Cloud Computing Fundamentals

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Basic Concepts and Terminology

- Cloud: refers to a distinct IT environment that is designed for the purpose of remotely provisioning scalable and measured IT resources.
- IT Resource: A physical or virtual IT-related artifact that can be either software-based, such as a virtual server or a custom software program, or hardware-based, such as a physical server or a network device.
- Scaling, from an IT resource perspective, represents the ability of the IT resource to handle increased or decreased usage demands.
  - Horizontal Scaling
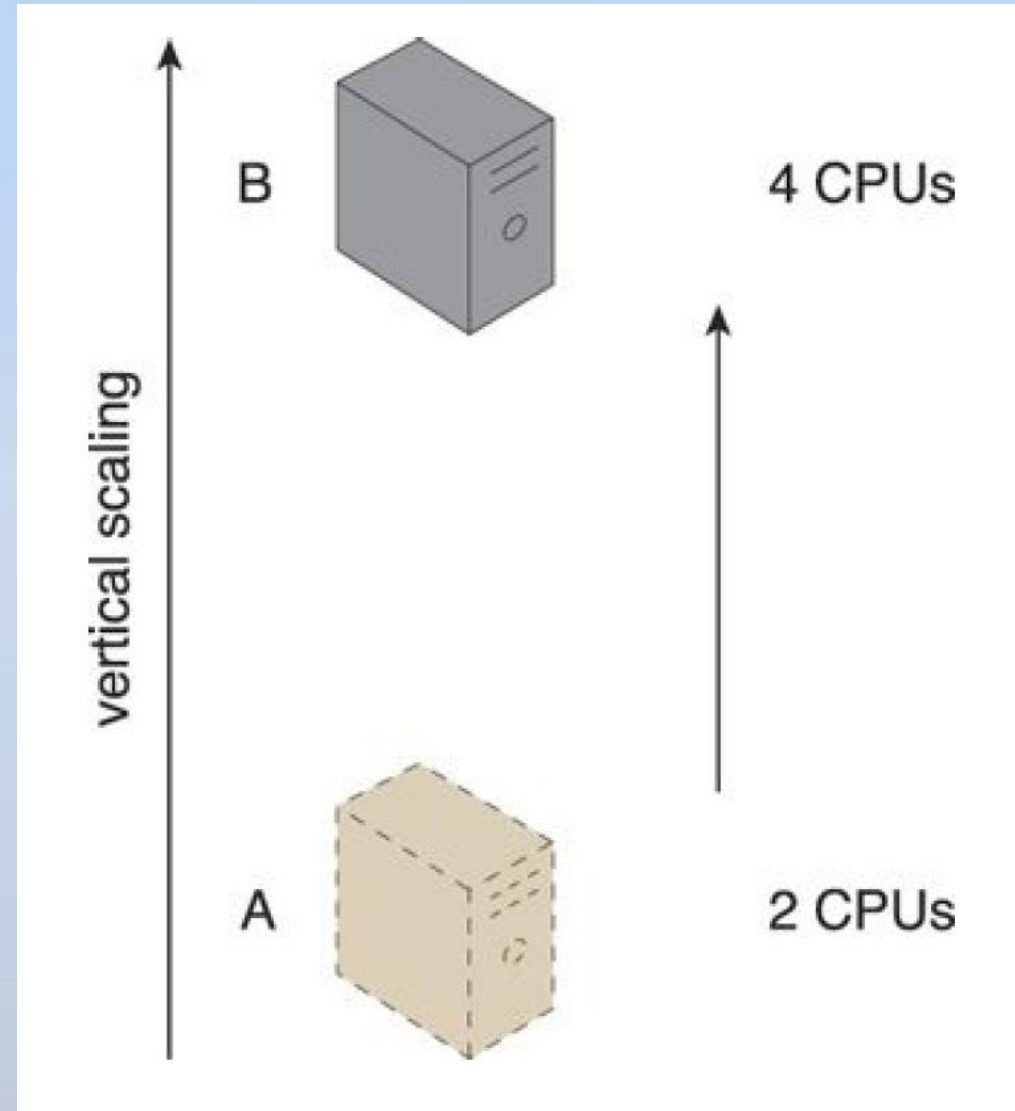 - Vertical Scaling

Horizontal Scaling

- The allocating or releasing of IT resources that are of the same type.
- More common in cloud environments.

pooled physical servers

virtual servers

A → demand → A B → demand → A B C

horizontal scaling
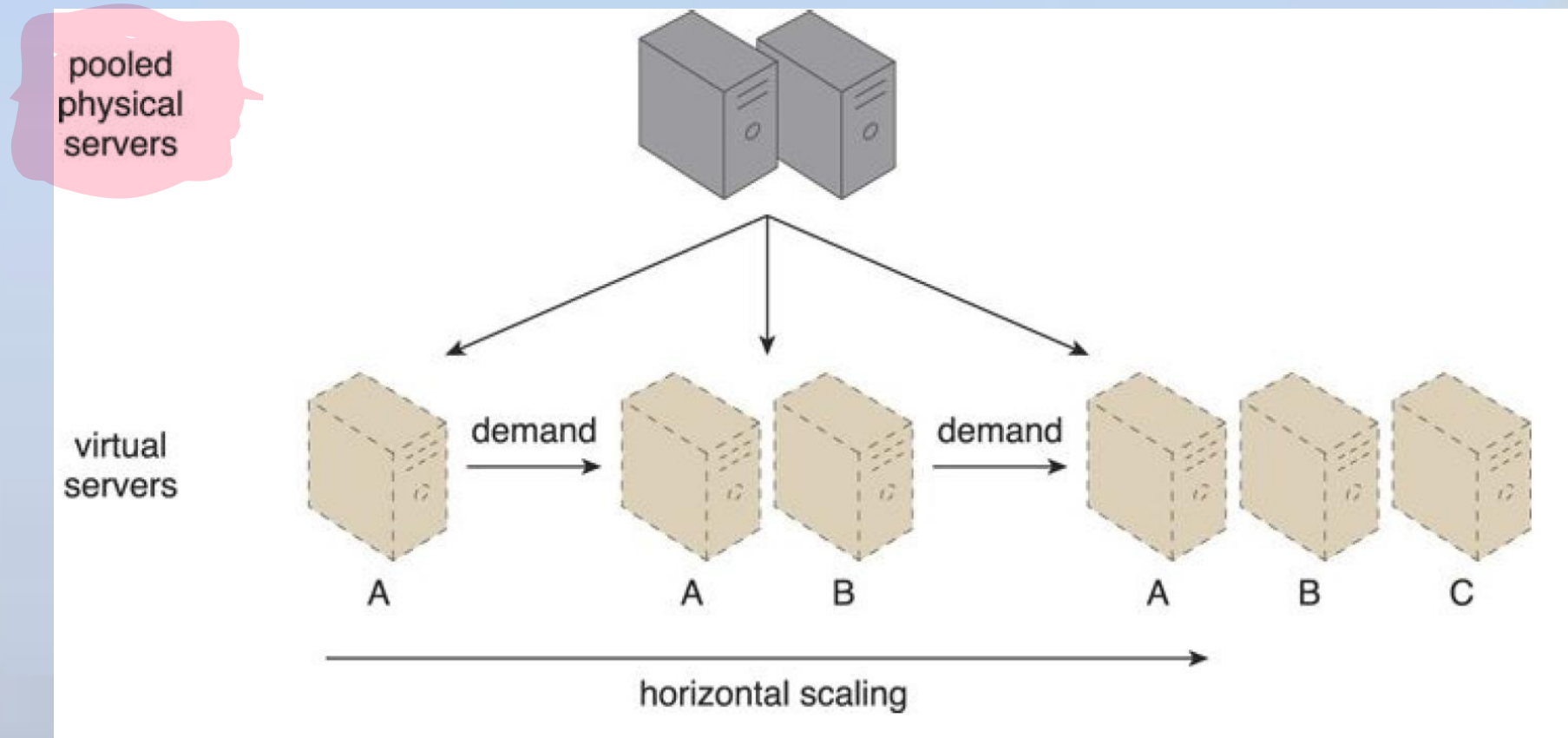
Vertical Scaling

- When an existing IT resource is replaced by another with higher or lower capacity.

- Less common in cloud environments

Cloud Service

- A cloud service is any IT resource that is made remotely accessible via a cloud.

- Although a cloud is a remotely accessible environment, not all IT resources residing within a cloud can be made available for remote access.

- The driving motivation behind cloud computing is to provide IT resources as services that encapsulate other IT resources, while offering functions for client to use and leverage remotely.

Cloud Characteristics

- **On-demand usage** – self service provisioning
- **Ubiquitous access** – from anywhere
- **Multitenancy** (and resource pooling) – by cloud provider
- **Elasticity** – horizontal scaling
- **Measured usage** – keeping track of resource used
- Resiliency - redundant IT resources within the same cloud (but in different physical locations) or across multiple clouds
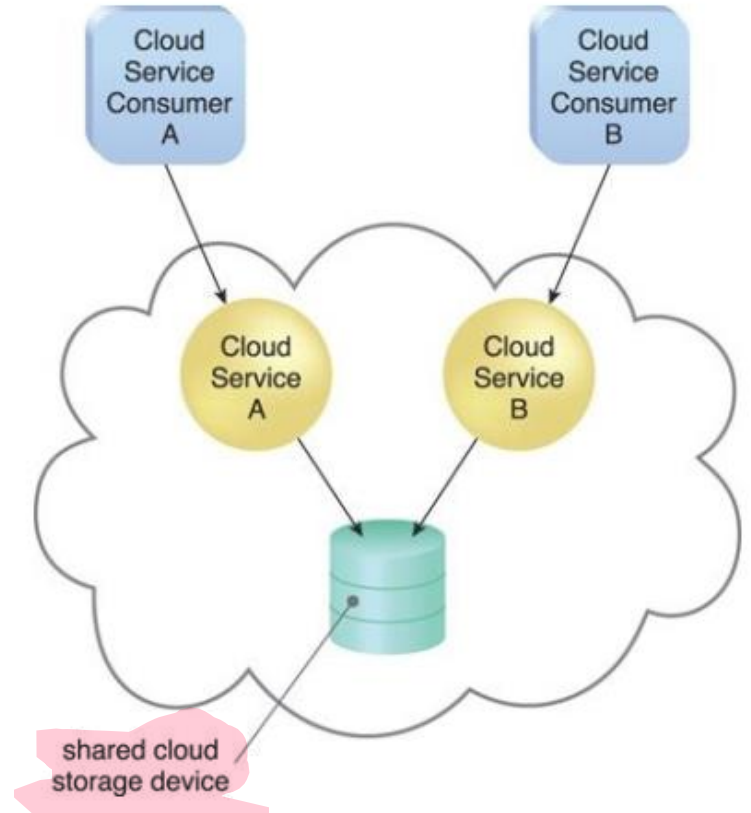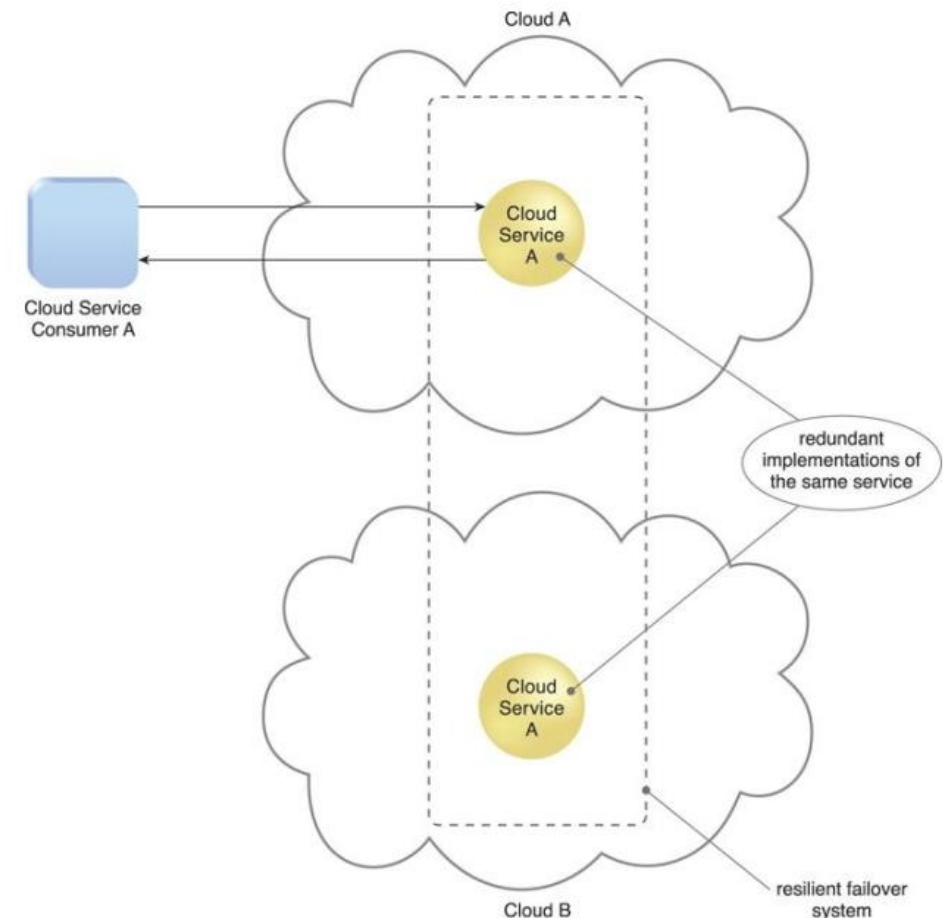
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Roles

- Cloud Provider: The organization that provides cloud-based IT resources
- Cloud consumer: an organization (or a human) that has a formal contract or arrangement with a cloud provider to use IT resources made available by the cloud provider
- Cloud resource administrator
  - The person or organization responsible for administering a cloud-based IT resource.
  - Can be (or belong to) the cloud consumer or cloud provider
  - Alternatively, it can be (or belong to) a third-party organization contracted to administer the cloud-based IT resource.

Organisational Boundary vs Trust Boundary
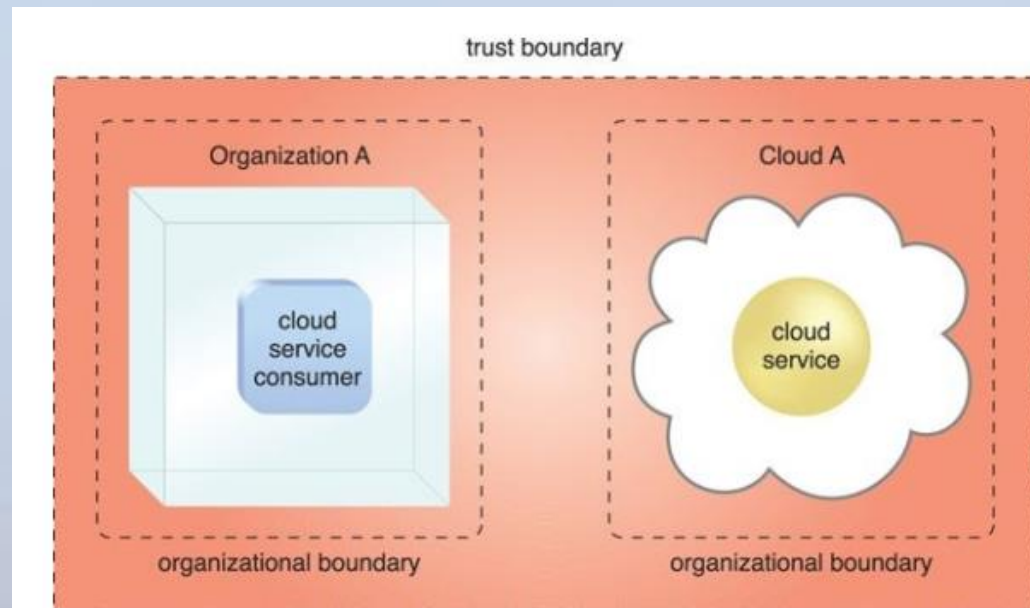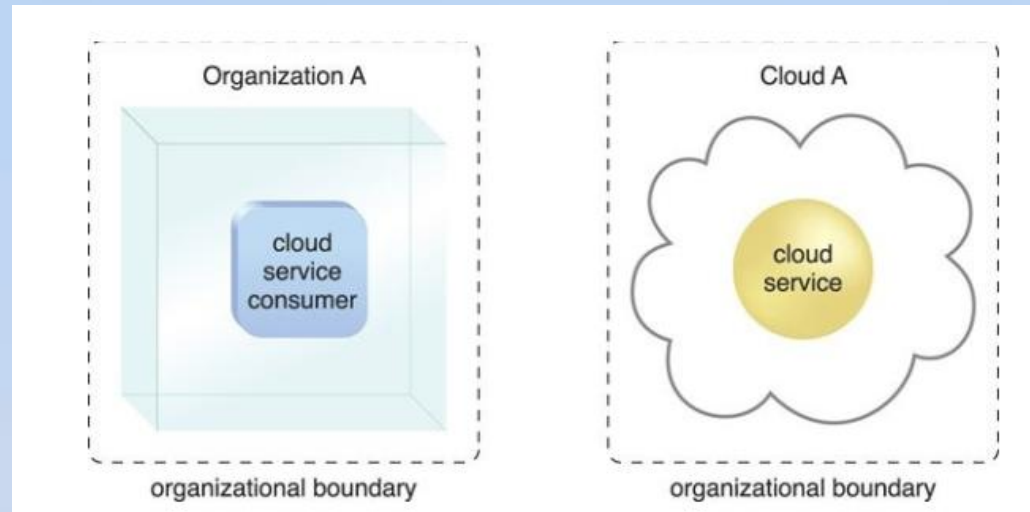
Goals and Benefits

- Reduced upfront Investments
- Proportional Costs
- Increased Scalability
- Increased Availability
- Increased Reliability

Risks

- Increased Security Vulnerabilities
- Reduced Operational Governance Control
- Limited Portability Between Cloud Providers
- Multi-Regional Compliance and Legal Issues

What you don't do…

What you do but don't say…