

CLOUD COMPUTING

R.UMAMAHESWARI

INTRODUCTION

- ▶ Cloud Computing provides us a means by which we can access the applications as utilities, over the internet.
- ▶ It allows us to create , configure, and customize applications online.
- ▶ With Cloud Computing users can access database resources via the internet from anywhere for as long as they need without worrying about any maintenance.

- ▶ The term is generally used to describe data centers available to many users over the internet.
- ▶ CC is the use of hardware and software to deliver a service over a network.
- ▶ CC users can access files &use applications from any device that can access the Internet.
- ▶ Ex:Gmail.

When CC starts?

- ▶ Network based computing 1960's
- ▶ First use of CC 9/8/2006
- ▶ Introducer: Google CEO Eric schmidt
31/10/2011

What is Cloud?

- ▶ Cloud refers to a Network or Internet.
- ▶ Which is present at remote location.
- ▶ Cloud can provide services over network.
- ▶ Public or private network. WAN, LAN, VPN.
- ▶ Applications such as e-mail, web conferencing, Customer Relationship Management(CRM).

What is cloud computing?

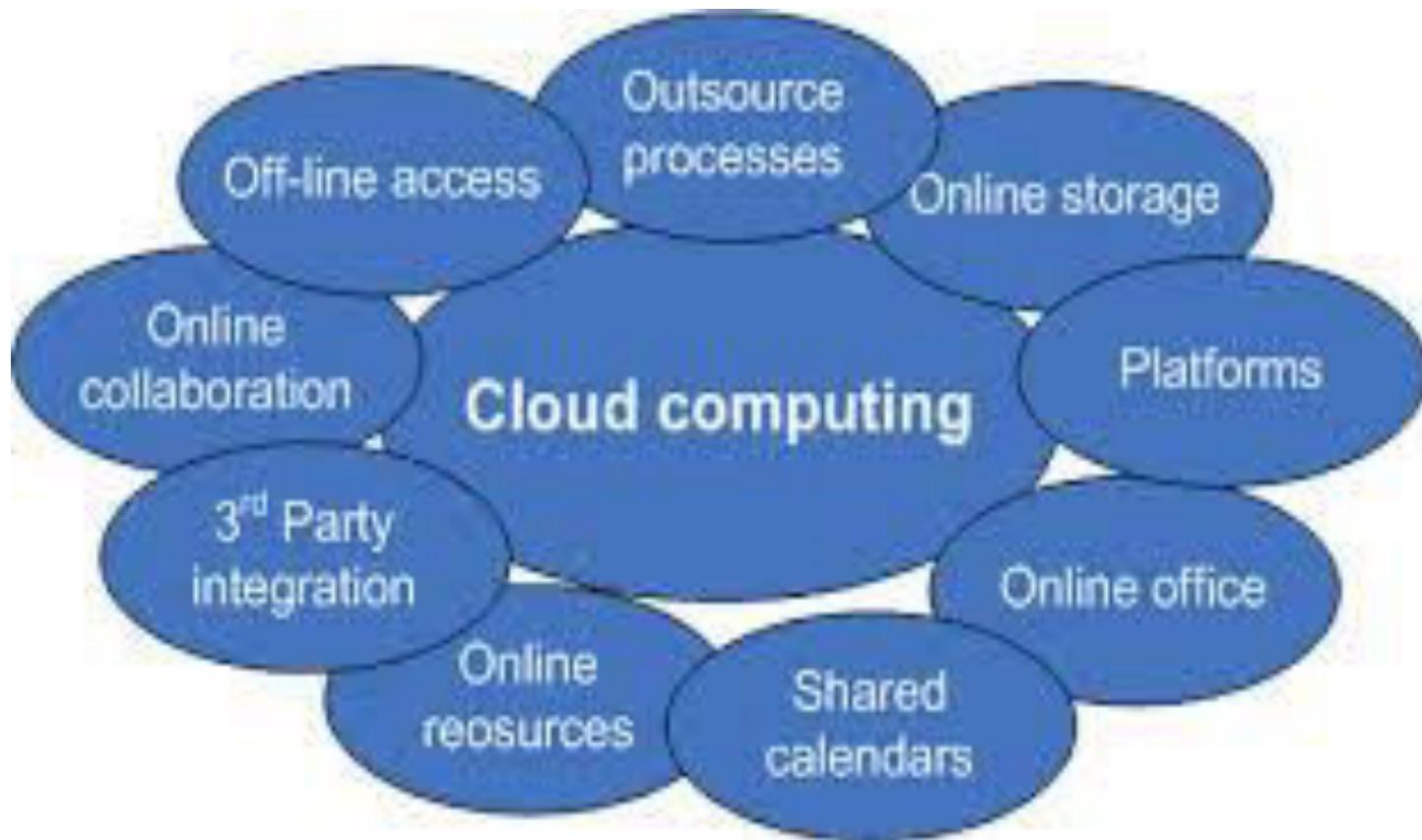
- ▶ Manipulating, configuring, and accessing the application online.
- ▶ It offers online data storage, infrastructure and application.
- ▶ CC is both a combination of software and hardware based computing resources delivered as a network services.



Cloud Computing

Why is CC?

- ▶ CC allows consumers and business to use applications without installation.
- ▶ Access their personal files at any computer with Internet access.



Basic concepts

- ▶ There are certain services and models working behind the scene making the cloud feasible and accessible to end users.
 1. Deployment model
 2. Service models

DEPLOYMENT MODELS

- ▶ It defines type of access to the cloud.
- ▶ Cloud can have four types of access.
 1. Public cloud
 2. Private cloud
 3. Hybrid cloud
 4. Community cloud

1. Public cloud

- * it allows system and services to be easily accessible to the general public.
- Public cloud may be less secure because of its openness
- ex:gmail.

2. Private cloud

- ▶ It allows systems and services to be accessible within an organization.
- ▶ It offers increased security because of its.

3. Community cloud:

It allows systems and services to be accessible by group of organization.

Ex: Jewellery shop bills

4. Hybrid cloud

- ▶ The hybrid cloud is mixture of public and private cloud.
- ▶ The critical activities are performed using private cloud while the non critical activities are performed using public cloud.

SERVICE MODELS

- ▶ Service models are the reference models on which the CC is based.
- ▶ There are three basic models
 1. Infrastructure as a service(IaaS)
 2. Platform as a service(PaaS)
 3. Software as a service(SaaS)

1. IaaS

- ▶ IaaS is the delivery of technology infrastructure as an on demand scalable service.
- ▶ IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storages etc.,
- ▶ Usually billed based on usage.
- ▶ Usually multi tenant virtualized environment.

2.PaaS

- ▶ PaaS provides the runtime environment for applications, development & deployment tools, etc.
- ▶ PaaS provides all of the facilities required to support the complete lifecycle of building and delivering web applications.
- ▶ Multi tenant environment. Amazon, Azure.
- ▶ Highly scalable multi tier architecture.

3.SaaS

- ▶ It allows to use software applications as a service to end users.
- ▶ SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a web based service.
- ▶ Usually billed based on usage.
- ▶ Usually multi tenant environment
- ▶ Highly scalable architecture

ADVANTAGES

- ▶ Lower computer costs
- ▶ Improved performances
- ▶ Reduced software costs
- ▶ Instant software updates
- ▶ Unlimited storage capacity
- ▶ Increased data reliability
- ▶ Latest version availability
- ▶ Easier group collaboration.

Disadvantages

- ▶ Requires a constant internet connection
- ▶ Does not work well with low speed connections
- ▶ Features must be limited
- ▶ Can be slow
- ▶ Stored data can be lost
- ▶ Stored data might not be secure.

Examples

- ▶ Facebook is a cloud computing application. User can access your photos, updates anywhere in the world so long as you have an access to internet.

CC APPLICATIONS

- ▶ CC is a technology that users the internet & central remote servers to maintain data and applications.
- ▶ CC allows consumers & businesses to use both application without installation & access their personal files at any computers with internet access.

How did CC evolve?

- ▶ CC is a process that entails accessing of services, including storage application & servers through the Internet.

How does CC works?

- ▶ Via an internet service connection, cloud storage works by enabling users access & to download data on any chosen device such as laptop, tablet, or smart phone.
- ▶ Cloud storage users can also edit documents simultaneously with other users as well, making it easier to work away from the office.

- ▶ What are the common reasons to use the cloud?
- ▶ Cost savings
- ▶ Ease of use
- ▶ Increased storage capacity
- ▶ Automation
- ▶ Agility, Flexibility & scalability
- ▶ Freeing up your IT staffs.

THANK YOU



CLOUD COMPUTING

DAY 2
26.08.2020

PREVIOUS CLASS

- ▶ CLOUD COMPUTING OVERVIEW

- ▶ APPLICATIONS

1. Deployment model

- Public cloud

- Private cloud

- Hybrid cloud

- Community cloud

2. Service models

1. Infrastructure as a service(IaaS)

2. Platform as a service(PaaS)

3. Software as a service(SaaS)

INTERNETS AND THE CLOUD

- ▶ The **Internet** is a network of networks that provides software or hardware infrastructure to maintain and establish connectivity of Computers.
- ▶ Cloud is a newer technology that offers various kinds of resources over the **internet**.
- ▶ **cloud computing** means storing and accessing data and programs over the internet instead of your computer's hard drive.



© Can Stock Photo - csp16417241

- ▶ **Cloud Computing** is the use of hardware and software to deliver a service over a network.
- ▶ An example of a **Cloud Computing** provider is Google's Gmail. Gmail users can access files and applications hosted by Google via the internet from any device.
- ▶ All **cloud** applications **need** an **Internet** connection at some point, but not all **require** a constant connection – after all, mobile users can't stay connected at all times.

FIRST MOVERS IN THE CLOUD

- ▶ One of the first movers in cloud computing was **Salesforce.com**, which in 1999 introduced the concept of delivering enterprise applications via a simple website.
- ▶ Amazon was next on the bandwagon, launching Amazon Web Service in 2002.

- ▶ **Amazon Web Services (AWS), Microsoft and Google.**
- ▶ **Amazon was the first major cloud provider, with the 2006 offering of Amazon Simple Storage Service (Amazon S3).**

First Movers in Cloud Computing



Amazon

Google

Microsoft

Amazon

Amazon was one of the first companies to offer cloud services to the public, and they are very sophisticated.

Amazon offers a number of cloud services, including

- ▶ **Elastic Compute Cloud (EC2)** Offers virtual machines and extra CPU cycles for your organization.
- ▶ **Simple Storage Service (S3)** Allows you to store items up to 5GB in size in Amazon's virtual storage service.

- ▶ **Simple Queue Service (SQS)** Allows your machines to talk to each other using this message-passing API.
- ▶ **SimpleDB** A web service for running queries on structured data in real time.
- ▶ This service works in close conjunction with Amazon Simple Storage Service (Amazon S3) and Amazon Elastic Compute Cloud (Amazon EC2), collectively providing the ability to store, process, and query data sets in the cloud.
- ▶ Amazon is the most extensive cloud service to date. You can see more about Amazon's cloud services at <http://aws.amazon.com>.

- ▶ A **first mover** is a company that gains a competitive advantage by being the **first** to bring a new product or service to the market.
- ▶ **First movers** typically establish strong brand recognition and customer loyalty.
- ▶ **Amazon** and eBay are examples of companies that enjoy **first-mover** status

GOOGLE

- ▶ Google offers online documents and spreadsheets, and encourages developers to build features for those and other online software, using its Google App Engine.
- ▶ Google reduced the web applications to a core set of features, and built a good framework for delivering them.
- ▶ Google also offers handy debugging features

EXAMPLES

- ▶ Google Browser
- ▶ Gpay
- ▶ Google map
- ▶ G translate
- ▶ It can be found online at [code.google.com/appengine/.](http://code.google.com/appengine/)

MICROSOFT

- ▶ Microsoft's cloud computing solution is called **Windows Azure**, an operating system that allows organizations to run Windows applications and store files and data using Microsoft's datacenters.
- ▶ It's also offering its Azure Services Platform, which are services that allow developers to establish user identities, manage workflows, synchronize data, and perform other functions as they build software programs on Microsoft's online computing platform.
- ▶ Key components of Azure Services Platform include.

Your Organization and Cloud Computing:

When you can use Cloud Computing:

- ▶ Cost/benefit ratio
- ▶ Speed of delivery
- ▶ How much capacity you will use
- ▶ Whether your data is regulated
- ▶ Your organization's corporate and IT structure





Benefits of Cloud Computing

BENEFITS

- ▶ Scalability
- ▶ Simplicity
- ▶ Knowledgeable Vendors
- ▶ Security
- ▶ Reduced IT costs
- ▶ Business Continuity
- ▶ Flexibility of work practices
- ▶ Access to automatic updates

CLOUD COMPUTING

DAY 3
27.08.2020

PREVIOUS CLASS

- ▶ INTERNET AND THE CLOUD
- ▶ FIRST MOVERS IN THE CLOUD
- ▶ BENEFITS OF CLOUD COMPUTING

TODAYS TOPIC

- ▶ Limitations
- ▶ WHEN YOU CAN USE CLOUD COMPUTING

LIMITATIONS

- ▶ Internet dependence
- ▶ Data incompatibility
- ▶ Security breach threats.
- ▶ Various costs
- ▶ Customer support

1. Internet dependence

- ▶ Everything at the cloud is accessible through internet only.
- ▶ If the cloud server faces some issues
- ▶ If user use an internet services that fluctuates a lot.
- ▶ Even the biggest service providers face quite long down times.

2. Data incompatibility

- ▶ This is varied as per different service providers
- ▶ A vendor locks in the customer by using proprietary rights so that the customer can't switch to another vendor.

3. Security breach threats

- The data transactions happen through internet only.
- Through your cloud service provider claims to be one of the best secured service provider.

4. Various costs

- ▶ The common mistakes business owners do is to invite un-required expenses in highly advanced.
- ▶ The current infrastructure is serving the needs, then migrating to the clouds would not be recommended.
- ▶ If your business demands huge data transfer, every month you would be billed huge amount.

5. Customer support

- ▶ If your business faces heavy traffic every day and heavies on weekends.
- ▶ Then, a quick fix is always on top priority.
- ▶ The best cloud service providers must have optimum support for technical difficulties via email, call, chat or even forums.

When you can use CC?

Here a few situations where cloud computing is used to enhance the ability to achieve business goals:

- ▶ IaaS and PaaS
- ▶ Private cloud and hybrid cloud
- ▶ Test and development
- ▶ Big data analytics
- ▶ File storage
- ▶ Disaster recovery
- ▶ Backup

1. IaaS and PaaS

- ▶ When it comes IaaS, using an existing Infrastructure on a pay per use schemes.
- ▶ It seems to be an obvious choice for companies saving on the cost of investing to acquire.
- ▶ PaaS for the same reasons while also seeking to increase the speed of development on a ready to use platform to deploy applications.

2. Private cloud and Hybrid cloud

- ▶ There are two situations
 - 1. Org are looking into ways to access some of the applications.
 - 2. They intended to deploy into their environment through the use of cloud(public).
- Hybrid cloud approach allows for testing application workloads,
- Providing the comfort of an environment without the initial investment.

3. Test and development

- ▶ The best scenario for the use of a cloud is a test and development environment.
- ▶ This entails securing a budget, setting up your environment through physical assets, significant man power and time.
- ▶ Then comes the installation and configuration of your platform.
- ▶ All this can often extend the time it takes for a project to be completed & stretch your milestones.

4. Big data analytics

- ▶ Structured and unstructured data to harness the benefits of extracting business value.
- ▶ Retailers and suppliers are now extracting information delivered from consumers buying patterns to target their advertising & marketing to a particular segment of populations.

5. File storage

- ▶ Cloud can offer you the possibility of storing your files and accessing, retrieving from any web enabled.
- ▶ The web service interface are usually simple.
- ▶ At any time any place you have high availability speed, scalability and security for ur environment.
- ▶ Org are only paying for the amount of cloud storage they are actually consuming.

6. Disaster recovery

- ▶ Cloud based on the cost effectiveness of a Disaster Recovery solution that provides for a faster recovery from a mesh of different physical locations.
- ▶ Lower cost than the traditional DR site with fixed assets, rigid procedure and higher cost.

7. backup

- ▶ Backing up data has always been a complex & time consuming operation.
- ▶ Maintaining a set of tapes or drives.
- ▶ Manually collecting them & dispatching them to a backup facility with all the inherent problems that might happen in between the originating and the back up site.

Advantages of CC

- ▶ Less costs
- ▶ 24x7 availability
- ▶ Flexibility in capacity
- ▶ All over functioning
- ▶ Automated updated on software
- ▶ Security
- ▶ Carbon foot print
- ▶ Enhanced collaboration
- ▶ Control on the document
- ▶ Easily managable.

Disadvantages

- ▶ Down time
- ▶ Security and privacy
- ▶ Vulnerability to attack.
- ▶ Limited control & flexibility
- ▶ Vendor lock in
- cost concern

PRINCIPLES OF CLOUD COMPUTING

DAY 4

28.08.2020

PREVIOUS CLASS

- ▶ Limitations
- ▶ WHEN YOU CAN USE CLOUD COMPUTING

TODAY CLASS

- ▶ SECURITY CONCERN
- ▶ Regularity Issues

Security Concerns

- ▶ Cloud is not as a traditional IT operation
- ▶ Security patching is better in an cloud
- ▶ Demonstrating compliance is harder in a cloud.
- ▶ Data loss is less likely in a cloud
- ▶ More control leads to better security
- ▶ Cloud providers have a better view of threats.
- ▶ Cloud offers more availability than in house IT.

Security pitfalls

- ▶ User is not aware with cloud services are provided
- ▶ There is no well demarcated network security border
- ▶ Cloud computing implies loss of control.

What is cloud security?

- ▶ Confidentiality
- ▶ Integrity
- ▶ Availability of mission IT assets stored or processed on a cloud computing platform.

Delivery models

- ▶ Application services: Gmail, Google calander
- ▶ PAAS: Google App engine
- ▶ IAAS: IBM blue house, Amazon EC2, Microsoft azure

Deployment models

- ▶ Private cloud: owned or leased by a single organization, no public access
- ▶ Public cloud: Owned by an organization selling cloud services
- ▶ Managed cloud: owned by a single organization.
- ▶ Community cloud: shared by several organization.
- ▶ Hybrid cloud: composition of 2 or more clouds.

Security issues in Deployment models

- ▶ Trusted
- ▶ Control
- ▶ Reliable
- ▶ Secure
- ▶ Flexibility
- ▶ Dynamic
- ▶ On-demand
- ▶ Efficient

Security issues in SaaS

- ▶ Data security
- ▶ Network security
- ▶ Data locality
- ▶ Data integrity
- ▶ Data access
- ▶ Data segregation
- ▶ Authorization and Authentication
- ▶ Data confidentiality
- ▶ Web application security
- ▶ Data breaches
- ▶ Backup

Security issues in IaaS

- ▶ Hackers are likely to attack visible code, including but not limited to code running in user context.
- ▶ Attack the infrastructure and perform extensive black box testing.

Overall security concerns

- ▶ Privileged access
- ▶ Regularity compliance
- ▶ Data location
- ▶ Data segregation
- ▶ Recovery
- ▶ Investigate support
- ▶ Data availability

REGULARITY ISSUES

- ▶ The expansion of digital technologies has enabled services such as cloud that dramatically changed the way in which services are delivered to and accessed by consumers.
- ▶ Today we face urgency in deciding how to use ICT Consumer Data and Privacy Protection
Today we face urgency in deciding how to use ICT markets, self-regulation, and regulatory enforcement to protect personal data

- ▶ Protecting the privacy of consumers' data and ensuring consumers' data is used for the purposes intended are essential safeguards in todays' converged environment
- ▶ Regulations are needed to protect consumer's expectation of privacy, protection of personal data; privacy; confidentiality of information and the right to complain for local services delivered / accessed over the Internet.

- ▶ Globally, a number of regulators do enforce minimum QoSE requirements to ensure that providers have reliable and uninterrupted services, including access to information in the cloud.

PRINCIPLES OF CLOUD COMPUTING

DAY 5
29.08.2020

PREVIOUS CLASS

- ▶ SECURITY CONCERN
- ▶ REGULARITY ISSUES

TODAY CLASS

- ▶ BENEFITS of cloud computing
- ▶ Cloud Computing With the Titans



Benefits of Cloud Computing

BENEFITS

- ▶ Scalability
- ▶ Reduced IT costs
- ▶ Business continuity
- ▶ Collaboration efficiency
- ▶ Flexibility of work practices
- ▶ Access to automatic updates



A central blue cloud icon contains the text "Cloud Computing". Dashed lines connect the cloud to nine smaller icons arranged around it, each enclosed in a blue circle. The icons represent various devices: a desktop computer, a smartphone, a laptop, a tablet, and a monitor. The connections are as follows: top-left to top-middle, top-middle to top-right, top-right to middle-right, middle-right to bottom-right, bottom-right to bottom-middle, bottom-middle to bottom-left, bottom-left to top-left, and a direct connection from the cloud to the middle-left icon.

Cloud Computing

Scalability

- ▶ Users business can scale up or scale down.
- ▶ Users operation and storage needs quickly to suit his situation, allowing flexibility as users needs change.
- ▶ Purchasing & installing expensive upgrades yourself, your cloud computers service provider can handle this for you.
- ▶ Using the cloud frees up your time so you can get on with running your business.

REDUCED IT COSTS

- ▶ Purchase expensive systems & equipment for your business.
- ▶ User can reduce your costs by using the resources of CC service provider.
- ▶ The cost of system upgrades, new h/w &s/w may be included in your contract.
- ▶ No longer need to pay wages for expert staff.
- ▶ Your energy consumption costs may be reduced.

Business continuity

- ▶ Protecting your data and systems in an important part of business continuity planning.
- ▶ User experience a natural disaster, power failure or other crises, having your data stored in the cloud.
- ▶ Backed up and protected in a secure &safe location.
- ▶ Being able to access your data again quickly allows you to conduct business as usual, minimizing any downtime & loss of productivity.

Collaboration efficiency

- ▶ The ability to communicate and share more easily outside of the traditional methods.
- ▶ If you are working on a project across different locations, you could use CC to give employees, contractors and third parties access to the same files.
- ▶ User could also choose a CC model that makes it easy for you to share your records with your advisors.
- ▶ Ex: Quick and secure way to share accounting records with your accountant or financial advisor

Flexibility of work practices

- ▶ CC allows employees to be more flexible in their work parties
- ▶ Ex: you have ability to access data from home on holiday.
- ▶ If you need access to your data while you are off site, you can connect to your virtual office, quickly and easily.

Access to automatic updates

- ▶ IT requirements may be included in your service fee.
- ▶ Depending on your CC service provider, your system will regularly be updated with the latest technology.
- ▶ This could include up-to-date versions of s/w as well as upgrades to server and computer processing power.

Cloud Computing With the Titans

- ▶ Google
- ▶ EMC
- ▶ NetApp
- ▶ Microsoft
- ▶ Amazon
- ▶ Salesforce.com
- ▶ IBM
- ▶ Partnership.

Google

- ▶ The cloud is certainly one of Google's biggest business ventures, and they offer a couple of tools to help draw customers to their cloud.



- ▶ Google has spent years developing infrastructure for scalable web applications,” said Pete Koomen, a product manager at Google.
- ▶ Gmail and Google search to hundreds of millions of people worldwide
- ▶ built out a powerful network of datacenters to support those applications.

EMC

- ▶ EMC Corporation is the world leader in products, services, and solutions for information storage and management.
- ▶ That help organizations extract value from their information.
- ▶ They have their fingers in all sorts of different cloud computing and virtualization pies.
- ▶ For example, in early 2009, EMC raised the stakes in its bet that virtualization is going to be the “next big thing” in the world of computing.

- ▶ It introduced its Symmetric V-Max system in April 2009, claiming that it is the first management system to support high-end virtual datacenters.
- ▶ EMC Software delivers worldwide enterprise class software solutions and services that keep the world's business-critical information and applications available.
- ▶ EMC has a long tradition of adopting and driving storage-specific standards.

- ▶ The system allows customers with vast storage need to easily manage and expand storage systems without interfering with day-to-day operations.
- ▶ This system allows multiple datacenters to be run as if they were one, making their management much easier and more efficient.

Net app

- ▶ NetApp is an organization that creates storage and data management solutions for their customers.
- ▶ Their goal is to deliver cost efficiency and accelerate business breakthroughs.
- ▶ In 1992 they introduced the world's first networked storage device.
- ▶ The company continues to introduce new technologies that reduce the costs of IT

- ▶ NetApp claims they can cut your IT costs in half, use up to 80 percent less storage, hold off on datacenter expansion, and speed up your time to market.
- ▶ NetApp, engages in the design, manufacture, marketing, and technical support of **storage** and data management solutions.
- ▶ It offers cloud data services, data **storage** software, data backup and recovery, all-flash **storage**, converged systems, data infrastructure management, ONTAP data security, and hybrid ~~flash storage~~.

- ▶ The **NetApp storage** system is a hardware-and software-based data **storage** and retrieval system.
- ▶ It responds to network requests from clients and fulfills them by writing data to or retrieving data from its disk array.
- ▶ Data ONTAP is the operating system for all **NetApp storage** systems.

Microsoft

- ▶ Microsoft offers a number of cloud services for organizations of any size—from enterprises all the way down to mom-and-pop shops or individuals.
- ▶ A good portion of Microsoft's cloud offerings are cloud variants of products that people already use, so cloud versions aren't that difficult to use.
- ▶ Microsoft Azure is an ever-expanding set of cloud services to help your organization meet your business challenges.
- ▶ It is the freedom to build, manage and deploy applications on a massive, global network using your favorite tools and frameworks.

- ▶ Microsoft Office System programs use SharePoint site content.
- ▶ A site's collaborative content—like documents, lists, events.
- ▶ It can be read and edited with Microsoft Office Word. Picture editing is also possible. Microsoft Office Outlook allows SharePoint site event calendars to be viewed side by side with personal calendars.
- ▶ SharePoint also allows managers to customize the content and layout of sites so that site members can access and work with relevant information.
- ▶ Members' activity can also be monitored and moderated by managers.

AMAZON



- ▶ 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.
- ▶ Computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).

- ▶ **Amazon Web Services** offers reliable, scalable, and inexpensive **cloud computing** services.
- ▶ Free to join, pay only for what you use.
- ▶ In 2006, **Amazon Web Services** (AWS) started to offer IT services to the market in the form of web services, which is nowadays known as **cloud computing**.

Salesforce.com



- ▶ Explore all the solutions on the **Salesforce** Customer 360 Platform. We're the innovative company behind the world's #1 CRM platform



- ▶ Microsoft Dynamics CRM Online supplements Microsoft's software plus services strategy for delivering integrated business solutions over the Internet, and it is a part of Microsoft's multibillion-dollar investment in global datacenters.
- ▶ When you use salesforce CRM to manage contacts and sales activities.
- ▶ Discover how salesforce is committed to your success. Learn how we can help you find, win and keep customers to grow.

IBM

- ▶ A faster more reliable way to modernize & move to cloud.
- ▶ IBM cloud paks are enterprise ready contains software solutions that give clients an open, faster and more secure way to move core business applications to any cloud.

PARTNERSHIP

- ▶ A partnership is a formal arrangement by two or more parties to manage & operate a business & share its profits.
- ▶ There are several types of partnership arrangements.
- ▶ All partners share liabilities & profits equally.
- ▶ Partners have limited liability.
- ▶ A legal form of business operation between 2 or more individuals who share management & profits.
- ▶ There are 4 types
 - ▶ 1. general partnership
 - ▶ 2. limited partnership
 - ▶ Limited liability partnership
 - ▶ Limited liability limited partnership

QUERIES???

**UNIT I
COMPLETED**

DAY 6

31.08.2020

PRINCIPLES OF CLOUD COMPUTING UNIT II

The Business Case for Going to the
Cloud:

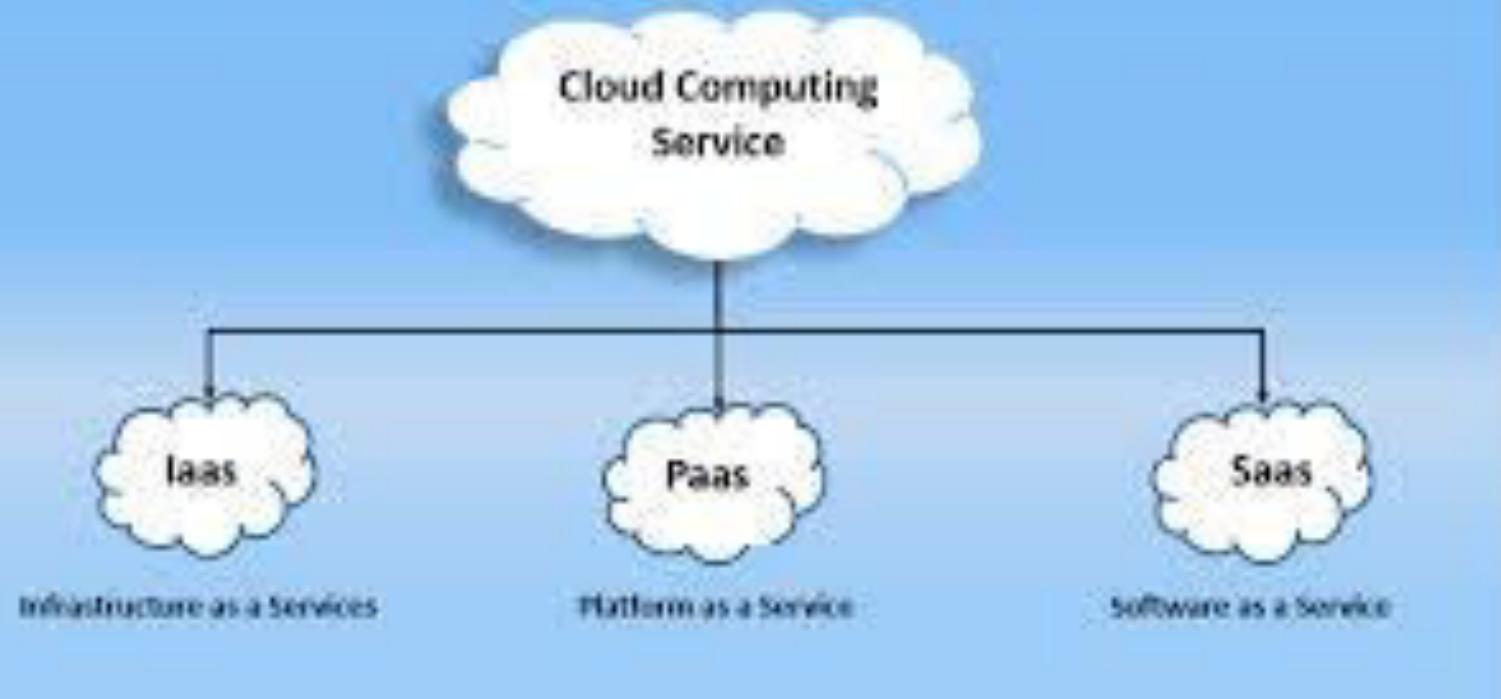
Cloud Computing Services:

Your organization can benefit from the cloud in different guises. The different ways your organization can utilize different services.

- Infrastructure as a service
- Platform as a service
- Software as a Service
- Software plus Services
- Amazon
- Windows
- Salesforce.com
- Google



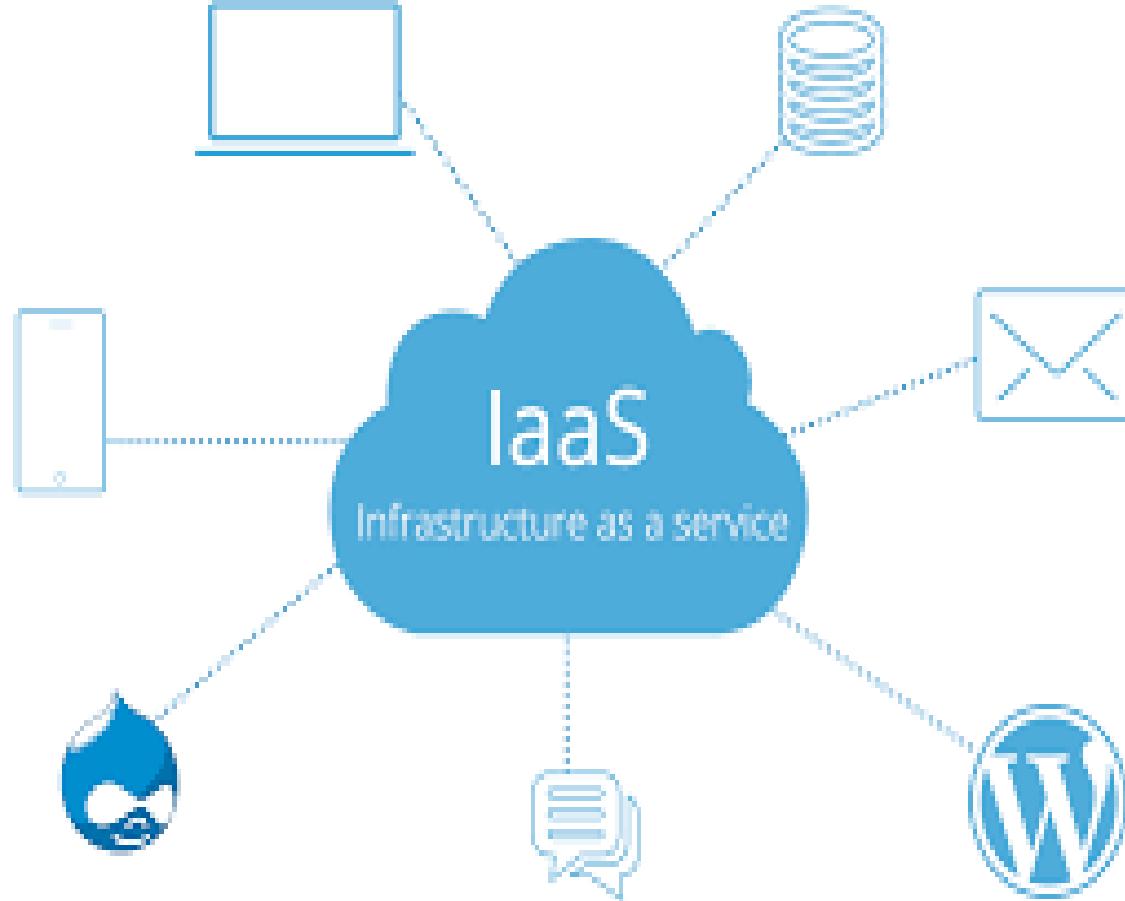
Cloud Computing Providers



Infrastructure as a service

- Infrastructure-as-a-Service (IaaS) is a cloud-computing offering in which a vendor provides users access to computing resources such as servers, **storage** and networking.
- Organizations use their own platforms and applications within a service provider's infrastructure.





Key features

- Instead of purchasing hardware outright, users pay for IaaS on demand.
- Infrastructure is scalable depending on processing and storage needs.
- Saves enterprises the costs of buying and maintaining their own hardware.
- Because data is on the cloud, there can be no single point of failure.
- Enables the virtualization of administrative tasks, freeing up time for other work.

PaaS

- Platform as a service (PaaS) is a cloud computing offering that provides users with a cloud environment in which they can develop, manage and deliver applications.
- Storage and other computing resources, users are able to use a suite of prebuilt tools to develop, customize and test their own applications.

- **Platform as a service (PaaS)** is a **cloud computing** model where a third-party provider delivers hardware and software tools to users over the internet.
- Usually, these tools are needed for application development.
- A **PaaS** provider hosts the hardware and software on its own **infrastructure**.

SaaS

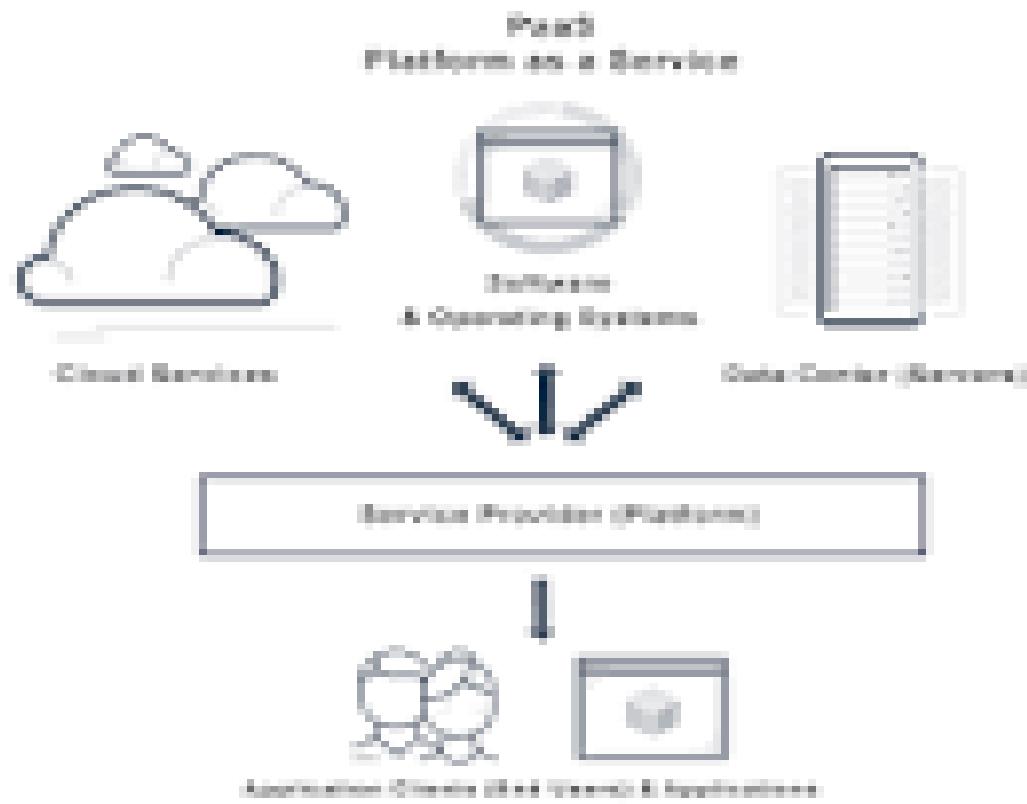
- Software as a service
- Operating environment largely irrelevant, fully functional applications provided, e.g. CRM, ERP, email

PaaS

- Platform as a service
- Operating environment included, e.g. Windows/.NET, Linux/j2EE, applications of choice deployed

IaaS

- Infrastructure as a service
- Virtual platform on which required operating environment and application are deployed
- Includes storage as a service offerings



Key features

- PaaS provides a platform with tools to test, develop and host applications in the same environment.
- Enables organizations to focus on development without having to worry about underlying infrastructure.
- Providers manage security, operating systems, server software and backups.
- Facilitates collaborative work even if teams work remotely.

SaaS

- Software as a service (SaaS) is a cloud computing offering that provides users with access to a vendor's cloud-based software.
- Users do not install applications on their local devices.
- The applications reside on a remote cloud network accessed through the web or an API.
- Through the application, users can store and analyze data and collaborate on projects.

Key features

- SaaS vendors provide users with software and applications via a subscription model.
- Users do not have to manage, install or upgrade software; SaaS providers manage this.
- Data is secure in the cloud; equipment failure does not result in loss of data.
- Use of resources can be scaled depending on service needs.
- Applications are accessible from almost any internet-connected device, from virtually anywhere in the world.



software-as-a-service model



Software plus service

- **Software Plus Services (Software + Services)** is Microsoft's philosophy for complementing the **software** company's on-premises **software** offerings with **cloud-based** remote **computing software** options.
- Also see **software-as-a-service** (SaaS), **cloud computing** and application **service provider** (ASP) terms in Webopedia.

- Microsoft's Software + Services cloud strategy seeks to strike an ideal balance between the flexibility and interoperability of Web applications and the versatility and increased functionality available with PC-centric applications.

- Software Plus Services provides 3 options:
 - 1) hosted, subscription model (SAAS).
 - 2) purchasing software in a hosted environment.
 - 3) purchasing the software to deploy on-premise.
- In the subscription-based, hosted model, initial cost outlays are limited and responsibility for the customer's IT department is low.

- Over the long run this can be a significantly more costly approach, and can have some impact on customizations, integrations, etc.
- At some point in time, the customer may opt to bring the solution in-house, purchase the software, and maintain it internally going forward.
- With a SAAS solution, this is impossible. With the Microsoft approach, it's completely possible, on the same version of the software.

AMAZON

- 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, needed basis from a cloud provider like Amazon Web Services (AWS).

- SaaS examples: BigCommerce, Google Apps, Salesforce, Dropbox, **MailChimp**, ZenDesk, DocuSign, Slack, Hubspot.
- PaaS examples: AWS Elastic Beanstalk, Heroku, Windows Azure (mostly used as PaaS), Force.com, OpenShift, Apache Stratos, Magento Commerce Cloud.

WINDOWS

- **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.
- The **Windows 10 Cloud** is Microsoft's answer to Chrome OS and similar platforms.
- With the Universal **Windows** Platform (UWP) becoming the future of Microsoft's OS, it makes sense for them to create a **cloud-based** OS for users on less powerful devices.

Salesforce.com

- **Salesforce** is the leader in **cloud computing**, offering applications for all aspects of your business, including CRM(Customer Relationship Management), sales, ERP(Enterprise Resource Planning), customer service, marketing automation, business analytics, mobile application building, and much more.
- And it all works on the same, connected platform, drawing from the same customer data.

- **Salesforce** is a **cloud computing** service as a software (SaaS) company that specializes in customer relationship management (CRM).
- The software has become the number one for customer success and helps businesses track customer activity, market to customers and many more services

Google

- **Google Cloud Platform (GCP)**, offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, file storage, and YouTube.
- Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning.^[2] Registration requires a credit card or bank account details.

- Google Cloud Platform provides infrastructure as a service, platform as a service, and serverless computing environments.
- In April 2008, Google announced App Engine, a platform for developing and hosting web applications in Google-managed data centers.
- which was the first cloud computing service from the company.
- The service became generally available in November 2011.
- Since the announcement of the App Engine, Google added multiple cloud services to the platform.

QUERIES????

THANKYOU

DAY 7

01.09.2020

**PCC
UNIT II**

How Those Applications Help Your Business?

- Cloud Computing for small **businesses** enables **them** to expand at will and makes **the** operations flexible.
- They provide access and when it is requested for and thus **business** owners can accommodate new resources with ease.
- It gives **them** **the** ability to enhance their capacity to support **the** sudden growth of **businesses**.

- Cloud Computing for Small Businesses is nothing less of a revolution.
- It has opened up doors that were earlier accessible only by larger corporations.
- Small business are able to both compete with and overtake larger businesses with this technology.
- It largely makes everything need-based and on-demand, from data security to storage, thus giving them freedom from the burden of huge investments.

- Also, it has given them insights of CRM, the ability to harness the latest software and of course, monitor resources and optimize, all with the help.
- Here are 6 reasons why this technology has gained as much recognition.
 1. **Remote Access**
 2. **Exponential Expansion**
 3. **Financial Optimization**
 4. **Higher efficiency**
 5. **Enhanced security**
 6. **Easy Resource Management**

Remote Access

- Cloud-based programs can be utilized remotely, without the hassles of resources transportation or space allocation.
- Cloud Computing allows anyone to connect seamlessly, anytime on the gadget of their choice.
- The primary requirement is that of an uninterrupted internet.
- Such access has forged networking and made operations very easy.
- Also, on the basis of consultation resource persons from across the world maybe roped into projects, thus giving them far better potential.
- In fact, 66% of small to medium business sized owners have seem to have felt that switching to cloud technology has helped them greatly.

Exponential Expansion

- Cloud Computing for small businesses enables them to expand at will and makes the operations flexible.
- They provide access as and when it is requested for and thus business owners can accommodate new resources with ease.
- It gives them the ability to enhance their capacity to support the sudden growth of businesses.
- Often, start-ups require resources that help the business expand, especially as and when the opportunity arises.

- But growth that comes with a very high level of investment is never feasible.
- However, with the cloud, all resources may be tailored on demand at very project specific pricing.
- It has given them the freedom to evolve into small-sized fully functional enterprises with high levels of productivity.
- And, they often have just as many resources as required.

Financial Optimization

- Cloud Computing for small businesses can help minimize many expenses including power and cooling costs, server maintenance, upgraded expenses and software licensing.
- As much as 49% of business owners deploy Cloud Computing for their businesses.
- Not only do they save on hardware that can get obsolete relatively soon, the software that this technology introduces is far more flexible.
- It allows multiple convergences of resources and is far easier in terms of operation.

Higher efficiency

- Cloud computing easily gets far more reliable than other technology solutions.
- Given how the software gives far lesser scope for human error, it becomes consistent.
- Also, it becoming a very common thing, their need to constantly spend on highly specialized IT resources have significantly reduced.
- This easily results in better efficiency at lesser costs.

Enhanced security

- Cloud computing provides great levels of data security, so much so that, both small and large businesses alike have come to use it.
- Constantly backing data, and making sure it is no longer the businesses' worry.
- It also provides security against data theft as well that of natural disasters.
- And the very fact that the data is not physically stored makes it safer on its own.
- Given how you can rest assured that your data is safe from both from viruses and miscreants, you will find yourself far more focused on the other aspects of the business.

Easy Resource Management

- With off-site servers that are managed by experts, Cloud Computing enables you to make running your business the single-focus.
- Given how the accessibility of the stored data resources is unconditional, the time required for random access has reduced from hours to minutes.
- Thus, it is ideal for business owners looking to extend their resources and be more competitive. Working in the Cloud has become extremely essential.

- Cloud Computing for Small Businesses allows their teams working in remote locations to effectively collaborate on documents without having to go back and forth over emails.
- Everything from calendars to task lists can be accessed from anywhere and anytime.
- The participants simply need to sign up for the service and access the service easily over the internet.
- Plus there is no downloading or installation required.
- Thus this improved capability to share information has opened doors for many small businesses by enabling them to react quickly to multiple business opportunities.

Cloud Computing Can Enhance Business Productivity

1. Enhanced Collaboration
2. Increased data security
3. Reduced cost
4. Remote operation
5. Access to the Best Technologies
6. Free and Timely Upgrades
7. Easy Data Recovery
8. Easily scalable
9. Control over data files
10. Reduced carbon Footprint

Deleting Your Datacenter

1. Click Clusters from the Lifecycle Manager navigation menu.
2. Select a cluster in the Clusters pane.
The **Datacenters** pane appears.
3. Select the **datacenter** to un manage in the **Datacenters** pane.
4. Click **Delete** from the **Datacenters** pane menu.
 - A dialog prompts you to confirm removing the datacenter and its nodes from management within LCM.
5. Click **Delete**: The datacenter no longer appears in the Datacenters pane, and its nodes no longer appear in the Nodes pane.

- Delete a datacenter from managing within Lifecycle Manager.
- Removing a datacenter also removes its child nodes.
- Deleting a datacenter in LCM instructs LCM to stop managing the nodes, but does not decommission them.
- Prior to deleting a datacenter in LCM, use Ops Center to decommission the associated nodes.

Can you permanently delete files stored in the cloud?

- When **you delete** items in the **cloud**, **they will** be deleted from collaborators' synced local folders. These **files can** be downloaded and restored later.
- **You can** also **choose permanently delete files** — this way **they will** be deleted from the **cloud** and synced devices immediately.

What is a node in a data center?

- A **node** is a single machine that runs Cassandra.
- A collection of **nodes** holding similar **data** are grouped in what is known as a "ring" or cluster.
- Sometimes if you have a lot of **data**, or if you are serving **data** in different geographical areas, it makes sense to group the **nodes** of your cluster into different **data centers**.

Can you delete things from the cloud?

- From your iPad or computer, sign in to iCloud.com.
- Tap the iCloud Drive app. Select the files that **you** want to **delete**, then tap Trash . Open the iCloud Drive folder and tap **Recently Deleted**.

Where does the datacenter operate?

- **Data centers** are simply centralized locations where computing and networking equipment is concentrated for the purpose of collecting, storing, processing, distributing or allowing access to large amounts of **data**.
- They have existed in one form or another since the advent of computers.

Who is the largest data center provider?

- These are the six largest providers:
- **CenturyLink.** # of Data Centers: 350+ ...
- **Equinix.** # of Data Centers: 200+ ...
- **NTT Communications.** # of Data Centers: 140+ ...
- **Data Foundry.** # of Data Centers: 6. ...
- **BT.** # of Data Centers: 48. ...
- **Cyxtera.** # of Data Centers: 50+

Who needs data center?

- Any entity that generates or uses **data** has the **need** for **data centers** on some level, including government agencies, educational bodies, telecommunications companies, financial institutions, retailers of all sizes, and the purveyors of online information and social networking services such as Google and Facebook.

DAY 8

02.09.2020

PCC
UNIT II

PREVIOUS CLASS

- How Those Applications Help Your Business?
 1. Remote Access
 2. Exponential Expansion
 3. Financial Optimization
 4. Higher efficiency
 5. Enhanced security
 6. Easy Resource Management
- Deleting Your Datacenter

TODAY WE DISCUSS

- Salesforce.com
- Thomson Reuters.

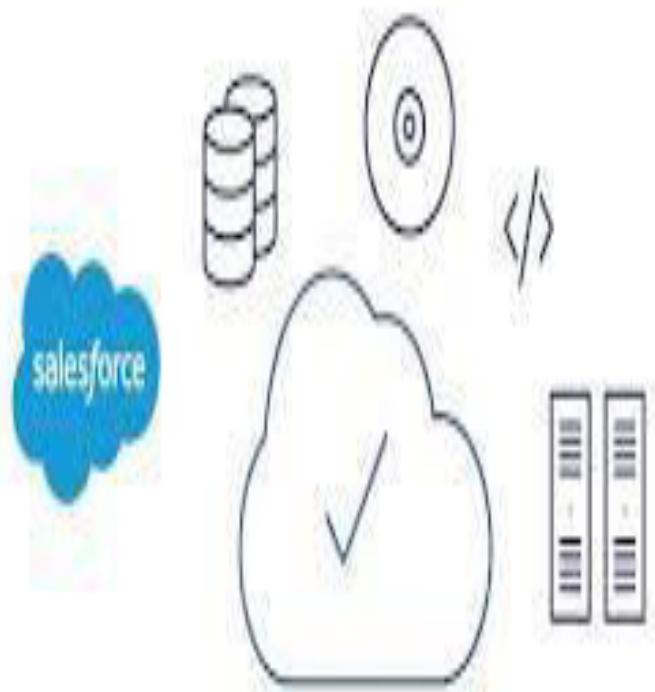
The logo consists of the word "salesforce" in a lowercase, black, serif font. The letters are slightly slanted to the right. A large, semi-transparent blue cloud shape surrounds the text. The cloud has a white-to-blue gradient and a soft, rounded, bubbly texture. A small registered trademark symbol (®) is located at the top right of the "e" in "force".

salesforce®

Salesforce.com

- Move deals faster by tracking customer information and interactions in one place
- Make more insightful decisions — faster, and from anywhere — with the most up-to-date information
- Drive customer engagement by automating and personalizing your email marketing at scale
- Deliver exceptional social experiences by connecting them to marketing, sales, and service
- 24/7 customer support team to help all users from Small business to Enterprise

- **Salesforce** is the leader in **cloud computing**, offering applications for all aspects of your business, including CRM, sales, ERP, customer service, marketing automation, business analytics, mobile application building, and much more.
- And it all works on the same, connected platform, drawing from the same customer data.



GETTING READY FOR THE CLOUD



Email: bdg@qburst.com | Website: www.qburst.com

- **Salesforce.com** is an American **cloud-based** software company headquartered in San Francisco, California.
- Salesforce.com is a cloud computing and social enterprise software-as-a-service (SaaS) provider based in San Francisco.
- It was founded in March 1999, in part by former Oracle executive Marc Benioff.

Is Salesforce a ERP?

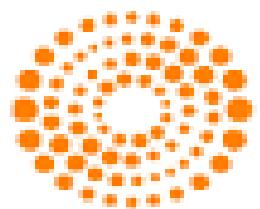
- A key industry player for over a decade, **Salesforce** now controls well over half the market for customer relationship management (CRM) software.
- It was one of the first enterprise software vendors to provide a stand-alone CRM suite, unshackled by a bulky enterprise resource planning (**ERP**) suite

Services and products

- Cloud platforms and applications, the company is best known for its Salesforce customer relationship management ([CRM](#)) product.
- which is composed of Sales Cloud, Service Cloud, Marketing Cloud, Commerce Cloud, Analytics Cloud, IoT Cloud, App Cloud, Health Cloud, Financial Services Cloud, Force.com, and Chatter.

the list of Top 10 Cloud Services

- Amazon Cloud Drive (<https://www.amazon.com/clouddrive>)
- Box (<https://www.box.com/pricing>)
- Dropbox (<https://www.dropbox.com>)
- Egnyte (http://www.egnyte.com/corp/plans_pricing.html)
- G Suite (<https://gsuite.google.com/pricing.html>)
- iCloud (<http://www.apple.com/icloud/>)
- iDrive (<https://www.idrive.com/idrive>)
- Microsoft OneDrive (<https://onedrive.live.com>)
- OpenDrive (<https://www.opendrive.com>)
- SugarSync (<https://www.sugarsync.com>)



THOMSON REUTERS

Thomson Reuters

- Thomson Reuters is the world's leading source of intelligent information for businesses and professionals.
- We combine industry expertise with innovative technology to deliver critical information to leading decision makers in the financial and risk, legal, tax and accounting, intellectual property and science and media markets, powered by the world's most trusted news organization.
- With headquarters in New York and major operations in London and Eagan, Minnesota, Thomson Reuters employs approximately 60,000 people and operates in over 100 countries.
- For more information, go to www.thomsonreuters.com.

- Thomson Reuters is a company that provides information to a wide range of clients—lawyers, accountants, scientists, reporters, and a host of others.
- For the most part, they have nothing in common but the need to get information.
- Thomson Reuters calls itself “the world’s leading provider of ‘intelligent information’ for businesses and professionals.”.

- To live up to that billing, they need to do more than simply deliver search engine results, a lot more.
- They pull distributed information together; they analyze the information first to ensure it is what the customer wants.
- They provide methods of data delivery and retrieval that help their customers get what they want.

- Thomson Reuters wanted to give its customers a better, more intelligent way to search for information than they were providing at the time.
- Their solution was to adopt a Microsoft Software-plus-Services solution.
- They integrated Microsoft Live Search with their own search engines and databases.
- When information is requested, both Live Search and Thomson Reuters's databases are scanned for the information.
- Thomson Reuters analyzes the results to return the best information to the client.

Thomson Web outlined its requirements for teaming with an existing web search engine provider:

- The company needed an engine that could return results in 200 milliseconds. This gave Thomson Reuters time to apply business logic to make the results more meaningful.
- The engine also needed to accept hundreds of thousands of search requests from a single IP address.

DAY 9

03.09.2020

**PCC
UNIT II**

PREVIOUS CLASS

- SALESFORCE.COM
- THOMSON REUTERS

TODAYS TOPIC

- **Hardware and Infrastructure:**
- Clients
- Security
- Network
- Services.

Hardware and Infrastructure:

- **Hardware** comprises the physical parts of a computer that can be touched.
- **Infrastructure** comprises the **Physical hardware** used to connect computers to other computers and users.

Cloud infrastructure

- Cloud infrastructure refers to the hardware and software components such as servers, storage, network and virtualization software
- That are needed to support the computing requirements of a cloud computing model.
- Cloud infrastructure also includes an abstraction layer that virtualizes resources and logically presents them to users through application program interfaces and API-enabled command-line or graphical interfaces.

What is considered IT infrastructure?

- Information technology (IT) **infrastructure** are the components required to operate and manage enterprise IT environments.
- These components include hardware, software, networking components, an operating system (OS), and data storage, all of which are used to deliver IT services and solutions.

What are the 7 components of IT infrastructure?

Infrastructure is everything from wall jack to wall jack.

- Switching. A network switch is the device that provides connectivity between network devices on a Local Area Network (LAN).
- Routers.
- Firewalls.
- Servers.
- Physical Plant.
- People.
- Server Rooms / Data Center.

Benefits

- Increased efficiency
- Flexibility for roaming staff
- Enterprise level, secure IT infrastructure
- Reduced ongoing IT costs

Technologies

- Virtualization
- Remote Desktop Services
- Microsoft Exchange
- Thin client technology

CLIENTS

- A **cloud client** is a interface of the **cloud** to the common computer user through web browsers and thin **computing** terminals.
- The term **cloud client** describes a piece of hardware, a piece of software or both, that is specifically designed for a **cloud** service.

What is client infrastructure?

- **Client**–server model is a distributed application structure that partitions tasks or workloads between the providers of a resource or service, called servers, and service requesters, called **clients**.

What is client hardware?

- In computing, a **client** is a piece of computer **hardware** or software that accesses a service made available by a server as part of the **client–server** model of computer networks.
- The server is often on another computer system, in which case the **client** accesses the service by way of a network.

What is the client process?

- The **client** is a **process** that sends a message to a server **process** requesting that the server perform a task.
- **Client** programs usually manage the user-interface portion of the application, validate data entered by the user, dispatch requests to server programs, and sometimes execute business logic.

- The clients on your end users desks are how you will interact with the cloud
- ***A client is the requestor or receiving end of a service in a client-server model of a system.***
- There are different types of clients that can link to the cloud.
- Each one offers a different way for you to interact with your data and applications.
- Depending on your organization and its needs, you may find yourself using any combination of these devices.

- Mobile
- Thin
- Thick

Mobile clients

- Mobile clients run the gamut from laptops to PDAs and smartphones, like an iPhone or BlackBerry.
- You're not likely to utilize a particularly robust application on a PDA or smartphone.
- But laptop users can connect to the cloud and access applications just as if they were sitting at their desk.
- Mobile clients have security and speed concerns.

- Because the clients will be connecting to the cloud from various locations that may not have an optimized connection.
- But not all applications need speedy connections, and mobile users probably aren't inputting gigabytes worth of data into a database.
- Further, since you can create your own applications in the cloud, they can be crafted with a mobile client in mind.
- While a mobile user won't put tons of information into a database, an application can still be developed to let them access it.
- Client computers that have no hard drives, no DVD-ROM drives, and simply display what's on the server.



Thick Client

What is a Thick Client?

- A *thick client also known as Fat, Rich or Heavy client is one of the component of client server architecture connected to the server through a network connection and does not consume any of the server's computer resources to execute applications.*
- Thick clients are good choices if users need to maintain files on their own machines or run programs that don't exist on the cloud is LED & LCD.
- Security-wise, thick clients are more vulnerable to attack than thins

Why To Select Thick Client?

- A *thick client is a type of client device in client-server architecture that has most hardware resources on board to perform operations, run applications and perform other functions independently.*
- *Although a thick client can perform most operations, it still needs to be connected to the primary server to download programs*

Where To Implement Thick Client?

- *Thick clients are generally implemented in computing environments when the primary server has low network speed, limited computing and storage capacity to facilitate client machine, or there is a need to work offline.*

- Data is stored on the machine's hard drive, if the machine is stolen then the data could be compromised. There's also an issue of reliability.



Fat Clients



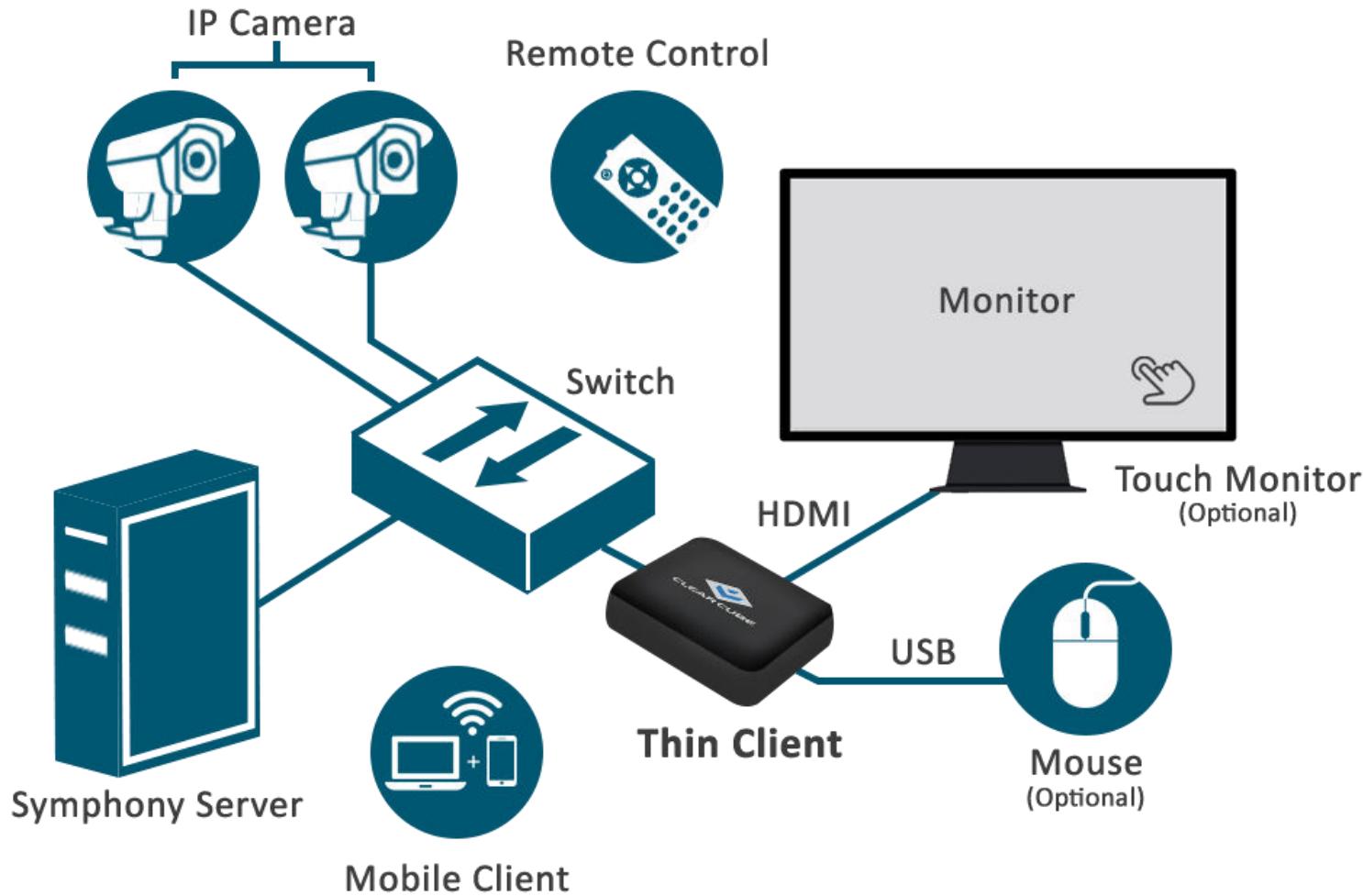
Thin Clients

Thin Client

- Less expensive than thick clients, are much less expensive to maintain, and use less energy.
- *A thin client also known as Lean, Zero or Slim Client is a computer or computer program that depends heavily on some other computer (server) to fulfill its computational roles.*
- If a thin client fails, all it takes is for another thin to get plugged in and the user's work environment is right there.

Why To Select Thick Client?

- *Thin clients occur as components of a broader computer infrastructure, where many clients share their computations with the same server.*
- *Thin client infrastructure can be viewed as providing some computing service via several user interfaces.*
- *This is desirable in contexts where individual thick clients have much more functionality or power than a infrastructure required.*
- *Thin client computing is also a way of easily maintaining computational services at a reduced total cost of ownership.*
- If a thick client fails, whatever data is stored on the machine, including the operating system and all the configuration settings is lost and a new computer will have to be configured for the user.

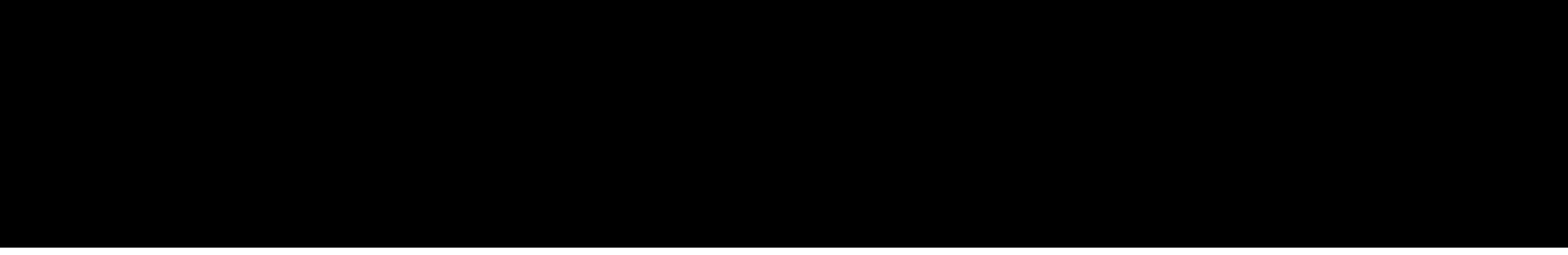


Thin clients

- Very little client
- All the work is done on the server(remotely)
- Application, OS, storage are running on centralized server
- Cheap and maintenance free.
- Software installation and updates single time for all

THIN CLIENTS VS THICK CLIENTS

S.NO.	FACTORS	THIN CLIENTS:	THICK CLIENTS:
1.	Installation	Thin clients have browser based installation.	Thick clients are installed locally.
2.	Type of devices	Thin clients are used by handheld devices.	Customization systems use thick clients.
3.	Processing Type	In thin clients there is complete processing on server side.	Thick clients make use of computer resources more than server.
4.	Deployability	Thin clients are easily deployable as compared to thick clients.	Thick clients are more expensive to deploy.
5.	Data validation	The data verification is required from the server side.	The data verification is done by client side.
6.	Communication	In thin clients continuous communication is required from server side.	In thick clients communication is done at particular intervals with the server.
7.	Interfacing	It cannot be interfaced with other equipment.	It is robust as compared to thin client and it can be interfaced with other equipment.
8.	Security	It has less security threats.	It has more security threats as compared to



Thick clients

- Fat client
- All the work is done on the local
- Application, OS, storage are running on local
- Very expensive
- Its required individual software installation and updates.

DAY 10

04.09.2020

**PCC
UNIT II**

PREVIOUS CLASS

- HARDWARE AND INFRASTRUCTURE
 - CLIENTS

TODAYS CLASS

■ **Hardware and Infrastructure:**

- Clients
- Security
- Network
- Services.

SECURITY

- **Cloud security**, also known as **cloud computing security**.
- It consists of a set of policies, controls, procedures and technologies that work together to protect **cloud-based** systems, data, and infrastructure.
- **Cloud security** is the protection of data stored online via **cloud computing** platforms from theft, leakage, and deletion.
- Methods of providing **cloud security** include firewalls, penetration testing, obfuscation, tokenization, virtual private networks (VPN), and avoiding public internet connections

What are the security issues in cloud computing?

- Data Breaches.
- Hijacking of Accounts.
- Insider Threat.
- Malware Injection.
- Abuse of **Cloud Services**.
- Insecure APIs.
- Denial of Service Attacks.
- Insufficient Due Diligence.

How does cloud security work?

- The servers had to protect themselves from threats.
- With **cloud web security**; traffic gets to the **cloud** instead of being routed to the servers directly.
- The **cloud** analyses the traffic and only allow the legitimate users to gain access.
- Any traffic that the **cloud** does not approve, it blocks it from getting to the server.

Why is cloud security important?

- **Cloud security is important** for both business and personal users.
- Everyone wants to know that their information is safe and **secure** and businesses have legal obligations to keep client data **secure**, with certain sectors having more stringent rules about data storage.

What are the security risks of cloud computing privileged access?

- **Privileged user access.**
- Sensitive data processed outside the enterprise brings with it an inherent level of risk.
- Because outsourced services bypass the "physical, logical and personnel controls" IT shops exert over in-house programs.
- Get as much information as you can about the people who manage your data.

Who is responsible for cloud security?

- Cloud **consumers** must always ensure the security of the endpoints that are used to access cloud services.
- In the SaaS model, this is the only responsibility of the **cloud consumer** regarding infrastructure security.
- With IaaS, the **cloud user** is responsible for network security and, if necessary, communication encryption

Cloud security offers many benefits

- **Centralized security:** Just as cloud computing centralizes applications and data, cloud security centralizes protection.
- Difficult to manage when dealing with shadow IT.
- Managing these entities centrally enhances traffic analysis and web filtering, streamlines the monitoring of network events and results in fewer software and policy updates.
- Disaster recovery plans can also be implemented and actioned easily when they are managed in one place.

- **Reduced costs:** One of the benefits of utilizing cloud storage and security is that it eliminates the need to invest in dedicated hardware.
- Not only does this reduce capital expenditure, but it also reduces administrative overheads.
- Cloud security delivers proactive security features that offer protection 24/7 with little or no human intervention.

Reduced Administration: When you choose a reputable cloud services provider or cloud security platform.

- These tasks can have a massive drain on resources, but when you move them to the cloud, all security administration happens in one place and is fully managed on your behalf.

Reliability: Cloud computing services offer the ultimate in dependability.

- With the right cloud security measures in place, users can safely access data and applications within the cloud no matter.

NETWORK

- Cloud network is referred to a computer network that exists within or part of a cloud computing infrastructure.
- It is a computer network that provides network interconnectivity between cloud based or cloud enabled application, services and solutions.
- Cloud network can be cloud based network or cloud enabled network.
- Cloud network works similar to a standard computer network but its components / devices / operations are centered on cloud computing.
- A cloud network will enable connecting a remote user with a cloud application (SaaS) or cloud infrastructure (IaaS).
- cloud network also enables the network communication between virtual machines.

Why cloud networking?

- Businesses today turn to the cloud to drive agility, deliver differentiation, accelerate time-to-market, and increase scale.
- The cloud model has become the standard approach to build and deliver applications for the modern enterprise.
- Cloud networking has also played a critical role in the way organizations address.
- Their growing infrastructure needs, regional expansions, and redundancy plans.
- Many organizations are adopting a multi-data center strategy and leveraging multiple clouds from multiple cloud service providers (CSPs).

Benefits of cloud networking

- Most organizations have become a patchwork of on-premises technologies, public cloud services, legacy applications and systems, and emerging technologies.
- A complex situation that contributes to a weak security posture and results in inadequate governance, visibility, and manageability across fragmented networks.
- It is an architectural approach built in software at global scale from edge-to-edge, that's able to deliver consistent, security for apps and data wherever they reside, independent of underlying physical infrastructure.

- A Virtual Cloud Network is VMware's vision of the future of networking.
- Whether your workloads are on premises or in the cloud, the same network and security stack can be used to provide connectivity, security, and visibility.
- It is also the kind of next-generation networking service consumption technology that IT is increasingly adopting to provide the digital fabric that helps unify a hyper-distributed world.

SERVICES

- Cloud Computing Services provide information technology (IT) as a service over the Internet or dedicated network.
- With delivery on demand, and payment based on usage.
- Cloud computing services range from full applications and development platforms, to servers, storage, and virtual desktops.
- There are different services you will need to run, depending on your cloud provider and what your organization does.
- Also, these services will likely affect how your cloud infrastructure is deployed.
- Identity
- Integration
- Mapping
- Search

Benefits of cloud computing services

- Faster implementation and time to value
- Anywhere access to applications and content
- Rapid scalability to meet demand
- Higher utilization of infrastructure investments
- Lower infrastructure, energy, and facility costs
- Greater IT staff productivity and across organization
- Enhanced security and protection of information assets

How cloud computing services work

Cloud computing services have several common attributes:

- **Virtualization**- cloud computing utilizes server and storage virtualization extensively to allocate/reallocate resources rapidly
- **Multi-tenancy** -resources are pooled and shared among multiple users to gain economies of scale
- **Network-access** - resources are accessed via web-browser or thin client using a variety of networked devices (computer, tablet, smartphone)
- **On demand** - resources are self-provisioned from an online catalogue of pre-defined configurations
- **Elastic** -resources can scale up or down, automatically
- **Metering/chargeback** -resource usage is tracked and billed based on service arrangement

Three types of cloud computing services

1. Software as a Service (SaaS)

- software runs on computers owned and managed by the SaaS provider, versus installed and managed on user computers.
- The software is accessed over the public Internet and generally offered on a monthly or yearly subscription.

2. Infrastructure as a Service (IaaS)

- compute, storage, networking, and other elements are provided by the IaaS provider via public Internet, VPN, or dedicated network connection.
- Users own and manage operating systems, applications, and information running on the infrastructure and pay by usage.

3. Platform as a Service (PaaS)

- All software and hardware required to build and operate cloud-based applications are provided by the PaaS provider via public Internet, VPN, or dedicated network connection.
- Users pay by use of the platform and control how applications are utilized throughout their lifecycle.

QUERIES????

UNIT II
COMPLETED

PCC

UNIT III



DAY 12

07.09.2020

UNIT – III



- **Accessing the Cloud:**

Platforms – Web Applications – Web APIs –
Web Browsers.

- **Cloud Storage:**

Overview – Cloud Storage Providers.

- **Standards:**

Applications – Client – Infrastructure – Service.

Accessing the Cloud



- Control of **access** rights plays a unique role in **cloud computing**, because the data is no longer stored on devices managed by the organizations owning the data.
- **Cloud computing differs from traditional IT via the following characteristics:**
 - Multi-tenancy.
 - Paid services.
 - Elasticity.
 - Internet dependent.
 - On-demand services.

Platforms



- One of the most important parts of that shift is the advent of cloud platforms.
- This kind of platform lets developers write applications that run in the cloud.
- Different names are used for this kind of platform :
 - on-demand platform
 - platform as a service (PaaS).



- When a development team creates an on-premises application
- An operating system provides basic support for executing the application, interacting with storage, and more.
- Other computers in the environment offer services such as remote storage.
- If the creators of every on-premises application first had to build all of these basics.



- If every development team that wishes to create a cloud application must first build its own cloud platform.
- vendors are rising to this challenge, and a number of cloud platform technologies are available

CLOUD PLATFORMS IN CONTEXT: THREE KINDS OF CLOUD SERVICES

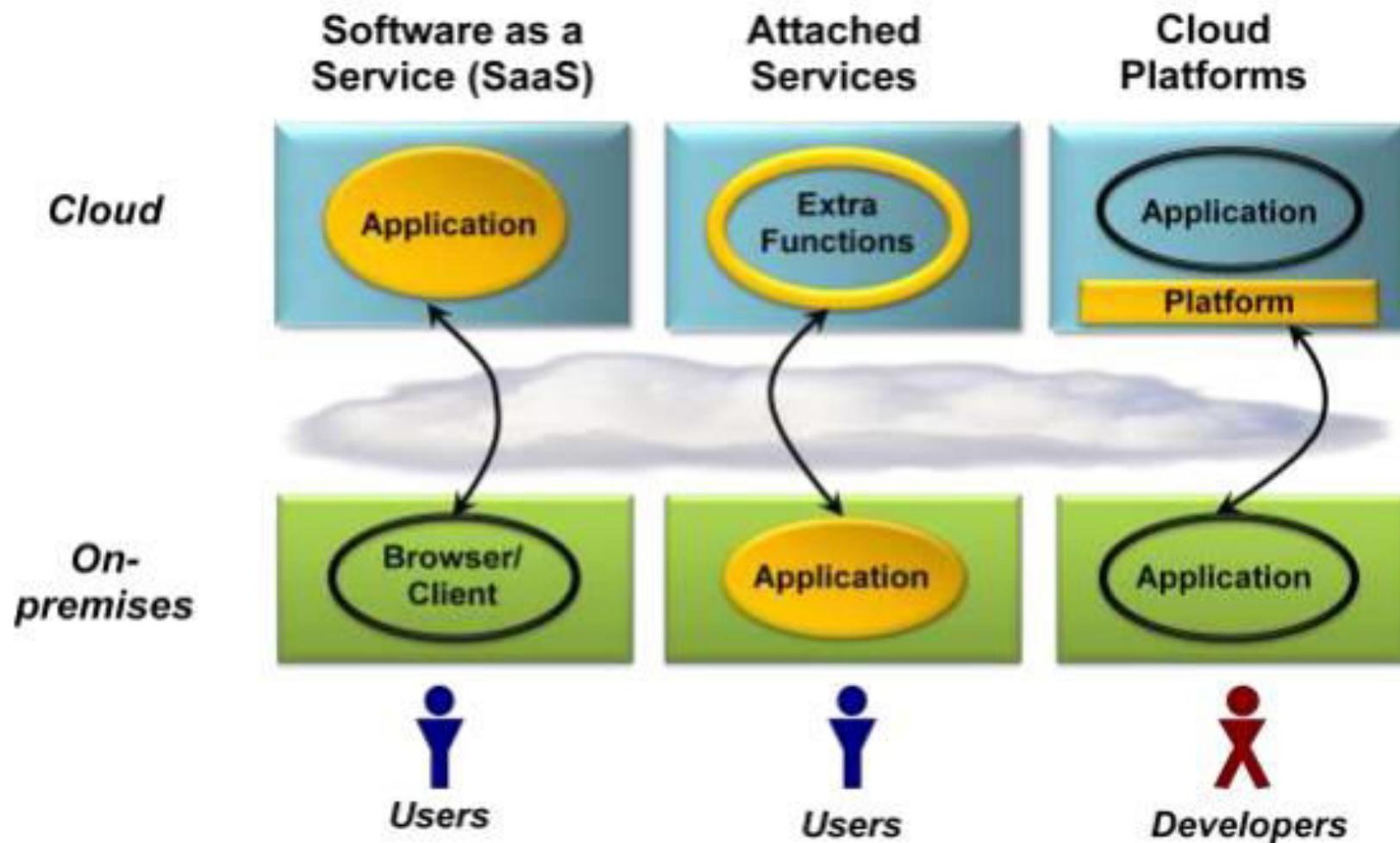


Figure 1: Cloud services can be grouped into three broad categories.



Software as a service (SaaS):

- A SaaS application runs entirely in the cloud.
- The on-premises client is typically a browser or some other simple client.
- The most well-known example of a SaaS application today is probably Salesforce.com.



Attached services:

- Every on-premises application provides useful functions on its own.
- An application can sometimes enhance these by accessing application-specific services provided in the cloud.
- Because these services are usable only by this particular application, they can be thought of as attached to it.
- One popular consumer example of this is Apple's iTunes: The desktop application is useful for playing music and more, while an attached service allows buying new audio and video content.



Cloud platforms:

- A cloud platform provides cloud-based services for creating applications.
- Rather than building their own custom foundation, for example, the creators of a new SaaS application could instead build on a cloud platform.



- A useful way to think about cloud platforms is to see how the services an application developer relies on in the on-premises environment translate to the cloud.
- To help do this, Figure 2 shows a general model that can be applied to both words.

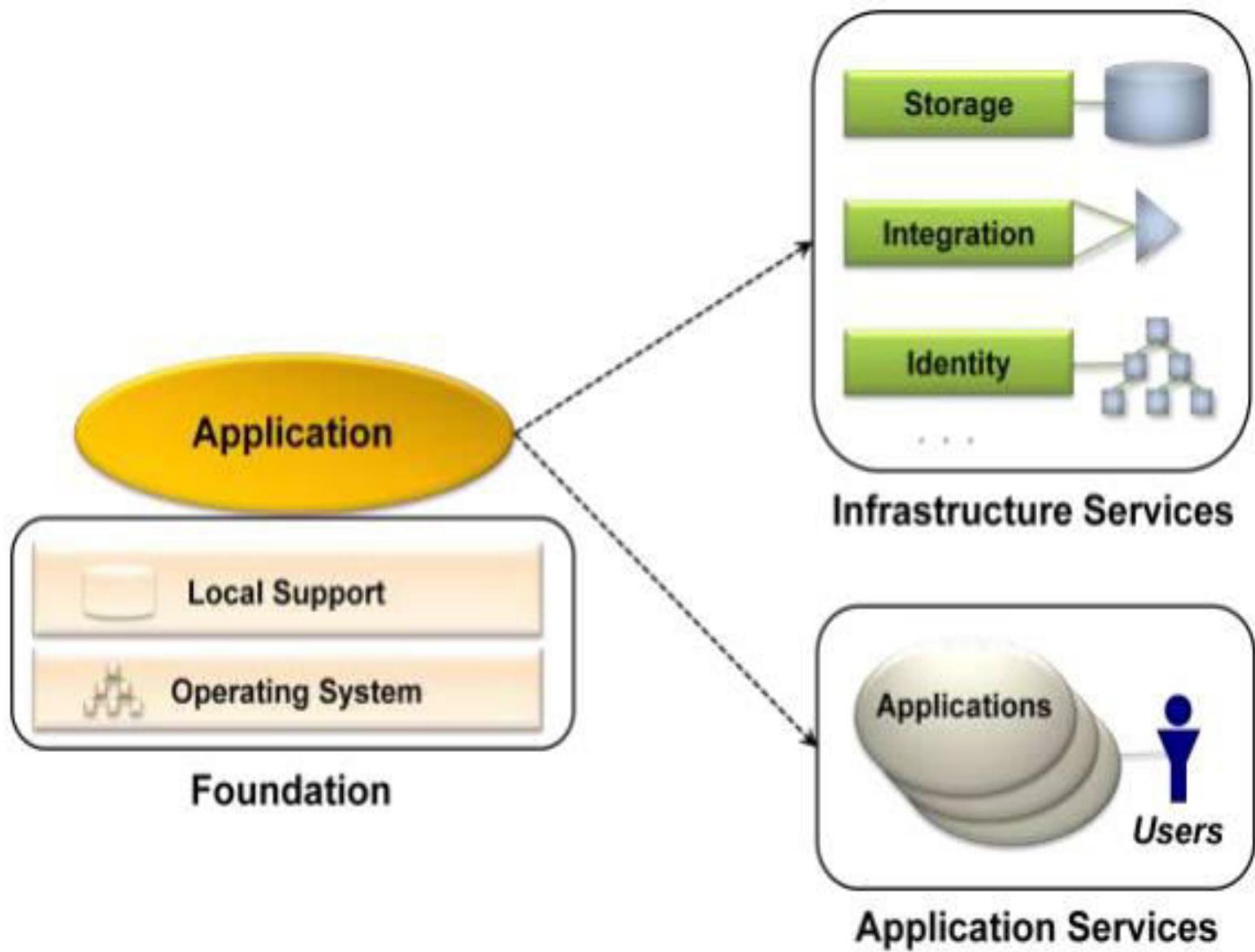


Figure 2: A modern application platform can be viewed as having three parts.



- An application platform can be thought of as comprising three parts:
 1. **A foundation:** Nearly every application uses some platform software on the machine it runs on. This typically includes various support functions, such as standard libraries and storage, and a base operating system.
 2. **A group of infrastructure services:** In a modern distributed environment, applications frequently use basic services provided on other computers. It's common to provide remote storage, for example, integration services, an identity service, and more.
 3. **A set of application services:** As more and more applications become service-oriented, the functions they offer become accessible to new applications. Even though these applications exist primarily to provide services to end users, this also makes them part of the application platform.



- **Operating system:** The dominant choices are Windows, Linux, and other versions
- **Local support:** Different technologies are used depending on the style of application. The .NET Framework and Java EE application servers provide general support for Web applications and more.
- For example, Microsoft's Dynamics CRM product includes a platform designed for creating a particular type of business application.



- **Storage:** Like storage in the foundation, infrastructure storage comes in various styles. A remote file system might provide simple byte-oriented storage, while a Microsoft SharePoint document library provides a more structured remote storage service. Applications can also access a database system remotely, allowing access to another kind of structured storage.
- **Integration:** Connecting applications within an organization usually depends on a remote service provided by some integration product. A message queue is a simple example of this, while more complex scenarios use products such as IBM's WebSphere Process Server, Microsoft's BizTalk Server, and others.
- **Identity:** Providing identity information is a fundamental requirement for most distributed applications. Common on-premises technologies that address this include Microsoft's Active Directory and other LDAP servers



- **Packaged applications:** This includes business software such as SAP, Oracle Applications, and Microsoft Dynamics, along with a myriad of other off-the-shelf products. While not all packaged applications expose services to other applications, more and more of them do.
- **Custom applications:** Many organizations have a large investment in custom software. As these applications increasingly expose their functionality through services, they become part of the onpremises application platform.

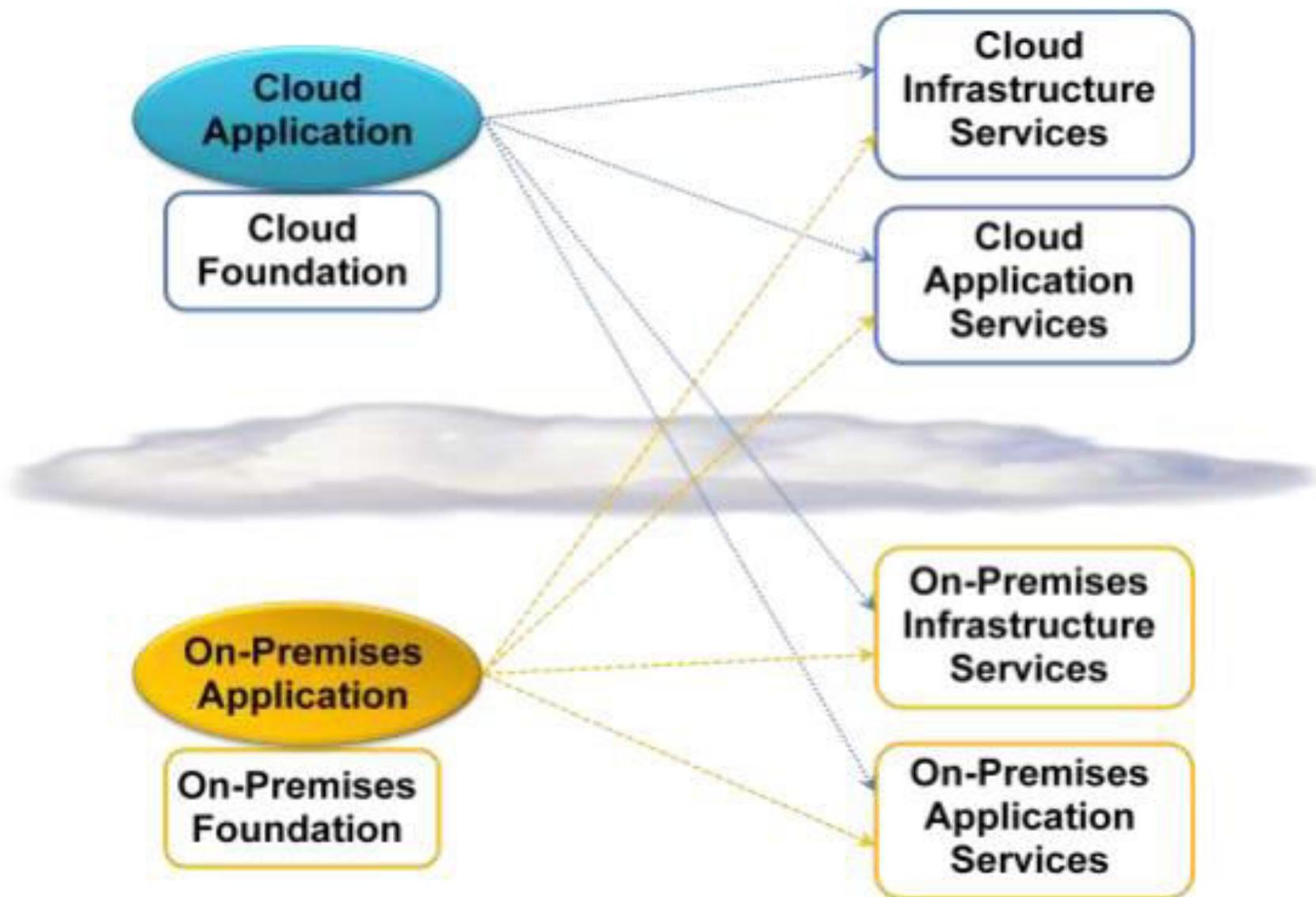


Figure 3: On-premises platforms and cloud platforms can be viewed in similar ways, and they can also be used together.

Web Applications



- A cloud application, or cloud app, is a software program where cloud-based and local components work together.
- This model relies on remote servers for processing logic that is accessed through a web browser with a continual internet connection.
- Cloud application servers typically are located in a remote data center operated by a third-party cloud services infrastructure provider.
- Cloud-based application tasks may encompass email, file storage and sharing, order entry, inventory management, word processing, customer relationship management (CRM), data collection, or financial accounting features.

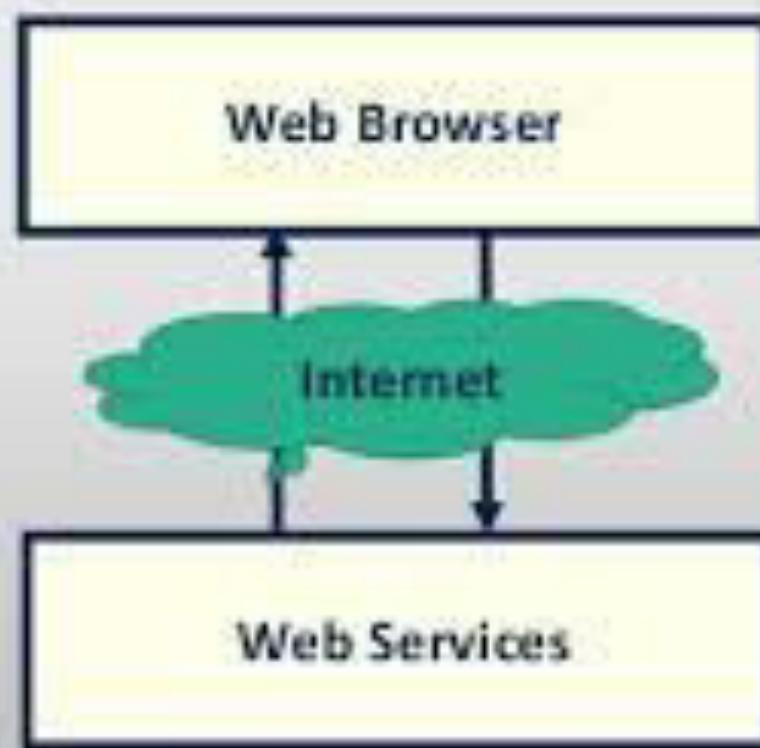


- You have tons of options when it comes to finding online applications.
- Your provider may have a stable of premade applications that you can use.
- For instance, Google offers a slew of applications geared toward productivity
- Different companies offer different things, but for the sake of understanding the market,



- Google Apps, launched as a free service in August 2006, is a suite of applications that includes:
- Gmail webmail services
- Google Calendar shared calendaring
- Google Talk instant messaging and Voice Over IP
- Start Page for creating a customizable home page on a specific domain

Web Applications



Benefits of cloud apps



- **Fast response to business needs.** Cloud applications can be updated, tested and deployed quickly, providing enterprises with fast time to market and agility. This speed can lead to culture shifts in business operations.
- **Simplified operation.** Infrastructure management can be outsourced to third-party cloud providers.
- **Instant scalability.** As demand rises or falls, available capacity can be adjusted.
- **API use.** Third-party data sources and storage services can be accessed with an application programming interface (API). Cloud applications can be kept smaller by using APIs to hand data to applications or API-based back-end services for processing or analytics computations, with the results handed back to the cloud application



- **Gradual adoption.** [Refactoring](#) legacy, on-premises applications to a cloud architecture in steps, allows components to be implemented on a gradual basis.
- **Reduced costs.** The size and scale of data centers run by major cloud infrastructure and service providers, along with competition among providers, has led to lower prices. Cloud-based applications can be less expensive to operate and maintain than equivalents on-premises installation.
- **Improved data sharing and security.** Data stored on cloud services is instantly available to authorized users. Due to their massive scale, cloud providers can hire world-class security experts and implement infrastructure security measures that typically only large enterprises can obtain. Centralized data managed by IT operations personnel is more easily backed up on a regular schedule and restored should [disaster recovery](#) become necessary.

Benefits of cloud apps



How cloud apps work



- Data is stored and compute cycles occur in a remote data center typically operated by a third-party company. A back end ensures uptime, security and integration and supports multiple access methods.
- Cloud applications provide quick responsiveness and don't need to permanently reside on the local device. They can function offline, but can be updated online.
- While under constant control, cloud applications don't always consume storage space on a computer or communications device. Assuming a reasonably fast internet connection, a well-written cloud application offers all the interactivity of a desktop application, along with the portability of a web application.

Cloud apps vs. web apps



- With the advancement of remote computing technology, clear lines between cloud and web applications have blurred.
- The term *cloud application* has gained great cachet, sometimes leading application vendors with any online aspect to brand them as cloud applications.
- Cloud and web applications access data residing on distant storage.
- Both use server processing power that may be located on premises or in a distant data center.



- A key difference between cloud and web applications is architecture.
- A web application or web-based application must have a continuous internet connection to function.
- Conversely, a cloud application or cloud-based application performs processing tasks on a local computer or workstation.
- An internet connection is required primarily for downloading or uploading data.



QUERIES?????



THANK YOU

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UNIT III



DAY 13
08.09.2020

Previous class



- **Accessing the Cloud:**
 - Platforms
 - Web Applications

Today class



- Web APIs
- Web Browsers

Web APIs



- An application programming interface (API) is a set of programming instructions and standards for accessing a web-based program.
- Software companies release their APIs to the public so that other software developers can design products that are powered by its service.
- For example, Amazon released its own API so that web site developers could more easily access information maintained at the Amazon web site.
- By using Amazon's API, a third-party web site can directly link to products on the Amazon site.



- APIs allow one program to speak with another.
- They are not user interfaces. Using APIs, programs can speak to each other without the user having to be involved.
- For instance, when you buy something at Amazon and enter your credit card information, Amazon uses an API to send your credit card information to a remote application.



- An API is similar to Software as a Service (SaaS), because software developers don't have to start from scratch every time they write a program.
- **SOAP (Simple Object Access Protocol)** SOAP encodes XML messages so that they can be received and understood by any operating system over any type of network protocol.
- **UDDI (Universal Description, Discovery, and Integration)** UDDI is an XML-based directory that allows businesses to list themselves, find each other, and collaborate using web services.
- **WSDL (Web Services Description Language)** WSDL is the SOAP of UDDI. WSDL is the XML-based language that businesses use to describe their services in the UDDI.

What are Web APIs used for?



- It is a framework that helps you to create and develop HTTP based RESTFUL services.
- The **web API** can be developed by using different technologies such as java, ASP.NET, etc.
- **Web API is used in** either a **web** server or a **web** browser.
- Basically **Web API** is a **web** development concept.



- An application program interface (**API**) is a set of routines, protocols, and tools for building software applications.
- Basically, an **API** specifies how software components should interact.
- Additionally, APIs are used when programming graphical user interface (GUI) components.

What is Web API and how it works?



- The **Web API** is a framework for building **web** services, these **web** services use the HTTP protocol.
- The **Web API** returns the data on request from the client, and it can be in the format XML or JSON.

What is Web API example?



- The ASP.NET Web API is an extensible framework for building HTTP based services that can be accessed in different **applications** on different platforms such as web, windows, mobile etc.
- It works more or less the same way as ASP.NET MVC web application except that it sends data as a response instead of html view.

Is Web API a Web service?



- There you have it: an **API** is an interface that allows you to build on the data and functionality of another application, while a **web service** is a network-based resource that fulfills a specific task.
- Yes, there's overlap between the two: all **web services** are **APIs**, but not all **APIs** are **web services**.

Web Browsers



- To connect to the cloud, most likely you and your users will utilize a web browser.
- Browsers tend to be mostly the same, but with some subtle functional differences.
- Internet Explorer enjoys the highest market share of browser usage—69.77 percent .
- You can attribute that dominance to the fact that Internet Explorer is included with Windows, the dominant operating system in the world.





- Mozilla's Firefox accounts for 20.78 percent, Apple's Safari represents 7.13 percent, while Google Chrome accounts for less than 1 percent of the market at .98 percent.
- The remaining almost 2 percent of browsers include products like Camino, Opera, and others.
- Of course these numbers are moving targets, but the market shares have been more or less the same over the months.



- A **web browser** (commonly referred to as a **browser**) is a software application for accessing information on the World Wide Web.
- When a user requests a web page from a particular website, the web browser retrieves the necessary content from a web server and then displays the page on the user's device.
- A web browser is not the same thing as a search engine, though the two are often confused.
- For a user, a search engine is just a website that provides links to other websites.
- However, to connect to a website's server and display its web pages, a user must have a web browser installed.



- Windows Internet Explorer 8 for Windows Vista, XP, and Windows 7 is the latest version of the popular web browser.
- Internet Explorer 8 delivered a new look and enhanced capabilities that made everyday tasks—such as searching, browsing multiple sites, and printing—simple and fast.
- The big change in IE 8 is its rendering modes.
- The progressive evolution of the Web has necessitated that browsers such as Internet Explorer include multiple content-rendering modes—both supporting strict interpretation of certain web standards .



- Web browsers are used on a range of devices, including desktops, laptops, tablets, and smartphones.
- In 2019, an estimated 4.3 billion people used a browser.
- The most used browser is Google Chrome, with a 64% global market share on all devices, followed by Safari with 18%.
- Other notable browsers include Firefox and Microsoft Edge.



- Web site designers generally have the ability to specify which mode they are designing.
- In the absence of specific instructions from a web site, browsers are preset to use one of the modes by default.
- Internet Explorer 8 has been designed to include three rendering modes:
 - **One** that reflects Microsoft's implementation of current web standards
 - A **second** reflecting Microsoft's implementation of web standards at the time of the release of Internet Explorer 7 in 2006
 - A **third** based on rendering methods dating back to the early Web



- The newest rendering mode is forward-looking and preferred by web designers, while the others are present to enable compatibility with the myriad sites across the Web that are currently optimized for previous versions of Internet Explorer.



- In June 2008 Mozilla released Firefox 3, a major update to its popular, free, open-source web browser.
- Firefox 3 is the culmination of three years of efforts from thousands of developers, security experts, localization and support communities, and testers from around the globe.
- Available in approximately 50 languages, Firefox 3 is two to three times faster than its predecessor and offers more than 15,000 improvements, including the revolutionary smart location bar, malware protection, and extensive under-the-hood work to improve the speed and performance of the browser.
- Firefox Performance
- Firefox 3 is built on top of the Gecko 1.9 platform, resulting in a safer, easier-to-use, and more personal product.

Security



- Firefox 3 raises the bar for security. The new malware and phishing protection helps protect from viruses, worms, trojans, and spyware to keep people safe on the Web.
- Firefox 3's one-click site ID information allows users to verify that a site is what it claims to be. Mozilla's open-source process leverages the experience of thousands of security experts around the globe.

Features of web browser



- Allow the user to open multiple pages at the same time, either in different browser windows or in different tabs of the same window.
- *Back* and *forward* buttons to go back to the previous page visited or forward to the next one.
- A *refresh* or *reload* button to reload the current page.
- A *stop* button to cancel loading the page.
- A *home* button to return to the user's home page.
- An address bar to input the URL of a page and display it.
- A search bar to input terms into a search engine.

Customization



- Firefox 3 lets users customize their browser with more than 5,000 add-ons. Firefox add-ons allow users to manage tasks like participating in online auctions, uploading digital photos, seeing the weather forecasts, and listening to music, all from the convenience of the browser.
- The new Add-ons Manager helps users to find and install add-ons directly from the browser.

Function



- The purpose of a web browser is to fetch information resources from [the Web](#) and display them on a [user](#)'s device.
- This process begins when the user inputs a [Uniform Resource Locator](#) (URL), such as <https://en.wikipedia.org/>, into the browser.
- Virtually all URLs on the Web start with either *http:* or *https:* which means the browser will retrieve them with the [Hypertext Transfer Protocol](#) (HTTP).
- In the case of *https:*, the communication between the browser and the [web server](#) is [encrypted](#) for the purposes of security and privacy.
- Once a [web page](#) has been retrieved, the browser's [rendering engine](#) displays it on the user's device.
- This includes [image](#) and [video](#) formats supported by the browser.



- Web pages usually contain hyperlinks to other pages and resources.
- Each link contains a URL, and when it is clicked or tapped, the browser navigates to the new resource.
- Thus the process of bringing content to the user begins again.
- Most browsers use an internal cache of web page resources to improve loading times for subsequent visits to the same page.
- The cache can store many items, such as large images, so they do not need to be downloaded from the server again.
- Cached items are usually only stored for as long as the web server stipulates in its HTTP response messages.

What are the 5 main web browsers?



- **Web - Browser Types**
- **Internet Explorer.**
- **Google Chrome.**
- **Mozilla Firefox.**
- **Safari.**
- **Opera.**
- **Konqueror.**
- **Lynx.**

What are the main Web browsers?



- **Google Chrome.**
- **Mozilla Firefox.**
- **Apple Safari.**
- **Microsoft Internet Explorer.**
- Microsoft Edge.
- Opera.
- Maxthon.

Which is the best browser 2019?



The best Android browsers are

- Chrome. The best Android browser for most users.
- **Opera.** Fast and great for saving data. ...
- Firefox. Powerful alternative if you want to avoid Google.
...
- DuckDuckGo Privacy Browser. Good browser if you value privacy.
- **Microsoft Edge.** Fast browser with a fantastic Read It Later mode. ...
- Vivaldi.
- Flynx.
- Puffin.

What is the number one browser?



- Google is often referred to as “the search company”.
- However, search is not the only area that Google excels in.
- As the following chart, based on StatCounter data shows, the company's web **browser** Chrome is the **number one** gateway to the internet around the world.

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UNIT III



DAY 14
09.09.2020

PREVIOUS CLASS



- **Accessing the Cloud:**
 - Platforms
 - Web Applications
 - Web APIs
 - Web Browsers.

TODAY CLASS



- **Cloud Storage:**

- Overview
- Cloud Storage Providers

Cloud storage



- Cloud storage is the process of storing digital data in an online space that spans multiple servers and locations, and it is usually maintained by a hosting company.
- How cloud storage works?
- Where is your data?
- What are the benefits?
- What are the challenges?

How cloud storage works?



- In the past, organizations relied on storing data on large hard drives or external storage devices, like thumb drives, compact discs, & floppy disks.
- Over time, organizations found ways to consolidate data onto a local on-premise storage device or devices.
- Today, individuals and enterprises alike use cloud storage to store data on a remote database using the internet to connect the computer and the off-site storage system.





- Cloud storage systems are ubiquitous, the size and maintenance of those systems can be quite different.
- The smallest cloud storage system consists of a single data server that connects to the internet.
- Other cloud storage systems are so enormous the equipment can fill entire warehouses called “server farms”.
- Microsoft Azure, Amazon Web Services (AWS), and Google Cloud Computing all maintain these gigantic data centers, storing data from all over the world.



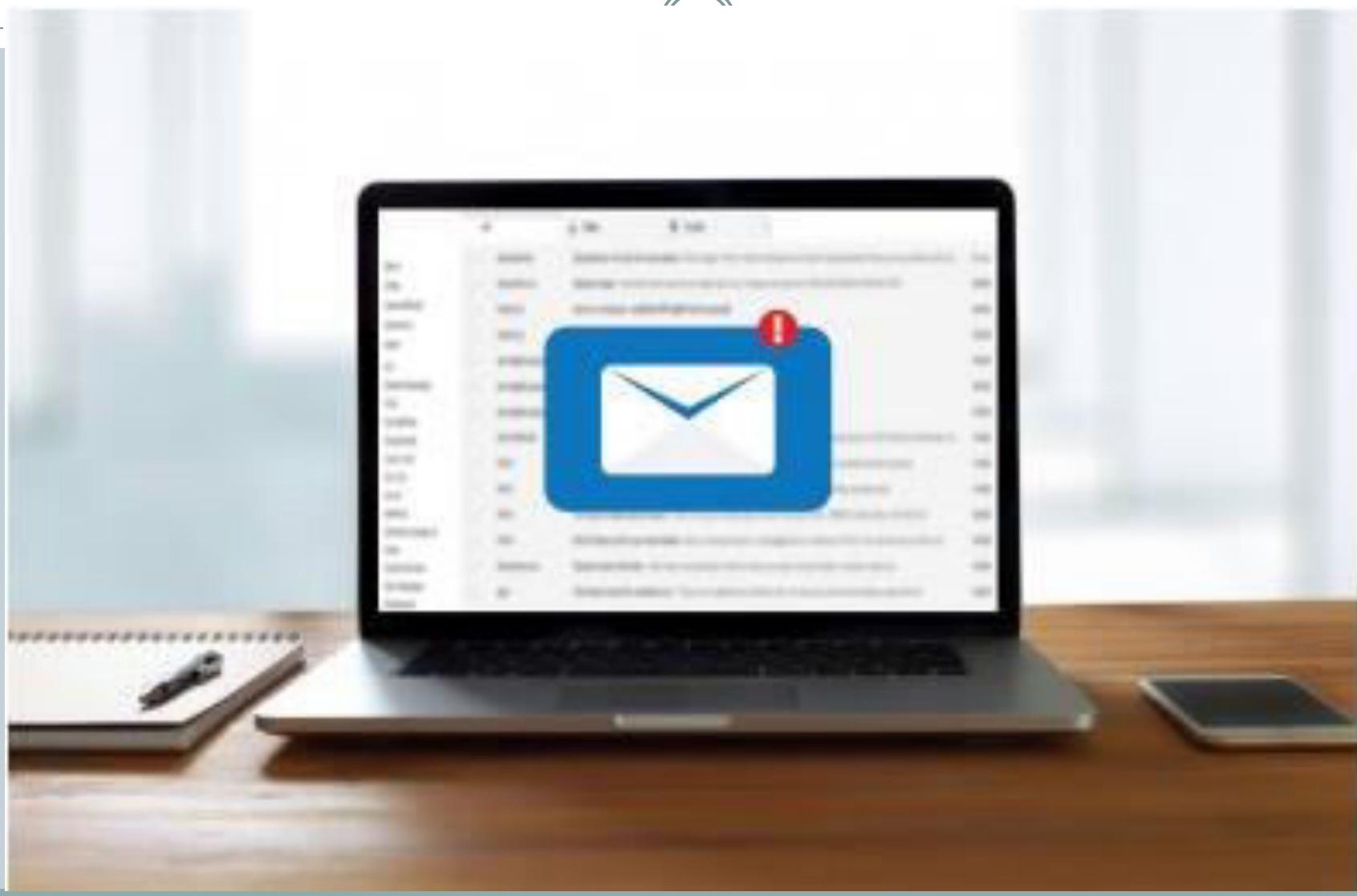
Where Is Your Data?



- We use webmail as an example (Gmail, Yahoo, Hotmail, etc.).
- You can log on and view your email on any computer or device – your laptop, a friend's computer, a library computer, your phone, a tablet while on vacation – it doesn't matter.
- You'll see all the same emails and folders.
- That's because those emails aren't stored on the hard drive of your computer.
- They are stored on the email providers' servers.



- The data is still physically stored.
- Companies that provide cloud storage must also have servers dedicated to storing your data.
- Where are these server farms located?
- Even providers that are based in one country, such as the U.S., might have servers in China or France or Canada, or anywhere else in the world.
- Some providers also enlist a third party to store data.
- In the same way a construction project might have dozens of subcontractors, a cloud storage system can have dozens of sub-cloud storage providers.



What Are The Benefits?



- 49% of businesses are delaying a move to the cloud due to cyber security skills gaps and security concerns.
- Despite this, 80% of all IT budgets are committed to cloud solutions, and 73% of companies are planning on moving to the cloud.
- People are asking what is cloud storage because any savvy business leader can see it is the direction the market is moving.
- Cloud storage provides a competitive advantage if adopted early.



Data Retrieval:

- You can retrieve data from virtually anywhere.
- Companies can now offer work-from-home and bring-your-own-device (BYOD) solutions.
- As the business changes, the agile nature of cloud storage makes it easy to adjust.

Collaboration:

- Other people can access the same data and tools, enabling teams to work together more easily.
- Engaging the right provider with the right tools, even version control can become a breeze.
- Cloud providers can work with cloud solution platforms – like [Zerto Virtual Replication 6.0](#) – to provide a disaster recovery and backup strategy.
- This is especially beneficial to [contact centers](#).
- Cloud storage is an essential tool for enabling omnichannel strategies.



Pay-As-You-Use:

- In the past, businesses had to purchase computing infrastructure – hardware, licenses, equipment – based on their expectations on business growth for the next several years.
- Companies tended to over-buy, fearing being underprepared, and were left with expensive equipment and storage space they didn't use.
- Cloud storage and virtualization allows businesses to pay for the data they actually use.
- This means businesses can scale and adjust up and down as their business needs and strategy change.



“Green” Business:

- Sometimes this benefit is left off the list, but businesses that switch to cloud computing can cut their energy consumption by up to 70%.
- Maintaining even a small data center is expensive: servers, networks, power, cooling, space, and ventilation all contribute to energy costs.
- Not to mention work-from-home policies reduce community CO₂ emissions and office energy consumption.



Increased Capabilities:

- Small and medium-sized businesses of the past were only able to use the tools they could afford.
- Today, using a cloud storage provider means SMBs can utilize the different services the cloud provider offers for all their clients.
- Your data could be stored in the same facility as the U.S. Department of Defense's data.
- Since the DOD has strict requirements for security and capabilities, the data center will meet those needs.
- And your business benefits, too.
- Virtualization, web applications, [collaboration tools](#), disaster recovery solutions, centralization, data protection, and security protocols are all available to the users.

What are the challenges?



Attack Surface Area:

- This is a mathematical understanding of risk.
- The data stored on a local network is in one place and one place only.
- By distributing data to more locations, the risk of that data being subject to unauthorized access increases.
- More people = more risk of compromise.
- The cloud also uses the internet to transfer data.
- So, instead of data being transferred via a local area network (LAN), it uses a wide area network (WAN), which increases the risk.



- Cloud providers offer additional [services to decrease these risks](#), such as crypto-shredding.
- A key-aggregate cryptosystem can consolidate the increased number of decryption access keys.
- Encryption technology is essential to ensure that data is protected both while it is in transit and when it reaches its destination.



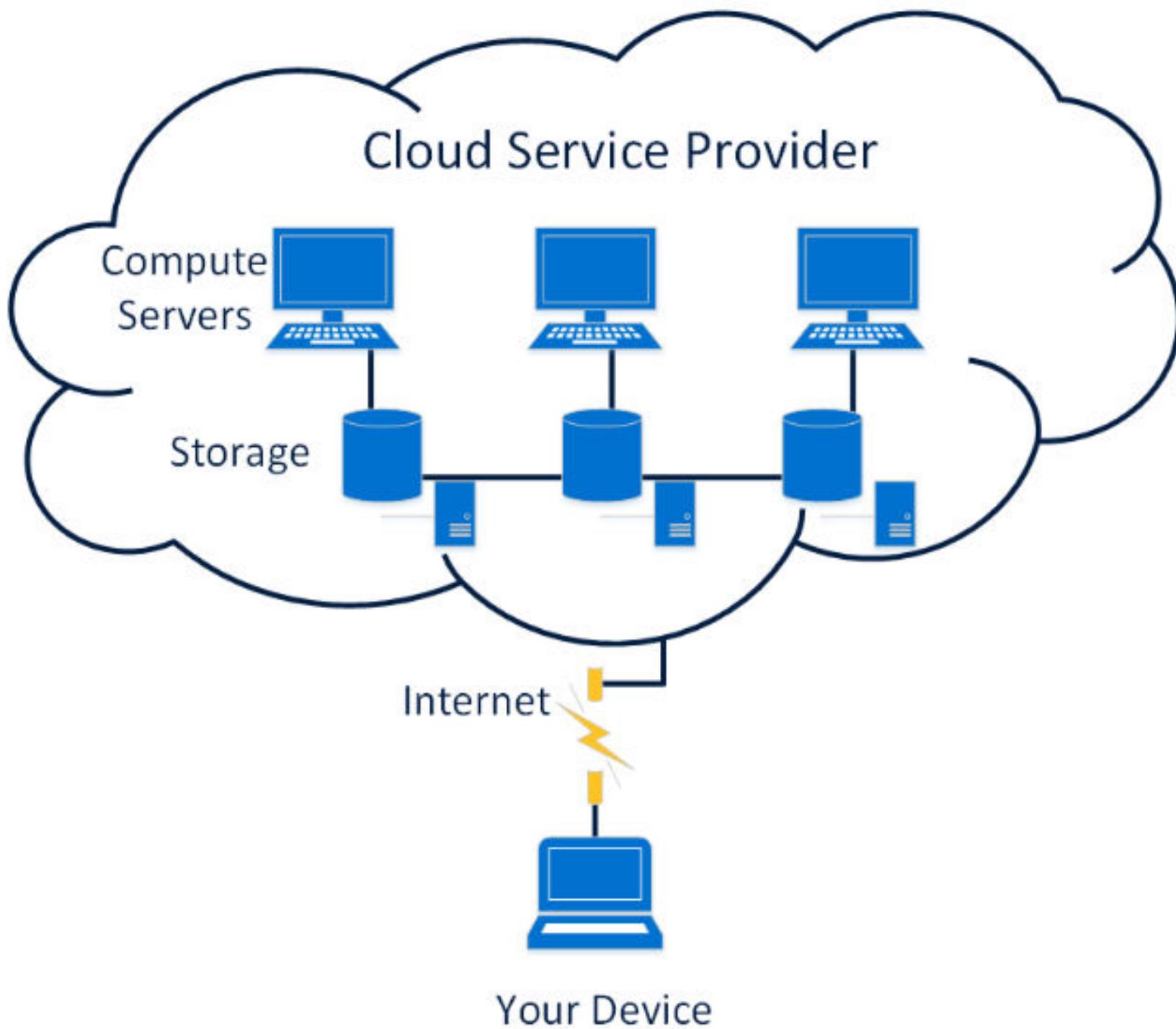
Supplier Sustainability:

- What happens if your cloud storage provider goes bankrupt, suffers a disaster, or changes their business strategy?
- Teaming up with another party means aligning business goals. That isn't always easy.



Security:

- Many businesses store sensitive data, such as healthcare or financial records.
- These industries are subject to strict regulations.
- Putting this data in the hands of someone else can be a difficult decision to make.
- Understanding the safeguards cloud storage providers take and how your team will need to leverage those tools for added security is an important step in migrating your data to the cloud.
- Security is a shared responsibility. Your customers, clients, employees, and team look to you to protect their information and the information vital to your business.



Cloud storage provider



- A cloud storage provider, also known as a managed service provider ([MSP](#)).
- It is a company that offers organizations and individuals the ability to place and retain data in an off-site storage system.
- Customers can lease cloud storage capacity per month or on demand.
- A cloud storage provider hosts a customer's data in its own data center, providing fee-based computing, networking and storage infrastructure.
- Both individual and corporate customers can get unlimited storage capacity on a provider's servers at a low per-gigabyte price.



- Rather than store data on local storage devices, such as a hard disk drive, flash storage or tape, customers choose a cloud storage provider to host data on a system in a remote data center.
- Users can then access those files using an internet connection.
- The delivery of IT services via the internet is broadly defined as cloud computing.
- This business model first hit mainstream enterprises with the rise of application service providers.



- A cloud storage provider also sells non-storage services for a fee.
- Enterprises purchase compute, software, storage and related IT components as discrete cloud services with a pay-as-you-go license.
- For example, customers can opt to lease infrastructure as a service; platform as a service; or security, software and storage as a service.



- Amazon **Cloud** Drive
- Apple iCloud
- Box
- Carbonite
- Dropbox
- Google Drive
- Microsoft OneDrive
- Mozy
- SOS Online Backup
- SugarSync
- Western Digital My **Cloud** are among the leading consumer **cloud** options.

What is cloud storage in cloud computing?



- **Cloud storage** is a **cloud computing** model that stores data on the Internet through a **cloud computing** provider who manages and operates data **storage** as a service.
- It's delivered on demand with just-in-time capacity and costs, and eliminates buying and managing your own data **storage** infrastructure.

What is storage provider?



- A **Storage** service **provider** (SSP) is any company that provides computer **storage** space and related management services.
- SSPs also offer periodic backup and archiving. Advantages of managed **storage** are that more space can be ordered as required.

What are cloud providers give two examples?



- Amazon and Rackspace

Other major **cloud** service **providers** include Cisco, Citrix, Google, IBM (SoftLayer), Oracle, Microsoft (Azure), and SAP, Rackspace, and Verizon (which acquired Terremark)

What are the examples of cloud storage?



- Other examples of Cloud Storage are **Google Docs**, Xdrive, MediaMax and Strongspace.
- Perhaps most private computer users are familiar with backup services in the Cloud. Mozy.com and carbonite.com are good examples of this technology.

Who is the largest cloud storage provider?



- **Best cloud storage services in 2020: Google Drive, OneDrive, Dropbox, and more**
- Amazon Drive. AWS for business is great, but Amazon Drive isn't so hot. ...
- Box. Box is both cloud storage and a document workflow program in one. ...
- **Dropbox.** Oldest personal cloud storage shows its age, but it's still good. ...
- **Google Drive.** ...
- iCloud Drive.

What is the price of cloud storage?



- Apple's iCloud **storage** maxes at one terabyte, but there are more options for those who want less space.
- For example, you can opt for 20GB for \$0.99, 200GB for \$3.99, or 500GB for \$9.99 per month.
- If you want something less than a terabyte, Google only offers the free 15GB and 100GB for \$1.99 per month.

Who are the major cloud providers?



- Microsoft Azure.
- **Amazon Web Services (AWS)**
- Google Cloud.
- Alibaba Cloud.
- IBM Cloud.
- Oracle.
- Salesforce.
- SAP.

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UNIT III



DAY 15

10.09.2020

PREVIOUS CLASS



- **Cloud Storage:**
 - Overview
 - Cloud Storage Providers

TODAY CLASS



- **Standards:**

- Applications
- Client
- Infrastructure
- Service.



- ISO/IEC 17788, **Cloud** computing – Overview and vocabulary, provides definitions of common **cloud** computing terms, including those for **cloud** service categories such as Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

1. APPLICATION



- A cloud application is the software architecture that the cloud uses to eliminate the need to install and run on the client computer.
- There are many applications that can run, but there needs to be a standard way to connect between the client and the cloud.



- take a closer look at the protocols that are used to manage connections between both parties.
- Communication
- HTTP
- XMPP

Communication



- Computers need a common way to speak with one another.
- Think of it like talking on the telephone to someone who doesn't speak English and you don't speak their language.
- There's no way to achieve a common understanding.
- You may be able to guess a word here or there, but for the most part, the conversation won't work.
- Computers can't even guess a common word, so without a language in common, that communication won't happen.

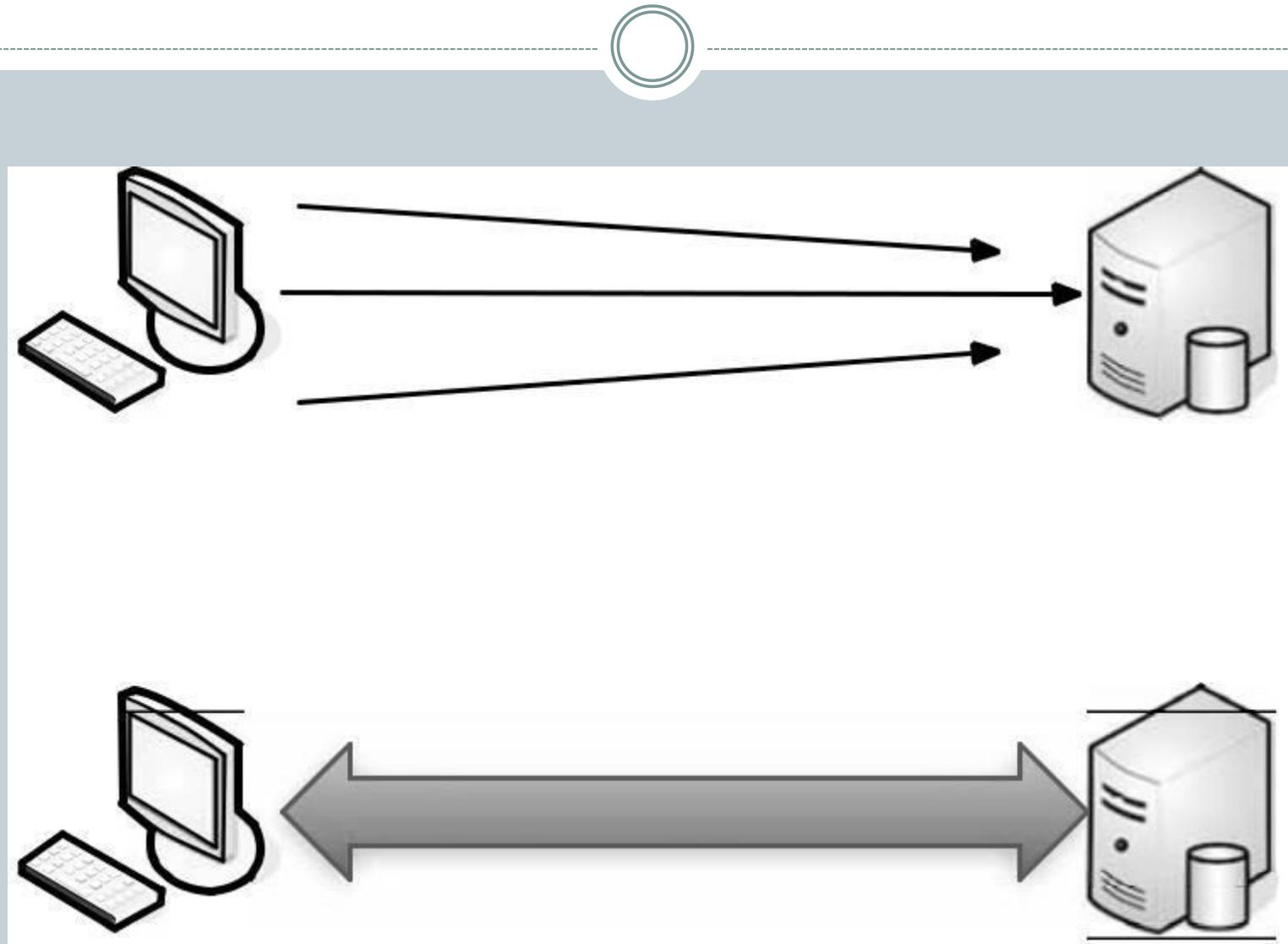
HTTP



- Hypertext Transfer Protocol (HTTP) as the computing mechanism to transfer data between the cloud and your organization.
- HTTP is a stateless protocol.
- This is beneficial because hosts do not need to retain information about users between requests, but this forces web developers to use alternative methods for maintaining users' states.



- For example, when a host needs to customize the content of a web site for a user, the web application must be written to track the user's progress from page to page.
- The most common method for solving this problem is sending and receiving cookies.



XMPP



- The Extensible Messaging and Presence Protocol (XMPP) is being talked about as the next big thing for cloud computing.
- The problem is that current cloud services including SOAP and other HTTP-based protocols are all one-way information exchanges.
- This means that clouds do not operate in real time and might have difficulties clearing a firewall.
- XMPP allows for two-way communication and eliminates polling.



- XMPP (also known as Jabber) is a protocol that Google, Apple, AOL, IBM, and LiveJournal have all signed on with.
- But with so many big names already adopting XMPP.
- The Problem with Polling When you wanted to sync services between two servers, the most common means was to have the client ping the host at regular intervals. This is known as ***polling***.



- This is generally how we check our email. Every so often, we ping our email server to see if we got any new messages. It's also how the APIs for most web services work.
- The web site High Scalability reported in 2008 that Twitter was reporting an average of 200 to 300 connections per second, with spikes that rose as high as 800 requests per second.
- And at one point, during the Macworld keynote, the service went down because of so many polls.

2.CLIENTS



- The clients on your end users desks are how you will interact with the cloud.
- The different types of clients and how they can be configured to communicate with the cloud.
- There are different types of clients that can link to the cloud, and each one offers a different way for you to interact with your data and applications.



- Depending on your organization and its needs, you may find yourself using any combination of these devices.
- How you interact with your data based on these clients will be a combination of factors—what your needs are, and the benefits and limitations of these client types.
 1. Mobile client
 2. Thin client
 3. Thick client

1. Mobile client



- Mobile clients run the gamut from laptops to PDAs and smartphones, like an iPhone or BlackBerry.
- You're not likely to utilize a particularly robust application on a PDA or smartphone, but laptop users can connect to the cloud and access applications just as if they were sitting at their desk.



- Mobile clients have security and speed concerns.
- Because the clients will be connecting to the cloud from various locations that may not have an optimized connection.
- But not all applications need speedy connections, and mobile users probably aren't inputting gigabytes worth of data into a database.



- Further, since you can create your own applications in the cloud, they can be crafted with a mobile client in mind.
- While a mobile user won't put tons of information into a database, an application can still be developed to let them access it.
- Thin clients, as we've mentioned before, are client computers that have no hard drives, no DVD-ROM drives, and simply display what's on the server.

2. Thin client



- Thins may have a role in your organization, but likely only if you have an in-house cloud.
- Of course, it depends on what applications and services you're accessing on the cloud is TFT.
- Access cloud-based services or is accessing a virtualized server, then thin clients are a great option.
- They're less expensive than thick clients, are much less expensive to maintain, and use less energy.

3.Thick clients



- Thick clients are the clients you already use and are likely to use to connect to applications in the cloud.
- Already have applications installed on your end users' machines.
- While you can offload some of your applications to the cloud,
- That simply need to stay in-house.



- These machines can certainly still connect to a virtualized server, and if you don't want to spend any more money for clients, just use the machines that you already have.
- Thick clients are good choices if users need to maintain files on their own machines or run programs that don't exist on the cloud is LED & LCD.



- Security-wise, thick clients are more vulnerable to attack than thins.
- Since data is stored on the machine's hard drive, if the machine is stolen then the data could be compromised.
- There's also an issue of reliability.
- If a thin client fails, all it takes is for another thin to get plugged in and the user's work environment is right there.
- If a thick client fails, whatever data is stored on the machine, including the operating system and all the configuration settings, is lost and a new computer will have to be configured for the user.

3. INFRASTRUCTURE



- Infrastructure is a way to deliver virtualization to your cloud computing solution.
- We talked about virtualization before, both across the Internet (having your machines running on a remote server and displayed at your organization) and locally (having your clients' sessions run on a local server and displayed at their desktops).
- A fairly new computing solution is being standardized and how major players are working and playing together to make it come together.



- **Expanding virtualization solutions:** The availability of open-standard virtualization interfaces and the collaborative nature of VMware Community Source are intended to accelerate the availability of new virtualization solutions.
- **Expanded interoperability and supportability** : Standard interfaces for hypervisors are expected to enable interoperability for customers with heterogeneous virtualized environments.



- **Accelerated availability of new virtualization-aware technologies:** Vendors across the technology stack can optimize existing technologies and introduce new technologies for running in virtual environments.

4.SERVICES



- A *web service*, as defined by the World Wide Web Consortium (W3C), “is a software system designed to support interoperable machine-to-machine interaction over a network” that may be accessed by other cloud computing components.
- Web services are often web APIs that can be accessed over a network, like the Internet, and executed on a remote system that hosts the requested services.



- Extensible Markup Language (XML) is a standard, self-describing way of encoding text and data so that content can be accessed with very little human interaction and exchanged across a wide variety of hardware, operating systems, and applications.
- XML provides a standardized way to represent text and data in a format that can be used across platforms. It can also be used with a wide range of development tools and utilities.



- XML Basics XML is very similar to HTML .
- HTML will find it easy to pick up XML.
- That said, there are two major differences between the two:
 - 1. Separation of form and content** HTML uses tags to define the appearance of text, while XML tags define the structure and the content of the data. Individual applications will be specified by the application or associated style sheet.
 - 2. XML is extensible** Tags can be defined by the developer for specific application, while HTML's tags are defined by W3C..



- There are **different services** you will need to run, depending on your cloud provider and what your organization does. Also, these services will likely affect how your cloud infrastructure is deployed.
- Identity
- Integration
- Mapping
- Search



- Integration is also on the cloud and technologies are being developed for that use.
- For example, Amazon's Simple Queue Service (SQS) provides a way for applications to exchange messages via queues in the cloud.
- Maps are becoming more and more popular in web applications.
- For instance, hotel and restaurant web sites show their locations on their web sites and allow visitors to enter their addresses to get customized directions.
- Such services as Google Maps and Microsoft's Virtual Earth provide this cloud-based function, allowing developers to embed maps in web pages.



- Searchability is limited only to the organization.
- For instance, a company might develop an application that does both.
- For instance, let's say a company has a database of movie information.
- By typing in the name of the movie, you can search its own database as well as a search of the Internet to give you two types of results—what's stored in the company database as well as what's on the entire Web.
- If you were to use a single computer to access the cloud, the requirements are pretty minimal .
- All you need is a computer and an Internet connection.



QUERIES?????



UNIT III

COMPLETED

PCC

UNIT IV

DAY 16

11.09.2020

PREVIOUS CLASS

- **Accessing the Cloud:**
 - Platforms
 - Web Applications
 - Web APIs
 - Web Browsers.
- **Cloud Storage:**
 - Overview
 - Cloud Storage Providers.
- **Standards:**
 - Applications
 - Client
 - Infrastructure
 - Service.

UNIT IV

- **Software as a Service:**
 - Overview
 - Driving Forces
 - Company Offerings
 - Industries.
- **Software plus Services:**
 - Overview
 - Mobile Device Integration
 - Providers
 - Microsoft Online.

TODAYS CLASS

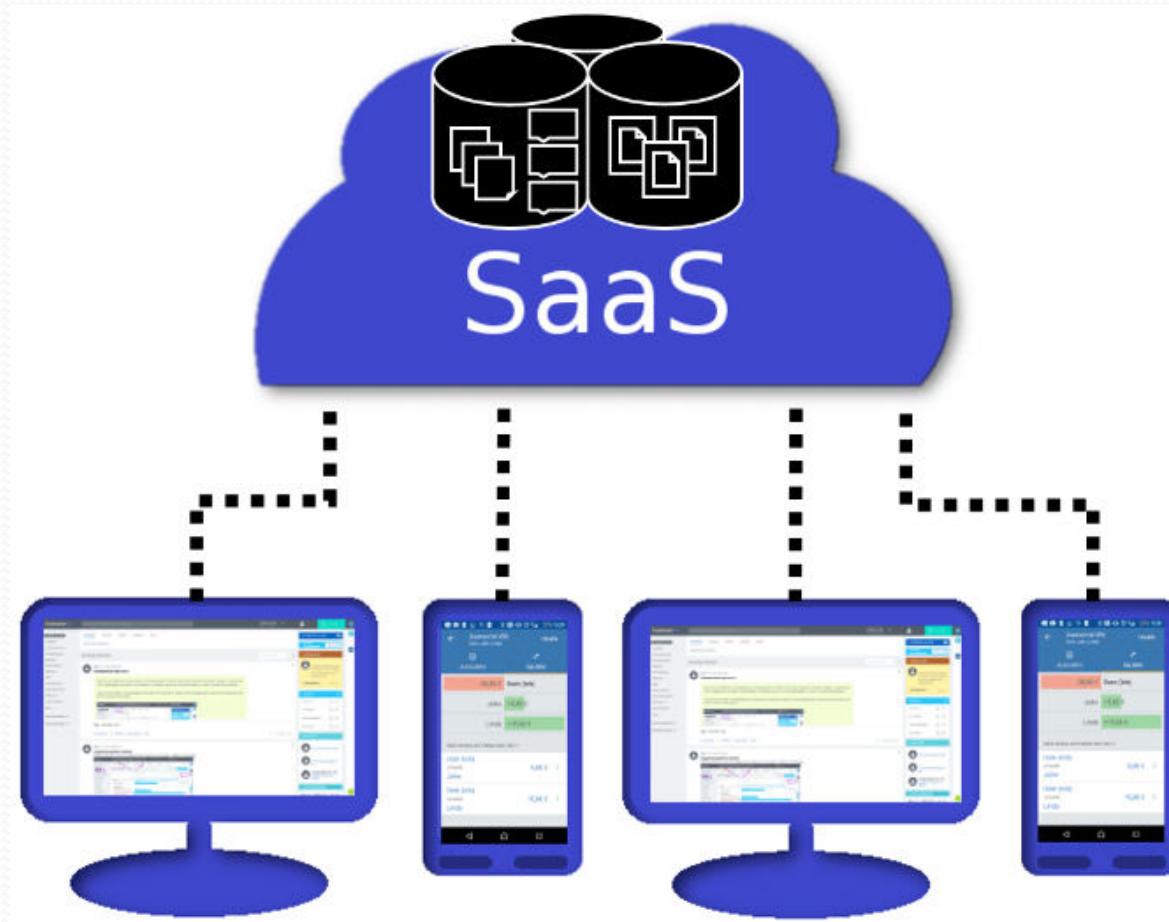
- **Software as a Service:**
 - Overview
 - Driving Forces
 - Company Offerings
 - Industries.

Cloud Computing at Work: Software as a Service

- SaaS are using **software through an internet connection**, rather than software that is **installed locally**.
- Hardware and software belong to a service provider and they rent the external use of their products.
- SaaS is an aspect of cloud computing by definition, one of the largest areas of business development.

SaaS Overview

- SaaS (Software as a Service) is an application hosted on a remote server and accessed through the Internet.
- An easy way to think of SaaS is the web-based email service offered by such companies as Microsoft (Hotmail), Google (Gmail), and Yahoo! (Yahoo Mail). Each mail service meets the basic criteria: the vendor (Microsoft, Yahoo, and so on) hosts all of the programs and
- This is a simple explanation of SaaS, but the same architecture can be applied to a broad variety of applications, used either by businesses or individual end users.



SaaS can be divided into two major categories:

- **Line of business services** These are business solutions offered to companies and enterprises. They are sold via a subscription service. Applications covered under this category include business processes, like supply-chain management applications, customer relations applications, and similar business-oriented tools.
- **Customer-oriented services** These services are offered to the general public on a subscription basis. They are offered for free and supported by advertising. Examples in this category include the aforementioned web mail services, online gaming, and consumer banking, among others.

How does SaaS work?

- With SaaS, software is **centrally provided** as a service through the Internet.
- Users create individual accounts and accruing costs are billed monthly or annually.
- The applications do not run on their own computer, but are **called up online**.
- The provider is directly responsible for providing, maintaining, and updating the programs.
- Users only need to access the software through a web browser.
- This usually works with any Internet-enabled device; all you have to do is log into the tool with your login data.

- The most popular **SaaS programs** include project management apps, content management systems (CMS), financial accounting, file management, e-commerce, customer relationship management (CRM), archive management, and personal planning.
- While companies have often had to install multiple programs in the past and purchase and manage licenses for them, the much more customer-friendly SaaS model is becoming increasingly popular as a replacement.

Advantages of SaaS

- **Quick commissioning** and provision of services to customers: instead of sending software packages and issuing licenses, the user simply has to go online to start operations.
- **The provider deals with maintenance**, which is a relief to employees: above all, IT teams do not have to worry about software installations, licenses, updates, or maintenance, but can focus their resources on tasks that are equally important for the company.
- **Easy integration for new employees**: no need to license or install software for new employees. Creating a new registration in the web tool is enough to integrate them, which is helpful as they can start their work immediately.

- Use of services both **stationary and mobile** from different devices: software is no longer necessarily bound to a workstation. With the login data, users can also access the tools from mobile or other systems. This also makes the home office concept considerably easier.
- Cloud architecture provides all users with the **same security standards**: local hardware and software problems are less likely to lead to data loss due to the decentralized storage of all data on a cloud server. Smaller companies enjoy the same security standards as larger companies.

- **New functions and updates** are implemented and integrated much faster: since the software runs on the vendor's side, they also have complete control over it. This ensures that you always use the latest version of the services.
- **User-oriented**: companies do not pay flat-rate amounts, but instead pay per user. Software licenses were often too expensive in the past in terms of size, especially for smaller companies. With payment options per user, corporate spending can be managed efficiently.

Disadvantages and dangers of SaaS

- Sharing your data with the provider
- Danger of service termination
- Requires a quick, consistent internet connection
- Software cannot be used during downtime:
- Required compatibility
- Commissioning unfinished software

Popular SaaS providers

Slack:

- Slack provides a communication interface for workplaces.
- The tool divides all conversations into created channels and then further into threads that delimit specific conversations.
- It also offers a **wide range of apps** that can be installed as add-ons.
- Slack can be set up quickly, and you can invite other people to join by e-mail.

Salesforce:

- Salesforce provide various business tools, and as a result can compete with the software heavyweight SAP.
- It offers a wide range of cloud computing services: With finance tools, chat programs, developer tools, and customer relationship management (CRM).
- Salesforce is a **complete solution for businesses**.

Trello:

- SaaS-based web tools can provide playful, innovative solutions to work processes and **project management**.
- Trello packs tasks, events, requests, and more into interactive maps that can be edited or moved by authorized members of the network.
- Its interface is appealing thanks to an excellent overview.

Driving Forces

- SaaS is popular because of the popularity of cloud computing.
- In fact, there are a number of issues that are driving more cloud vendors to offer SaaS and more clients to sign on.
- Let's take a look at why SaaS is driven as much as it is.

- Popularity
- Software Vendors
- SaaS Platforms
- SaaS and SOA

- There are many SaaS platforms out there, and they grow each month.
- For example, Oracle is developing its own SaaS platform while Microsoft is working to make their own applications SaaS-ready.
- As SaaS becomes more and more popular, more vendors are going to be forced to make their platforms SaaS-friendly for SaaS-based applications.

- A service-oriented architecture (SOA) is one in which IT supports the business processes that cover current and emerging requirements to run the business end-to-end.
- This ranges from electronic data interchange (EDI) to online auctions.
- By updating older technologies—like Internet-enabling EDI-based systems—companies can make their IT systems available to internal or external customers.

- SOA unifies business processes by structuring large applications as a collection of smaller modules known as “services.”
- SOA presents a design framework for realizing rapid and low-cost system development and improving total system quality.
- SaaS and SOA are quite similar; what they have in common is that they use a services model.
- As of this writing, we’re in the midst of a recession and that poses a problem for SaaS vendors.
- However, many industry observers think conventional ISVs will have a tougher time than SaaS vendors.

COMPANY OFFERINGS

- There are dozens of companies offering SaaS. There are a lot of fish in the SaaS pond.
- Like Microsoft and IBM, they all want their own slice of the SaaS pie.
 - QuickBooks Overview
 - Intuit

- QuickBooks Online (www.qboe.com) gives small business owners the ability to access their financial data whether they are at work, home, or on the road.
- Intuit Inc. says the offering also gives users a high level of security because data is stored on firewall-protected servers and protected via automatic data backups.
- There is also no need to hassle with technology—software upgrades are included at no extra charge.

THE VALUE OF CLOUD

The Value of Cloud Computing

Greater Flexibility and Agility



Competitive Differentiation



More Business Process Innovations




91%
OF COMPANIES
IN NORTH AMERICA
CLOUD
WILL HAVE A
**MAJOR
IMPACT**
ON THEIR
ORGANIZATIONS

Cloud Adoption Survey: What people want:

-  51% Greater productivity
-  35% Simplified compliance
-  33% Faster business processes
-  23% Reduced costs

85%

OF RESPONDENTS SAY THEY ARE LOOKING FOR INNOVATION & FLEXIBILITY THROUGH THE CLOUD.



With SAP Cloud Business, we offer individual solutions, comprehensive packages, and complete portfolio integration. Our mission is to help our customers succeed in their digital transformation journey.

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THE WORLD'S LEADING PROVIDER OF BUSINESS SOFTWARE.

SAP

For companies that are growing, QuickBooks Online Plus offers advanced features such as automatic billing and time tracking, as well as the ability to share information with employees in multiple locations.

QuickBooks Online features include

- The ability to **access financial data** anytime and from anywhere. QuickBooks Online is accessible to users 24 hours a day, seven days a week.
- **Automated online banking.** Download bank and credit card transactions automatically every night, so it's easy to keep data up to date.

- **Reliable automatic data backup.** Financial data is automatically backed up every day and is stored on Intuit's firewall-protected servers, which are monitored to keep critical business information safe and secure. QuickBooks Online also supports 128-bit Secure Sockets Layer (SSL) encryption.
- No software to buy, install, or maintain and no network required.
- The software is hosted online, so small business users never have to worry about installing new software or upgrades.
- QuickBooks Online remembers customer, product, and vendor information, so users don't have to re-enter data

- Easy accounts receivable and accounts payable.
- Invoice customers and track customer payments.
- Create an invoice with the click of a button.
- Apply specific credits to invoices or apply a single-customer payment to multiple jobs or invoices.
- Receive bills and enter them into QuickBooks Online with the expected due date.
- Write and print checks. Enter information in the onscreen check form and print checks.

INDUSTRIES

- Amazon and Microsoft offering general SaaS.
- Different industries have their own players that offer unique, industry-specific SaaS applications.
- Microsoft launched its Microsoft HealthVault, a software and services platform aimed at helping people better manage their health information.
- The company says its vision is for ways in which HealthVault can bring the health and technology industries together to create new applications, services, and connected devices that help people manage and monitor their personal health information, including weight loss and disease management, such as for diabetes

- “People are concerned to find themselves at the center of the healthcare ecosystem today because they must navigate a complex web of disconnected interactions between providers, hospitals, insurance companies and even government agencies,” said Peter Neupert, corporate vice president of the Health Solutions Group at Microsoft.
- “Our focus is simple: to empower people to lead healthy lives.
- The launch of HealthVault makes it possible for people to collect their private health information on their terms and for companies across the health industry to deliver compatible tools and services built on the HealthVault platform.”

Industry Support HealthVault offers more than 40 applications and devices from the following organizations:

- ActiveHealth Management
- Allscripts
- American Diabetes Association
- American Heart Association
- American Lung Association
- American Stroke Association
- apMed, a division of Bio-Imaging Technologies Inc.

- Claricode
- Diabetes Prevention Source (DPS)
- Diet.com
- Eclipsys Corp.
- HealthCentral Network Inc.
- HealthMedia Inc.
- Healthphone Solutions Ltd.
- Healthways
- Healthy Circles LLC
- Home Diagnostics Inc.
- iMedica Corp.
- Kryptiq Corp.

- LifeScan Inc., a Johnson and Johnson company
- LiveHealthier
- Matria Healthcare Inc.
- Medem Inc.
- MedHelp
- Medical Informatics Engineering (MIE)
- Medifast Inc.
- MEDSEEK
- Medstar Health
- Microlife USA Inc.



QUERIES?



THANK YOU

PCC

UNIT IV

DAY 17
12.09.2020

PREVIOUS CLASS

- **Software as a Service:**
 - Overview
 - Driving Forces
 - Company Offerings
 - Industries.

TODAYS CLASS

- **Software plus Services:**
 - Overview
 - Mobile Device Integration
 - Providers
 - Microsoft Online

Software plus service

1.Overview

- **Software Plus Services (Software + Services)** is Microsoft's philosophy for complementing the **software** company's on-premises **software** offerings with cloud-based remote computing **software** options.
- **Software-as-a-service** (SaaS), cloud computing and application **service** provider (ASP) terms in Webopedia.
- SaaS is boosted with software running locally.

Software + Services



Hosted

In Cloud

On-premise
nature = BUSINESS

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Microsoft Dynamics

- Software plus Services (S+S) is a Microsoft initiative to provide traditional software with a suite of cloud hosted services seamlessly integrated to provide enterprise-level solutions.
- Software plus services is a vision to create a pool of services and solutions that spread across virtually every possible personal or business computing requirement.
- User run some software on-site and reach out the cloud for additional services.
- You maintain some software on-site, which accesses data stored on the cloud.
- This is especially good for remote workers, road warriors, telecommuters, and anyone else who needs to be away from the corporate datacenter.

This is basically Microsoft's cloud strategy. Software plus services is guided by **three core principles**:

1. Unified application services for interoperability among multiple devices.
2. Transition of traditional in-house server, storage and other infrastructure solutions to the cloud.
3. Delivery of integrated development systems for rapid application development.

- These solutions and services are primarily delivered on cloud by Microsoft and its partner and provides all different cloud models from SaaS, PaaS, IaaS and hybrid solutions.
- The set of services delivered under this are Office 365, Windows Azure, System Centre, Dynamics and Intune and are delivered on both a subscription based pricing model and the traditional licensing model.

What are the benefits of SaaS?

- **Top five advantages of software as a service (SaaS)**
 1. Reduced time to benefit. Different from the traditional model, in SaaS the software (application) is already installed and configured.
 2. Lower **costs**.
 3. Scalability and integration.
 4. New releases (upgrades).
 5. Easy to use and perform proof of concepts.

Disadvantages of SaaS

- Loss of control. In-house software applications give business owners a high degree of control.
- Limited applications. **SaaS** is gaining in popularity.
- Connectivity requirements. Since **SaaS** software is web-hosted, you can't use these applications without an Internet connection.
- Variable functions & features.
- Slower speeds.

- Software plus Services takes the notion of Software as a Service (SaaS) to complement packaged software.
- Here are some of the ways in which it can help your organization:
- **Privacy worries** No matter how you use the cloud, privacy is a major concern. With Software plus Services, you can keep the most sensitive data housed on-site, while less sensitive data can be moved to the cloud.

- **Marketing** Software plus Services gives vendors a chance to keep their names in front of clients. Since it's so easy to move from vendor to vendor, providing a part-software/part-Internet solution makes it easier to sell your product to a client.
- **Power** More efficiency is realized by running software locally and synching to the cloud as needed.
- **Flexibility** Vendors can offer software in different sizes and shapes—whether on-site or hosted. This gives customers an opportunity to have the right-sized solution

What are the downsides of Software plus Services?

- The main one is cost.
- If you don't use as much of the services portion of the model, then you won't pay as much.
- However, if you are using it heavily, it might make more financial sense to house the servers locally.
- For instance, if you outsource your email to a cloud vendor, you could be paying quite a lot, whereas you would pay a fraction if you just bought a server and installed it locally.

- Second is Quality of Service (QoS).
- Depends on your cloud vendor and is something you should address in a service level agreement before committing, but your ability to access data might be at risk if there are so many clients using your vendor's equipment.
- Unless your vendor is especially responsible, you run the risk of slow response times and possibly even failure.

- The last downside is a big mental hurdle for a lot of people: simple fear.
- If you have your data stored on a cloud somewhere, is it really safe?
- Is it really secure? Social networking site Facebook came under fire in early 2009 when they issued a terms of service adjustment saying, in essence, “We own whatever you put up here.”
- Site members got understandably annoyed, fought back, and Facebook backed down.

- As people share more information on services like Facebook, a new relationship is created between Internet companies and the people they serve,” founder Mark Zuckerberg said in a statement.
- “The past week reminded us that users feel a real sense of ownership over Facebook itself, not just the information they share.”

Benefits of software plus service

- **User experience:** combining client software that provides the features you want with the ability of the internet to deliver those experience gives you the best of both worlds.
- **Working online:** by connecting occasionally and synching data, you get a good solution for road warriors and telecommuters who do not have the same bandwidth or cannot always be connected.
- **Privacy worries:** with software plus services, you can keep the most sensitive data housed on-site, while less sensitive data can be moved to the cloud.

- **Marketting:** Software plus service gives vendors a chance to keep their names in front of clients.
Providing a parts software internet solution makes it easier to sell your product to a client.
- **Power:** More efficiency is realized by running software and synching to the cloud as needed.
- **Flexibility:** Vendors can after software in different sizes and shapes.

2. Mobile Device Integration

- A key component of Software plus Services is the ability to work in the cloud from a mobile device.
- But what do you need to put on the cloud? It really depends on your organization.
- There are a number of free applications that you can use on the cloud.
- Take, for instance, Google's free apps. You can start a document at your PC and then share it with others or continue working on it on your mobile device.

- **Mobile cloud computing** uses **cloud computing** to deliver applications to **mobile devices**.
- These **mobile** apps can be deployed remotely using speed and flexibility and development tools.
- They can be delivered to many different **devices** with different operating systems, **computing** tasks, and data storage.

- **Mobile device integration** provides a cost-effective Student Response Solution for formative assessment by facilitating instantaneous feedback of data to students and teachers.
- At its most basic level, **cloud integration** means bringing multiple **cloud** environments together, either in a hybrid deployment or as multiple public **clouds**, so that they can operate as a single, cohesive IT infrastructure for an enterprise.

What are the integration tools?

Here's a list of **common on-premise data integration tools**:

- Centerprise Data Integrator.
- IBM InfoSphere.
- **Informatica PowerCenter**.
- Microsoft SQL.
- **Oracle Data Service Integrator**.
- **Talend Data Integration**.
- **webMethods**.

- A broad alliance of leading technology and wireless companies joined forces to develop Android, an open and comprehensive platform for mobile devices.
- Google, T-Mobile, HTC, Qualcomm, Motorola, and others collaborated on the development of Android through the Open Handset Alliance, a multinational alliance of technology and mobile industry leaders.

- This alliance shares a common goal of fostering innovation on mobile devices and giving consumers a chance to experience performance improvements over existing mobile platforms.
- By providing developers with a new level of openness that enables them to work more collaboratively, Android accelerates the pace at which new mobile services are made available to consumers.

3. Provider

- Software plus Services is a good match for mobile users & telecommuters.
- Applications can be developed by your organization or your vendor, depending on what your vendor offers or what you need.
- **Amazon** was the first major cloud provider, with the 2006 offering of **Amazon Simple Storage Service (Amazon S3)**.
- One of the **first** milestones in **cloud computing** history was the arrival of Salesforce.com in 1999, which pioneered the concept of delivering enterprise applications via a simple website

Top 10 cloud service providers

- Microsoft Azure
- Amazon Web Services (AWS)
- Google Cloud
- Alibaba Cloud
- IBM Cloud
- Oracle
- Salesforce
- SAP
- Rackspace Cloud
- VMWare

- A **cloud service provider** is a third-party company offering a **cloud-based** platform, infrastructure, application or storage **services**.
- Much like a homeowner would pay for a utility such as electricity or gas, companies typically have to pay only for the amount of **cloud services** they use, as business demands require.

4. Microsoft Online Services

- Microsoft Online Services is Microsoft's hosted-software offering and a component of their software plus services strategy.
- Microsoft Online Services are hosted by Microsoft and sold "with" Microsoft partners.
- The suite includes Exchange Online, SharePoint Online, Office Communications Online, Microsoft Forefront, and Microsoft Office Live Meeting.

- For businesses, the **Software-plus-Services** approach enables organizations to access the capabilities of enterprise software through on-premises servers, as online services, or a combination of both, depending on specific business requirements.
- Services also provide the option to add complementary capabilities that enhance on-premises server software and simplify system management and maintenance

What is Microsoft Cloud Computing?

- **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.

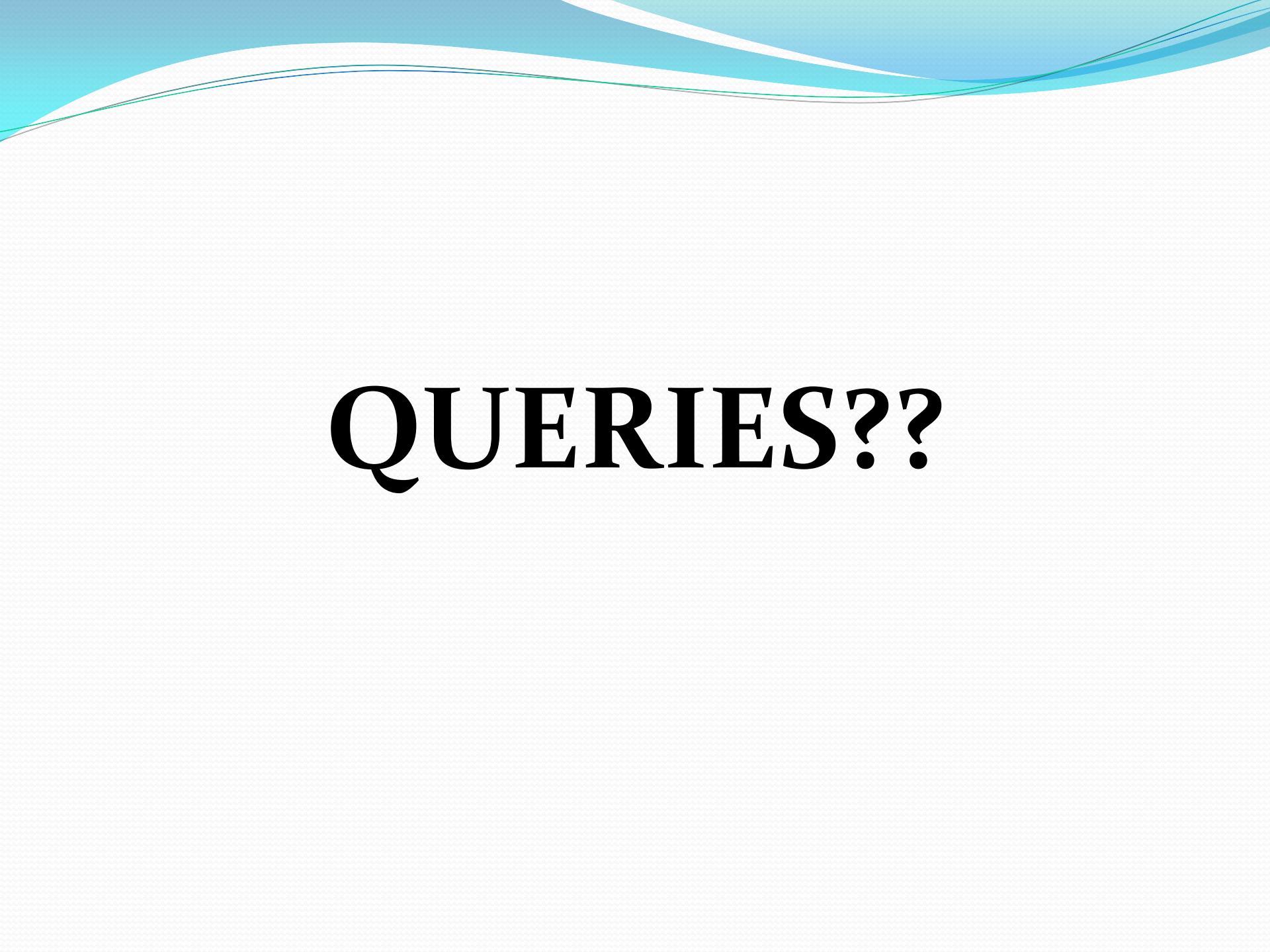
What is online and cloud computing?

- **Cloud computing** is the delivery of different **services** through the **Internet**.
- Rather than keeping files on a proprietary hard drive or local storage device, **cloud**-based storage makes it possible to save them to a remote database.

How does Microsoft use cloud computing?

- Software as a service (SaaS)

With SaaS, **cloud** providers host and manage the software application and underlying infrastructure, and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet, or PC.



QUERIES??

UNIT IV

COMPLETED

PCC UNIT V

DAY 18

14.09.2020

PREVIOUS CLASS

UNIT – IV Cloud Computing at Work

- **Software as a Service:**
 - Overview
 - Driving Forces
 - Company Offerings
 - Industries.
- **Software plus Services:**
 - Overview
 - Mobile Device Integration
 - Providers
 - Microsoft Online.

UNIT V

- **Developing Applications:**
 - Google
 - Microsoft
 - Intuit Quick base
 - Cast Iron Cloud
 - Bungee Connect
 - Development
 - Troubleshooting
 - Application Management.
- Local Clouds and Thin Clients:
 - Virtualization
 - Server Solutions
 - Thin Clients

TODAY'S CLASS

- **Developing Applications:**
 - Google
 - Microsoft

DEVELOPING APPLICATION

- A **cloud-based app** is an Internet-run program with components stored online with some processes executed in the **cloud**.
- Any **app** consists of data and processing logic stored as code and need a space to be run.
- **Cloud-based development** differs from **web development**.

- The term **cloud computing** refers to accessing services or information from third party data centers remotely over the Internet from any location.
- **Cloud computing** networks access to a shared pool of configurable networks, servers, storage, service, **applications** & other important **Computing** resources.

How do you develop cloud computing?

1. Design the application as a collection of services.
2. Decouple the data.
3. Consider communications between application components.
4. Model and design for performance and scaling.
5. **Make** security systemic within the application.

How do cloud applications work?

- **Cloud computing** is an **application-based** software infrastructure that stores data on remote servers, which can be accessed through the internet.
- The front end enables a user to access data stored in the **cloud** using an internet browser or a **cloud computing** software.

Google

- Google handles all the heavy lifting for you.
- There are a number of points that need to be considered when writing an app for the cloud.
- A seasoned programmer should be able to pick it up with some ease, and there are certainly plenty of resources—either paper-and-glue books or web sites—that can help.
- Java is very prevalent on the cloud. It is a very robust scripting tool and one that programmers know well.
- But its complexity is probably hurting it more than helping.

- Google is charging when applications exceed certain limits.
- For instance, Google says that you can only get “200 million megacycles of CPU per day.”
- This can be a little frightening, because Google can skew the number in odd ways that are beyond your control.
- Further, you could see resources being used up as the database stores information on more than one server.
- One server starts asking for information, inter-server traffic can slow everything down, and if two users are trying to get at the same data at the same time, access can become slow and expensive.
- On the plus side, App Engine will bring up new servers when demand rises.

How does Google use cloud computing?

- **Google Cloud** Platform is a provider of **computing** resources for deploying and operating applications on the web.
- Its specialty is providing a place for individuals and enterprises to build and run software, and it **uses** the web to connect to the users of that software.

- As with other cloud offerings, you are at Google's mercy.
- Looking at the terms and conditions, you can see that Google has the power to do whatever they want with your creation.
- Lock-in can be a problem, but at least it is somewhat offset by the open-source nature of the scripting language.
- Since Python is open source, you can take your toys and leave if you want.
- App Engine is best for simple applications that plan on staying simple.
- The cloud can scale the application as needed, but if you have dreams of making your application big, Google might not be the best option.

- The cloud is somewhat new territory, Google says it reserves the right to “pre-screen, review, flag, filter, modify, refuse or remove any or all Content from the Service.”
- If there is a copyright infringement, will Google work with the developer, or just wipe the developer’s account from their servers?
- There are plenty of competitors in the cloud.
- Amazon has its own cloud, but it takes a different approach, giving the user an empty Linux shell.
- That offers more flexibility,

Does Google offer cloud computing?

- **Google Cloud Platform (GCP), offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, file storage, and YouTube.**

What are the cloud services offered by Google?

- **Google Cloud** is a suite of **Cloud Computing services offered by Google**.
- The platform provides various **services** like compute, **storage**, networking, Big Data, and many more that run on the same infrastructure that **Google** uses internally for its end users like **Google** Search and YouTube.

Where is my Google cloud?

- Via the **Google** Photos App or at <https://photos.google.com/u/0/> Via the **(Google)** Drive App or someplace at <https://drive.google.com/drive/my-drive>.
- **How much is Google cloud per month?**
- Now **Google** is making a terabyte of **cloud** storage available for just \$10.
- Check out **Google** Drive's new **pricing** structure announced last week, which now offers the first **15 GB per month** for free.
- For **\$100 a month**, **Google** offers as **much** space you could ever need: **10 terabytes or more**.

Which is better AWS or Google cloud?

- There is no point choosing a **cloud** platform that offers a significant cost advantage if it lacks the flexibility, reliability, and level of performance to meet the needs of the business.
- **Google Cloud** offers around 50 different services, whereas **AWS** offers more than 200 and is more feature-rich.

Is Google cloud free to use?

- The **Google Cloud Free Tier** gives you **free** resources to learn about **Google Cloud** services by trying them on your own. A 3-month **free** trial with \$300 credit to **use** with any **Google Cloud** services.
- Always **Free**, which provides limited access to many common **Google Cloud** resources, **free** of charge.

Microsoft

- Microsoft Azure is an ever-expanding set of cloud services to help your organization meet your business challenges.
- It is the freedom to build, manage and deploy applications on a massive, global network using your favorite tools and frameworks.
- The Azure Services Platform (Azure) is an Internet-scale cloud services platform hosted in Microsoft datacenters, which provides an operating system and a set of developer services that can be used individually or together.
- Azure can be used to build new applications to run from the cloud or to enhance existing applications with cloud-based capabilities, and it forms the foundation of all Microsoft's cloud offerings.
- Its open architecture gives developers the choice to build web applications, applications running on connected devices, PCs, servers, or hybrid solutions offering the best of online and on-premises.

What is Microsoft Azure used for?

- **Azure** is a public cloud computing platform with solutions including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) that can be **used for** services such as analytics, virtual computing, storage, networking, and much more.

What is Microsoft Azure in simple terms?

- **Microsoft Azure**, formerly known as **Windows Azure**, is **Microsoft's** public **cloud** computing platform.
- Users can pick and choose from these services to develop and scale new applications, or run existing applications in the public **cloud**.

What is Microsoft Azure and how it works?

- **Microsoft Azure** is a private and public **cloud** platform.
- **Azure** takes this virtualization technology and rethinks it on a massive scale in **Microsoft** data centres around the world.
- Therefore, the **cloud** is a set of physical servers in one or several data centres that run virtualized hardware on behalf of clients.

Who uses Microsoft Azure?

- We have data on 177,177 companies that **use Microsoft Azure**.
- The companies using **Microsoft Azure** are most often found in United States and in the Computer Software industry.

Who **uses Microsoft Azure**?

• Company	Allied Wire & Cable, Inc.
• Website	awcwire.com
• Country	United States
• Revenue	50M-100M
• Company Size	200-500

Is Azure public or private cloud?

- The cloud resources are owned and operated by a third-party cloud service provider and delivered over the Internet.
- Microsoft Azure is an example of a public cloud.
- With a public cloud, all hardware, **software**, and other supporting **infrastructure** is owned and managed by the cloud provider.

How much is Microsoft Azure?

- **Microsoft Azure prices** start at \$13 a month.
- But, like all of the services tested, it gets complicated after that.
- My benchmark, for example, would have run me about \$65 per month.

How is AWS better than Azure?

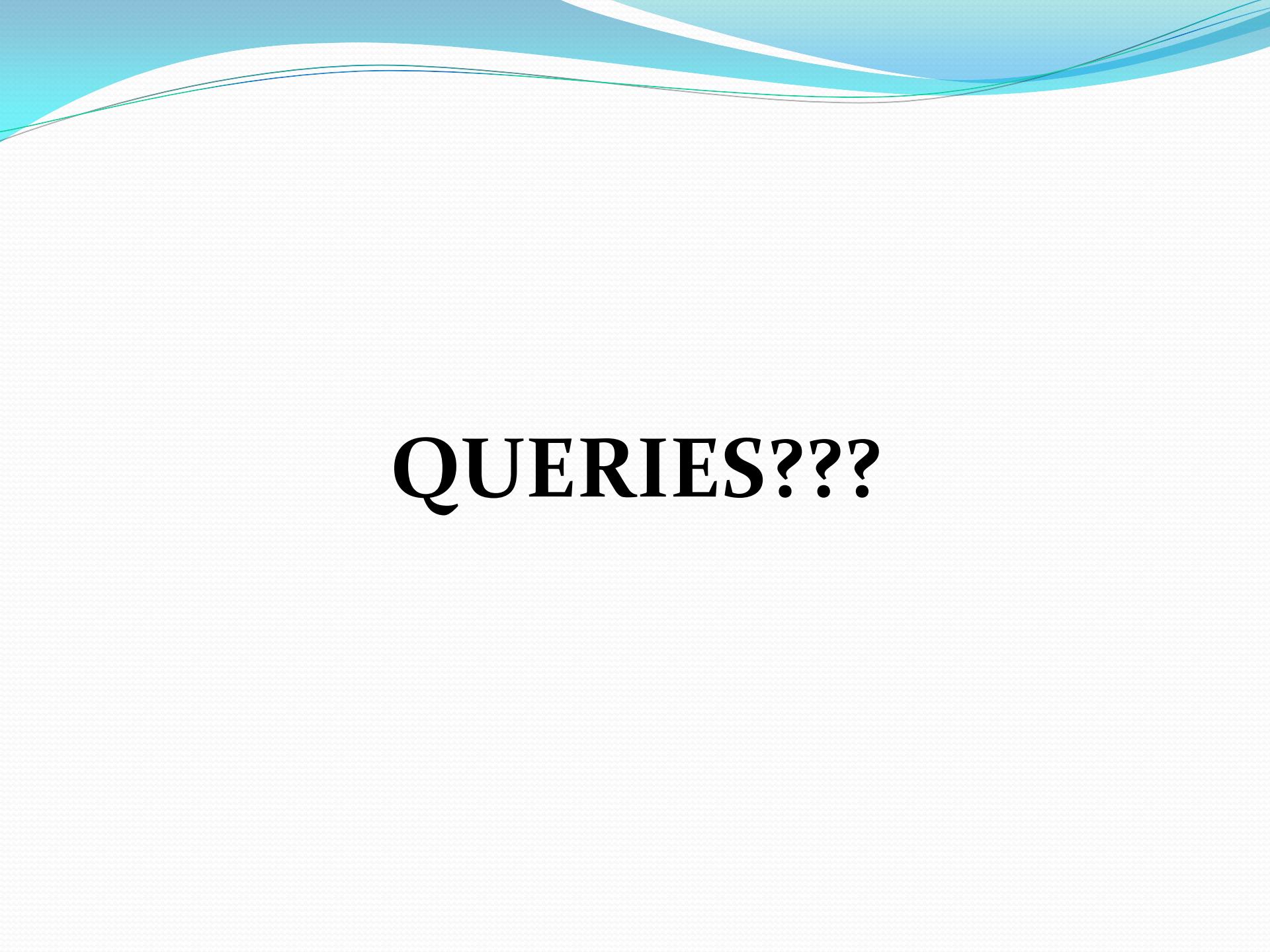
- Whereas **AWS** has grown into the largest cloud services provider by being first to market and by being the more developer-friendly of the two platforms.
- **Azure** caters **better** for larger organizations already committed to Microsoft products moving an existing infrastructure to the cloud.

What is the difference between cloud and Azure?

- An **Azure** Virtual Machine is basically what it sounds like an instance of a Windows or Linux VM that you control.
- **Azure** basically just gives you a space to host that VM.
- **With a Cloud Service**, you deploy your application to your role instances.

Who is Microsoft's biggest customer?

- eBay
- Boeing
- Samsung
- GE Healthcare
- BMW
- Travelocity



QUERIES???



THANK YOU

PCC UNIT V

DAY 19

15.09.2020

PREVIOUS CLASS

- **Developing Applications:**
 - Google
 - Microsoft

TODAYS CLASS

- **Developing Applications:**
 - Intuit Quick base
 - Cast Iron Cloud
 - Bungee Connect

Intuit Quick base

- **Quick Base** is a low code **database** and **application** development platform.
- It lets teams work with a common data repository to build forms, create reports, set up workflows and automate processes.

How much does quick base cost?

- 30-day free trial, no credit card required.
- Premier: from \$600/month (billed monthly) or \$500/month (billed annually) for up to 50 custom business apps.
- Platform: from \$1920/month (billed monthly) or \$1600/month (billed annually) for up to 100 custom business apps.

Who owns Quick base?

- **Intuit**
- Intuit has **owned QuickBase** since 1999, but announced last August plans to divest the business, along with Demandforce and Quicken.
- Demandforce was sold to Internet Brands in January and Quicken found a home with private equity firm H.I.G. Capital just last week.

Is QuickBase cloud based?

- Your **Cloud-Based** Business App Platform.
- **Quick Base** is built on easy to use database software that helps businesses move faster.
- Now anyone can solve important business problems by creating custom applications no coding required.



The logo features the Intuit brand name in its signature blue font, where each letter contains a small blue human icon. Below it, the word "QuickBase" is written in a dark gray, lowercase, sans-serif font.

intuit.[®]

QuickBase

Is QuickBase a CRM?

- The **CRM** solution manager is a simple, easy-to-use, and ready-to-download app template from **QuickBase**.
- Management software from **QuickBase** is designed to be updated, tweaked, and changed on the fly in a low-code platform that's intuitive for business managers.

Who uses Intuit QuickBase?

- Company Sightline Media Group, LLC
- Websitesight linemediagroup.com
- Country United States
- Revenue 10M-50M
- Company Size 200-500

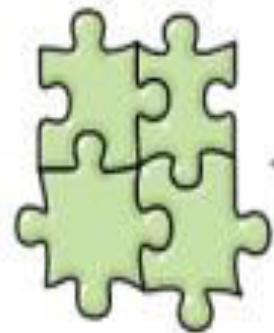
What language does QuickBase use?

- Ruby involves many pre-packaged tools that give novice developers a chance to experiment with programming.
- Python is also quite user-friendly, and this programming **language** is ideal for creating both Web apps and desktop applications.

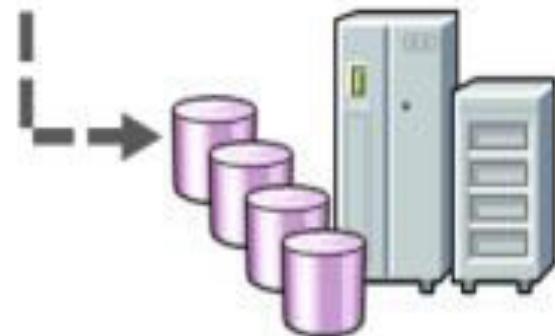
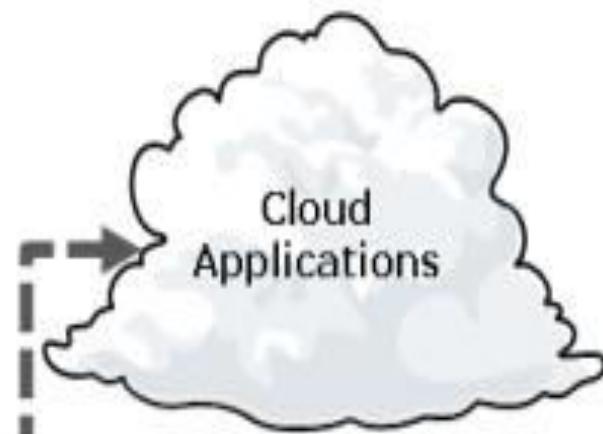
Cast Iron Cloud

- Short for IBM WebSphere **Cast Iron Cloud** Integration, IBM **Cast Iron** is an offering from IBM that provides clients with a platform for integrating **cloud**-based applications from leading SaaS providers with on-premise applications from IBM and other companies.

- IBM acquired Cast Iron Systems in 2010 and debuted the WebSphere Cast Iron Cloud Integration offering shortly thereafter.
- IBM Cast Iron projects can be deployed using a physical , a virtual appliance or a full cloud service (IBM Cast Iron Cloud).



Consolidated,
Consistent
Data



On-premise
Applications

- Welcome to WebSphere Cast Iron Support.
- This technote provides links to more information that can help you avoid opening service requests with IBM Support.
- Use the documents referenced here to answer questions about your appliance or virtual appliance and shorten the time to resolution if you need to open a service request.

- Cast Iron is the solution for exactly this type of problem.
- It's not the solution for everything, but this "data inconsistency" problem is one of the big ones in cloud computing.
- Having data in separate places can make it seem more difficult to keep track of.
- Cast Iron can provide a consistent view of data from a multitude of resources, both on site and off, thus making it a "hybrid cloud" solution.
- For example, it allows you to integrate services like SalesForce.com with other applications and resources you may have on site or elsewhere in the cloud.
- Updates to data can be bidirectional and configured to run automatically, on a schedule.

Cast Iron is available in three packages to fit your budget:

1. In the cloud: **WebSphere Cast Iron Live** provides a low-cost entry point for a proof of concept (POC) or small business.
2. In a virtual machine: **WebSphere Cast Iron Hypervisor Edition** gives you more control over the administrative environment.
3. In an appliance: **WebSphere Cast Iron DataPower XH40** is a self-contained physical appliance.

- Cast Iron education is also available in various “flavors” to fit your budget.
- The three-day **Cast Iron Appliance Configuration** course offers hands-on labs, delivered in your choice of three formats:
 1. WU940 (Classroom) is an instructor-led classroom course.
 2. VU940 (Remote Classroom) is an instructor-led online course.
 3. ZU940 (Self-paced) offers access to the course material and lab environment. This course includes an invitation to a community on developerWorks.com that we set up to support students taking the course.

BUNGEE CONNECT

- **Bungee Connect** is a Platform-as-a-Service that enables users to build business applications as well as move existing legacy applications to the cloud.
- Through a GUI interface, the platform enables users to operate and manage their applications just as they would on a desktop.
- **Bungee Connect** is the anti-thesis of a Rich Internet Application. Rather than pushing most of the computation to the client

- BungeeConnect is a new Eclipse-based application development framework for Java programmers who want to build mobile applications for the leading (iOS, Android, Windows 8, etc.) mobile platforms.
- It enables them to build applications in Java code (POJO) that run natively on all Bungee-supported platforms, from a single Java code base.
- BungeeConnect automates the connection to data through any back-end service [MBaaS](#) (e.g. IBM Worklight, Microsoft Azure, SAP, Salesforce Service Cloud, etc.) that is supported by Bungee, creating an end to end solution for mobile apps.

- Applications built with BungeeConnect run at native speeds on each platform.
- An application built in Java with BungeeConnect will run natively on all targeted platforms.
- Bungee connect, their web-based application development and hosting platform.
- Bungee aims to provide an end-to-end environment for developing applications in the cloud: from editing code through to debugging, deployment and runtime.
- Nothing installed locally, everything happens on their infrastructure.

- Bungee Connect is a Platform-as-a-Service that enables users to build business applications as well as move existing legacy applications to the cloud.
- Through a GUI interface, the platform enables users to operate and manage their applications just as they would on a desktop.
- The platform is best used to create cloud applications for CRM, ERP, supply chain and other back-office systems.

BUNGEE™
labs



- Bungee Labs offers its Bungee Connect web application development and hosting platform.
- Developers use Bungee Connect to build desktop-like web applications that leverage multiple web services and databases, and then deploy them on Bungee's multi-tenant grid infrastructure.
- Bungee Connect provides development, testing, deployment, and hosting in a single, on-demand platform.
- The company claims that using their solution, significant time and cost are eliminated across the entire application life cycle reducing time-to-market by as much as 80 percent.

Bungee Connect Key Features

- Industry-standard Eclipse IDE
- SOAP, REST and POX (plain-old-XML) services
- Application user interface
- Cloud-based source control
- Interactive end-user experience
- Web service & DB connectivity
- Developer collaboration
- Multi-tenant hosting

Bungee Connect features

- A single, on-demand environment for developing, testing, deploying, and hosting
- Interaction delivered entirely via browser with no download or plug-in for developers or end users
- Delivery of highly interactive user experience without compromising accessibility and security
- Automated integration of web services (SOAP/REST) and databases (MySQL/ PostgreSQL)
- Built-in team collaboration and testing
- Built-in scalability, reliability, and security
- Deep instrumentation of end-user application utilization for analytics
- Utility pricing model based on end-user application use

PCC UNIT V

DAY 20

16.09.2020

PREVIOUS CLASS

- Intuit Quick base
- Cast Iron Cloud
- Bungee Connect

TODAY CLASS

- Development
- Troubleshooting
- Application Management.

Development

- **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.

What are the stages of the development of cloud computing?

- There are three **stages** to the enterprise **cloud** transformation journey:
 - Application
 - Network
 - Security.
- Innovative software providers like Salesforce ushered in the era of Software as a Service (SaaS).

- Cloud computing is gaining popularity as more and more businesses are launching public and private cloud computing initiatives.
- In fact, the cloud computing industry is one of the fastest growing today.
- According to Gartner, a leading research and advisory company, the revenue for global public cloud services is forecasted to reach \$411.4 billion in 2020.
- With the growth of the cloud computing industry, comes the growth and diversification of opportunities available for an astounding amount of industries.

The Cloud and Cloud Development

- The cloud in the IoT industry is not the weirdly-shaped pockets of condensed water in the sky, a powerful combination of cloud computing, networking, storage, management solutions and business applications that facilitate consumer services.
- The cloud involves storing and accessing data and programs over the internet instead of on your PC's hard drive.
- There are different kinds of cloud services for business.
- Some businesses choose to implement Software-as-a-Service (SaaS) where the business subscribes to an application it accesses over the internet.
- Salesforce is an example of a SaaS. Other businesses choose to implement Platform-as-a-Service (PaaS) where a business can create its own cloud application for use by everyone in the company.
- And Finally, there is Infrastructure-as-a-Service (IaaS) where large players like Amazon and Microsoft provide a back-bone cloud service that can be rented out by other companies.



- Cloud development involves developing the cloud.
- Developing the cloud is not as simple as you might think.
- This involves developing the cloud architecture such as planning, organizing, and designing to implementing and structuring cloud delivery models (IaaS, PaaS, SaaS).
- Cloud development include managing the cloud service delivery models.
- This involves connecting outside provider data centers back to your company's network, creating a recovery plan in case the cloud service goes down, network bandwidth and more.
- There is the cloud software development which comprises of designing and developing cloud applications, services, and products.
- This can include anything from back-end, front-end, web application, full-stack, data and application integration and cloud application deployment.

Troubleshooting

- Troubleshooting within public or hybrid clouds can be a challenge when end users begin complaining of network and application performance problems.
- The loss of visibility of the underlying cloud network renders some traditional troubleshooting methods and tools ineffective.
- Thus, we must come up with alternative ways to regain that visibility.
- Let's look at five tips on how to better troubleshoot application performance in public cloud or hybrid cloud environments.

- **Tip 1: Verify the application and all services are operational form end-to-end**
- **Tip 2: Review recent network configuration changes**
- **Tip 3: Use traditional network monitoring and troubleshooting tools**
- **Tip 4: Use built-in application diagnostics and assessment tools**
- **Tip 5: Consider SD-WAN built-in analytics or pure-play network analytics tools**



- Although you can generalize basic troubleshooting practices from other kinds of computing work, some areas specific to working in the cloud may be new to you. Here are some tips which may help you understand and address cloud-related issues:
- Troubleshooting connectivity
 - An attempt to connect to a server fails.
 - An attempt to connect between Cloud Servers and another cloud service fails.
- Troubleshooting server builds
 - A cloud server build takes an unusually long time to complete.
 - A cloud server build fails.

Troubleshooting in the cloud

- Many common-sense practices that help you recognize, minimize, and prevent trouble in other situations apply to the Rackspace cloud as well:
- When you encounter a problem, investigate it by eliminating as many unknowns as possible.
- Try to get the simplest possible example of what you want to achieve working first.
- Then introduce new features gradually, testing after each change, until you know exactly at which point the problem begins.
- Maintain awareness of what is normal and abnormal within your configuration and within Rackspace overall. Monitor your systems and maintain historical logs so you know when key resources are not operating as usual.

- Rackspace provides tools to help you automate detection of and response to unusual situations such as workload spikes:
 - Rackspace Monitoring
 - Rackspace Auto Scale
 - Rackspace Intelligence
- Rackspace provides a real-time system status view that may help you understand whether a problem is unique to you or is caused by something more general.

- Troubleshooting computer systems is an act as old as computers themselves.
- Some might even call it an art. The cloud computing paradigm entails a fundamental change to how IT teams conduct troubleshooting.
- Successful IT troubleshooting doesn't depend only on luck or experience, but is a deliberate process that can be taught.
- When you're using cloud-based infrastructure, you're often troubleshooting via a cloud provider's help desk, adding another layer to helping users.
- Because of this shift away from the traditional IT team model, your communications with the provider are essential.

IT Best Practices- Troubleshooting issues in the cloud

- Amazon is known for its reliability and advanced features, problems and outages can still occur.
- In a nutshell, **Amazon EC2 instances** act as virtual servers to run your applications, so they are the fundamental building blocks for your cloud computing needs.
- **Amazon EBS volumes** provide persistent block level storage for use with Amazon EC2 instances.
- You can also rely on **Amazon RDS instances** to set up, operate, and scale a relational database in the cloud, or opt for unlimited cloud & internet storage with **Amazon S3 buckets**.

Here are some quick guidelines to help you get started:

- **Configure Site24x7 Amazon Monitors.**
- **Site24x7 will automatically discover and ~track key performance indicators across all your cloud resources including:**
 - **EC2 instances** (availability, CPU utilization, network traffic, Disk I/O)
 - **ESB Volumes** (volume traffic, latency, volume I/O, bandwidth, throughput)
 - **RDS Instances** (network read/write latency, read/write throughput, CPU, active database connections, availability and average number of disk read/write operations per second)
 - **S3 Buckets** (name, location, creation time, size, number of objects and virtual folders)

1. Memory Leaks: Just like in a datacenter, processes that are not written to effectively use memory, will overload the allocated memory in the EC2 instance.

- When an application runs out of memory, it can crash and cease functioning altogether.
- If available memory is less than 10% you might have a memory leak, especially if you see sudden jump back to normal once a faulty process is terminated and restarted.

2. Latency problems: Unpredictable ESB volumes with high latency will slow down your applications as processing queues up.

- In addition, a sustained increase of VolumeQueueLength above 1 on a standard EBS volume should be treated as exhausting the throughput of that EBS volume, an issue that should be addressed.

3. “**Stolen CPU**” is a measure of the cycles a CPU should have been able to run but could not due to the hypervisor diverting cycles away from your instance to a neighbor.

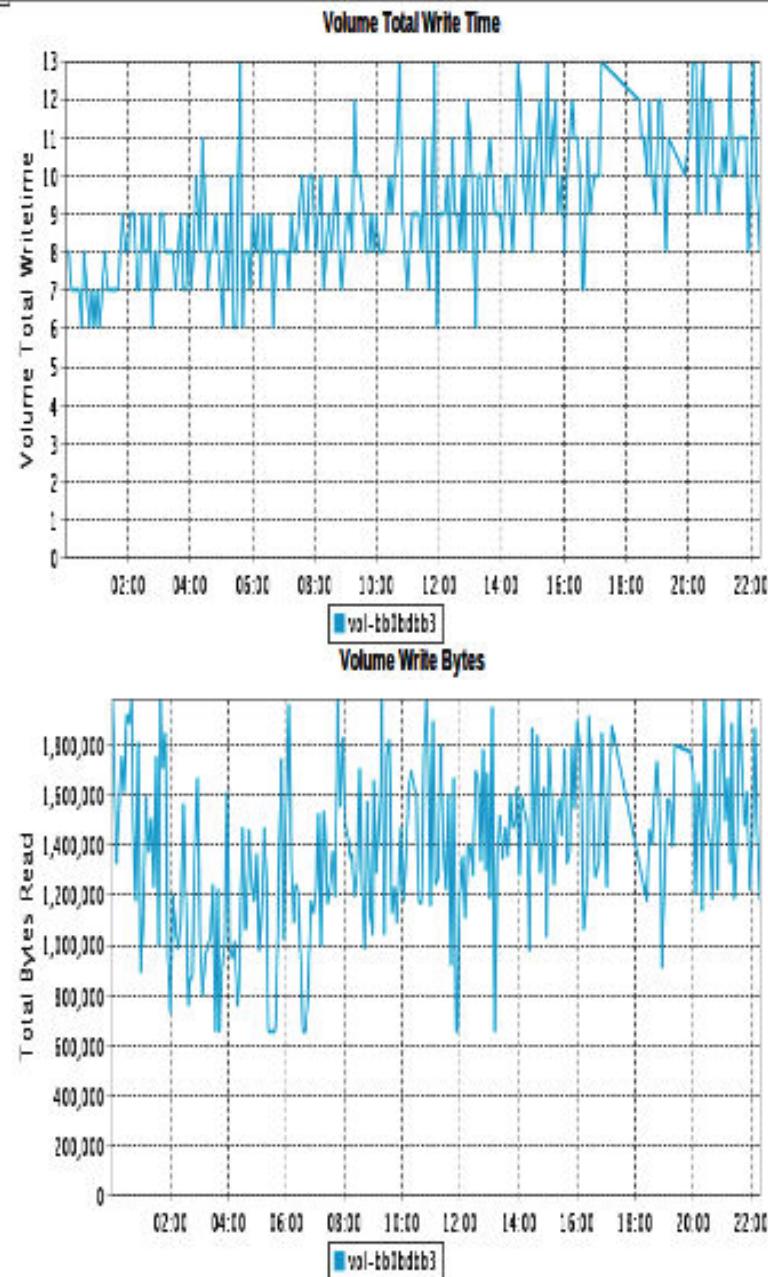
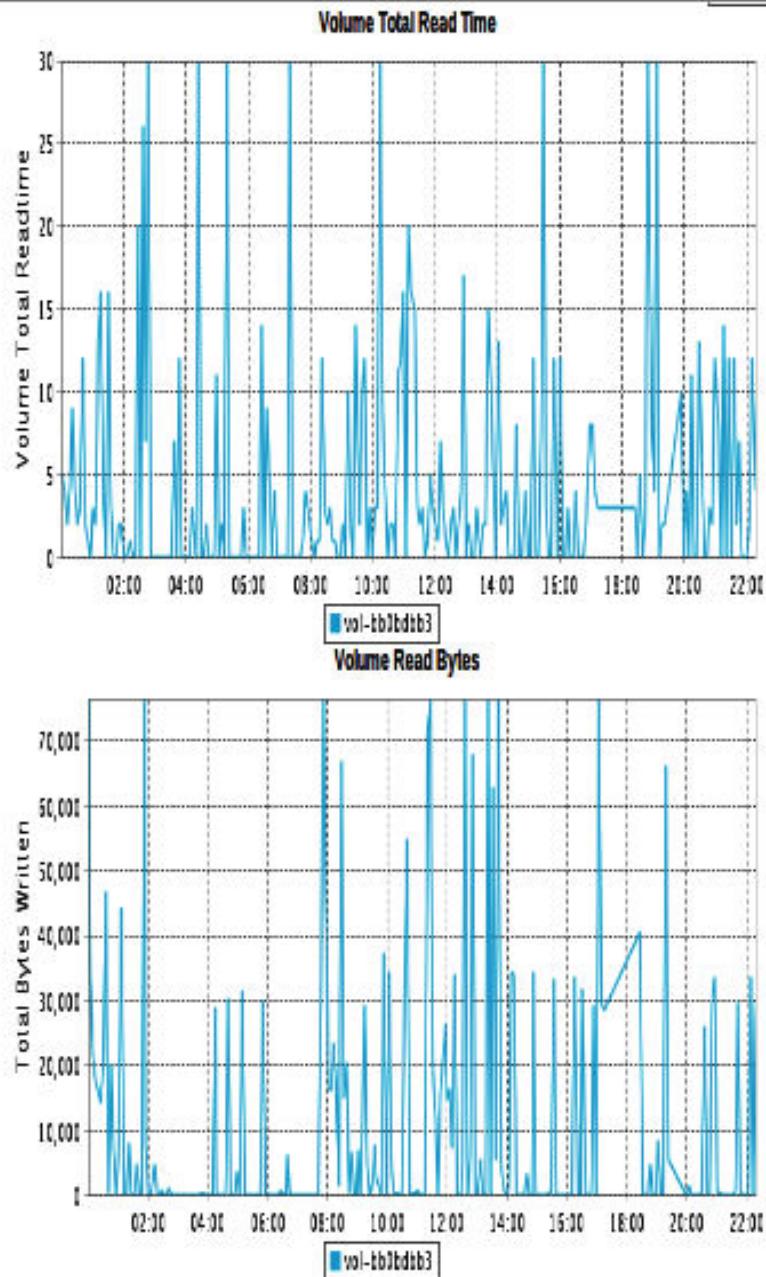
- To ensure that you have enough resources for your application, baseline CPU usage during normal operations and peak times.
- High CPU Steal is usually an indicator of noisy neighbors. If you have detected that there is stolen CPU in your EC2 instance, redeploy the application elsewhere.
- Using a command such as ‘iostat 1’ you can measure the amount of CPU Steal your EC2 instance is experiencing.

4. Corrupt Disk or Disk Full: The filesystem will become read-only, and you will be unable to write to disk.

- To detect this type of problem, you can analyze the Site24x7 screenshot shown below. To correct this problem, re-launch the problematic instance.

5. Instance at capacity: You can discover that your instance is at capacity by checking the CPU, memory, and disk IO evolution over time.

- If this is a problem for you, consider upsizing your EC2 Instance to a higher CPU, memory, storage, and networking capacity combination.



7. Underutilization of EC2 or RDS. In a cloud deployment, resources can be underutilized also and eat into your bill.

- You should periodically review and analyze CPU, Memory and Disk metrics to ensure a nice balance for your applications.
- If your cloud resources are underutilized consider downsizing your EC2 Instances.

Application Management

- **Cloud Application Management for Platforms (CAMP)** is a specification for managing applications in the context of a [platform as a service](#) (PaaS) system.
- CAMP is designed to address the needs of a high-level PaaS system; one in which the consumer provides application artifacts and specifies which provider-supplied services are required to realize these artifacts as an application.
- The details of the infrastructure (compute, storage, and networking) used to support these services are hidden from the consumer by the provider of the PaaS system.
- **CAMP defines the following:**
- A [domain-specific language](#) that describes the artifacts that make up an application, the services that are required to execute or utilize those artifacts, and the relationship of the artifacts to those services.
- A resource model for representing applications and their constituent components as well as the services used by those components along with runtime status information, configuration information, and metadata that describes the PaaS system.
- A [RESTful](#) protocol for manipulating these resources and, by so doing, changing the state of the underlying application.

CAMP Implementations

nCAMP

- Developed in tandem with the work of the OASIS CAMP Technical Committee, nCAMP is a proof-of-concept implementation of the CAMP v1.1 specification.
- nCAMP was not intended to be a useful PaaS system but, instead, to act as a vehicle to test the concepts and constructs of the CAMP specification.
- nCAMP presents a simple system that uses Tomcat and MySQL to support Java Servlet based web applications that can use MySQL as a database.

Project Solum

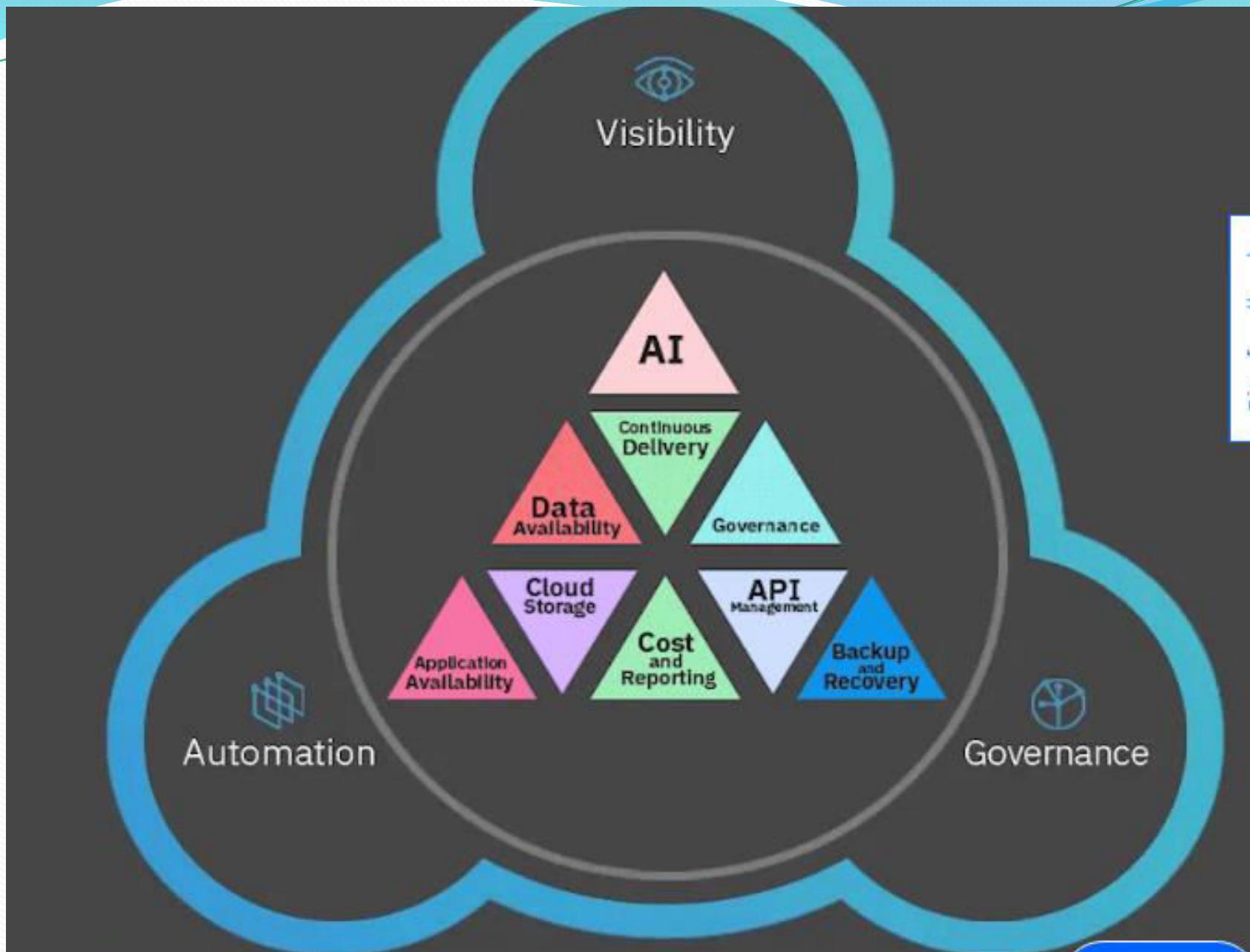
- Solum is an OpenStack Related Stackforge project designed to make cloud services easier to consume and integrate into the developers application development process.
- Solum's resource model and plan schema are based on CAMP, but not fully CAMP compliant.
- Work is currently ongoing to provide an additional, CAMP-compliant API in addition to the native Solum API.

Apache Brooklyn

- Apache Brooklyn is a framework for modeling, monitoring, and managing applications through autonomic blueprints.
- Apache Brooklyn blueprints conform to CAMP v1.1 Public Review Draft 01.

- Software that manages the availability of network-centered **applications** within an organization, such as email, intranets and client/server.
- It monitors all the components of an **application** to see if they are up and running.

- Manage traditional and multicloud environments across your enterprise
- The IBM Cloud management framework represents an open ecosystem supporting consistent management of a full application lifecycle.
- This framework helps business leaders, developers, Site Reliability Engineers (SREs) and IT Operations to manage applications and resources across traditional and multicloud environments in ways that deliver visibility, automation and governance.



- Cloud application management for platforms (CAMP) is a specification developed for the management of applications specifically in Platform as a Service (PaaS) based cloud environments.
- CAMP specification provides a framework for enabling application developers to manage their applications through open-source API structures based on representation state transfer (REST).
- CAMP was primarily developed by Oracle Corporation in collaboration with CloudBees, CloudSoft, Huawei, Rackspace, Red Hat and Software AG.

- These specifications allow the direct interaction between the cloud provider that builds and provisions the PaaS service and the cloud consumer that is using that platform to build applications and services.
- This allows the cloud consumer to self serve management of the application while sourcing core PaaS offerings.
- CAMP's key characteristics include the management of applications throughout their life cycle and to be as interoperable as possible.
- The application management services will be handled through common REST-ful APIs that operate on multiple cloud platforms/environments.

What is the Application Manager?

- The **Application Manager** in the **Android** system settings menu lets you forcibly stop and shut down most **applications**.
- The list of **Downloaded apps** will show all of the **apps** you've downloaded from the Google Play store, as well as many of the stand-alone **apps** that your carrier or device manufacturer installed.

What is the responsibility of application management?

- Application Management is responsible for managing applications throughout their lifecycles.
- Application Management is a function, which supports and maintains operational applications and also plays an important role in the design, testing and improvement of applications that form part of IT services.

PCC UNIT V

DAY 21

17.09.2020

PREVIOUS CLASS

- Development
- Troubleshooting
- Application Management.

TODAYS CLASS

- Local Clouds and Thin Clients:
 - Virtualization
 - Server Solutions
 - Thin Clients.

Local Clouds and Thin Clients

- The **cloud** computing model doesn't always mean your **clients** have to traverse the Internet to get at content.
- A **local cloud** also known as presentation virtualization skips the service provider component, and allows you to manage all the content yourself in your own datacenter.

- Most organizations will not jump to the cloud all at once.
- Most cases will start as a hybrid model, moving some business applications to the cloud while retaining a majority “in-house”.
- One way to become familiar with cloud computing concepts and benefits without the outsourcing commitment is to bring the cloud as close as possible by building your own cloud for your business.

Virtualization

- **Virtualization** is the creation of virtual servers, infrastructures, devices and **computing** resources.
- **Virtualization** changes the hardware-software relations and is one of the foundational elements of **cloud computing** technology that helps utilize the capabilities of **cloud computing** to the full.

What is the role of virtualization in cloud computing?

- **Virtualization** software allows multiple operating systems and applications to run on the same server at the same time.
- As a result, lowers costs and increases efficiency of a company's existing hardware.
- It's a fundamental technology that powers **cloud computing**.
- **Virtualization** thus emulates hardware.

What are the 3 types of virtualization?

- Three Kinds of **Server** Virtualization.
- There are three ways to create virtual servers: full virtualization, para-virtualization and OS-level virtualization.
- They all share a few common traits.
- The physical **server** is called the **host**.

What are types of virtualization in cloud computing?

- **BENEFITS OF VIRTUALIZATION.** More flexible and efficient allocation of resources.
- **Types of Virtualization:**
- **Application Virtualization:**
Application **virtualization** helps a user to have a remote access of an application from a server.
- **Network Virtualization**
- **Desktop Virtualization**
- **Storage Virtualization**

What are advantages of virtualization?

- Virtualization can increase IT **agility**, flexibility and scalability while creating significant **cost** savings.
- Greater workload mobility, increased performance and availability of resources, automated operations.
- They're all benefits of virtualization that make IT simpler to manage and less costly to own and operate.

What is virtualization and its benefits in cloud computing?

- **Virtualization in Cloud Computing**, save the cost for a physical system such as hardware and servers.
- It stores all the data in the virtual server, which are quite economical.
- It reduces the wastage, decreases the electricity bills along with the maintenance cost.

What's the difference between cloud and virtualization?

- The main **difference between** the two concepts **is** that **virtualization** refers to the manipulation of software and hardware, while **cloud** computing **is** the consequence of this process.
- It uses software that has developed multiple virtual infrastructures, from a physical layer, resulting in **virtualization**.

Server Solutions

- A **cloud server** is a **virtual server** (rather than a **physical server**) running in a **cloud computing** environment.
- It is built, hosted and delivered via a **cloud computing** platform via the internet, and can be accessed remotely.
- They are also known as **virtual servers**.

What does cloud based solutions mean?

- A **cloud based solution** refers to on-demand services, computer networks, storage, applications or resources accessed via the internet and through another provider's shared **cloud computing** infrastructure.

Which cloud server is best?

- Best Cloud Hosting Providers and Services
- **A2 Hosting:** Best Overall for Cloud Hosting.
- Cloudways: A Close Runner-Up.
- Kamatera: Best for Customization.
- **SiteGround:** Best features.

What are cloud based tools?

- **Cloud based tools** or applications are online or **web based** applications that are accessible generally via a web browser.
- They range from basic websites to complex and highly interactive online learning environments (OLEs).

THIN CLIENTS

- A **thin client** is a lightweight computer that is purpose-built for remoting into a server.
- It typically would remote into a **cloud** or desktop visualization environment.
- Note that a **thin client** REQUIRES the use of some form of **cloud computing** or desktop visualization environment.

What is an example of a thin client?

- **Thin client** software within the meaning:
- **Example of thin client** software in the sense: a Web browser is a universal **client**, particularly when an applet is downloaded.
- A Web browser, the practice is a **thin client** application, even if it must be equipped with plugins or virtual machine

Where are thin clients used?

- **Thin Clients** are compact devices with few moving parts and locally stored programs.
- They connect to servers to perform compute roles and run remote display protocols to access hard drives in secure data centers.
- This process instantly delivers virtual applications and desktops to end users.

What is difference between thin client and desktop?

- A **thin client** is a computer that has no processing power.
- Unlike a **desktop** the cpu, memory, and hard drive power come from a server or server farm.
- There is also a welcome reduction in security exposure, as the terminal server environment is locked down.

How much does a thin client cost?

- Thin Clients are cheaper than PCs.
- PCs typically start pricing at around **\$599**.
- With thin clients, the cost per unit really depends on the unit each user requires.
- Someone whose daily tasks entail the use of simple applications such as outlook and they can use a device such as the Ceptor that will come in around **\$99**.

Are thin clients more secure?

- Security professionals consider **thin clients more secure** because they do not have storage capacity.
- This means that everything users access and store resides on terminal servers, and that they have limited administrative privileges and limitations on installed applications

Limitations of thin clients

- The single biggest disadvantage to a **thin client** is its dependency on the network.
- Since everything a **thin client** does is provided across a network connection, the network becomes both a single point of failure and the single biggest performance bottleneck in the system.

- How many thin clients can a server support?
- A **server** equipped to **support** 5 concurrent **thin clients** could support 50 such **thin clients** -- not unusual for a typical computer lab -- if the bandwidth were sufficient and if those **thin clients** were used only 10% of the time.



QUERIES??



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