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Cloud Fundamentals

Chapter 2
Cloud Computing Basics
4 IA

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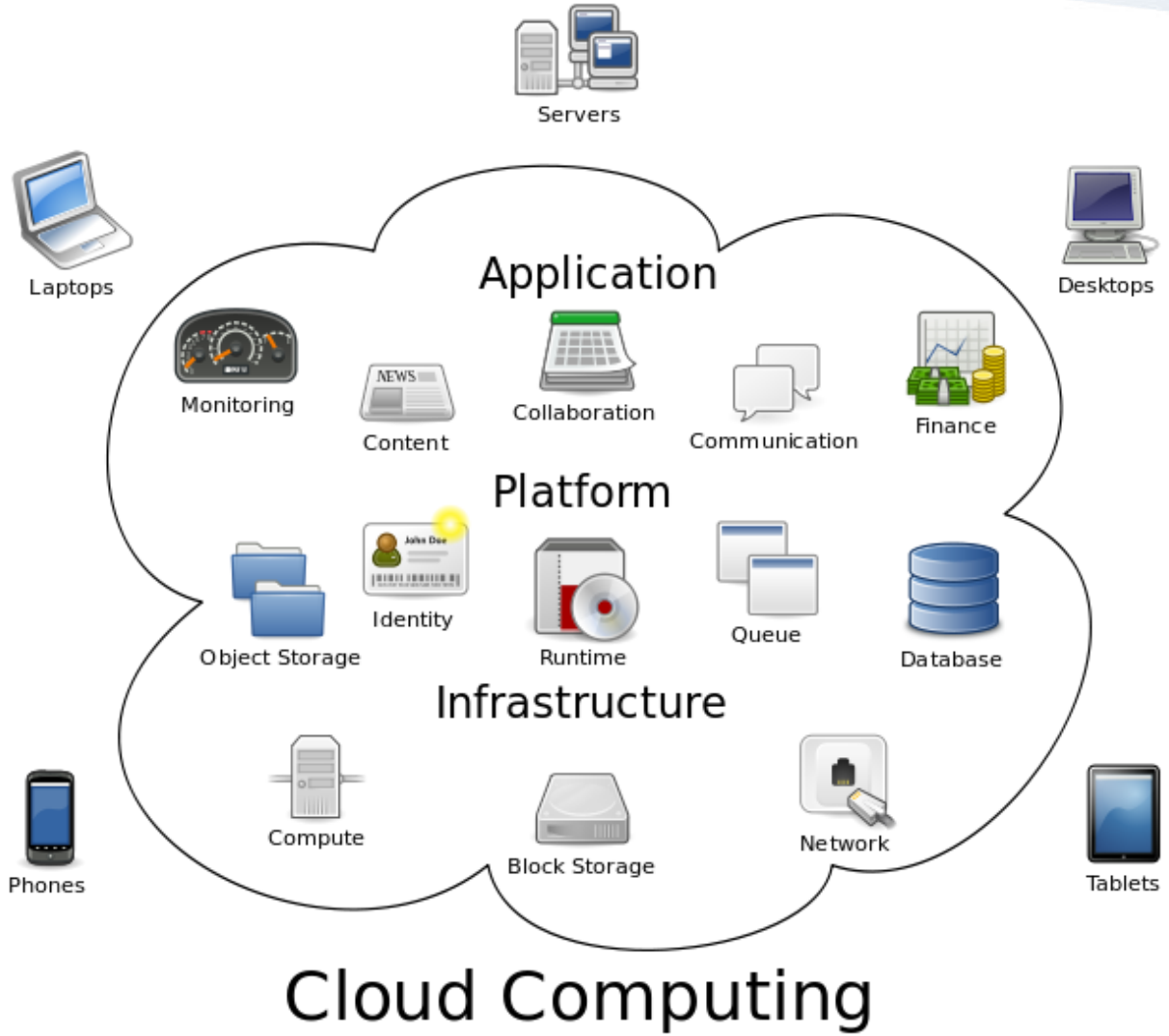
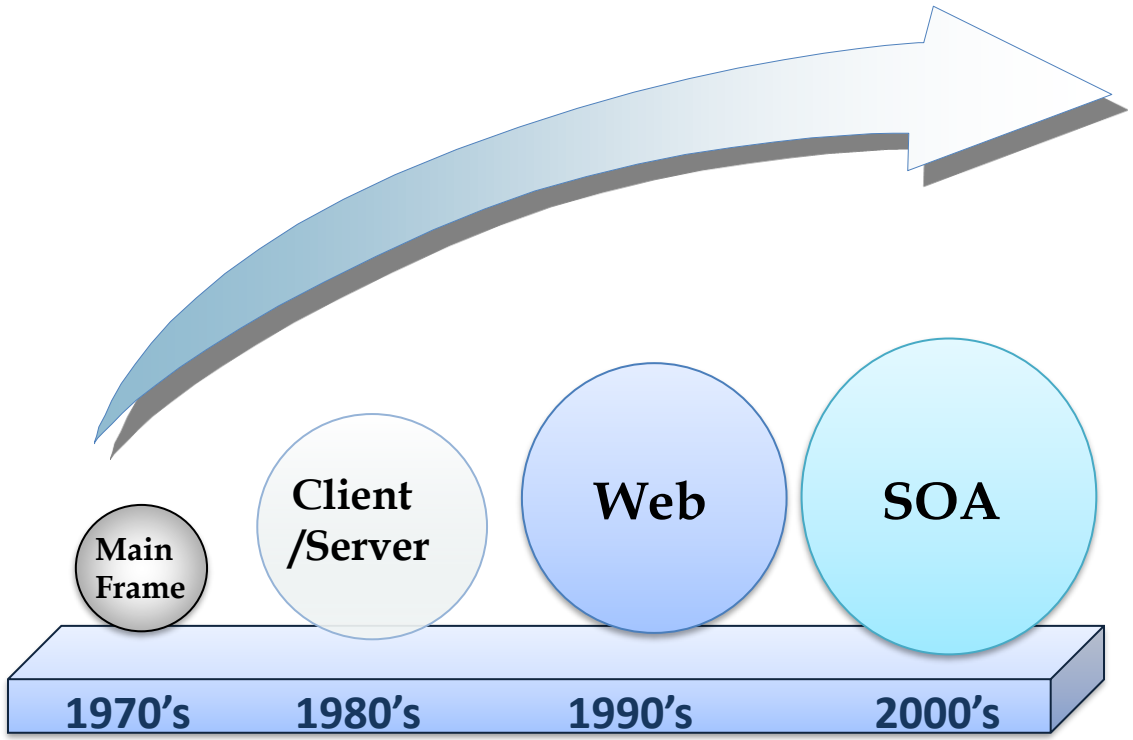
Lesson plan

1. Introduction and Technologies
2. Cloud Computing Definition
3. Key technologies
4. Cloud computing concept
5. Cloud Computing Characteristics

INTRODUCTION



Technologies evolution



CLOUD COMPUTING (2010+)

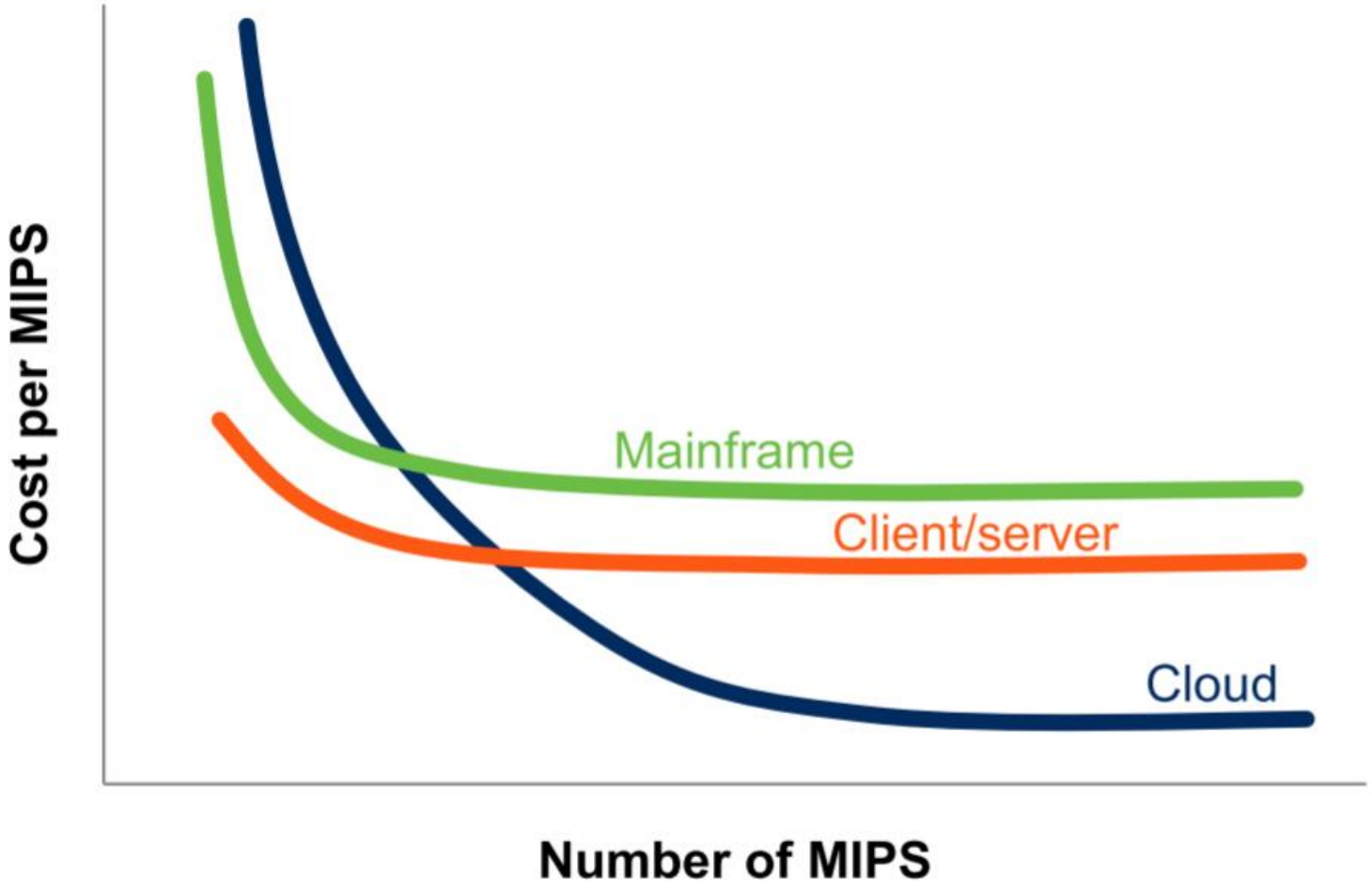
"Computation may someday be organized as a public utility"
John McCarthy- 1960

Technologies evolution

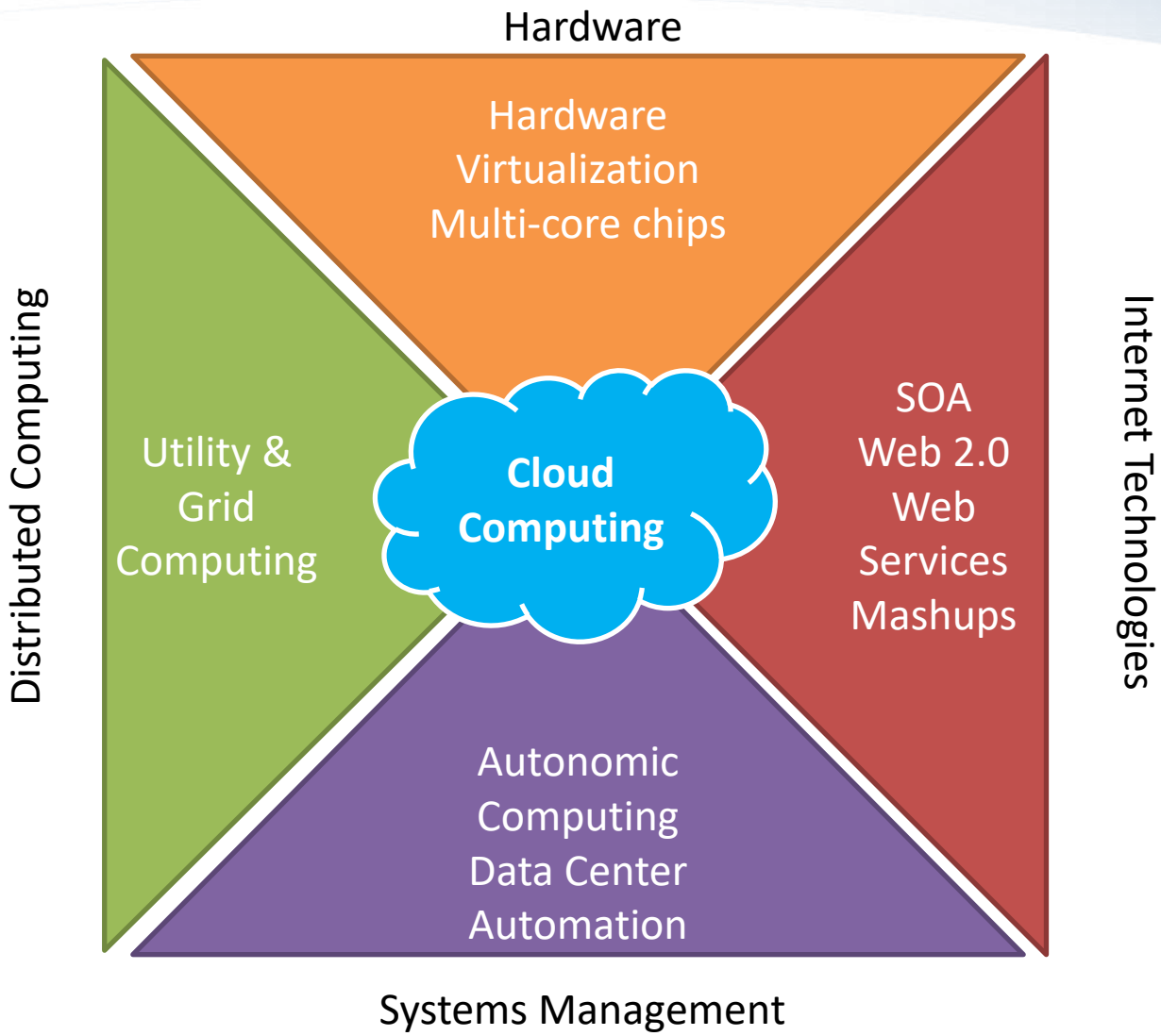
	Technology	Economic	Business Model
Mainframe 	Centralized compute and storage Thin clients	Optimized for efficiency because of the high cost	High up-front costs for hardware and software
Client/ Server 	PCs and servers for distributed compute, storage, and so on	Optimized for agility because of the low cost	Perpetual license for OS and application software
Cloud 	Large DCs, ability to scale, commodity hardware, devices	Efficiency and agility an order of magnitude better	Ability to pay as you go, and only for what you use

Source: Microsoft.

Technologies evolution



Convergence of Various Technologies



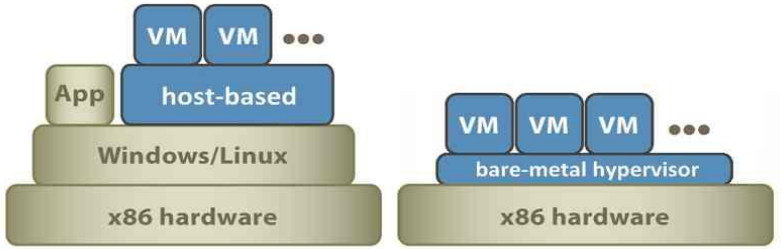
Cloud Computing definition

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.

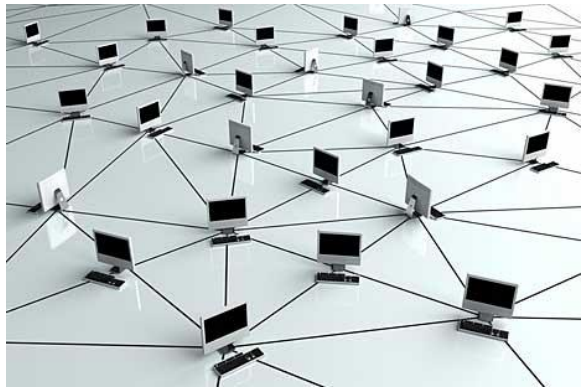
- **NIST Special Publication 800-146**
- (National Institute of Standards and Technology)

Key technologies

Outsourcing



Virtualization



Resource Sharing

Key Technologies (1/3)

- Outsourcing: is simply the farming out of services to a third party, Cloud computing represents a new way to outsource IT resources.
  - Lower cost
  - Lack of in-house capacity
  - Access to specific IT skills
  - Better Focus on core competencies

Key Technologies (2/3)

- Virtualization: The term refers to providing an environment able to render all the services, being supported by a hardware that can be observed as a personal computer, to the end users.
- Most types of IT resources can be virtualized, and have lead to the evolution of Cloud computing.

Key Technologies (3/3)

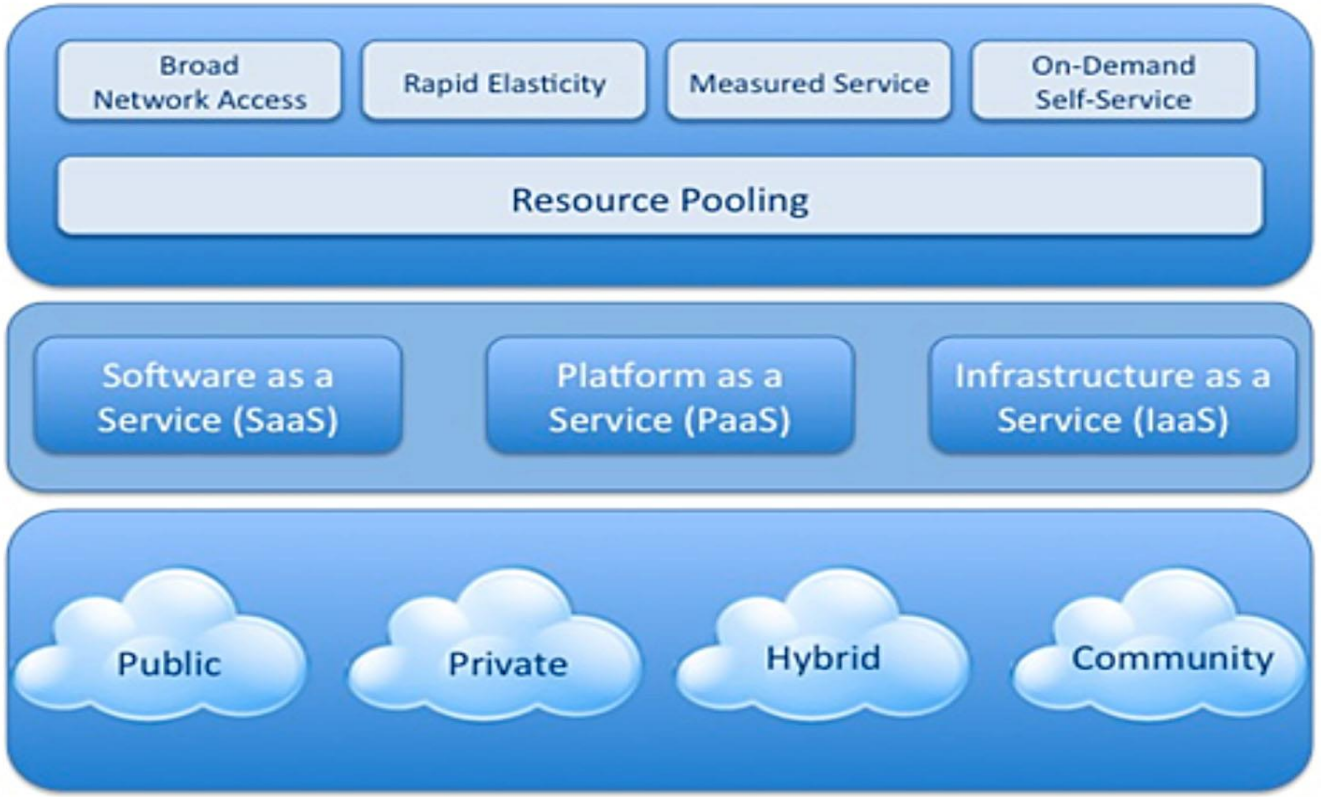
- Resources sharing:

- In computing, a shared resource or network share is a device or piece of information on a computer that can be remotely accessed from another computer, transparently as if it were a resource in the local machine.

- The concept of resource sharing itself has been around for decades, as well as its problems, such as security, performance, availability, and administrative isolation

- Resource sharing is an important aspect how cost savings in cloud computing are realized.

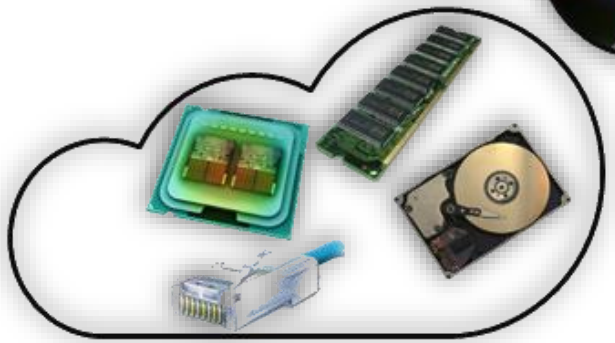
Cloud Computing concept



Cloud Computing Characteristics

Rapid elasticity

Broad network access



Resource pooling

Measured Service

On-demand self-service

Cloud Computing Characteristics

On-demand self-service : A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Cloud Computing Characteristics

Measured service: Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts).

Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

Cloud Computing Characteristics

Rapid Elasticity: Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Cloud Computing Characteristics

Auto Scaling helps you ensure that you have the correct number of Amazon EC2 instances available to handle the load for your application.

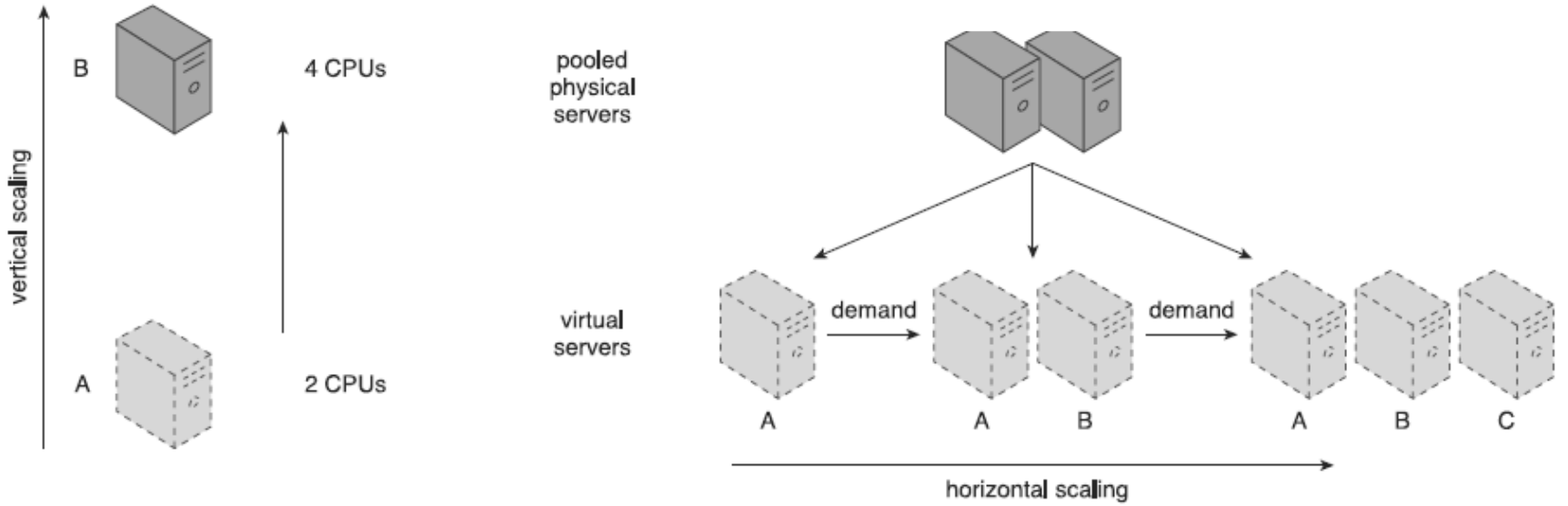
Cloud Computing Characteristics

- The following are types of scaling:
  - Horizontal Scaling – scaling out and scaling in
  - Vertical Scaling – scaling up and scaling down
- The allocating or releasing of IT resources that are of the same type is referred to as horizontal scaling
  - The horizontal allocation of resources is referred to as scaling out
  - the horizontal releasing of resources is referred to as scaling in

Cloud Computing Characteristics

- Vertical scaling is considered to have occurred, when an existing IT resource is replaced by another with higher or lower capacity
  - the replacing of an IT resource with another that has a higher capacity is referred to as scaling up
  - the replacing an IT resource with another that has a lower capacity is considered scaling down

Cloud Computing Characteristics



Cloud Computing Characteristics

Broad network access: Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

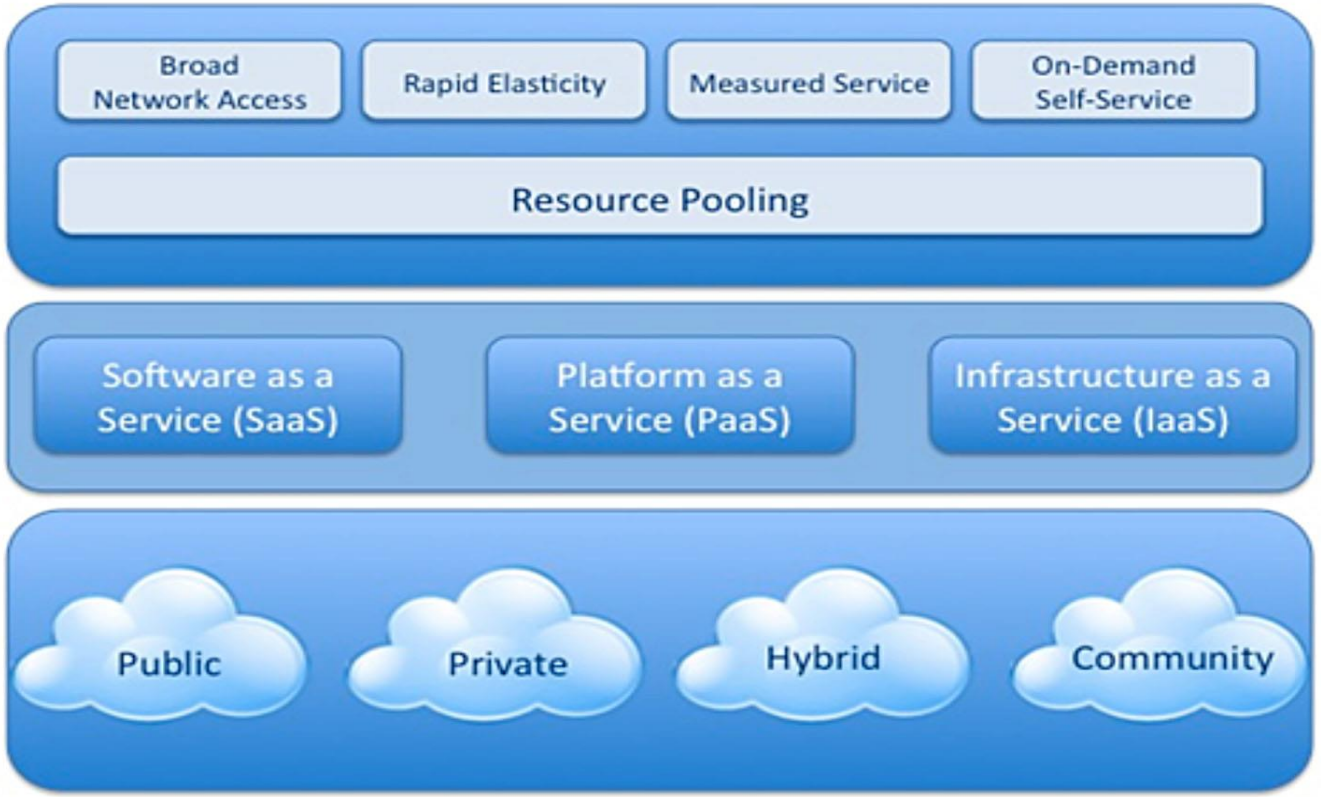
Cloud Computing Characteristics

Resource pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter).

Examples of resources include storage, processing, memory, and network bandwidth.

Conclusion


Broad Network Access
Rapid Elasticity
Measured Service
On-Demand Self-Service
Resource Pooling
Essential Characteristics
Software as a Service (SaaS)
Platform as a Service (PaaS)
Infrastructure as a Service (IaaS)
Service Models
Public
Private
Hybrid
Community
Deployment Models

Workshop to be prepared

Each group should:

- define the three predefined services model.

- provide a comparison between at least three different providers proposing the same service.

- list criteria for choosing a suitable provider.