Cloud Infrastructure Week#1

Emrah Mutlu
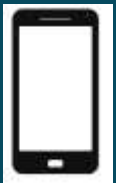
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Dokuz Eylul University

Electrical & Electronics Eng. – 2008

Bahcesehir Unv. – MBA – 2019

2008 – Nortel Netas: CVoIP Eng.

2013 – Netas: Engineering Team Lead

2014 – Netas: Engineering & CyberSec. Group Manager

2022 – OI Türkiye: Sr. Mgr & CSA

Global Support

BI Team

PoC Team

Unv. Relationship

Hiring Team

CSA

MBA

Linux Administration

CISCO CERTIFIED CCNA ROUTING & SWITCHING

CISCO CERTIFIED CCNP ROUTING & SWITCHING

Microsoft CERTIFIED AZURE SOLUTIONS ARCHITECT EXPERT

Microsoft AZURE SECURITY ENGINEER ASSOCIATE

Microsoft AZURE ADMINISTRATOR ASSOCIATE

aws PARTNER Advanced Tier Services

AWS Well-Architected

- Introduction to Cloud

- Cloud Service Models

- Deployment Models

- Services

- Accounts

- Regions

- Availability Zones

- Lab Session: Creating Free Accounts

- Lab Session: Creating a Web Page hosted by Cloud Services

Grading Scale:

- **Homework: %30**

- **Midterm %30**

- **Final Exam: %40**

- **Answers to bonus questions will be added separately.**

Introduction to Cloud

What is Cloud Computing?

- Pay-As-You-Go Model (CapEx vs. OpEx)

- Compute & Storage Nodes with efficient use

- Scalability & Cost Efficiency

Why is cloud computing typically cheaper to use?

- Lower your operating costs.

- Run your infrastructure more efficiently.

- Scale as your business needs change.

Why should I move to the cloud?

- The cloud helps you move faster and innovate in ways that were once nearly impossible.

- Teams deliver new features to their users at record speeds.

- Users expect an increasingly rich and immersive experience with their devices and with software.

The cloud provides on-demand access to:

- A nearly limitless 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.

CLOUD COMPUTING FUNDAMENTALS

Azure provides;

- IaaS, SaaS and Paas

- Pay-As-You-Go Model

- VMs

- Cloud-Based Storage

- Azure-App Services: Scalable hosting platform for Web-based apps.

- Azure Functions: Event-driven serverless applications

- Azure Container Instances: Allows to deploy containerized apps.

- Azure Kubernates Services: Allows to deploy containerized apps.

- DBs: SQL, Azure Cosmos DBs, PostgreSQL, etc.

- Azure AI & ML and IoT Services

- Regional Datacenters for dimensioning

- Azure Portal: Configure & Control all Services and Resources in one place
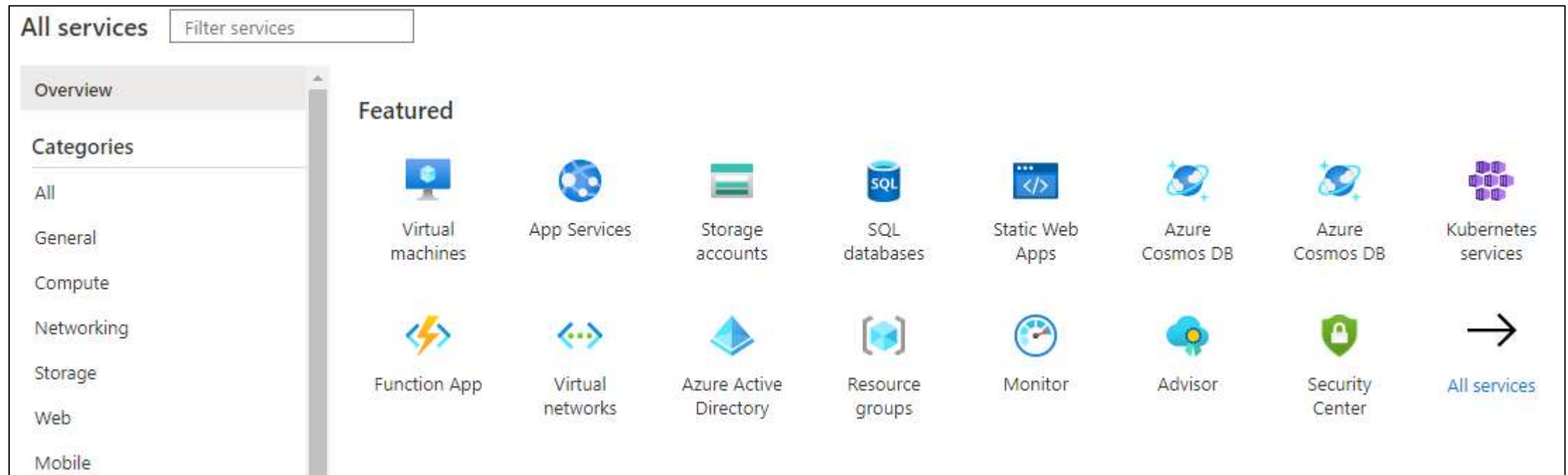
What are some cloud computing advantages?

- **Reliability:** 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.

Availability

The percentage of time that the infrastructure, system, or solution is operational under normal circumstances.

Reliability

The probability that the system will meet certain performance standards and yield correct output for a specific time.

What are some cloud computing advantages?

- **Scalability:** Applications in the cloud can be scaled in two ways, while taking advantage of autoscaling:
    - **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.
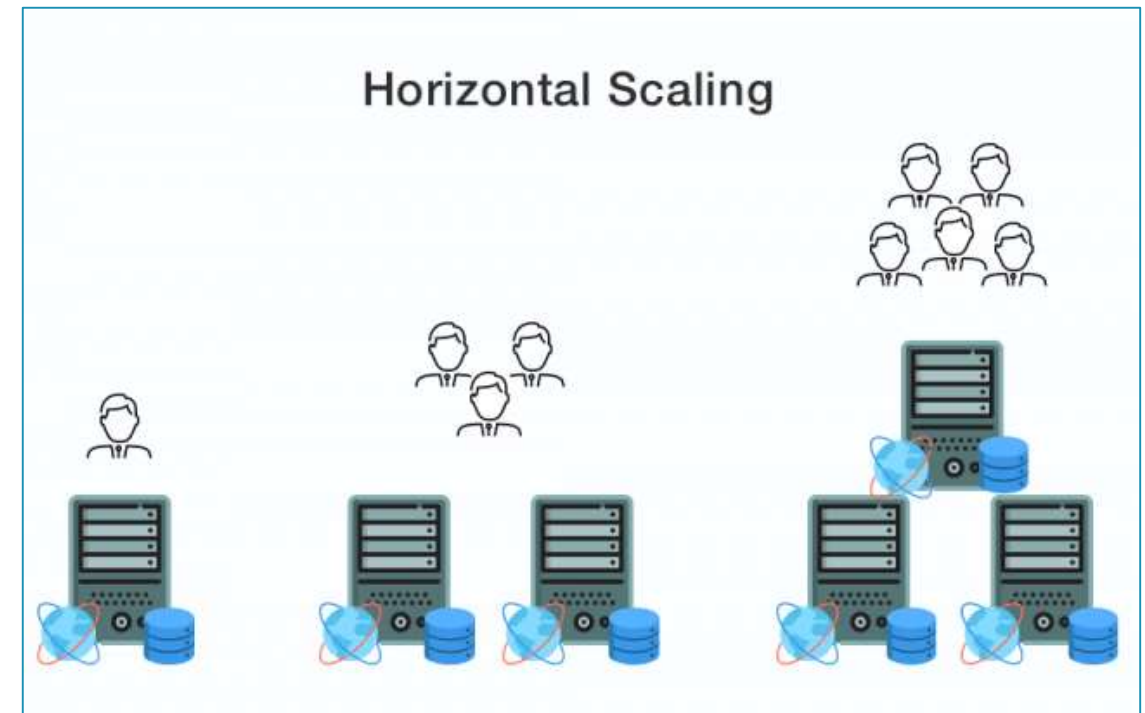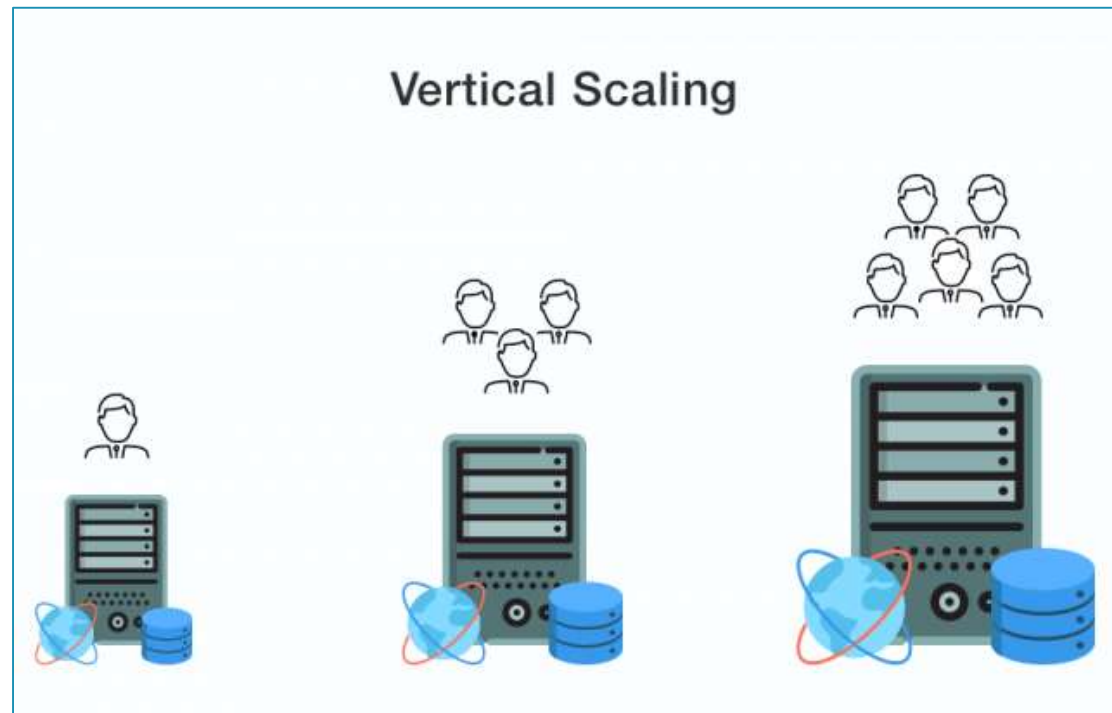
What are some cloud computing advantages?

- **Elasticity:** Cloud-based applications can be configured to always have the resources they need.
- **Agility:** Cloud-based resources can be deployed and configured quickly as your application requirements change.
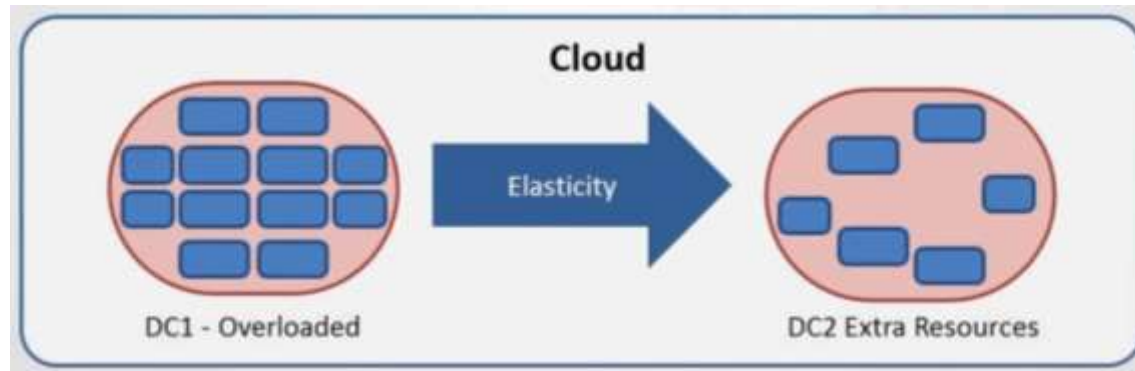
- GENEL- PUBLIC

What are some cloud computing advantages?

- **Geo-distribution:** Applications and data can be deployed to regional datacenters 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.
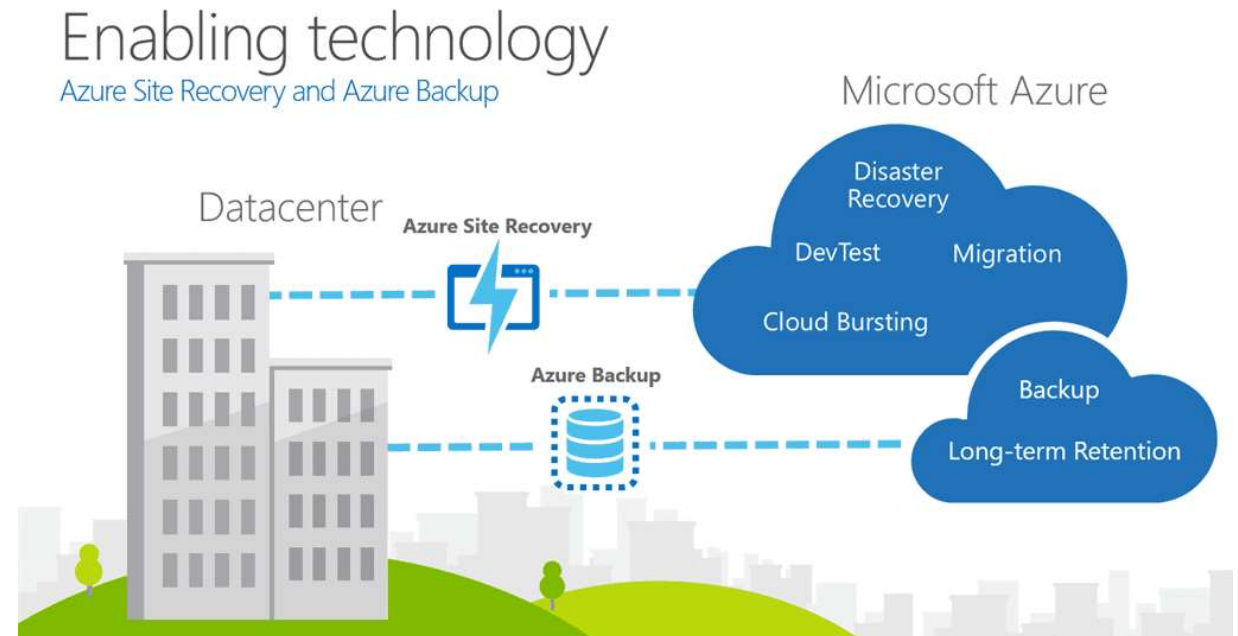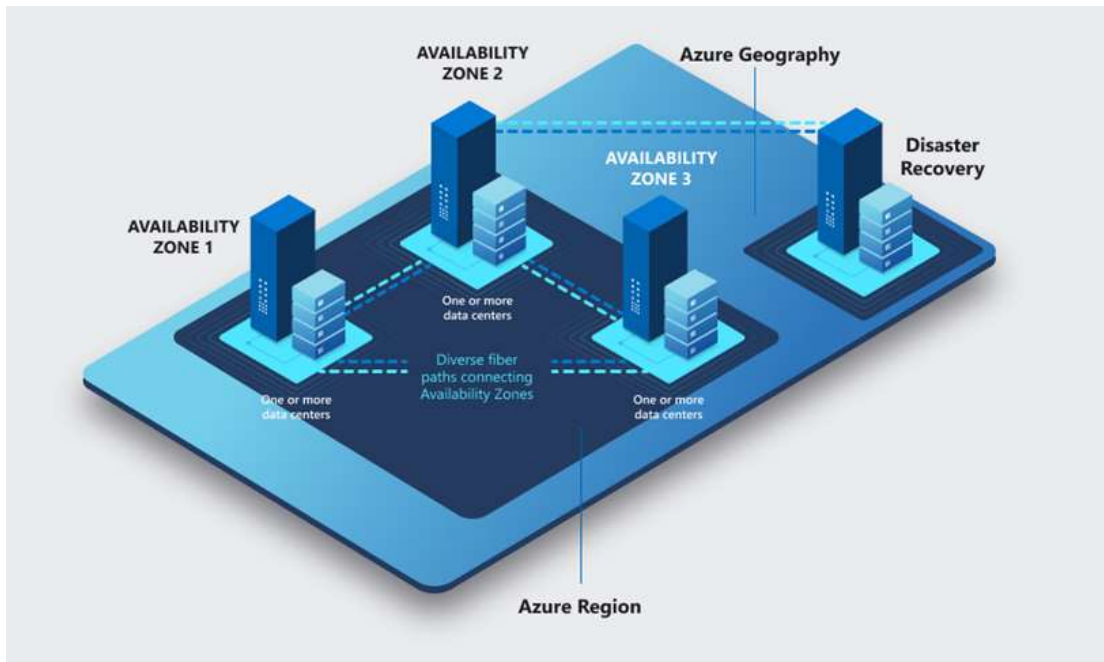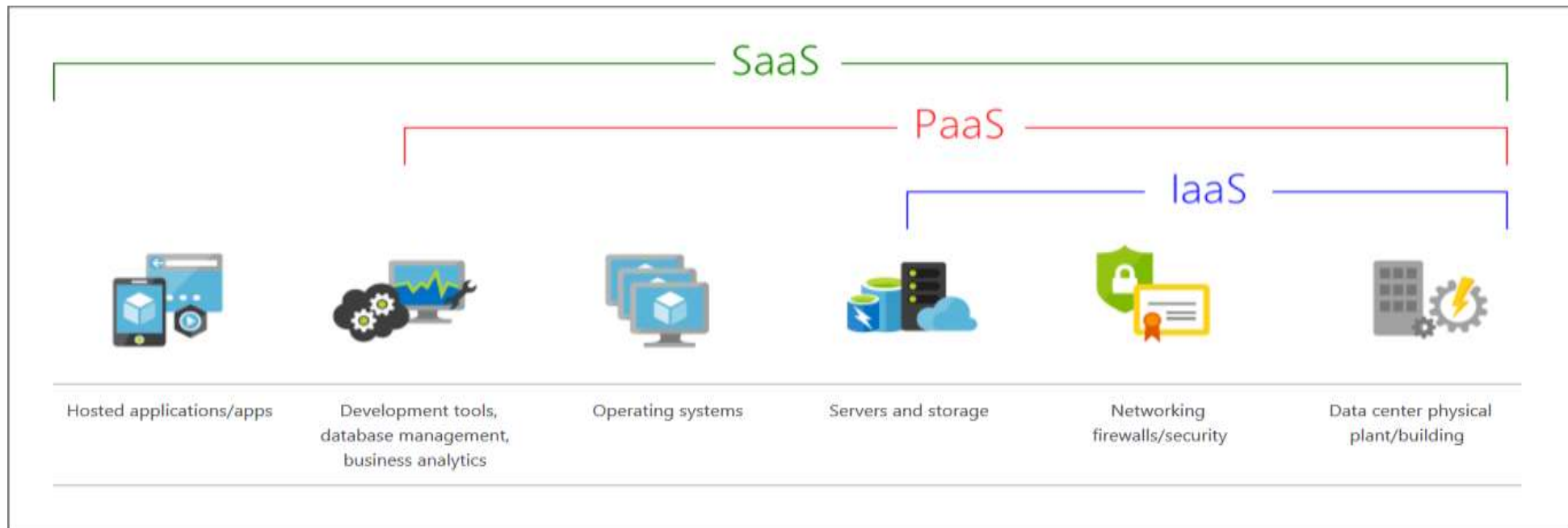
Cloud Service Models & Deployment Models & Services

CLOUD SERVICE MODELS

IaaS (Infrastructure as a Service): IaaS provides virtualized computing resources over the internet. It includes virtual machines, storage, and networks.
Example Providers: Amazon Web Services (AWS) Elastic Compute Cloud (EC2), Microsoft Azure Virtual Machines, Google Cloud Platform (GCP) Compute Engine.

PaaS (Platform as a Service): PaaS is a cloud computing service that provides a platform allowing customers to develop, run, and manage applications without dealing with the complexity of building and maintaining the underlying infrastructure.
Example Providers: AWS Lambda, Google App Engine, Microsoft Azure App Service.

SaaS (Software as a Service): SaaS delivers software applications over the internet, eliminating the need for users to install, maintain, and update the software on their devices.
Example Providers: Salesforce, Google Workspace, Microsoft 365, Dropbox.

On-Premises
- Applications
- Data Storage
- Runtime
- Middleware
- O/S
- Virtualization
- Servers
- Storage
- Networking

Infrastructure as a Service
- Applications
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- Middleware
- O/S
- Virtualization
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- Networking

Platform as a Service
- Applications
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- Runtime
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Software as a Service
- Applications
- Data Storage
- Runtime
- Middleware
- O/S
- Virtualization
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- Storage
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Client Manages   Provider Manages

CLOUD DEPLOYMENT MODELS

On Premise (Private Cloud): Dedicated, owned type of installation which is managed by the company itself.

Hybrid Cloud: A combination of public cloud and on-premise resources. Mostly preferrable method due to data regulations.

Public Cloud: All resources are on a single public cloud like AWS, Azure, GCP, OCI, Alibaba Cloud. The solution is also called Cloud-Native.

Multi-Cloud: Resources are separated on different Cloud vendors. The most preferrable Cloud-Native solution as it merges the benefits of different vendors.
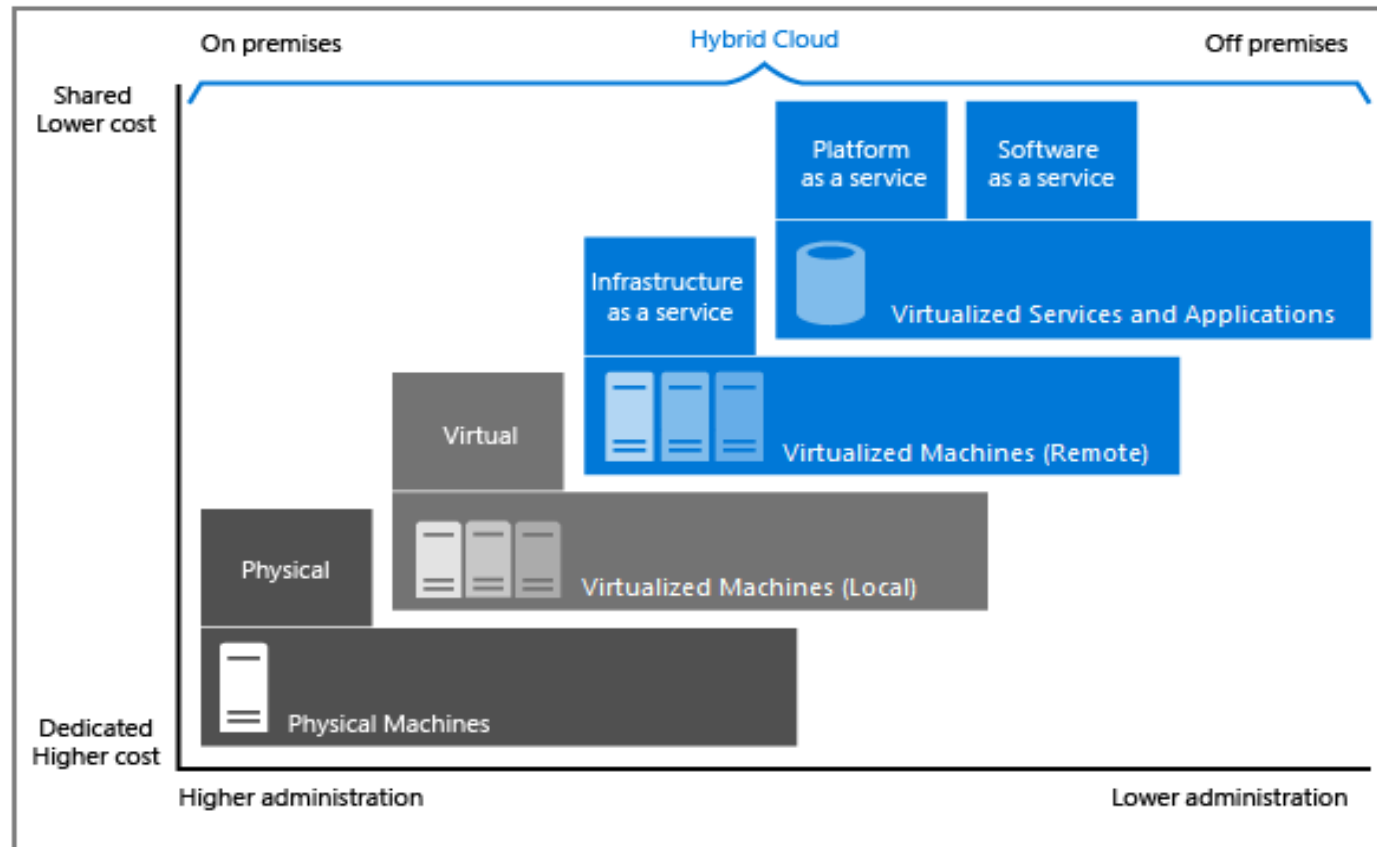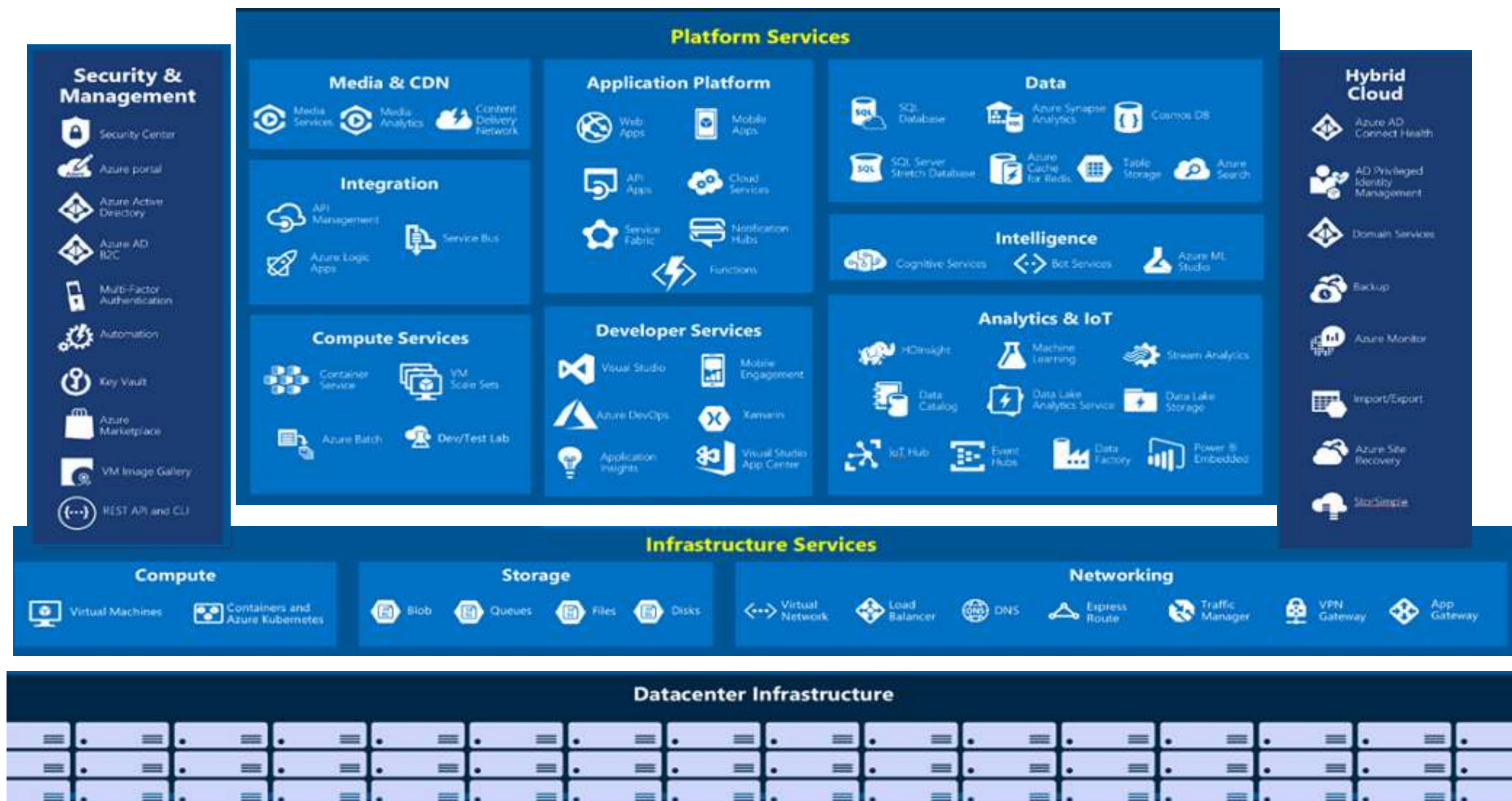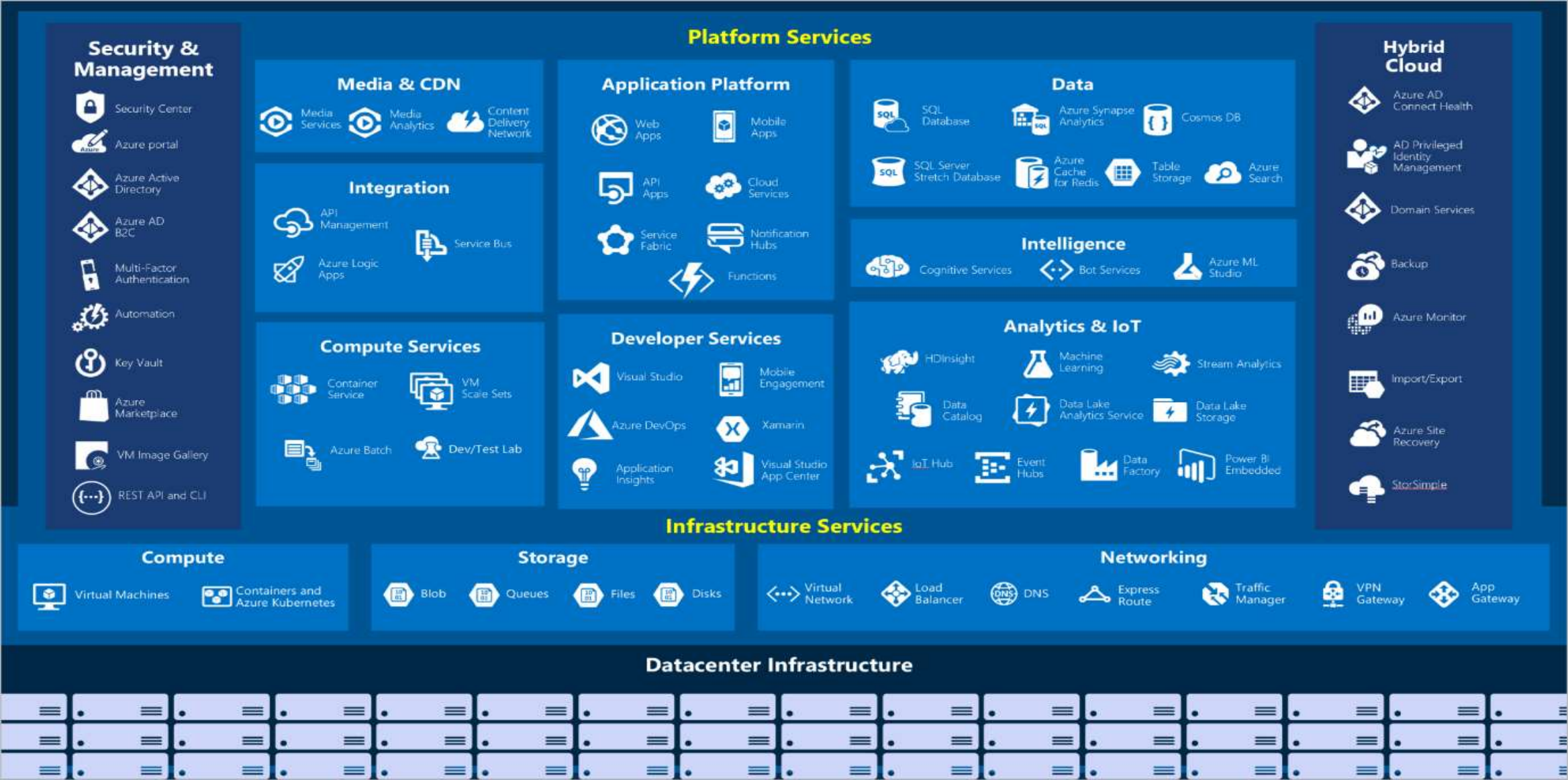
Accounts

Resources: Cloud resources like compute, storage and database.

Resource Groups: A single resource or a group of resources to build projects.

Subscriptions: A logical container to provision resources.

**Azure Account:** A single connection that represents all resources and billing sections of a company within Microsoft Azure.
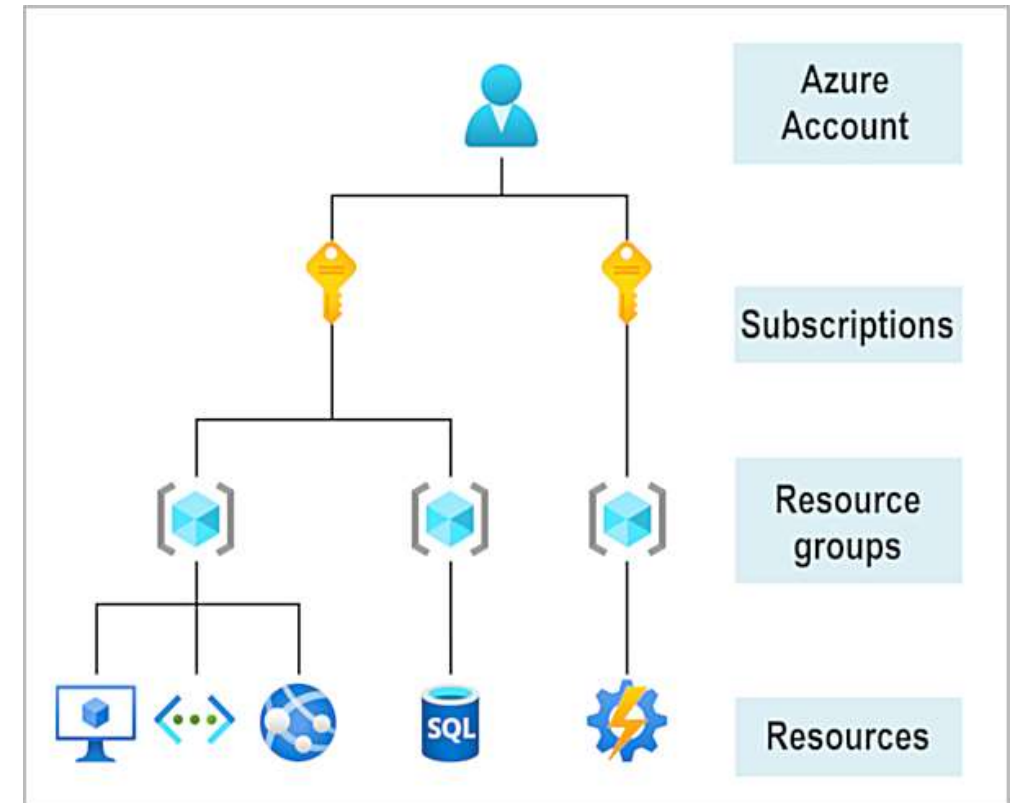
Invoice Section: A single subscription or a group of subscriptions to merge usage fees (i.e. Department based differentiation).
Billing Profile: A combination of invoice sections to merge usage fees (i.e. Sub-company based differentiation).
Billing Account: A single account which is responsible for the whole billing of a company.
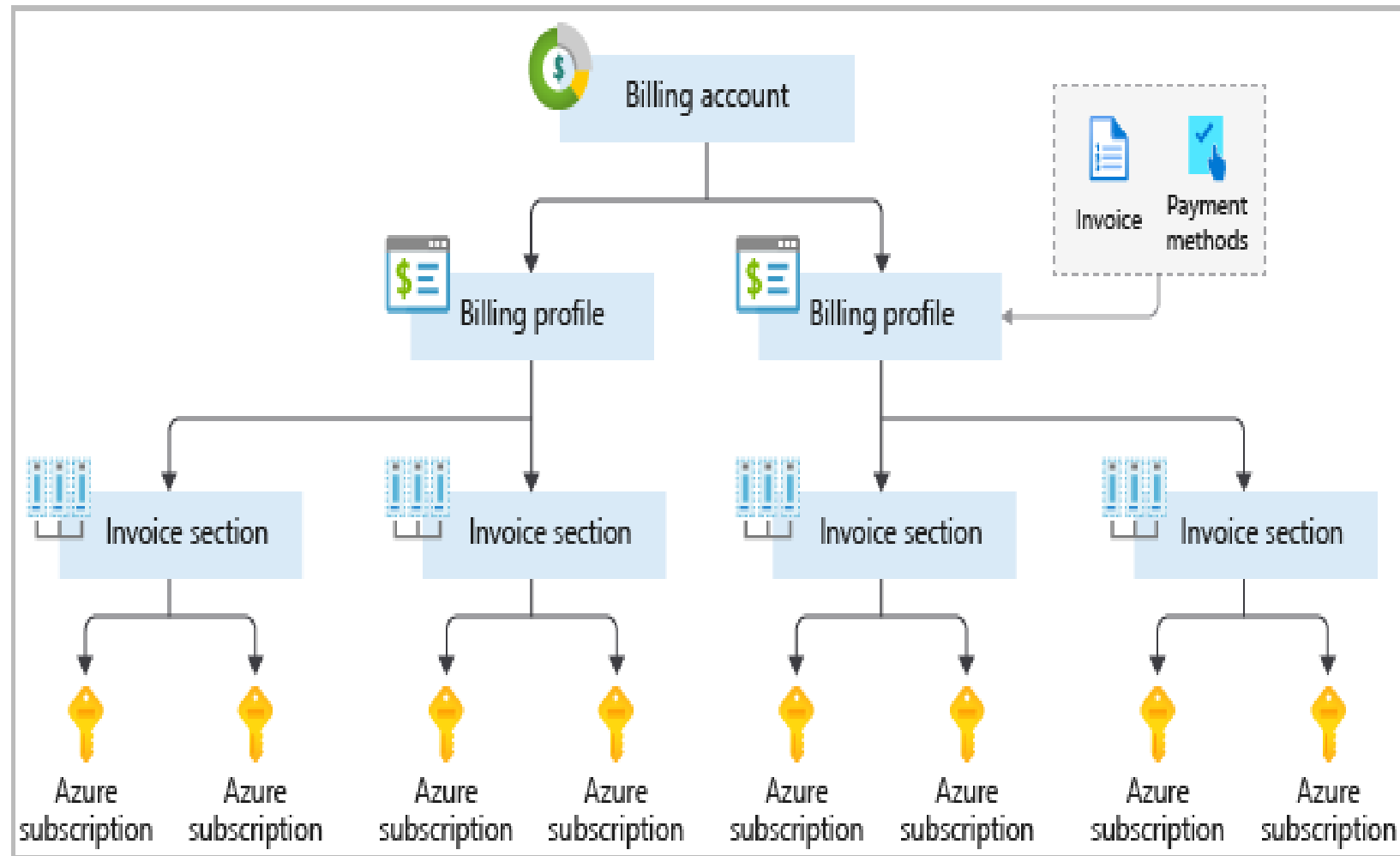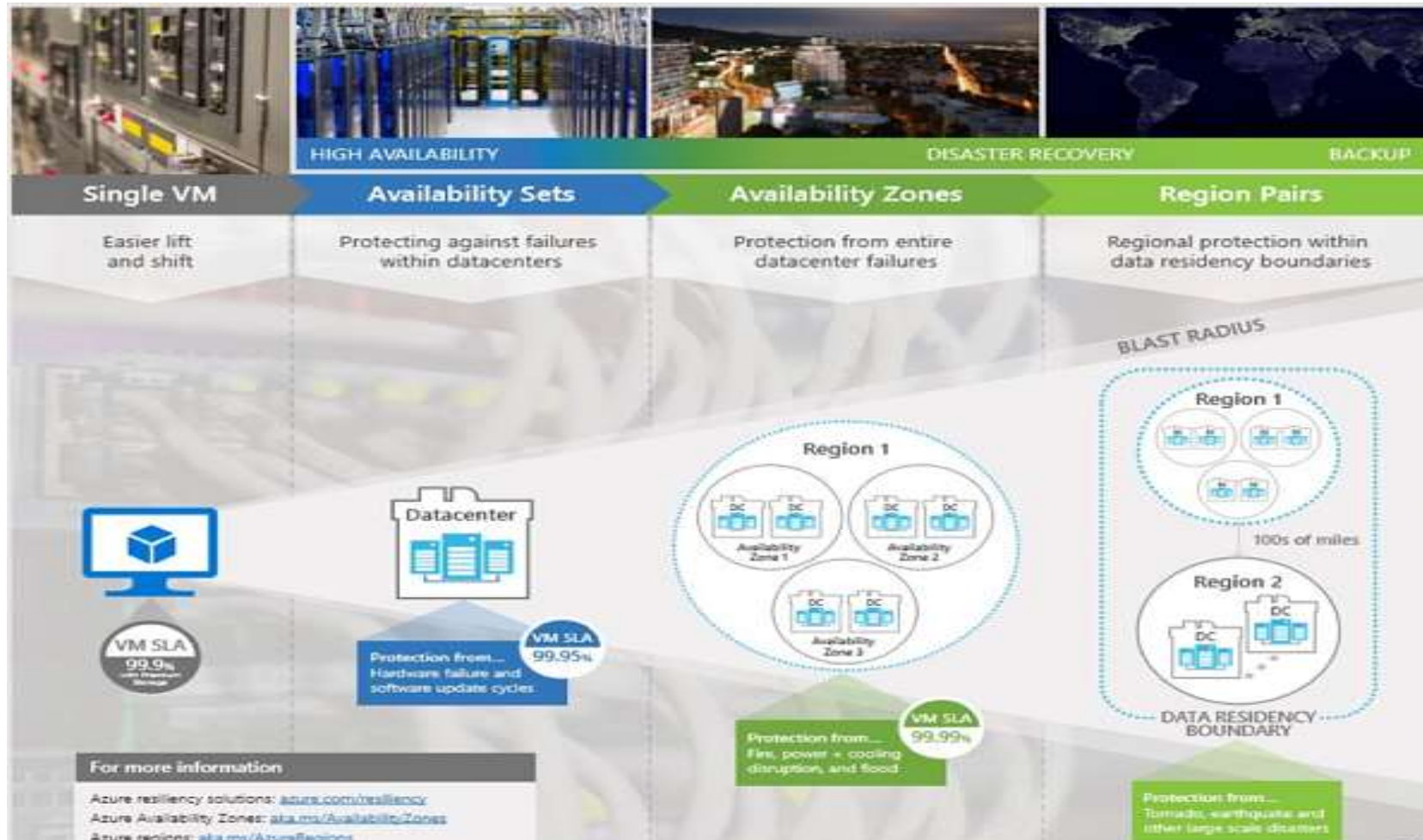
Regions & Availability Zones

AZURE REGIONS AND AVAILABILITY ZONES

- **Data Center:** A physical center that has all the Cloud environment like servers, routers, switches, firewalls, storage solutions, etc.

- **Availability Zone:** A logical zone that contains several data centers to protect against data center failures.

- **Region:** A logical collection of availability zones to protect against natural disasters.

- **Region Pair:** A paired region to build High-Available (HA) solutions.

54 regions worldwide   **140** available in 140 countries

Lab Session

LAB#1: CREATING FREE ACCOUNTS

- Follow the instructions: https://azure.microsoft.com/en-us/free

- IaaS Example: LAMP Server installation

Follow the provided instructions…

- Try to learn the AWS equivalents of services. Provide a short summary.

- Try to perform alternative Web Hosting services on Azure and provide a short summary about how you can do it (Tip: There are several ways).

- Try to learn more about Linux OS:

    – https://www.youtube.com/watch?v=ROjZy1WbCIA (Basic course, 3 hours watch)

    – https://training.linuxfoundation.org/training/introduction-to-linux/ (Free course, optional to learn more about Linux, 60 hours of training material).

Thank You

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