Introduction to cloud computing

by

Olabanji Stephen

Interlink Technologies and management systems

olabanjistephen.com

WHAT IS

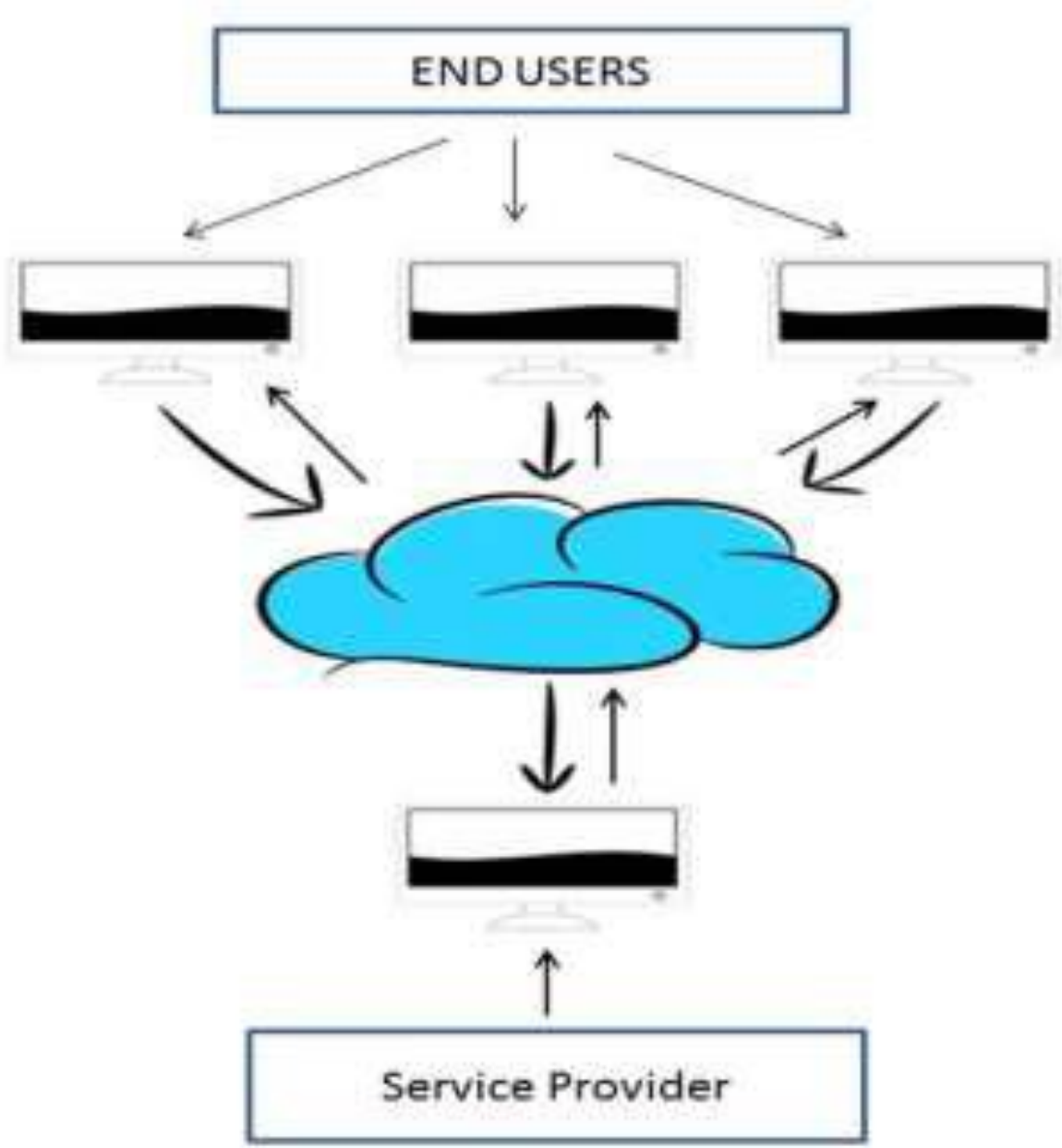
What is Cloud?

The term **Cloud** refers to a **Network** or **Internet**. In other words, we can say that Cloud is something that is present at remote location. Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.

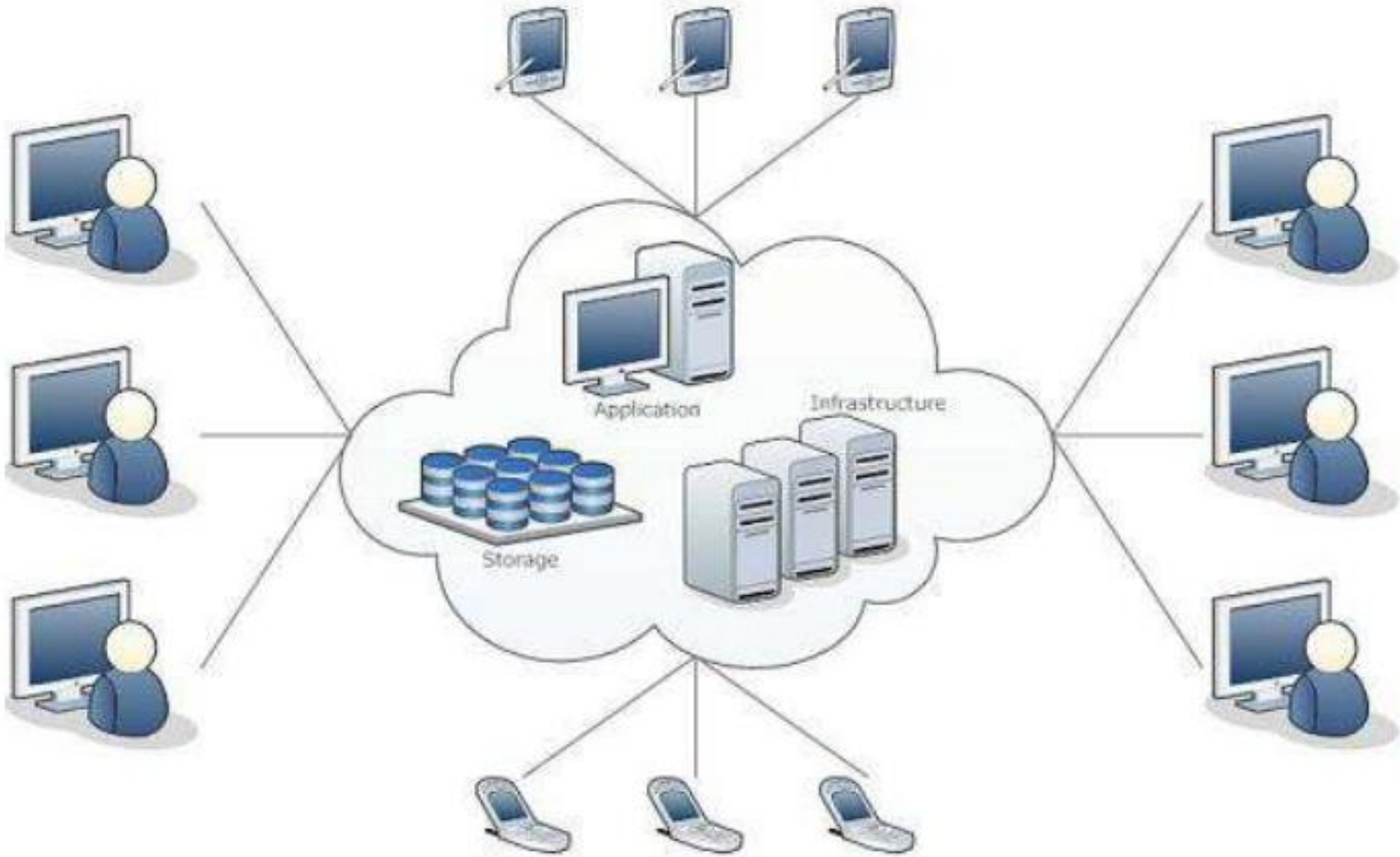
Applications such as **e-mail, web conferencing, customer relationship management (CRM),** all run in cloud.

Why the name Cloud

The term “Cloud” came from a network design that was used by network engineers to represent the location of various network devices and their inter-connection. The shape of this network design was like a cloud.


END USERS
Service Provider

What is Cloud Computing?


Application
Infrastructure
Storage

Why cloud computing

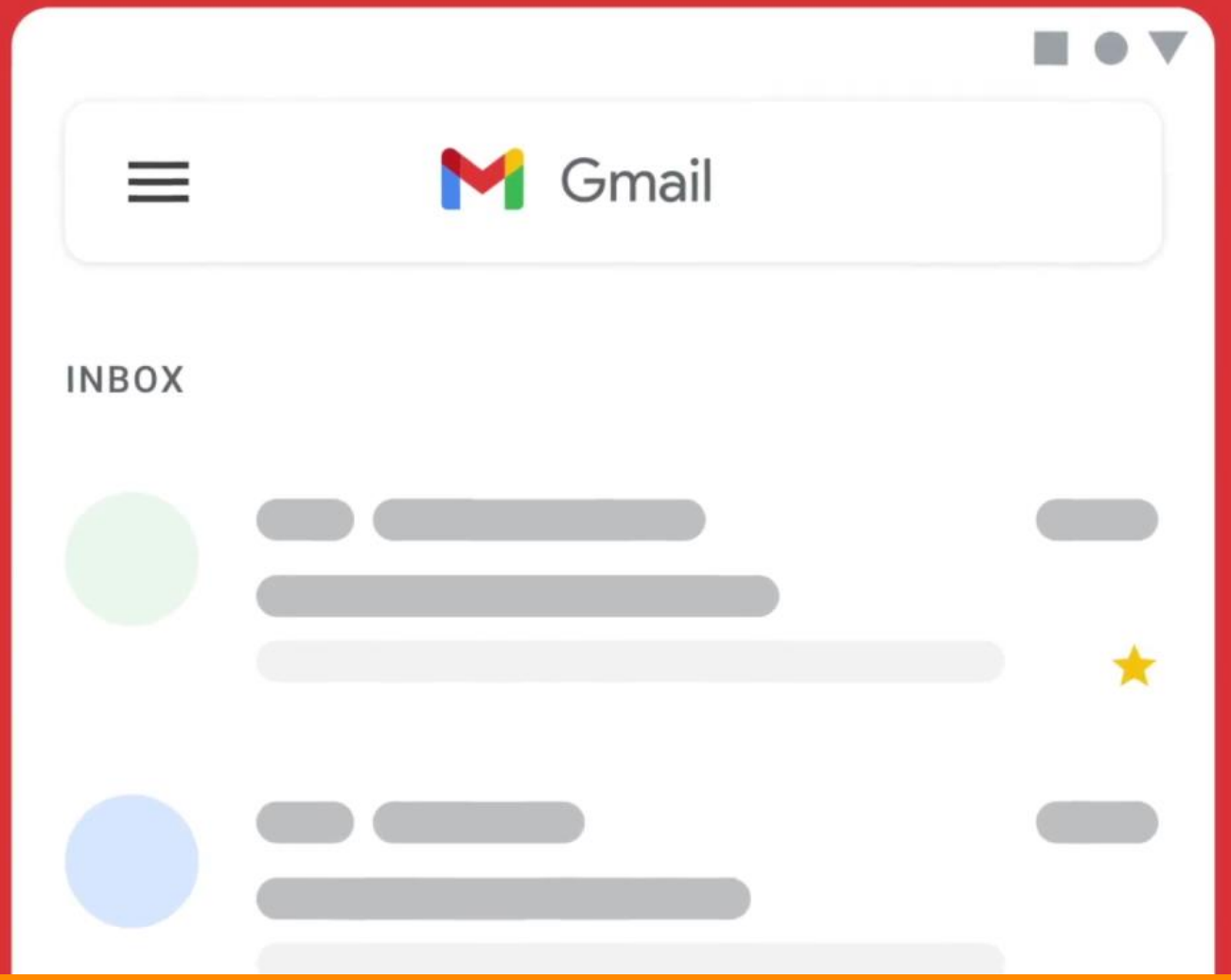
With increase in computer and Mobile user's, data storage has become a priority in all fields. Large and small scale businesses today thrive on their data & they spent a huge amount of money to maintain this data. It requires a strong IT support and a storage hub. Not all businesses can afford high cost of in house IT infrastructure and back up support services. For them Cloud Computing is a cheaper solution.

Perhaps its efficiency in storing data, computation and less maintenance cost has succeeded to attract even bigger businesses as well.

Why cloud computing

Cloud computing decreases the hardware and software demand from the user's side. The only thing that user must be able to run is the cloud computing systems interface software, which can be as simple as Web browser, and the Cloud network takes care of the rest.

We all have experienced cloud computing at some instant of time, some of the popular cloud services we have used or we are still using are mail services like gmail, hotmail or yahoo etc.

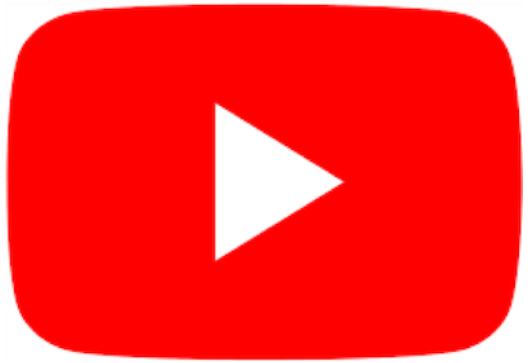

Gmail
INBOX

Benefits of Cloud Computing?

Benefits of cloud computing

1. Lower IT infrastructure and computer costs for users
2. Improved performance
3. Fewer Maintenance issues
4. Instant software updates
5. Improved compatibility between Operating systems
6. Backup and recovery
7. Performance and Scalability
8. Increased storage capacity
9. Increase data safety


20:16
MEMORY
TIME
STATUS



Types of Cloud Computing?

(deployment models)

Types/Deployment models

Public cloud
Private cloud
Community cloud
Hybrid cloud

Types/Deployment models

Public cloud

The **Public Cloud** allows systems and services to be easily accessible to the general public.
This type of cloud is used usually for B2C (Business to Consumer) type interactions. Here the computing resource is owned, governed and operated by government, an academic or business organization.
Public cloud may be less secure because of its openness, e.g., e-mail.

Types/Deployment models

Private cloud

The **Private Cloud** allows systems and services to be accessible within an organization. It offers increased security because of its private nature. Here**,** computing resources are deployed for one particular organization. This method is more used for intra-business interactions. Where the computing resources can be governed, owned and operated by the same organization.

Types/Deployment models

Community cloud

The **Community Cloud** allows systems and services to be accessible by group of organizations.
Here**,** computing resources are provided for a community and organizations.

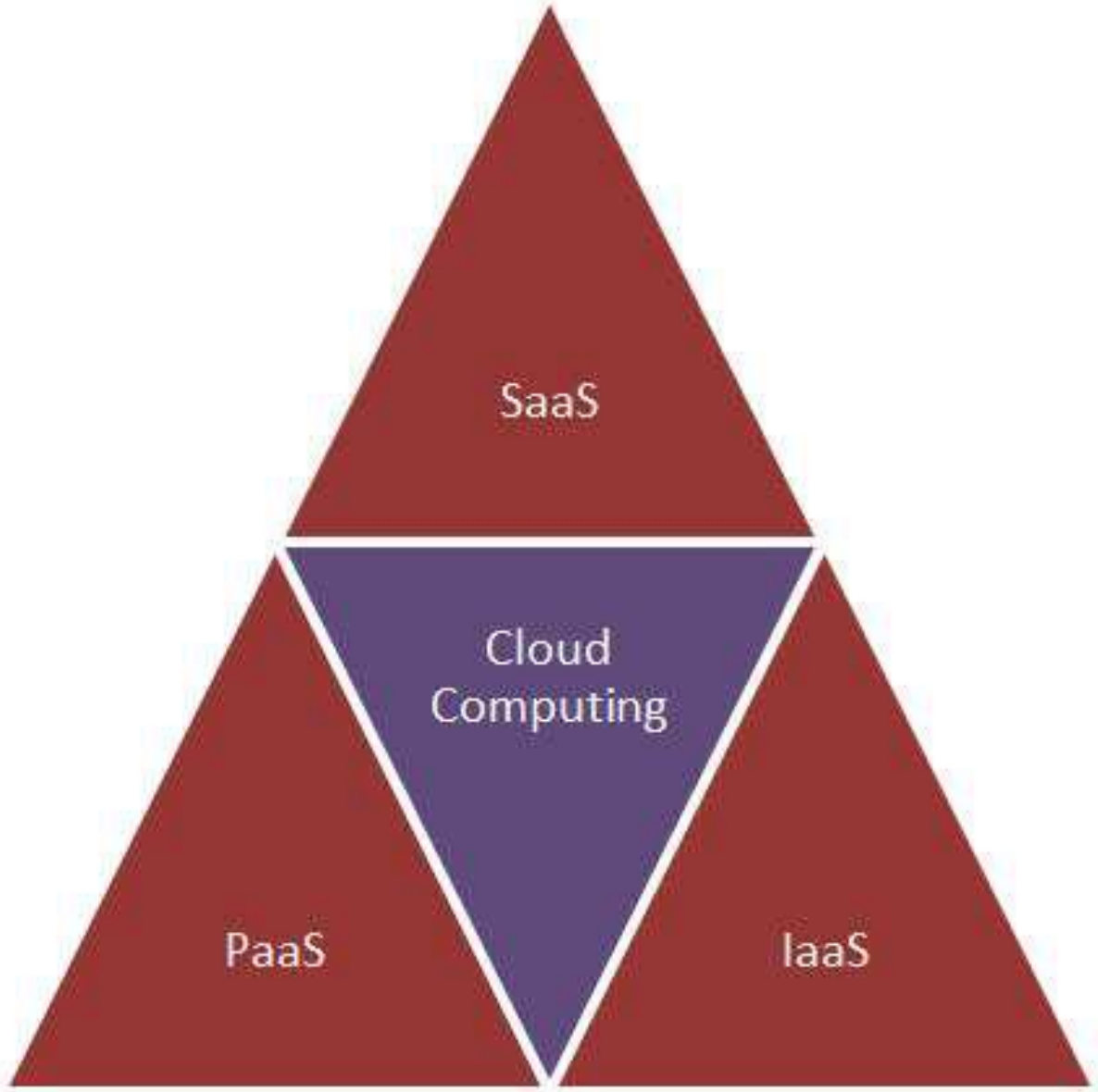
Types/Deployment models

Hybrid cloud

The **Hybrid Cloud** is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.
This type of cloud can be used for both type of interactions - B2B (Business to Business) and B2C (Business to Consumer). This deployment method is called hybrid cloud as the computing resources are bound together by different clouds.

Cloud Computing Services

(service models)


SaaS
Cloud
Computing
PaaS
IaaS

Software as a Service

SaaS or software as a service is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network (internet). SaaS is becoming an increasingly prevalent delivery model as underlying technologies that supports **Service Oriented Architecture (SOA) or Web Services**. Through internet this service is available to users anywhere in the world.

Software as a Service

Traditionally, software application needed to be purchased upfront &then installed it onto your computer. SaaS users on the other hand, instead of purchasing the software subscribes to it, usually on monthly basis via internet.

Anyone who needs an access to a particular piece of software can be subscribe as a user, whether it is one or two people or every thousands of employees in a corporation. SaaS is compatible with all internet enabled devices.

Many important tasks like accounting, sales, invoicing and planning all can be performed using SaaS.

Platform as a Service

Platform as a service, is referred as PaaS, it provides a platform and environment to allow developers to build applications and services. This service is hosted in the cloud and accessed by the users via internet.

To understand in a simple terms, let compare this with painting a picture, where you are provided with paint colors, different paint brushes and paper by your school teacher and you just have to draw a beautiful picture using those tools.

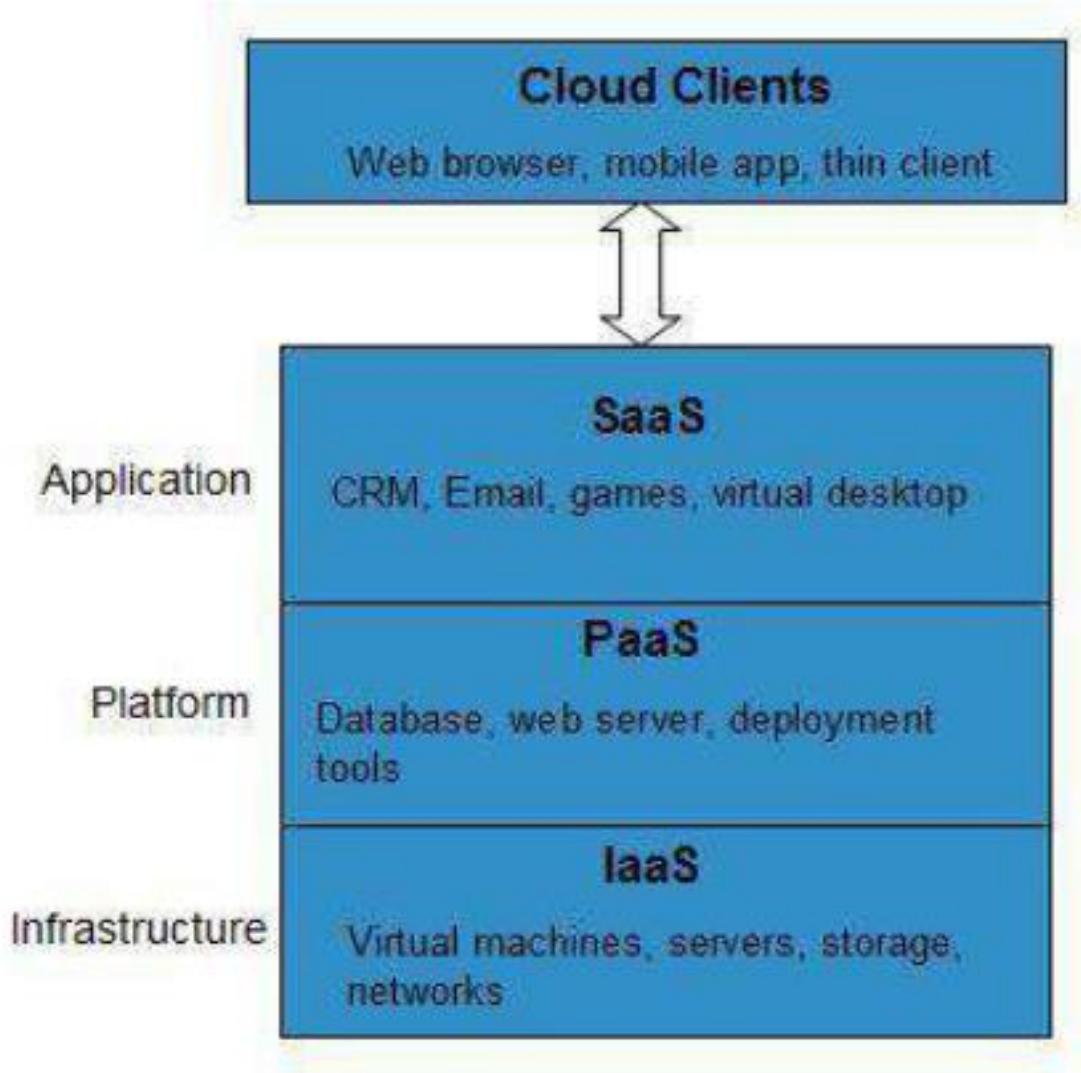
Platform Computing can be compared to your painting class where the teacher gives you paints, brushes etc as a platform to create your painting

Platform as a Service

PaaS services are constantly updated & new features added. Software developers, web developers and business can benefit from PaaS. It provides platform to support application development. It includes software support and management services, storage, networking, deploying, testing, collaborating, hosting and maintaining applications.

Infrastructure as a Service

IaaS (Infrastructure as a service) is a complete package for computing. For small scale businesses who are looking for cutting cost on IT infrastructure, IaaS is one of the solutions. Annually a lot of money is spent in maintenance and buying new components like hard-drives, network connections, external storage device etc. which a business owner could have saved for other expenses by using IaaS.


Cloud Clients
Web browser, mobile app, thin client
SaaS
CRM, Email, games, virtual desktop
Application
PaaS
Database, web server, deployment tools
Platform
IaaS
Virtual machines, servers, storage, networks
Infrastructure

Cloud Computing Technologies

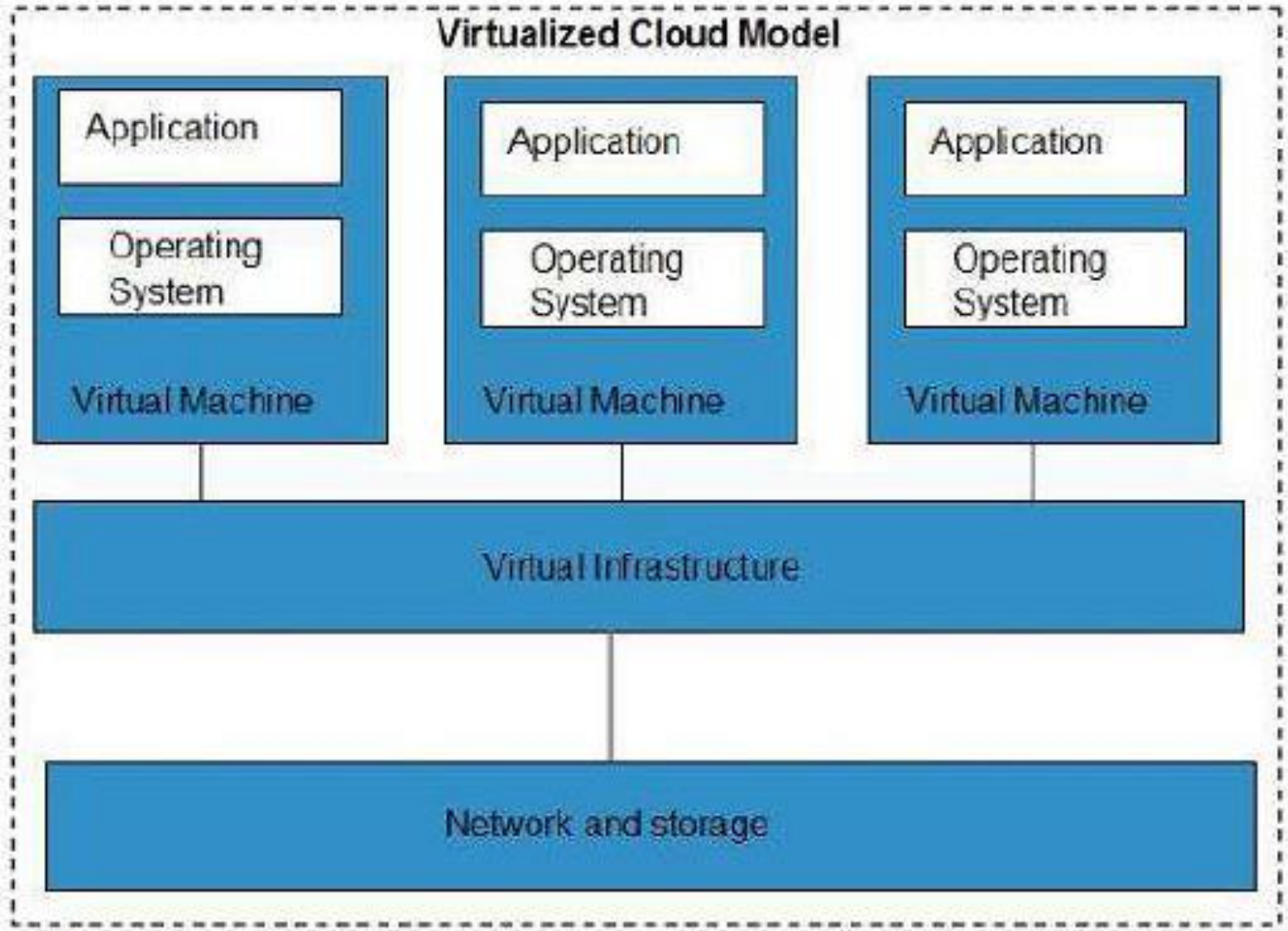
Cloud computing technologies

There are certain technologies that are working behind the cloud computing platforms making cloud computing flexible, reliable, and usable. These technologies are listed below:

- Virtualization
- Service-Oriented Architecture (SOA)
- Grid Computing
- Utility Computing

Virtualization

Virtualization is a technique, which allows to share single physical instance of an application or resource among multiple organizations or tenants (customers). It does so by assigning a logical name to a physical resource and providing a pointer to that physical resource when demanded.


Virtualized Cloud Model
Application
Operating System
Virtual Machine
Application
Operating System
Virtual Machine
Application
Operating System
Virtual Machine
Virtual Infrastructure
Network and storage

Virtualization

The main enabling technology for Cloud Computing is Virtualization. Virtualization is a partitioning of single physical server into multiple logical servers. Once the physical server is divided, each logical server behaves like a physical server and can run an operating system and applications independently.

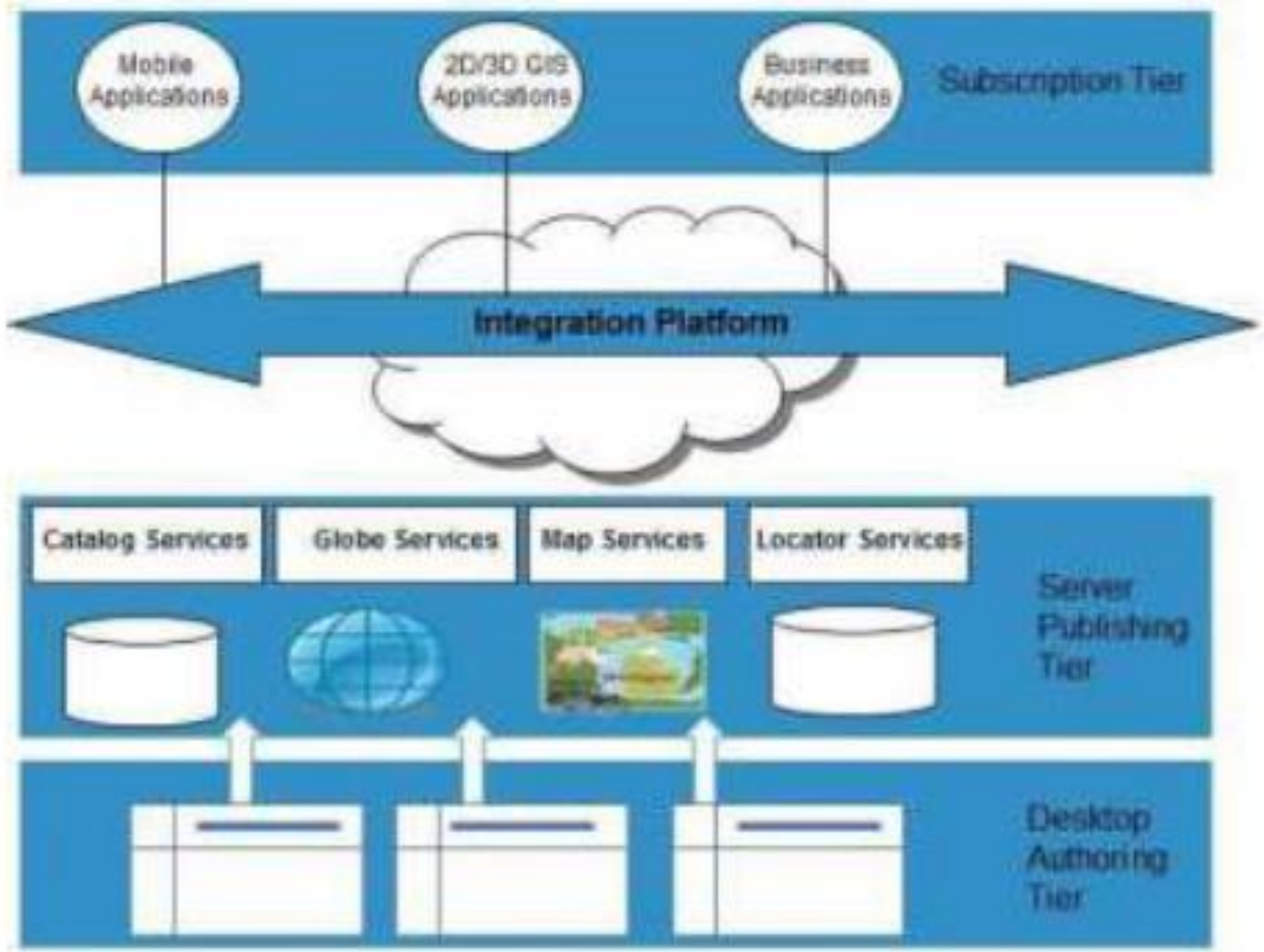
Many popular companies like VmWare and Microsoft provide virtualization services, where instead of using your personal PC for storage and computation, you use their virtual server. They are fast, cost-effective and less time consuming.

Virtualization

For software developers and testers virtualization comes very handy, as it allows developer to write code that runs in many different environments and more importantly to test that code. Like testing iOS app without iOS

Service-Oriented Architecture

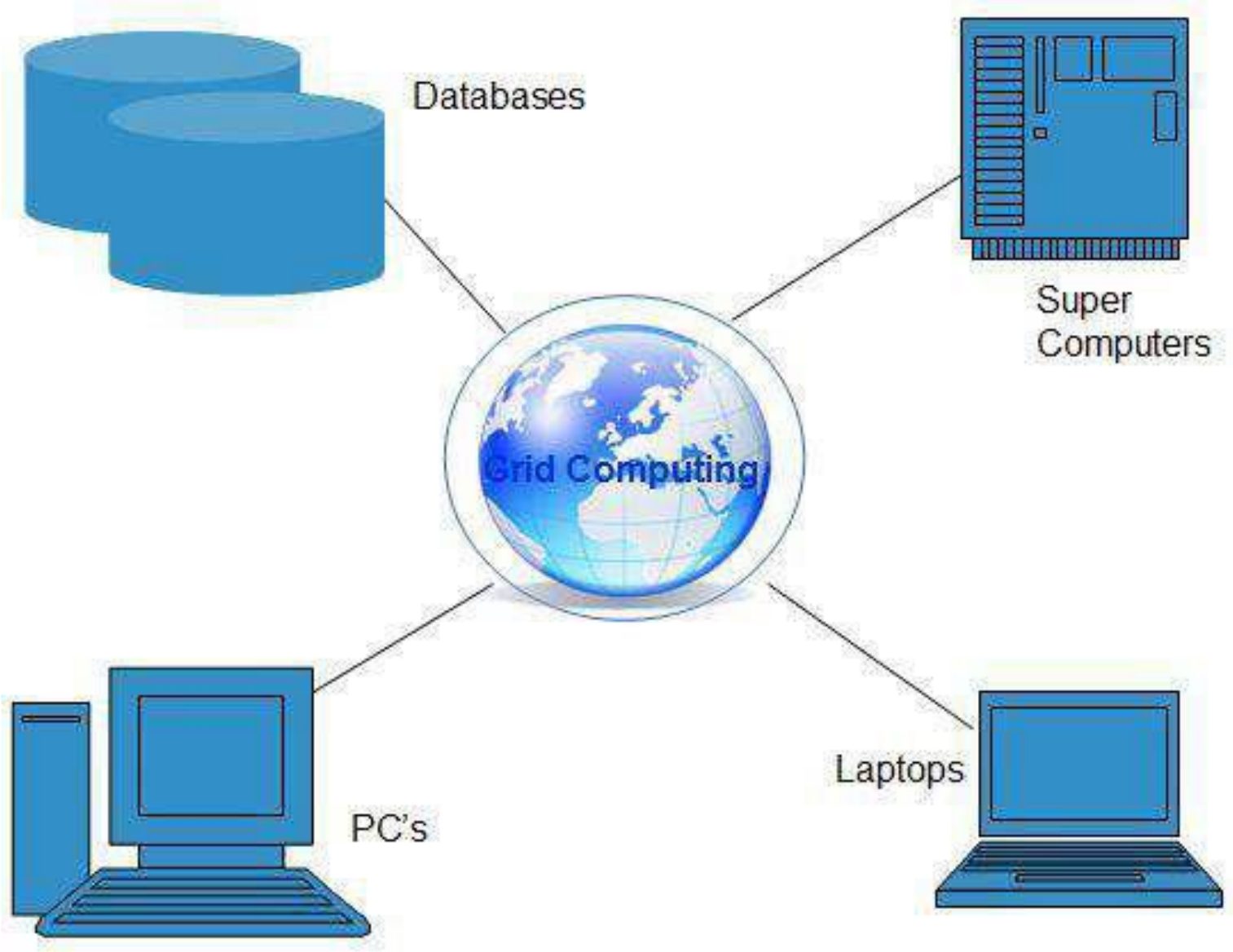
Service-Oriented Architecture helps to use applications as a service for other applications regardless the type of vendor, product or technology. Therefore, it is possible to exchange of data between applications of different vendors without additional programming or making changes to services.


Mobile Applications
2D/3D GIS Applications
Business Applications
Subscription Tier
Integration Platform
Catalog Services
Globe Services
Map Services
Locator Services
Server Publishing Tier
Desktop Authoring Tier

Grid computing

Grid Computing refers to distributed computing in which a group of computers from multiple locations are connected with each other to achieve common objective. These computer resources are heterogeneous and geographically dispersed. Grid Computing breaks complex task into smaller pieces.

These smaller pieces are distributed to CPUs that reside within the grid.


Databases
Super
Computers
Grid Computing
PC's
Laptops

Advantages of Cloud Computing

- One can access applications as utilities, over the Internet.
- Manipulate and configure the application online at any time.
- It does not require to install a specific piece of software to access or manipulate cloud application.
- Cloud Computing offers online development and deployment tools, programming runtime environment through **Platform as a Service model**.
- Cloud resources are available over the network in a manner that provides platform independent access to any type of clients.

Advantages of Cloud Computing

- Cloud Computing offers **on-demand self-service**. The resources can be used without interaction with cloud service provider.
- Cloud Computing is highly cost effective because it operates at higher efficiencies with greater utilization. It just requires an Internet connection.
- Cloud Computing offers load balancing that makes it more reliable.

Downside

- **SECURITY & PRIVACY**

It is the biggest concern about cloud computing. Since data management and infrastructure management in cloud is provided by third-party, it is always a risk to handover the sensitive information to such providers. Although the cloud computing vendors ensure more secure password protected accounts, any sign of security breach would result in loss of clients and businesses.

- **LOCK-IN**

It is very difficult for the customers to switch from one **Cloud Service Provider (CSP)** to another. It results in dependency on a particular CSP for service.

Downside

- **ISOLATION FAILURE**

This risk involves the failure of isolation mechanism that separates storage, memory, routing between the different tenants.

- **MANAGEMENT INTERFACE COMPROMISE**

In case of public cloud provider, the customer management interfaces are accessible through the Internet.

- **INSECURE OR INCOMPLETE DATA DELETION**

It is possible that the data requested for deletion may not get deleted. It happens either because extra copies of data are stored but are not available or disk destroyed also stores data from other tenants.

Characteristics

- **ON DEMAND SELF-SERVICE**

Cloud Computing allows the users to use web services and resources on demand. One can logon to a website at any time and use them.

- **BROAD NETWORK ACCESS**

Since Cloud Computing is completely web based, it can be accessed from anywhere and at any time.

- **RESOURCE POOLING**

Cloud Computing allows multiple tenants to share a pool of resources. One can share single physical instance of hardware, database and basic infrastructure.

Characteristics

- **RAPID ELASTICITY**

It is very easy to scale up or down the resources at any time. Resources used by the customers or currently assigned to customers are automatically monitored and resources. It make it possible

- **MEASURED SERVICE**

Service Models & Deployment Models are described in above section. Data farm

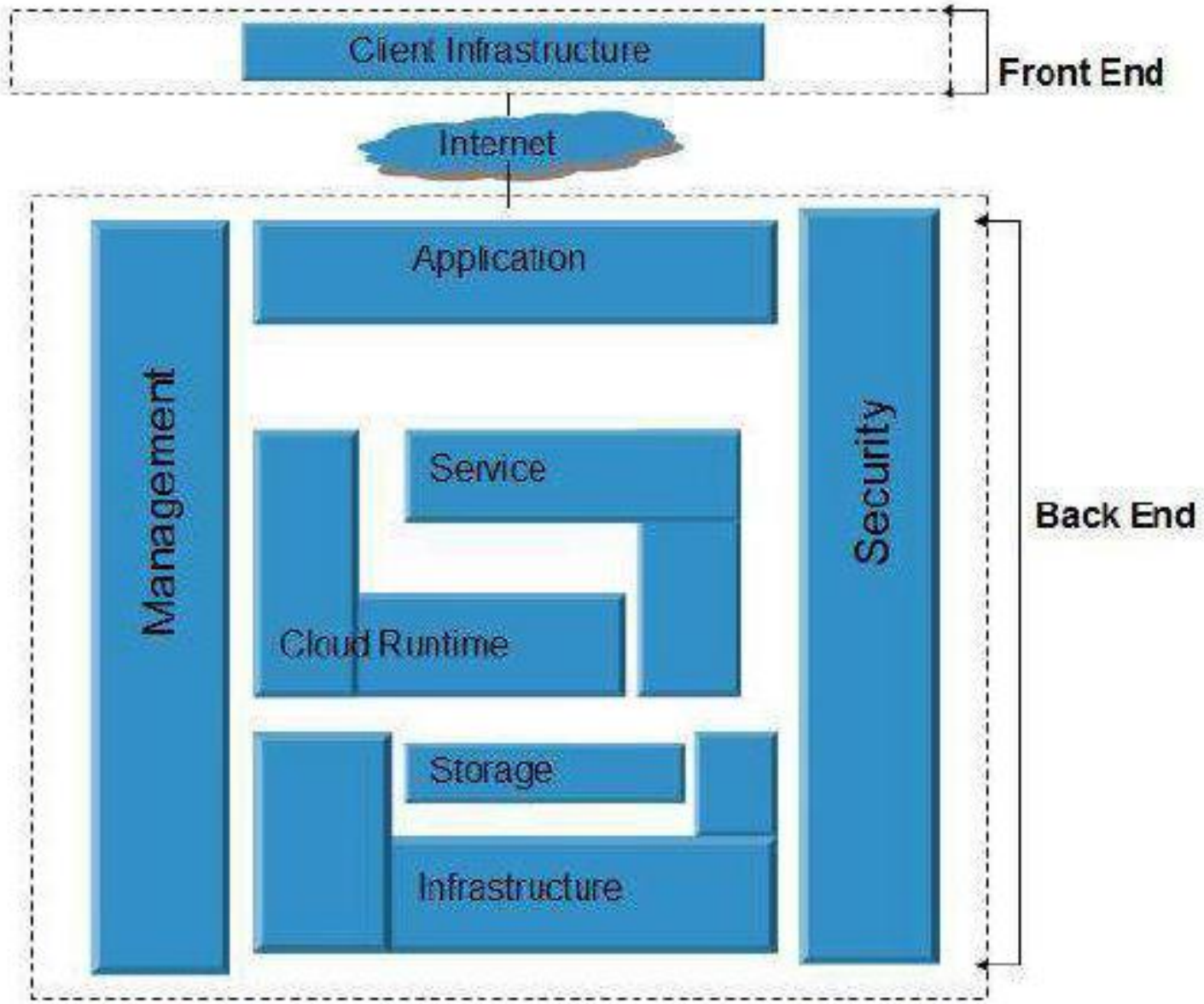
Cloud Computing Architecture

Cloud computing architecture

The Cloud Computing architecture is made up of many cloud components, each of them are loosely coupled. We can broadly divide the cloud architecture into two parts:

- Front End
- Back End

Each of the ends are connected through a network, usually via Internet. Here's a graphic view of cloud


Client Infrastructure
Front End
Internet
Application
Management
Service
Security
Back End
Cloud Runtime
Storage
Infrastructure

Cloud computing architecture

FRONT END

Front End refers to the client part of cloud computing system. It consists of interfaces and applications that are required to access the cloud computing platforms, e.g., Web Browser.

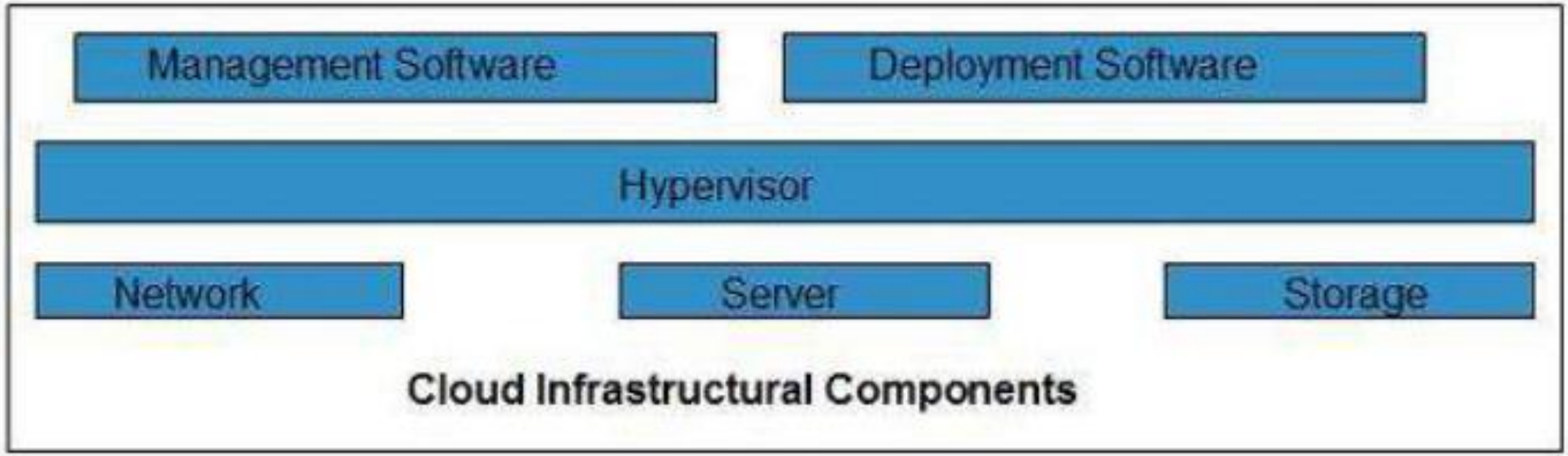
BACK END

Back End refers to the cloud itself. It consists of all the resources required to provide cloud computing services - huge data storage, virtual machines, security mechanism, services, deployment models, servers, etc. It is the responsibility of the back end to provide built-in security mechanism, traffic control and protocols.

Cloud Computing Infrastructure

Cloud computing infrastructure

Cloud **infrastructure** consists of servers, storage, network, management software, and deployment software and platform virtualization.


Management Software
Deployment Software
Hypervisor
Network
Server
Storage
Cloud Infrastructural Components

Cloud computing infrastructure

HYPERVISOR

Hypervisor is a firmware or low-level program that acts as a Virtual Machine Manager. It allows to share the single physical instance of cloud resources between several tenants.

DEPLOYMENT SOFTWARE

Deployment software helps to deploy and integrate the application on the cloud. An example is the Amazon Elastic Compute **Cloud** (Amazon EC2)

Cloud computing infrastructure

MANAGEMENT SOFTWARE

Management Software helps to maintain and configure the infrastructure. Examples are vRealize Suite, IBM **Cloud** Orchestrator, Cisco CloudCenter, RightScale, Scalr.

STORAGE

Cloud uses distributed file system for storage purpose. If one of the storage resource fails, then it can be extracted from another one which makes cloud computing more reliable.

Cloud computing infrastructure

NETWORK

Network is the key component of cloud infrastructure. It allows to connect cloud services over the Internet. It is also possible to deliver network as a utility over the Internet, i.e., the consumer can customize the network route and protocol.

SERVER

Server helps to compute the resource sharing and offer other services such as resource allocation and deallocation, monitoring resources, security, etc.

Cloud Conversation

Digital Transformation Technologies

Digital Transformation Technologies (a journey)

- Big Data and Real-Time Analytics.
- Cloud **Technology**
- Artificial Intelligence and Machine Learning.
- Augmented Reality.
- Virtual reality
- Internet of Things.
- API Based Integration.
- Robotic Process Automation (RPA)
- Bockchain
- It strategy

- Big Data and Real-Time Analytics.
- Cloud **Technology**
- Artificial Intelligence and Machine Learning.
- Augmented Reality.
- Virtual reality
- Internet of Things.
- API Based Integration.
- Robotic Process Automation (RPA)

Big Data and Real-Time Analytics.

Real-time analytics is defined as the ability for users to see, analyze and assess data as soon as it appears in a system. In order to provide users with insights (rather than raw data), logic, mathematics and algorithms are applied. The output is a visually cohesive and understandable dashboard and/or report.

Big Data and Real-Time Analytics.

Real-time analytics encompasses the technology and processes that quickly enables users to leverage data the second it enters the database. It includes data measurement, management, and analytics.

Big Data and Real-Time Analytics.

For businesses, analytics that is real time can be used to meet a variety of needs including enhancing workflows, boosting the relationship between marketing and sales, understanding customer behavior, finalising financial close procedures and more.

How it works

Real-time data analytics works by pushing or pulling data into the system. In order to push big data through into a system, there needs to be streaming inplace. However, streaming can require a lot of resources and may be impractical for certain uses. Instead, you may set data to be pulled in intervals, from seconds to hours.

How it works

Given the choices, outputs from real-time analytics can take place in just seconds to minutes. In order for real-time data analytics to work, the software generally includes the following components:

How it works

Aggregator: Pulls real-time data analytics from various sources
Analytics Engine: Compares the values of data and streams it together while performing analysis
Broker: Create the availability of data
Stream Processor: Executes logic and performs analytics in real-time by receiving and sending data

Cloud Technology

The term **Cloud** refers to a **Network** or **Internet**. In other words, we can say that Cloud is something that is present at remote location. Cloud can provide services over network, i.e., on public networks or on private networks, i.e., WAN, LAN or VPN.

Artificial Intelligence and Machine Learning.

“Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs. Artificial Intelligence is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable.”
John McCarthy

Artificial Intelligence and Machine Learning.

Simply put, AI's goal is to make computers/computer programs smart enough to imitate the human mind behaviour.

Knowledge Engineering is an essential part of AI research. Machines and programs need to have bountiful information related to the world to often act and react like human beings.

Artificial Intelligence and Machine Learning.

AI must have access to properties, categories, objects and relations between all of them to implement knowledge engineering. AI initiates common sense, problem-solving and analytical reasoning power in machines, which is much difficult and a tedious job.

Classifications of AI

- Vertical AI
- Horizontal AI

Classifications of AI

- **Vertical AI**

These are services focus on the single job, whether that's scheduling meeting, automating repetitive work, etc.
Vertical AI Bots performs just one job for you and do it so well, that we might mistake them for a human.

Classifications of AI

- **Horizontal AI**

These services are such that they are able to handle multiple tasks. There is no single job to be done. Cortana, Siri and Alexa are some of the examples of Horizontal AI. These services work more massively as the question and answer settings, such as “What is the temperature in New York?” or “Call Alex”.

They work for multiple tasks and not just for a particular task entirely.
AI is achieved by analyzing how the human brain works while solving an issue and then using that analytical problem-solving techniques to build complex algorithms to perform similar tasks. AI is an automated decision-making system, which continuously learn, adapt, suggest and take actions automatically. At the core, they require algorithms which are able to learn from their experience. **This is where Machine Learning comes into the picture.**

What is machine learning?

Machine Learning (ML) is a subset of Artificial Intelligence. ML is a science of designing and applying algorithms that are able to learn things from past cases. If some behaviour exists in past, then you may predict if or it can happen again. Means if there are no past cases then there is no prediction.

ML can be applied to solve tough issues like credit card fraud detection, enable self-driving cars and face detection and recognition. ML uses complex algorithms that constantly iterate over large data sets, analyzing the patterns in data and facilitating machines to respond different situations for which they have not been explicitly programmed. The machines learn from the history to produce reliable results. The ML algorithms use Computer Science and Statistics to predict rational outputs.

3 major areas

- Supervised learning
- Unsupervised learning
- Reinforcement learning

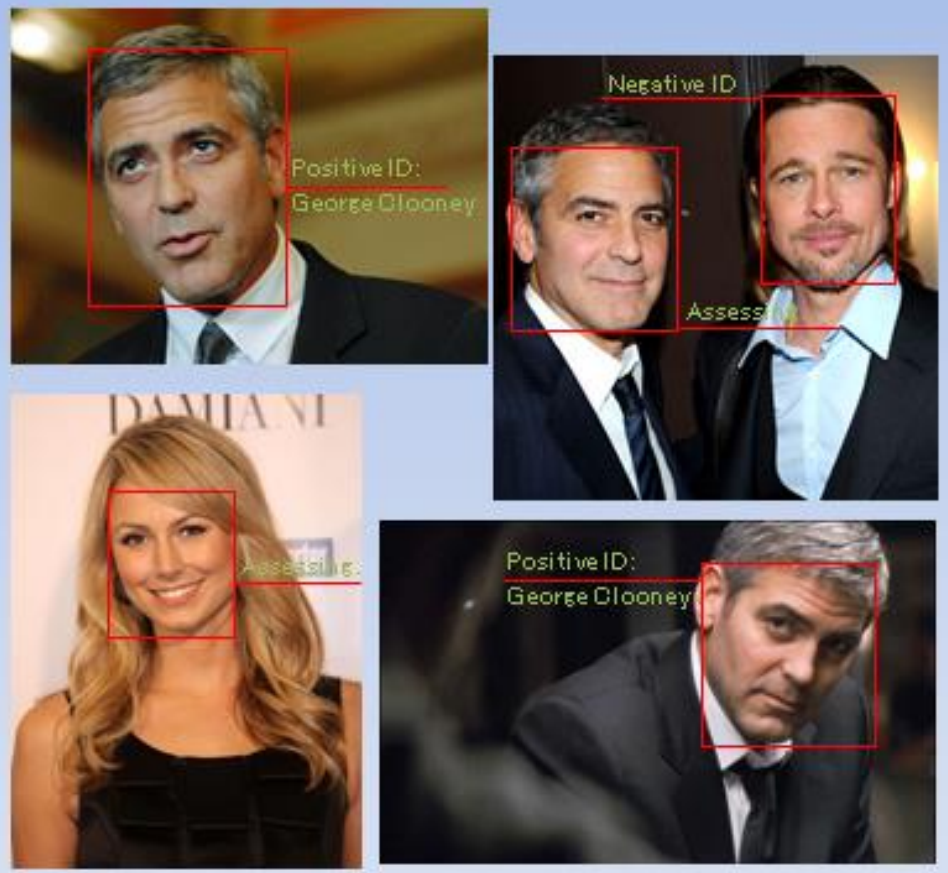
Supervised learning

In supervised learning, training datasets are provided to the system. Supervised learning algorithms analyze the data and produce an inferred function. The correct solution thus produced can be used for mapping new examples. Credit card fraud detection is one of the examples of Supervised Learning algorithm.

Unsupervised learning

Unsupervised Learning algorithms are much harder because the data to be fed is unclustered instead of datasets. Here the goal is to have the machine learn on its own without any supervision. The correct solution of any problem is not provided. The algorithm itself finds the patterns in the data. One of the examples of supervised learning is Recommendation engines which are there on all e-commerce sites or also on Facebook friend request suggestion mechanism.

Supervised Learning



Unsupervised Learning

Reinforcement learning

This type of Machine Learning algorithms allows software agents and machines to automatically determine the ideal behaviour within a specific context, to maximise its performance. Reinforcement learning is defined by characterising a learning problem and not by characterising learning methods. Any method which is well suited to solve the problem, we consider it to be the reinforcement learning method.

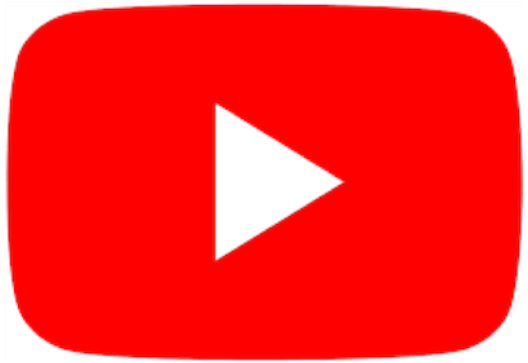
Reinforcement learning

Reinforcement learning assumes that a software agent i.e. a robot, or a computer program or a bot, connect with a dynamic environment to attain a definite goal. This technique selects the action that would give expected output efficiently and rapidly.

There are certain implications of AI and ML to incorporate data analysis like Descriptive analytics, Prescriptive analytics and Predictive analytics,

Augmented reality

Augmented reality (AR) is an experience where designers enhance parts of users' physical world with computer-generated input. Designers create inputs—ranging from sound to video, to graphics to GPS overlays and more—in digital content which responds in real time to changes in the user's environment, typically movement.



Virtual reality

Virtual reality (VR), the use of computer modeling and simulation that enables a person to interact with an artificial three-dimensional (3-D) visual or other sensory environment. VR applications immerse the user in a computer-generated environment that simulates reality through the use of interactive devices, which send and receive information and are worn as goggles, headsets, gloves, or body suits.

In a typical VR format, a user wearing a helmet with a stereoscopic screen views animated images of a simulated environment. The illusion of “being there” (telepresence) is effected by motion sensors that pick up the user’s movements and adjust the view on the screen accordingly, usually in real time (the instant the user’s movement takes place).

Thus, a user can tour a simulated suite of rooms, experiencing changing viewpoints and perspectives that are convincingly related to his own head turnings and steps.

Wearing data gloves equipped with force-feedback devices that provide the sensation of touch, the user can even pick up and manipulate objects that he sees in the virtual environment.

Internet of Things.

The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention.

Internet of Things.

The personal or business possibilities are endless. A ‘thing’ can refer to a connected medical device, a biochip transponder (think livestock), a solar panel, a connected automobile with sensors that alert the driver to a myriad of possible issues (fuel, tire pressure, needed maintenance, and more) or any object, outfitted with sensors, that has the ability to gather and transfer data over a network.

API Based Integration.

An API integration is **the connection between two or more applications, via their APIs, that lets those systems exchange data**. API integrations power processes throughout many high-performing businesses that keep data in sync, enhance productivity, and drive revenue.

API Based Integration.

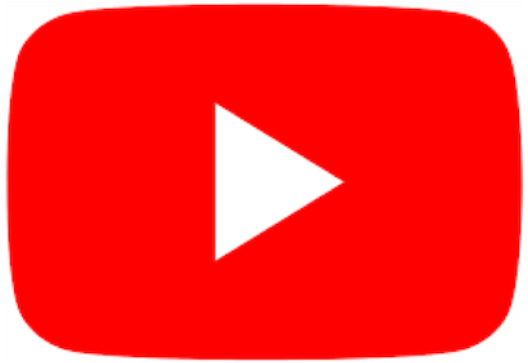
APIs act as shipping vessels for software. While freight is shipped in vessels made o reusable steel, APIs for web services consist of all the interactions, or ***messages,*** passed to (requests) and from (responses) an application.

Robotic Process Automation (RPA)

Robotic process automation (RPA) is a software technology that makes it easy to build, deploy, and manage software robots that emulate humans actions interacting with digital systems and software. Just like people, software robots can do things like understand what's on a screen, complete the right keystrokes, navigate systems, identify and extract data, and perform a wide range of defined actions.

Robotic Process Automation (RPA)

But software robots can do it faster and more consistently than people, without the need to get up and stretch or take a coffee break



Digital transformation components

the overhaul of processes.
the overhaul of operations, and.
the overhaul of relationships with customers.

Cloud Computing Operations

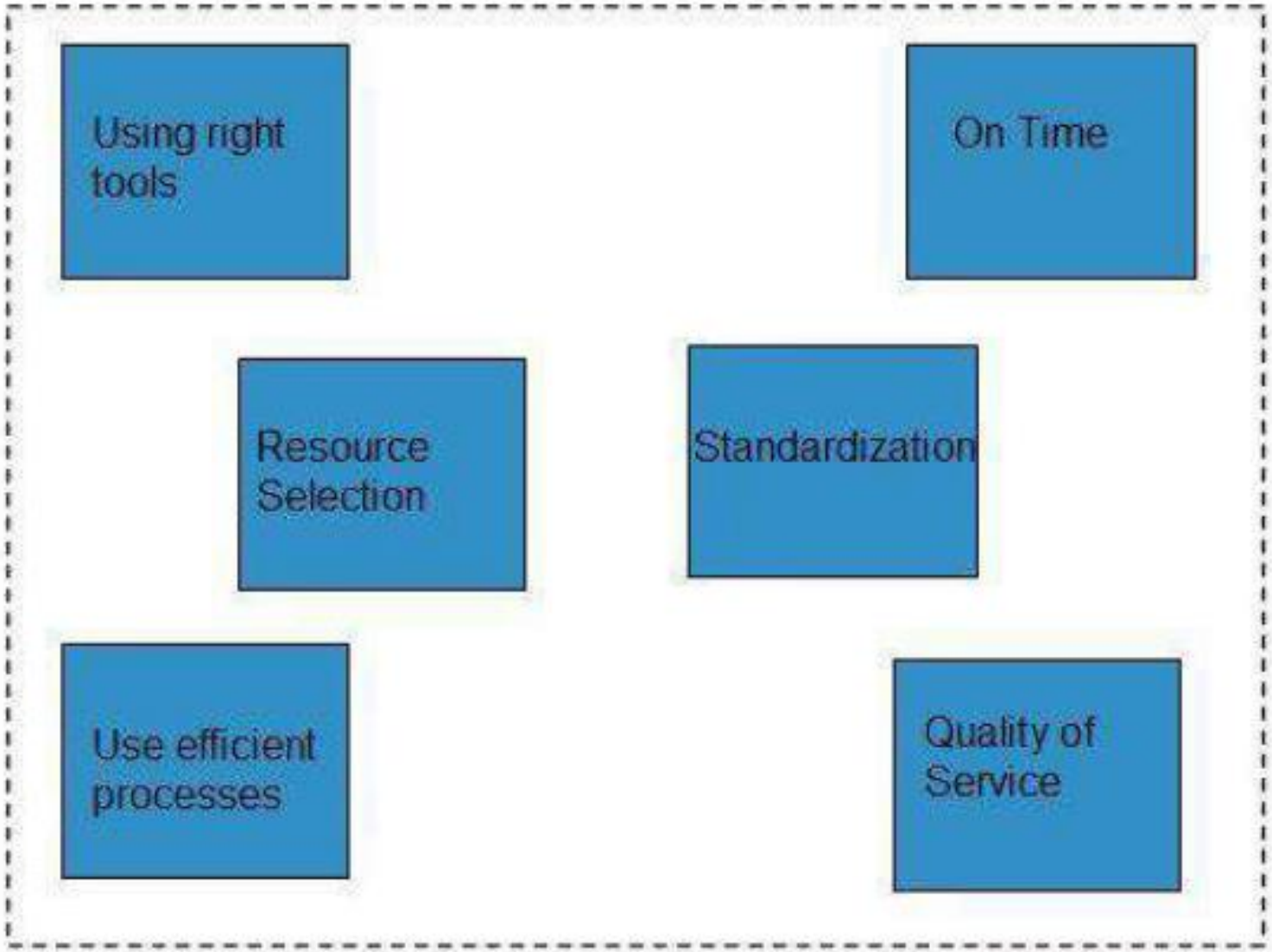
Cloud computing operations

Cloud Computing operation refers to delivering superior cloud service. Today, cloud computing operations have become very popular and widely employed by many of the organizations just because it allows to perform all business operations over the Internet. These operations can be performed using a web application or mobile based applications. There are a number of operations that are performed in cloud, some of them are shown in the following diagram:


Email marketing
Content management
Human resource management & recruitment systems
Operations
System wide reporting
Accounting services
Online marketplace

Managing Cloud Operations

As shown in this diagram below, there are several ways to manage day-to-day cloud operations:


Using right tools
On Time
Resource Selection
Standardization
Use efficient processes
Quality of Service

Managing Cloud Operations

- Using efficient process will eliminate the waste and redundancy.
- One should maintain the quality of service to avoid re-work later.
- Always employ right tools and resources to perform any function in the cloud.
- The process should be standardized and automated to avoid repetitive tasks.
- Things should be done at right time and at right cost.
- Selecting an appropriate resource is mandatory for operation management.

Cloud computing providers

Cloud based applications

- Mailchimp
- Google workspace
- Quick books

Data storage and backup

- Google drive
- Drop box
- Onedrive
- Box.com

Cloud computing providers

Cloud based applications

- Mailchimp
- Google workspace
- Quick books

Data storage and backup

- Google drive
- Drop box
- Onedrive
- Box.com

Cloud computing providers

Management applications

Evernotes
Notion
Slack
Trello

Social applications

Facebook
Twitter
Instagram
LinkedIn
Snapchat

AWS (Amazon Web Services)

AWS (Amazon Web Services) is a comprehensive, evolving cloud computing platform provided by Amazon that includes a mixture of infrastructure as a service (IaaS), platform as a service (PaaS) and packaged software as a service (SaaS) offerings.

AWS services can offer an organization tools such as compute power, database storage and content delivery services.

AWS (Amazon Web Services)

AWS launched in 2006 from the internal infrastructure that Amazon.com built to handle its online retail operations. AWS was one of the first companies to introduce a pay-as-you-go cloud computing model that scales to provide users with compute, storage or throughput as needed.

AWS (Amazon Web Services)

AWS offers many different tools and solutions for enterprises and software developers that can be used in data centers in up to 190 countries. Groups such as government agencies, education institutions, nonprofits and private organizations can use AWS services.

How AWS works

AWS is separated into different services; each can be configured in different ways based on the user's needs. Users should be able to see configuration options and individual server maps for an AWS service.
More than 100 services comprise the Amazon Web Services portfolio, including those for compute, databases, infrastructure management, application development and security.
These services, by category, include:
Compute, Storage databases, Data management, Migration, Hybrid cloud, Networking, Development tools, Management, Monitoring, Security, Governance, Big data management, Analytics, Artificial intelligence (AI), Mobile development, Messages and notification

Microsoft Azure

At its core, 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. It can be used to replace or supplement your on premise servers.

Google Cloud

Google Cloud Platform (**GCP**), offered by Google LLC, 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. Registration requires a credit card or bank account details.

Google Cloud

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 App Engine, Google added multiple cloud services to the platform.

Google Cloud

Google Cloud Platform is a part of **Google Cloud**, which includes the Google Cloud Platform public cloud infrastructure, as well as Google Workspace (G Suite), enterprise versions of Android and Chrome OS, and application programming interfaces (APIs) for machine learning and enterprise mapping services.

AWS

Identity and access management (IAM)
Create IAM user
IAM policy

Security concerns for Cloud Computing

Security concerns

While using cloud computing, the major issue that concerns the users is about its security.

One concern is that cloud providers themselves may have access to customer's unencrypted data- whether it's on disk, in memory or transmitted over the network.

Some countries government may decide to search through data without necessarily notifying the data owner, depending on where the data resides, which is not appreciated and is considered as a privacy breach (Example Prism Program by USA).

Security concerns

To provide security for systems, networks and data cloud computing service providers have joined hands with TCG (Trusted Computing Group) which is non-profit organization which regularly releases a set of specifications to secure hardware, create self-encrypting drives and improve network security. It protects the data from root kits and malware.
As computing has expanded to different devices like hard disk drives and mobile phones, TCG has extended the security measures to include these devices. It provides ability to create a unified data protection policy across all clouds.
Some of the trusted cloud services are Amazon, Box.net, Gmail and many others.

Privacy Concern & Cloud Computing

Privacy present a strong barrier for users to adapt into Cloud Computing systems
There are certain measures which can improve privacy in cloud computing.

1. The administrative staff of the cloud computing service could theoretically monitor the data moving in memory before it is stored in disk to keep the confidentiality of a data, administrative and legal controls should prevent this from happening.

Privacy Concern & Cloud Computing

2.
The other way for increasing the privacy is to keep the data encrypted at the cloud storage site, preventing unauthorized access through the internet; even cloud vendor can’t access the data either.

1.

Bit.ly/firscloudtest

2.

Bit.ly/firsdatatest

Bit.ly/firsdatatest