



Cloud Computing

Introduction

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Motivation

Cloud Computing is considered one of the **top five emerging technologies** that will have a major impact on the quality of science and society over next 20 years.

Course Objectives

1. To understand cloud computing and its benefits
2. To know the various service delivery and deployment models
3. To be familiar with the security and privacy issues and future challenges

Course Outline

Unit – I: Cloud Fundamentals

Unit – II: Developing Cloud Services

Unit – III: Using Cloud Services

Unit – IV: Other Ways to Collaborate Online

Unit – V: Cloud Security

Learning Outcomes

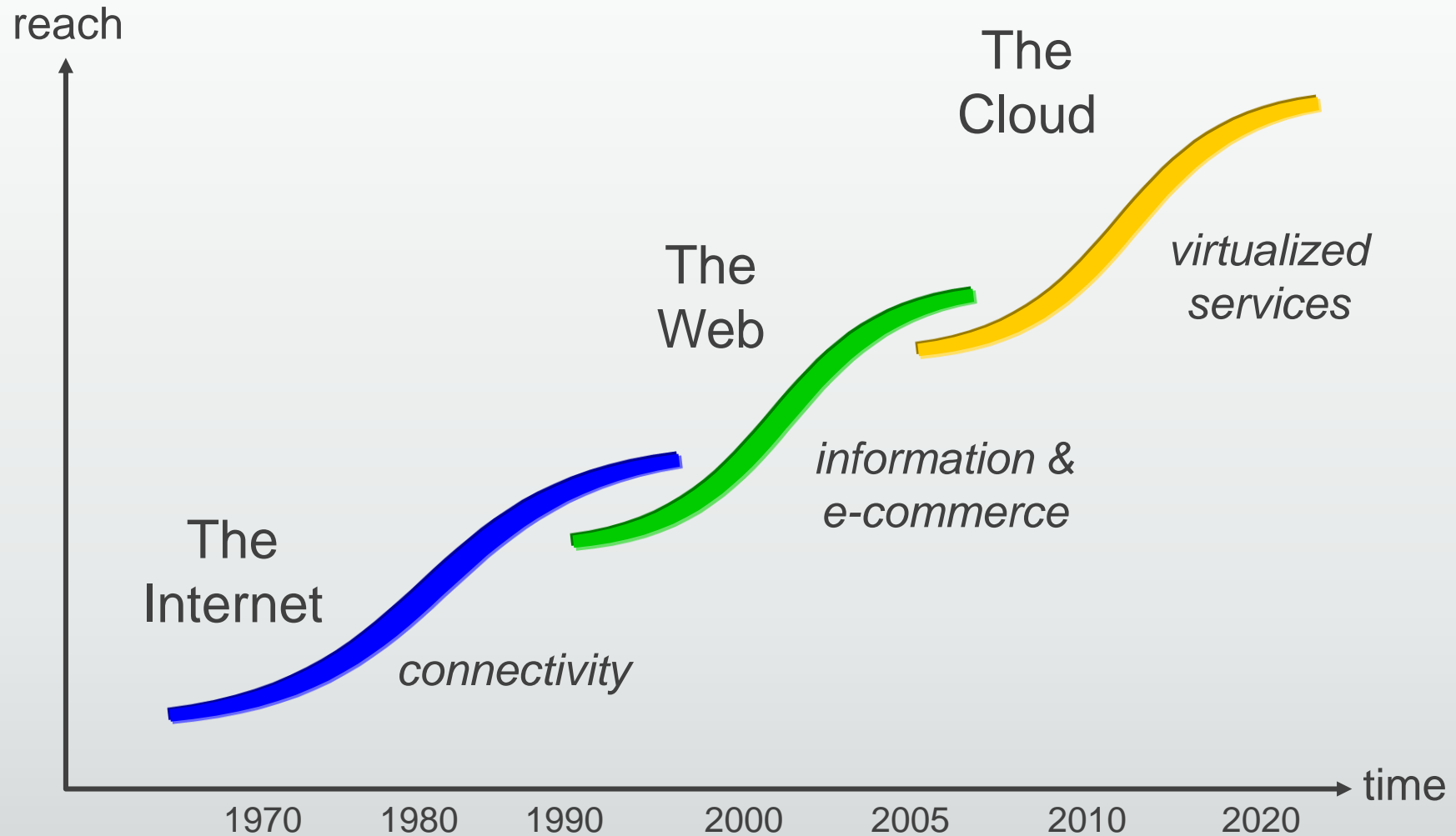
After successfully completing, you should be able to

1. Understand key concepts & technologies, strengths, and limitations of cloud computing.
2. identify the architecture and infrastructure of cloud computing.
3. identify problems, and explain, and evaluate various cloud computing solutions.
4. attempt to generate new ideas and innovations in cloud computing.
5. collaboratively research and write a research paper, and present the research online.
6. effectively communicate course work in writing and oral presentation.

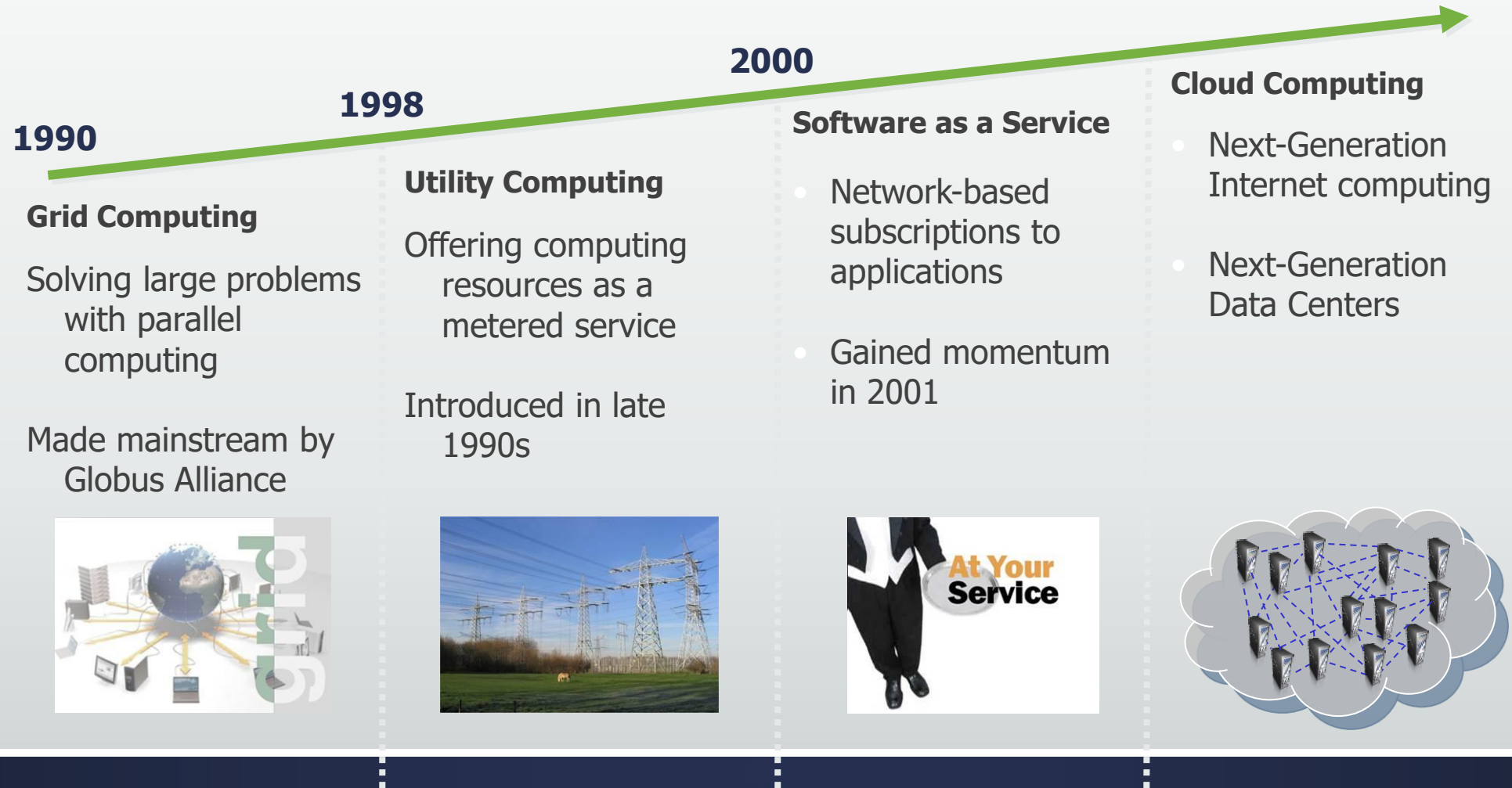
Introduction

Cloud Computing

Evolution of Internet Computing



Evolution of Internet Computing



Classic and Cloud Computing

Every 18 months?



- **Classical Computing**

- Buy & Own
 - Hardware, System Software, Applications often to meet peak needs.
- Install, Configure, Test, Verify, Evaluate
- Manage
- ..
- Finally, use it
- \$\$\$\$....\$(High CapEx)

- **Cloud Computing**

- Subscribe
- Use
- \$ - pay for what you use, based on QoS

Definition NIST

“Cloud computing is a model for enabling **ubiquitous**, convenient, **on-demand network access** to a shared pool of **configurable computing resources** (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with **minimal management** effort or service provider interaction.”

National Institute of Standards and Technology (NIST)

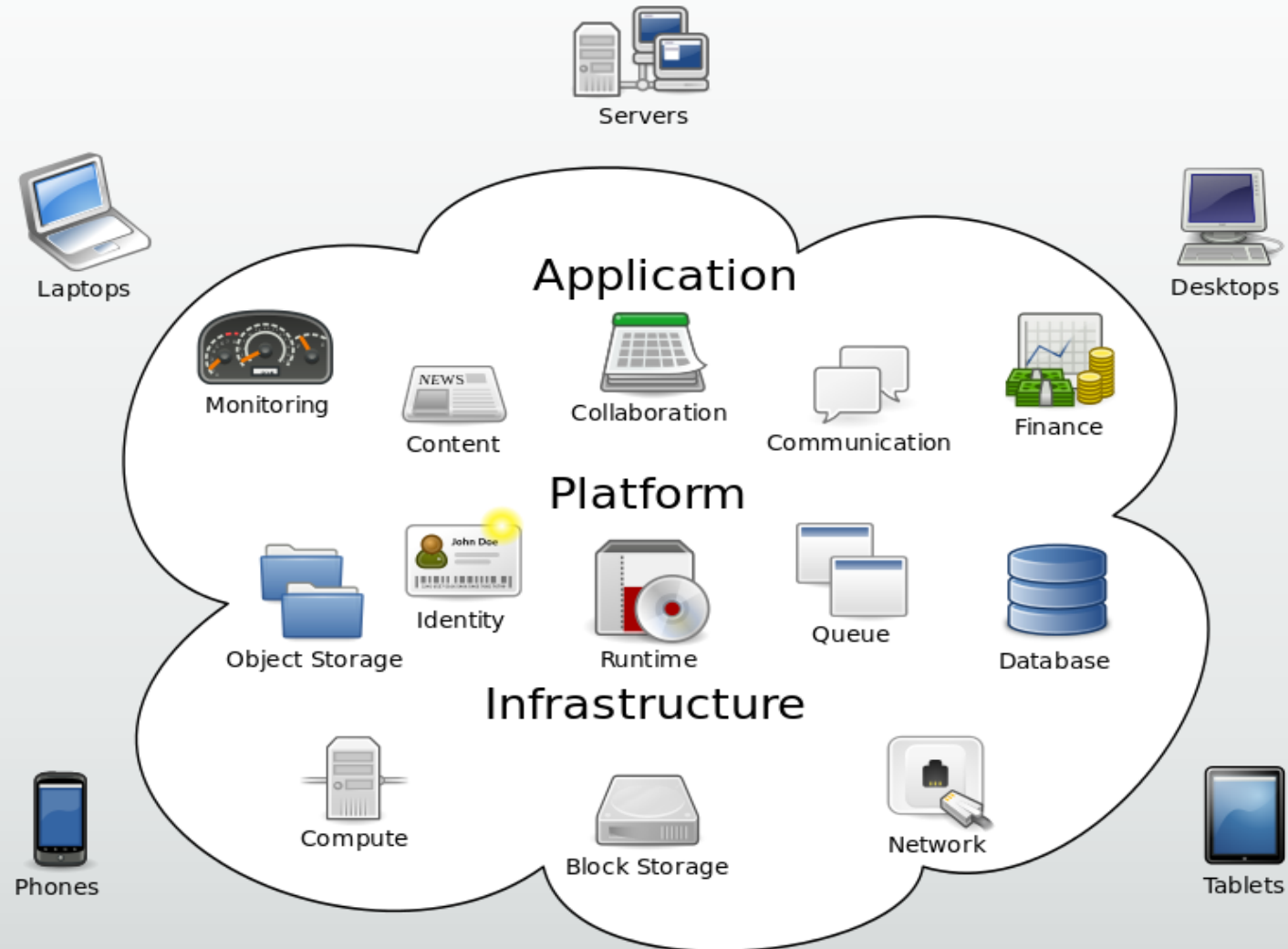
Definition Gartner

Cloud computing as a style of computing in which scalable and **elastic IT-enabled capabilities** are delivered as a service using Internet technologies.

Definition IBM

Cloud computing, often referred to as simply “the cloud,” is the **delivery of on-demand computing resources**—everything from applications to data centers—over the internet on a **pay-for-use** basis.

Wiki



Cloud computing

Essential Characteristics.... NIST

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

Top Benefits

- Cost
- Speed
- Global Scale
- Productivity
- Performance
- Reliability

Limitations

- Constant Internet Connection
- Internet speed
- Security & Privacy
- Lock In

Examples

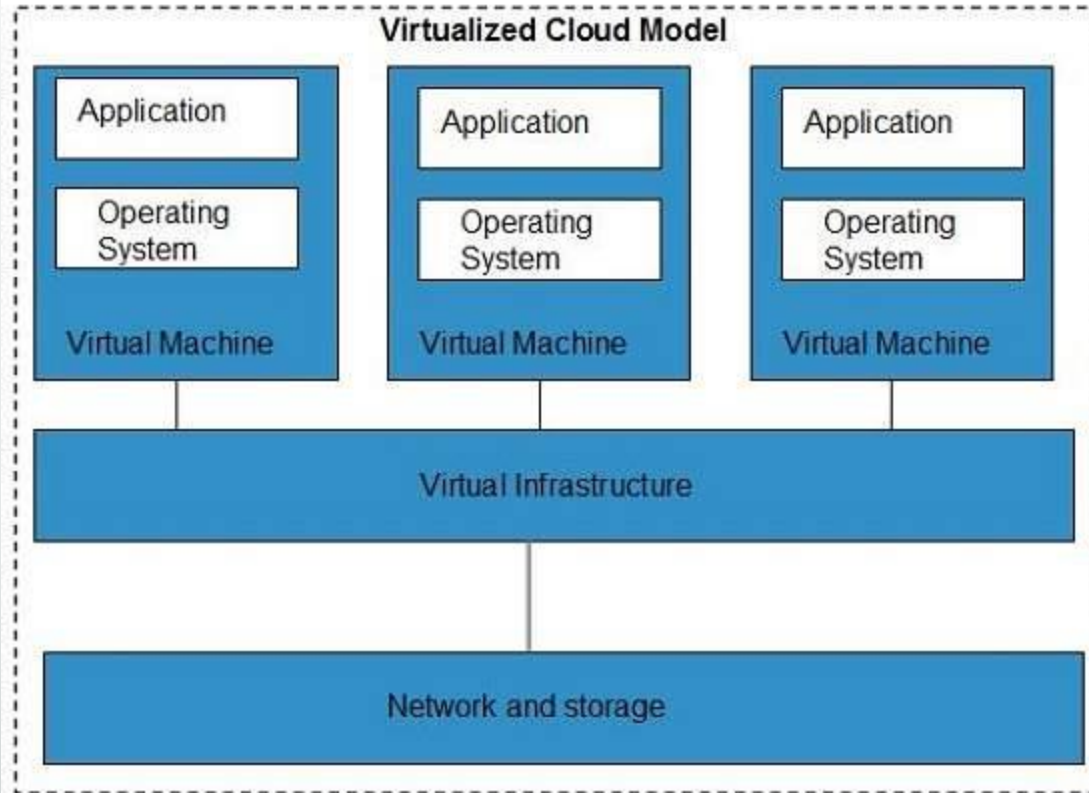
- Gmail
- Facebook
- Twitter
- WhatsApp
- YouTube
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Enabling Technologies

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

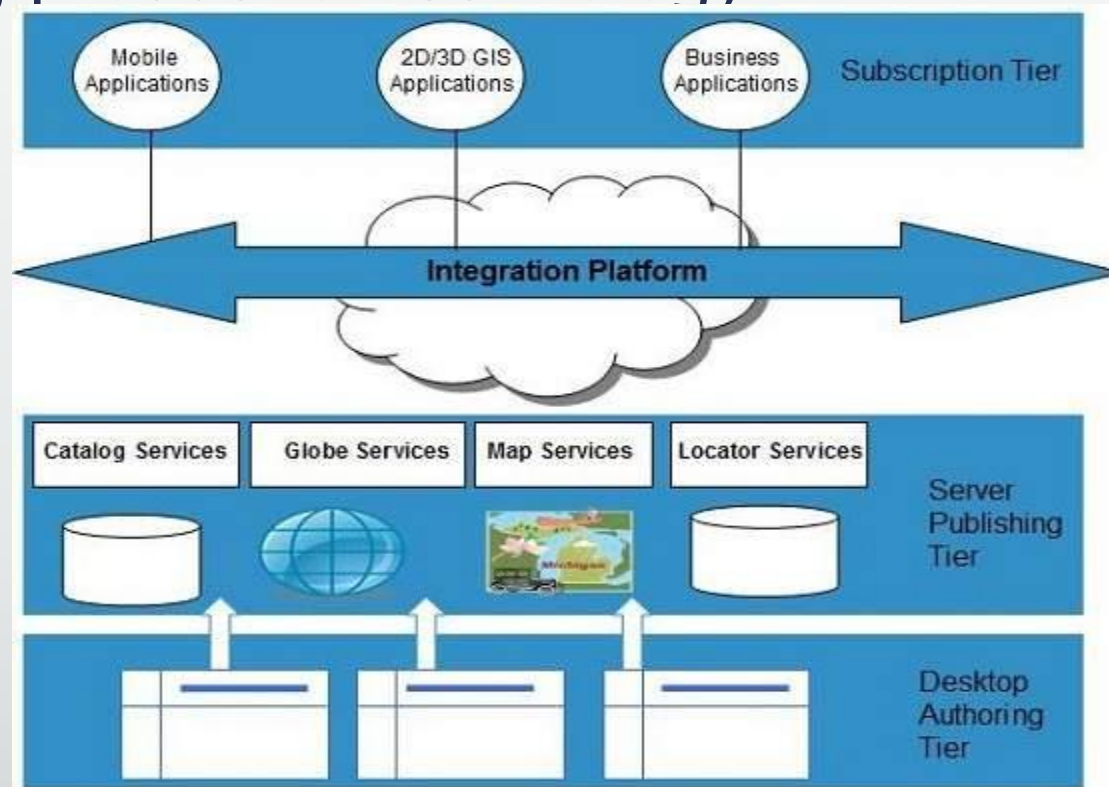
Virtualization & Multitenancy

Virtualization is a technique, which allows to share single physical instance of an application or resource among multiple organizations or tenants (customers).



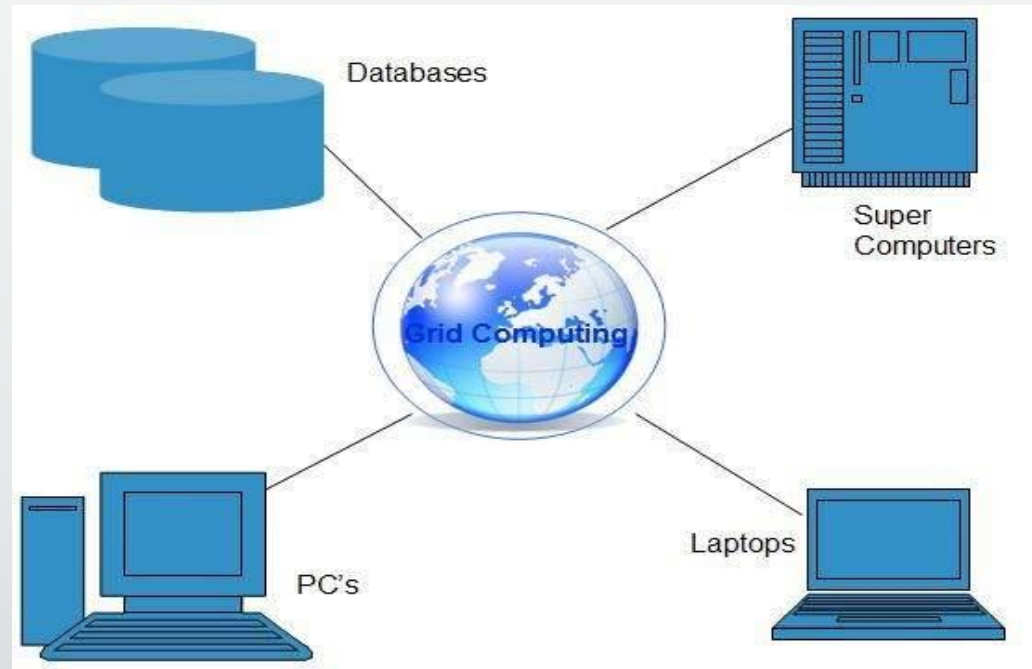
SOA

Service-Oriented Architecture helps to use applications as a service for other applications regardless the type of vendor, product or technology.



Grid Computing

Grid Computing refers to distributed computing, in which a group of computers from multiple locations are connected with each other to achieve a common objective.

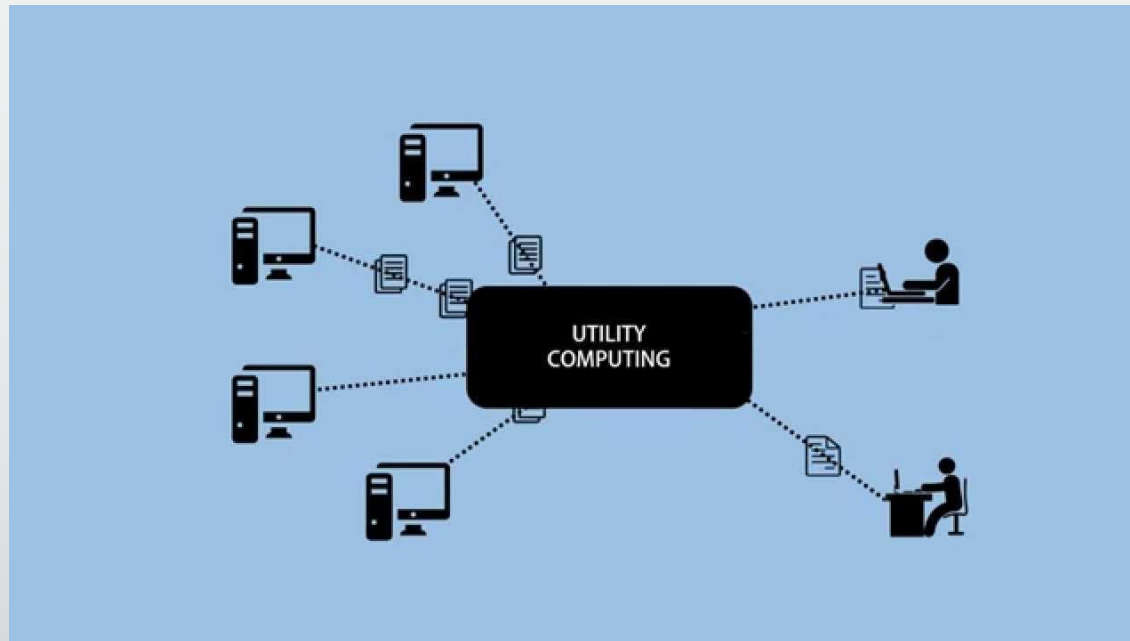


Grid Computing

BASIS FOR COMPARISON	CLOUD COMPUTING	GRID COMPUTING
Application focus	business and web-based applications.	Collaborative purposes.
Architecture used	Client-server	Distributed computing
Management	Centralized	Decentralized
Business model	Pay per use	No defined business model
Accessibility of services	High because it is real-time	Low because of scheduled services.
Resource usage patterns	Centralized manner	Collaborative manner
Flexibility	High	Low
Interoperability	Vendor lock-in and integration are some issues	Easily deals with interoperability between providers.

Utility computing

Utility computing is a model in which computing resources are provided to the customer based on specific demand. The service provider charges exactly for the services provided, instead of a flat rate.



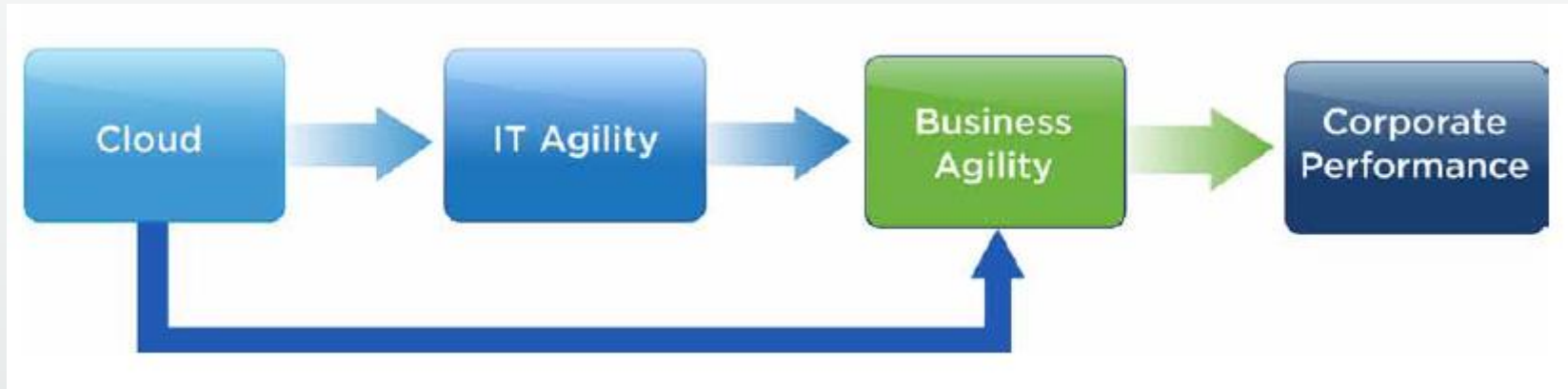
Challenges

- Security and Privacy
- Interoperability and Portability
- Reliability and Availability
- Service Quality
- Performance and Bandwidth Cost

Cloud Computing and Business Agility

- Agility is achieved in cloud computing because of its elasticity and flexibility.
- Quickly adapt to changing business processes
- Enables on-demand resources for development and testing
- Optimizes IT budgets
- Focus more on IT strategies

Cloud Computing and Business Agility



Cloud Computing is Sustainable

- **Green Computing**
- **Microsoft, Accenture** and WSP Environment & Energy Study Shows Significant Energy and Carbon Emissions Reduction Potential from Cloud Computing
- Moving business applications to the cloud can save **30 percent** or more in carbon emissions per user.

First Post: Feb 02, 2017 22:49:10 IST

<https://www.firstpost.com/business/biztech/business-tech/it-infrastructure/business-apps-in-the-cloud-can-reduce-energy-carbon-emissions-1880311.html>

Summary

Cloud computing is an **umbrella term** used to refer to Internet based development and services

- **Elastic resources**—Scale up or down quickly and easily to meet demand
- **Metered service** so you only pay for what you use
- **Ubiquitous**: Services or data are available from anywhere.
- **Self service**—All the IT resources you need with self-service access

Thank You

Any Questions

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