Cloud Concepts

AZ-900: Microsoft Azure Fundamentals

Exam objectives

Modules:

- Describe cloud concepts (25%- 30%)
- Describe the benefits of using cloud services (35—40%)
- Describe cloud service types (30—35%)

Module 1:

Describe cloud concepts

- Define cloud computing
- Describe the shared responsibility model
- Define cloud models, including public, private, and hybrid
- Describe the consumption-based model
- Compare cloud pricing models

What is cloud computing?

- It is the delivery of computing services over the internet, which is otherwise known as the cloud.
- These services include servers, storage, databases, networking, software, analytics, and intelligence.
- It uses a pay-as-you-go pricing model. You typically pay only for the cloud services you use, which helps you:
  - to lower your operation costs
  - scale your business needs
  - run your infrastructure more efficiently

MOBILE

NETWORK

DATABASE

TABLET

SERVER

LAPTOP

CLOUD COMPUTING

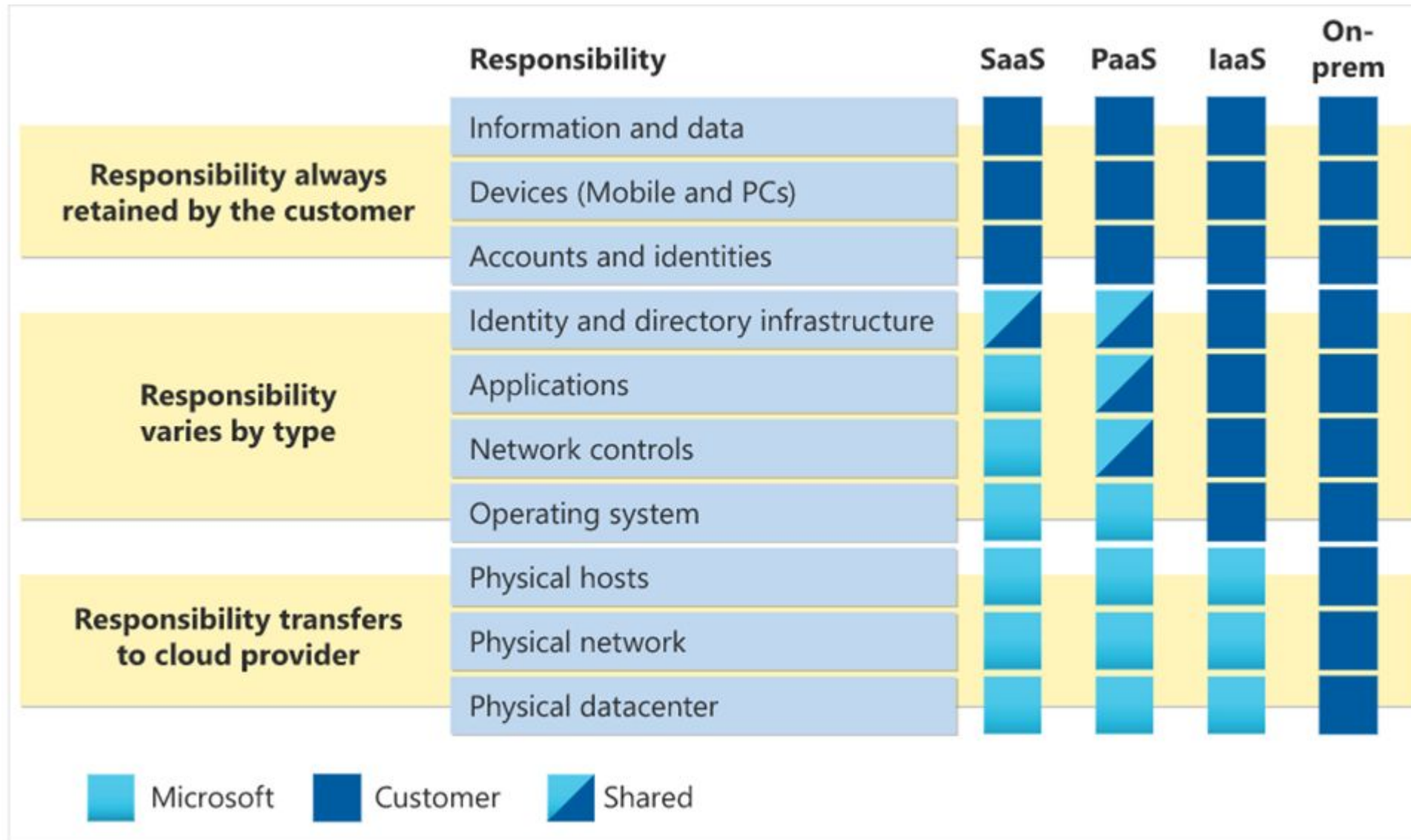SMARTPHONE
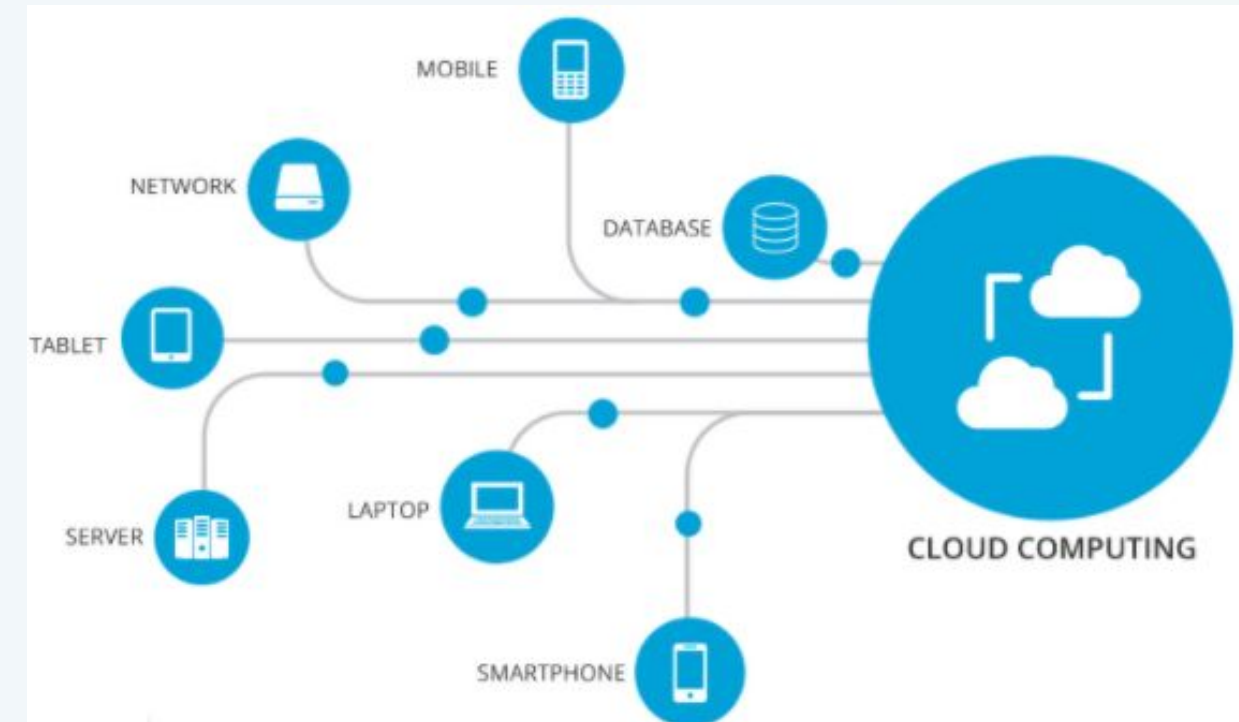
Why move to the cloud?

- A pool of raw compute, storage, and networking components
- Speech recognition and other cognitive services that help make your application stand out from the crowd
- Analytics services that deliver telemetry data from your software and devices

Shared responsibility model

You'll always be responsible for	The cloud provider is always responsible for	Your service model will determine responsibility for things like
● The information and data stored in the cloud	● The physical datacenter	● Operating systems
● Devices that are allowed to connect to your cloud (cell phones, computers, and so on)	● The physical network	● Network controls
● The accounts and identities of the people, services, and devices within your organization	● The physical hosts	● Applications ● Identity and infrastructure

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

Define cloud models

There are three deployment models for cloud computing: public cloud, private cloud, and hybrid cloud. Each deployment model has different aspects that you should consider as you migrate to the cloud.

Deployment model	Description
Public cloud	Services are offered over the public internet and available to anyone who wants to purchase them. Cloud resources like servers and storage are owned and operated by a third-party cloud service provider and delivered over the internet.
Private cloud	Computing resources are used exclusively by users from one business or organization. A private cloud can be physically located at your organization's on-site datacenter. It also can be hosted by a third-party service provider.
Hybrid cloud	This computing environment combines a public cloud and a private cloud by allowing data and applications to be shared between them.

Private cloud

- Run inside the enterprise (on-prem)

- Considered more secure

- You own all hardware and software

Public cloud

- Runs outside of the enterprise

- Provides elastic scaling

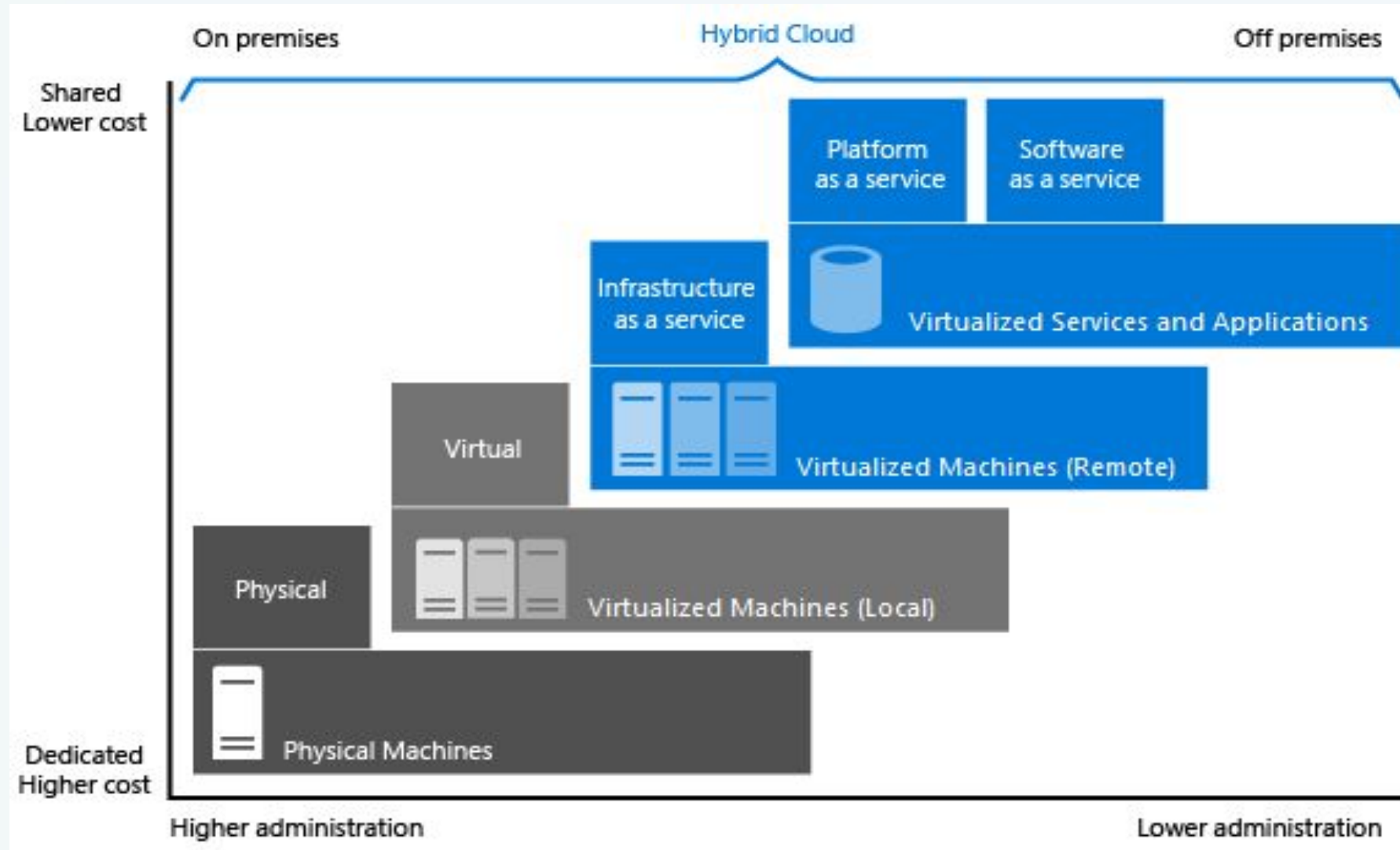- You don't own the hardware or software

Hybrid cloud

- Runs in the enterprise and within the public cloud (connecting on-prem to public cloud)

- Considered the most flexible model

PriMulti-cloud

- leveraging more than a single public cloud

Reference :https://multi-cloud-solutions.com/2022/04/18/multi-cloud/

Deployment Models (cont'd)

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Describe the consumption-based model

Capital Expenditure vs Operational Expenditure

CapEx	OpEx
Capital expenditures (CapEx) refers to long-term business investments. It's expected that CapEx will continue to benefit the business in the future and eventually pay for itself. Maintenance increases the life and utility of a CapEx item is therefore also a capital expenditure.	Operating expenditures (OpEx) are incurred in the day-to-day operation of a business, and generally include services or items expected to be used within a year. While operating expenditures are no less important than capital expenditures, they are not considered long-term investments.
A typical on-premise IT infrastructure generally requires significant CapEx including hardware, equipment, and maintenance. The upfront costs are predictable, but the lifetime of CapEx items and total maintenance costs are uncertain.	a cloud environment on a platform like Microsoft Azure operates on an OpEx model where a company only pays for what it needs at the specific point in time, on a monthly basis. Risks are lower and no equipment maintenance is required.
inherent inflexibility. You may end up paying for capacity your business does not require in the future, or in the future end up in the painstaking and expensive process of increasing capacity.	The OpEx model of cloud computing offers companies significantly more flexibility and agility. Microsoft Azure scales up or down to meet your specific capacity needs and budget.

Module 2:

Describe the benefits of using cloud services

- Describe the benefits of high availability and scalability in the cloud
- Describe the benefits of reliability and predictability in the cloud
- Describe the benefits of security and governance in the cloud
- Describe the benefits of manageability in the cloud

What are some cloud computing advantages?

High availability	Depending on the service-level agreement that you choose, your cloud-based applications can provide a continuous user experience with no apparent downtime even when things go wrong.
Scalability	Applications in the cloud can be scaled in two ways: • *Vertically*: Computing capacity can be increased by adding RAM or CPUs to a virtual machine. • *Horizontally*: Computing capacity can be increased by adding instances of a resource, such as adding more virtual machines to your configuration.
Elasticity	Cloud-based applications can be configured to take advantage of autoscaling, so your applications will always have the resources they need.
Agility	Cloud-based resources can be deployed and configured quickly as your application requirements change
Geo-distribution	Applications and data can be deployed to regional data centers around the globe, so your customers always have the best performance in their region
Disaster recovery	By taking advantage of cloud-based backup services, data replication, and geo-distribution, you can deploy your applications with the confidence that comes from knowing that your data is safe in the event that disaster should occur.

Describe the benefits of reliability and predictability in the cloud

Reliability	Reliability is the ability of a system to recover from failures and continue to function. ● With a decentralized design, the cloud enables you to have resources deployed in regions around the world. With this global scale, even if one region has a catastrophic event other regions are still up and running. ● You can design your applications to automatically take advantage of this increased reliability. ● In some cases, your cloud environment itself will automatically shift to a different region for you, with no action needed on your part.
Predictability	Predictability in the cloud lets you move forward with confidence. Predictability can be focused on: ● performance predictability ● cost predictability. Both

Benefits of manageability in the cloud

Management of the cloud speaks to managing your cloud resources. In the cloud, you can:

- Automatically scale resource deployment based on need.
- Deploy resources based on a preconfigured template, removing the need for manual configuration.
- Monitor the health of resources and automatically replace failing resources.
- Receive automatic alerts based on configured metrics, so you're aware of performance in real time.
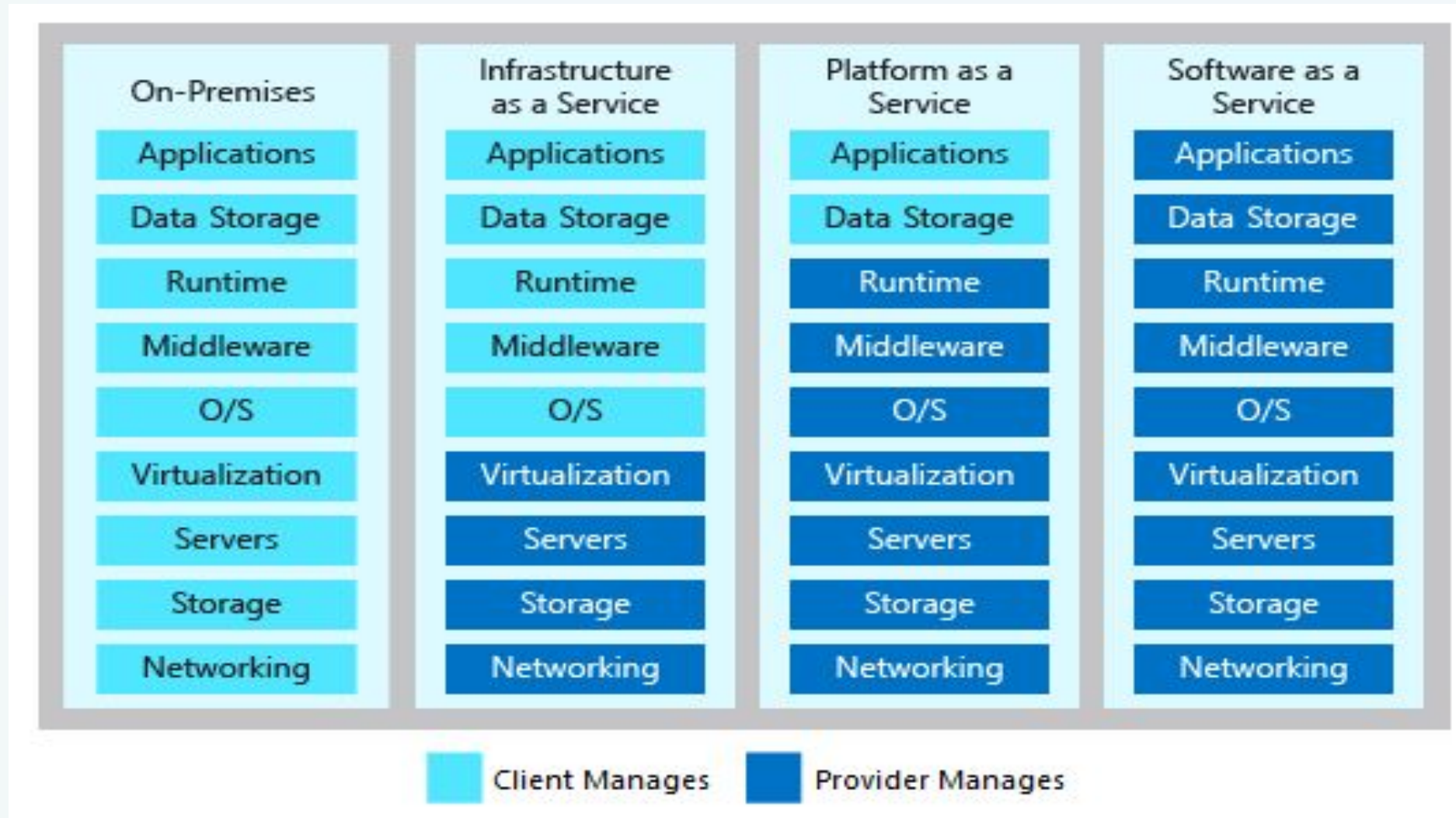
Module 3:

Describe cloud service types

- Describe infrastructure as a service (IaaS)
- Describe platform as a service (PaaS)
- Describe software as a service (SaaS)
- Identify appropriate use cases for each cloud service (IaaS, PaaS, SaaS)

Shared responsibility model

IaaS	A cloud provider keeps the hardware up to date, but operating system maintenance and network configuration is left to the cloud tenant.
PaaS	This cloud service model is a managed hosting environment. The cloud provider manages the virtual machines and networking resources, and the cloud tenant deploys their applications into the managed hosting environment.
SaaS	In this cloud service model, the cloud provider manages all aspects of the application environment, such as virtual machines, networking resources, data storage, and applications. The cloud tenant only needs to provide their data to the application managed by the cloud provider.

Cloud Service models (cont'd)

On-Premises	Infrastructure as a Service	Platform as a Service	Software as a Service
Applications	Applications	Applications	Applications
Data Storage	Data Storage	Data Storage	Data Storage
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

Client Manages   Provider Manages

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Iaas

Scenarios

- Lift-and-shift migration: You're setting up cloud resources similar to your on-prem data center, and then simply moving the things running on-prem to running on the IaaS infrastructure.

- Testing and development: You have established configurations for development and test environments that you need to rapidly replicate. You can start up or shut down the different environments rapidly with an IaaS structure, while maintaining complete control.

Paas

Scenarios

- Development framework: PaaS provides a framework that developers can build upon to develop or customize cloud-based applications. Similar to the way you create an Excel macro, PaaS lets developers create applications using built-in software components. Cloud features such as scalability, high-availability, and multi-tenant capability are included, reducing the amount of coding that developers must do.

- Analytics or business intelligence: Tools provided as a service with PaaS allow organizations to analyze and mine their data, finding insights and patterns and predicting outcomes to improve forecasting, product design decisions, investment returns, and other business decisions.

Saas

Scenarios

Email and messaging.

Business productivity applications.

Finance and expense tracking.

YOUR OWN CAR
On-premises solution

LEASED CAR
IaaS

TAXI
PaaS

BUS
SaaS

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