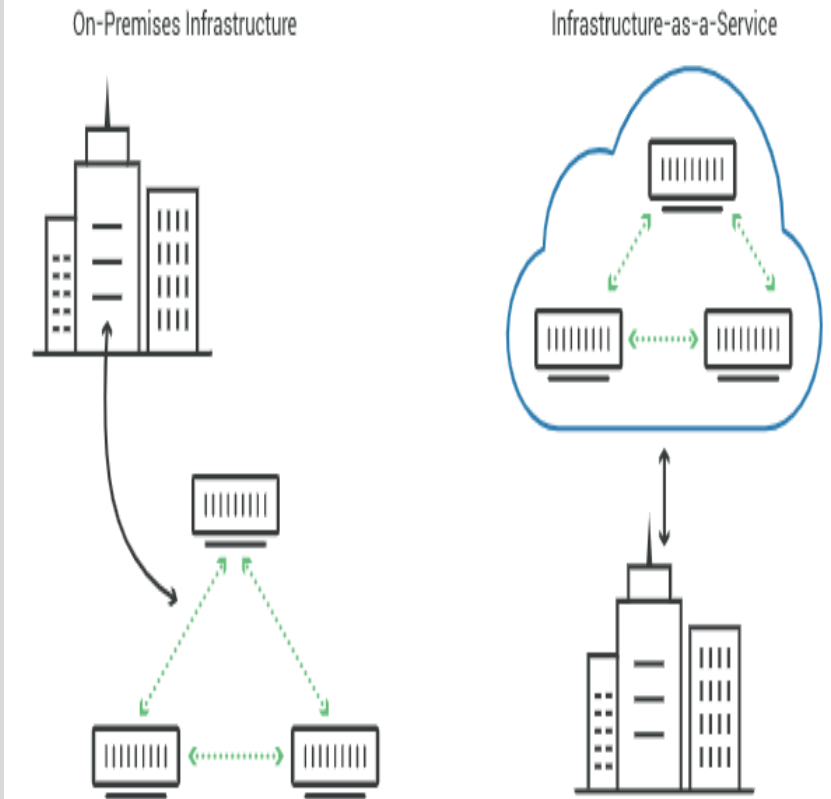
Why IaaS

- *Scalability:* It's much easier to expand a business with IaaS as the foundation. Instead of purchasing, installing, and maintaining a new server every time the business needs to scale up, they can just add a new server on demand through the IaaS provider. This on-demand scalability is a major benefit of cloud computing across all cloud service models.

- *Fewer resources dedicated to server maintenance:* With IaaS, a company has essentially outsourced server purchasing, maintenance, and updating to the IaaS provider. This is typically cheaper and requires less time and labor from internal teams than they would need to host their own infrastructure.

- *Faster time to market:* Companies using IaaS can deploy and update applications much faster, since cloud providers can offer however much infrastructure they need as they need it.

- *Flexible and efficient renting of computer hardware :*IaaS resources such as virtual machines, storage devices, bandwidth, IP addresses, monitoring services, firewalls, etc. are made available to the customers on rent. The payment is based upon the amount of time the customer retains a resource. Also with administrative access to virtual machines, the customer can run any software, even a custom operating system.

- *Portability, interoperability with legacy applications:* It is possible to maintain legacy between applications and workloads between IaaS clouds. For example, network applications such as web server or e-mail server that normally runs on customer-owned server hardware can also run from VMs in IaaS cloud.

PaaS

- Platform as a service (PaaS) is a complete development and deployment environment in the cloud, with resources that enable you to deliver everything from simple cloud-based apps to sophisticated, cloud-enabled enterprise applications. You purchase the resources you need from a cloud service provider on a pay-as-you-go basis and access them over a secure Internet connection.

- Like IaaS, PaaS includes infrastructure—servers, storage and networking—but also middleware, development tools, business intelligence (BI) services, database management systems and more. PaaS is designed to support the complete web application lifecycle: building, testing, deploying, managing and updating.

PaaS

- Among the leading PaaS providers are Amazon Web Services (AWS), Microsoft, Google, IBM, Salesforce.com, Red Hat, Pivotal, Mendix, Oracle, Engine Yard, and Heroku. Most widely used languages, libraries, containers, and related tools are available on all the major PaaS providers' clouds.

SaaS

- Software as a service (SaaS) allows users to connect to and use cloud-based apps over the Internet. Common examples are email, calendaring and office tools (such as Microsoft Office 365).

- SaaS provides a complete software solution which you purchase on a pay-as-you-go basis from a cloud service provider. You rent the use of an app for your organisation and your users connect to it over the Internet, usually with a web browser. All of the underlying infrastructure, middleware, app software and app data are located in the service provider's data center. The service provider manages the hardware and software and with the appropriate service agreement, will ensure the availability and the security of the app and your data as well. SaaS allows your organisation to get quickly up and running with an app at minimal upfront cost.

FaaS

◦ Function as a service is also referred to as serverless architecture

◦ FaaS allows us to develop ,build and Manage application without the hassle of infrastructure involved in building an app

◦ FaaS is a serverless way to execute a modular pieces of code

◦ FaaS allows developer to write and update a piece of code on the fly which can then be executed in response to an event ,like a user click on a button on web page

Issues with Cloud Services

- Security Issues
- Cost Issues
- Control Issues
- Performance
- Compliance
- Policy
- Cost to Productivity Mapping

How To Decide ?

- Based on budget

- Based on client requirement

- Based on project scale