Microsoft

AZ-900

Learning path 01:
Cloud concepts

Learning path 01—outline

You will learn the following concepts:

1 **Cloud computing**

- What is cloud computing
- Shared responsibility
- Cloud models
- Capital vs operational costing

2 **Cloud benefits**

- Benefits of the cloud

3 **Cloud service types**
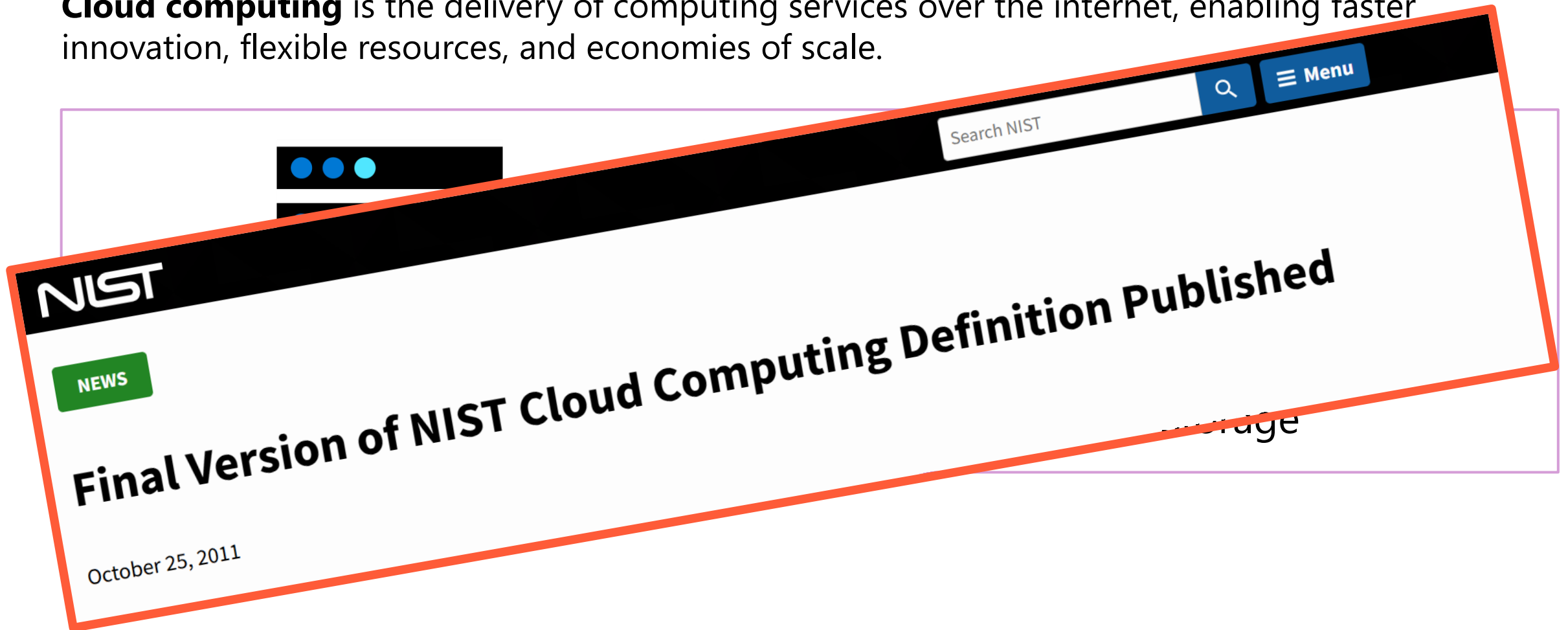
- IaaS, PaaS, and SaaS

Cloud computing

What is cloud computing?

Cloud computing is the delivery of computing services over the internet, enabling faster innovation, flexible resources, and economies of scale.

NEWS

Final Version of NIST Cloud Computing Definition Published

October 25, 2011

2. The NIST Definition of Cloud Computing

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. This cloud model is composed of five essential characteristics, three service models, and four deployment models.

Essential 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.

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).

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.

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.

Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability[1] 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.
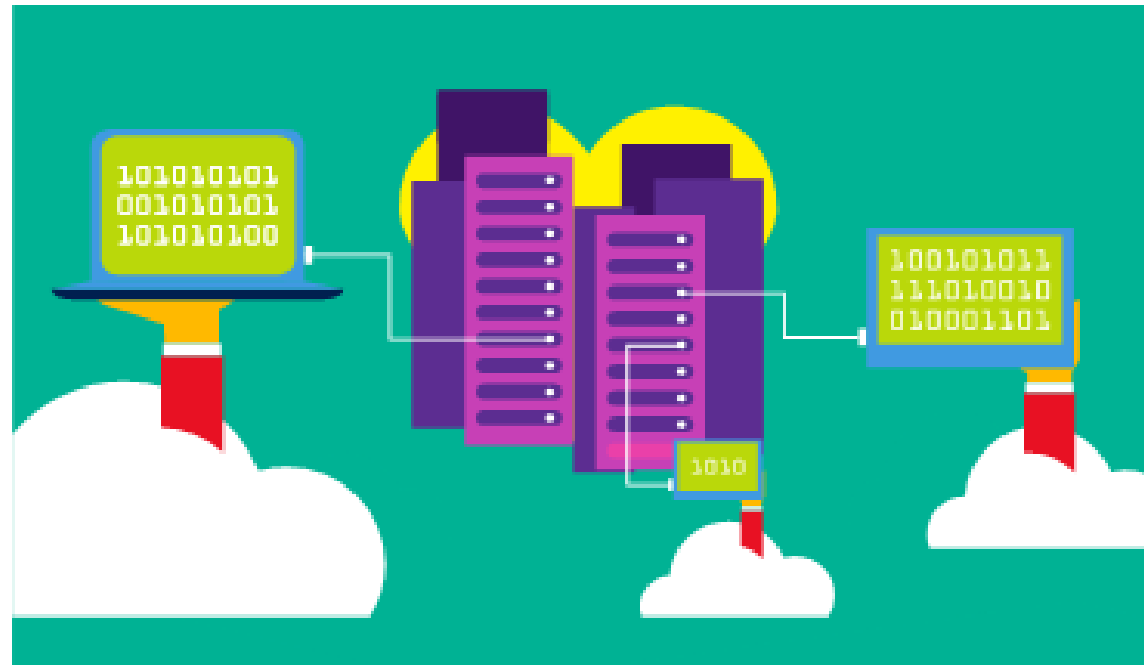
Private cloud

- Organizations create a cloud environment in their datacenter.

- Organizations are responsible for operating the services they provide.

- Does not provide access to users outside of the organization.

Public cloud

- Owned by cloud services or hosting provider.

- Provides resources and services to multiple organizations and users.

- Accessed via secure network connection (typically over the internet).

Hybrid cloud

Combines **public** and **private** clouds to allow applications to run in the most appropriate location.

Cloud model comparison

Public cloud

- No capital expenditures to scale up.

- Applications can be quickly provisioned and deprovisioned.

- Organizations pay only for what they use.

Private cloud

- Hardware must be purchased for start-up and maintenance.

- Organizations have complete control over resources and security.

- Organizations are responsible for hardware maintenance and updates.

Hybrid cloud

- Provides the most flexibility.

- Organizations determine where to run their applications.

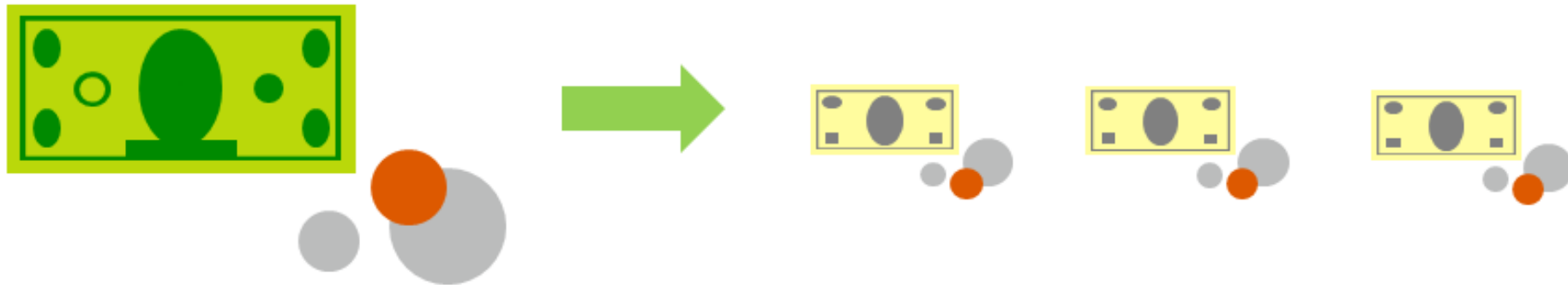- Organizations control security, compliance, or legal requirements.

Compare CapEx vs. OpEx

Capital expenditure (CapEx)

- The upfront spending of money on physical infrastructure.

- Costs from CapEx have a value that reduces over time.

Operational expenditure (OpEx)

- Spend on products and services as needed, pay-as-you-go.

- Get billed immediately.

Consumption-based model

Cloud service providers operate on a consumption-based model, which means that end users only pay for the resources that they use.

- Better cost prediction.

- Prices for individual resources and services are provided.

- Billing is based on actual usage.

Cloud benefits

Cloud benefits

High availability	Elasticity
Scalability	Reliability
Predictability	Security
Governance	Manageability

Cloud service types

Infrastructure as a service (IaaS)

IaaS

Servers and storage

Networking firewalls/Security

Datacenter physical plant/building
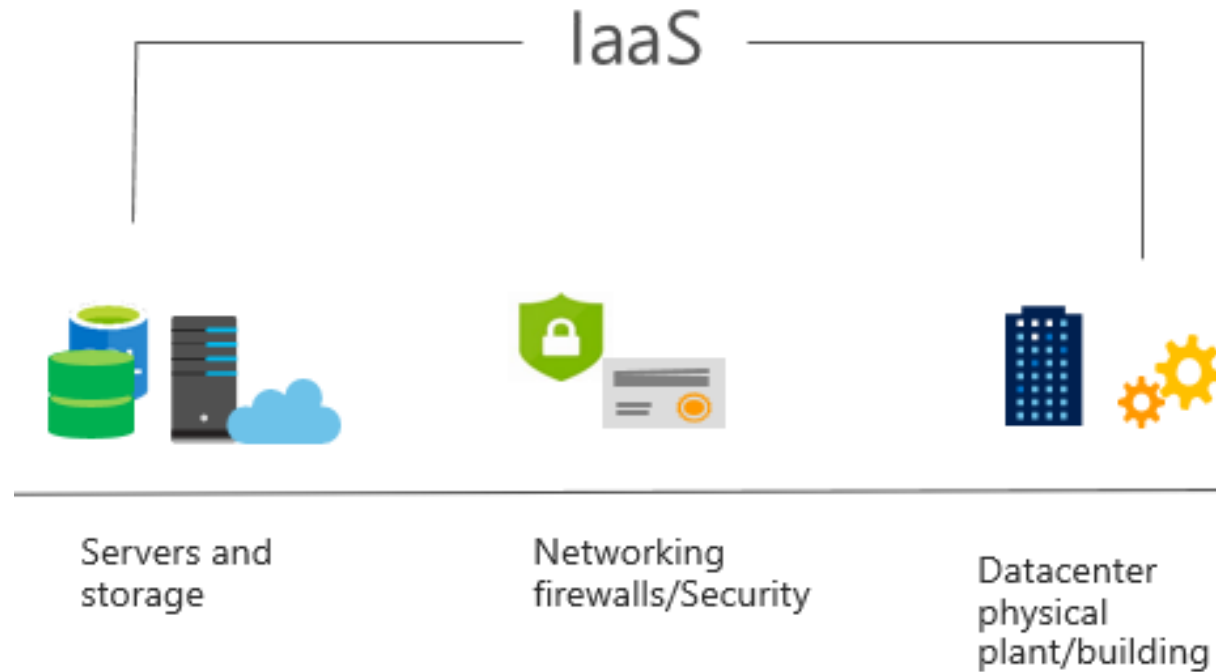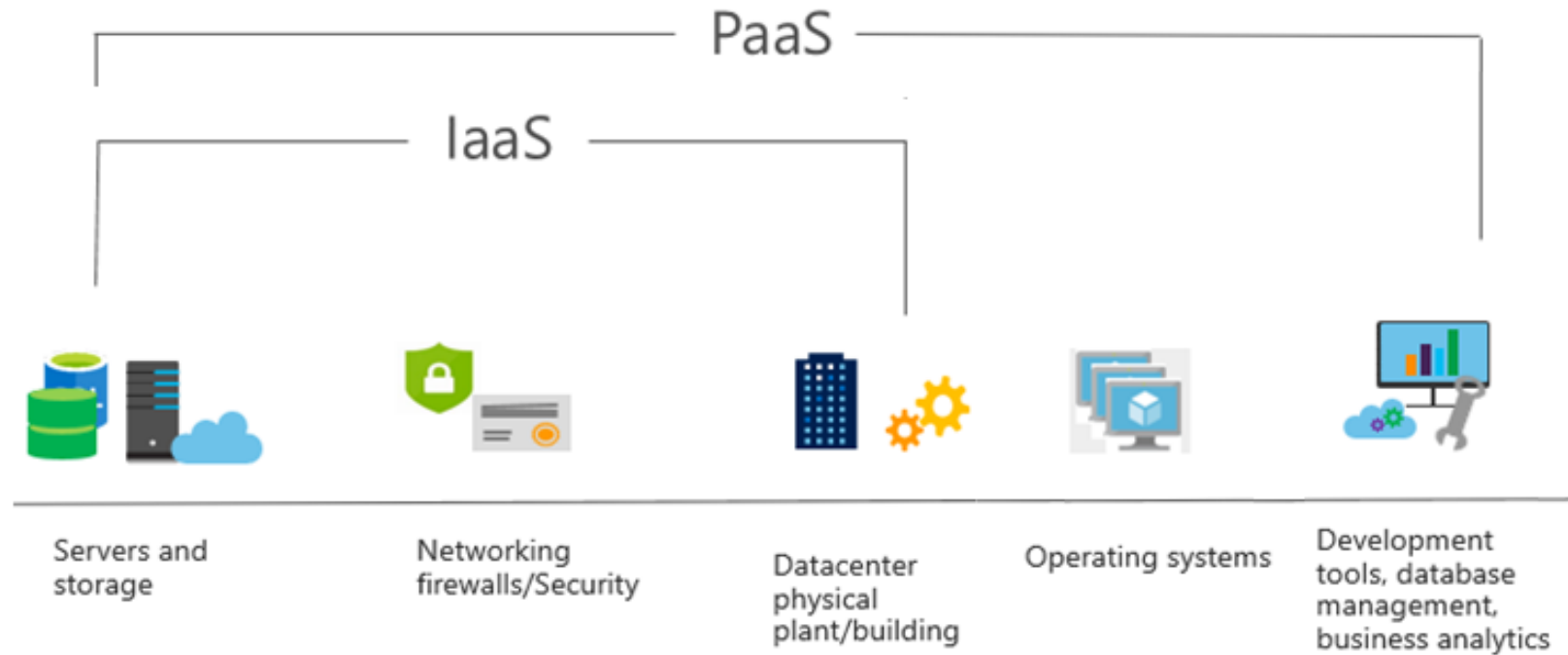
Build pay-as-you-go IT infrastructure by renting servers, virtual machines, storage, networks, and operating systems from a cloud provider.

Platform as a service (PaaS)

Provides an environment for building, testing, and deploying software applications; without focusing on managing underlying infrastructure.

Software as a service (SaaS)
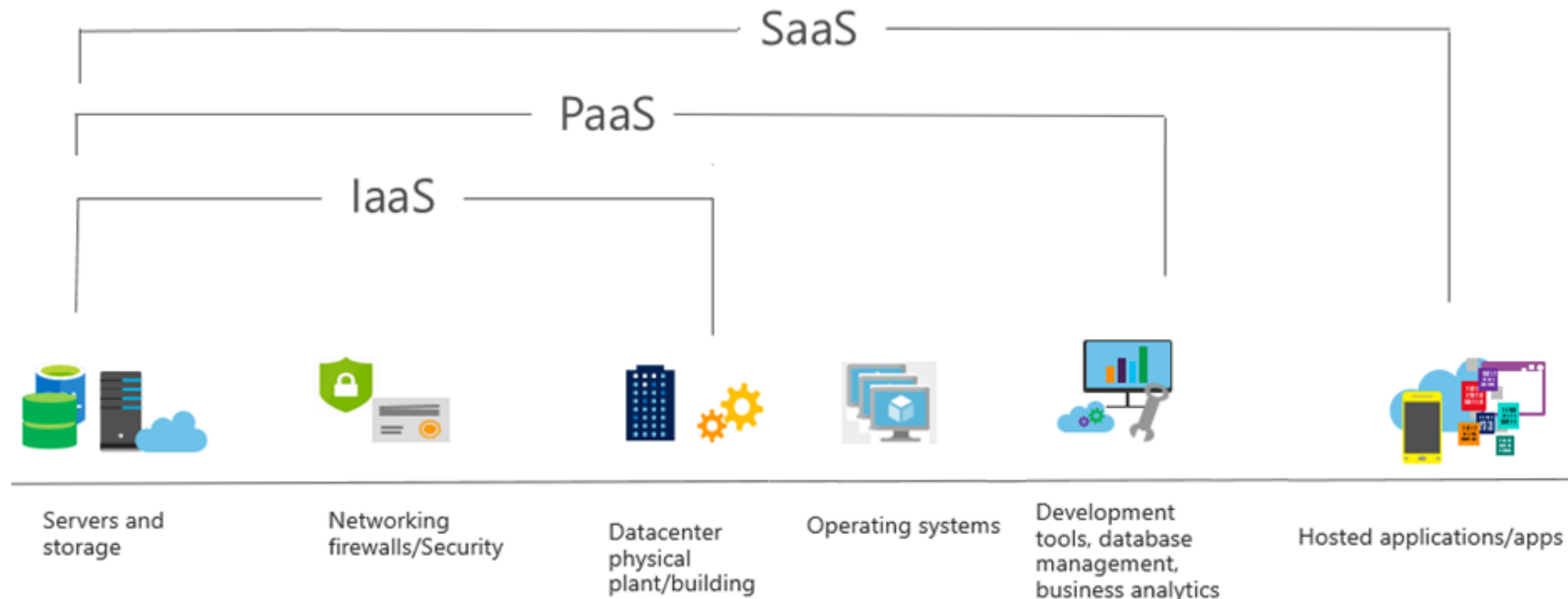
Users connect to and use cloud-based apps over the internet: for example, Microsoft Office 365, email, and calendars.

Shared responsibility model
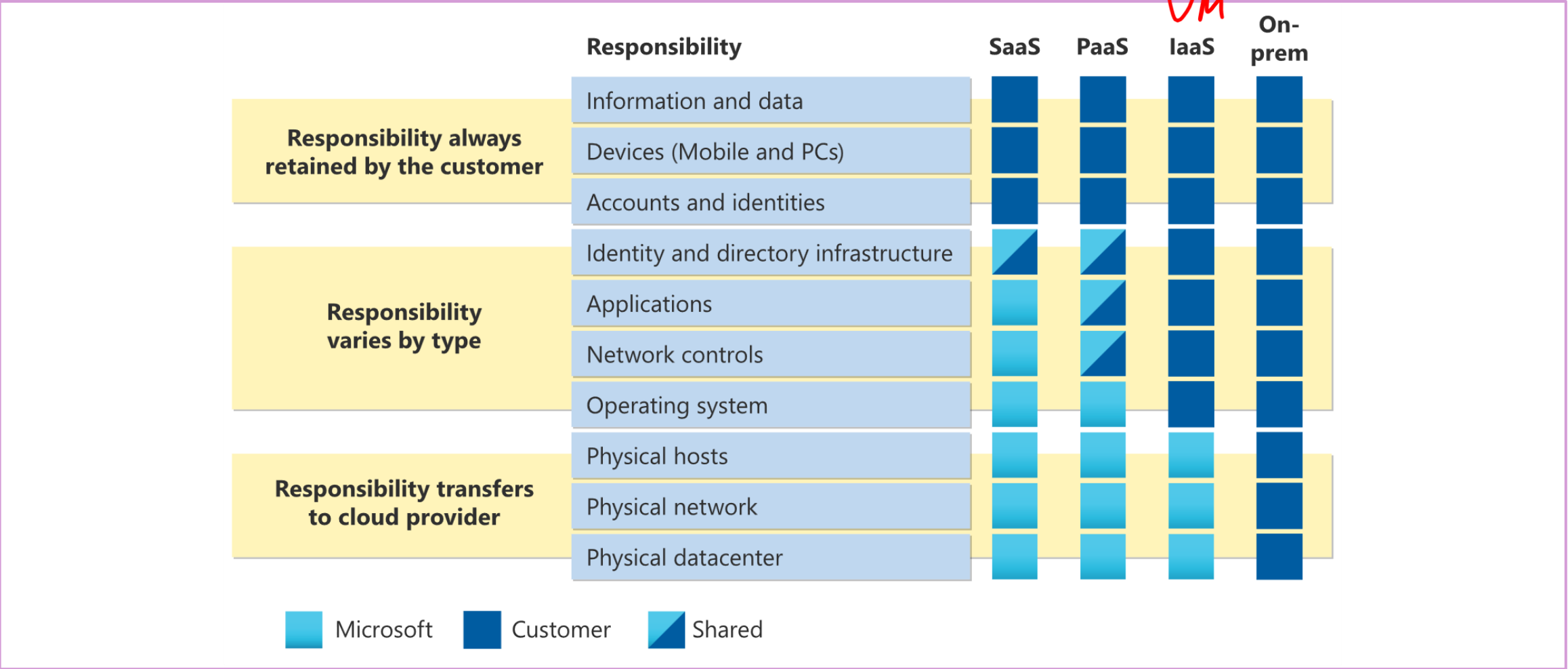

Responsibility		SaaS	PaaS	IaaS	On-prem
Responsibility always retained by the customer	Information and data	Customer	Customer	Customer	Customer
	Devices (Mobile and PCs)	Customer	Customer	Customer	Customer
	Accounts and identities	Customer	Customer	Customer	Customer
Responsibility varies by type	Identity and directory infrastructure	Shared	Shared	Customer	Customer
	Applications	Microsoft	Shared	Customer	Customer
	Network controls	Microsoft	Shared	Customer	Customer
	Operating system	Microsoft	Microsoft	Customer	Customer
Responsibility transfers to cloud provider	Physical hosts	Microsoft	Microsoft	Microsoft	Customer
	Physical network	Microsoft	Microsoft	Microsoft	Customer
	Physical datacenter	Microsoft	Microsoft	Microsoft	Customer

Legend: Microsoft | Customer | Shared

Cloud service comparison

IaaS

- The most flexible cloud service.
- You configure and manage the hardware for your application.
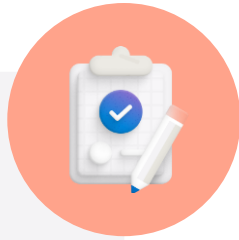
PaaS

- Focus on application development.
- Platform management is handled by the cloud provider.

SaaS

- Pay-as-you-go pricing model.
- Users pay for the software they use on a subscription model.

Learning path 01 review

**Microsoft Learn Modules
(learn.microsoft.com/training)**

- The shared responsibility model
- Public, private, and hybrid-cloud
- Benefits of cloud computing
- Cloud service types