WEEK 1 INTRODUCTION TO CLOUD COMPUTING AND AZURE

Taha Yiğit ALKAN

Agenda

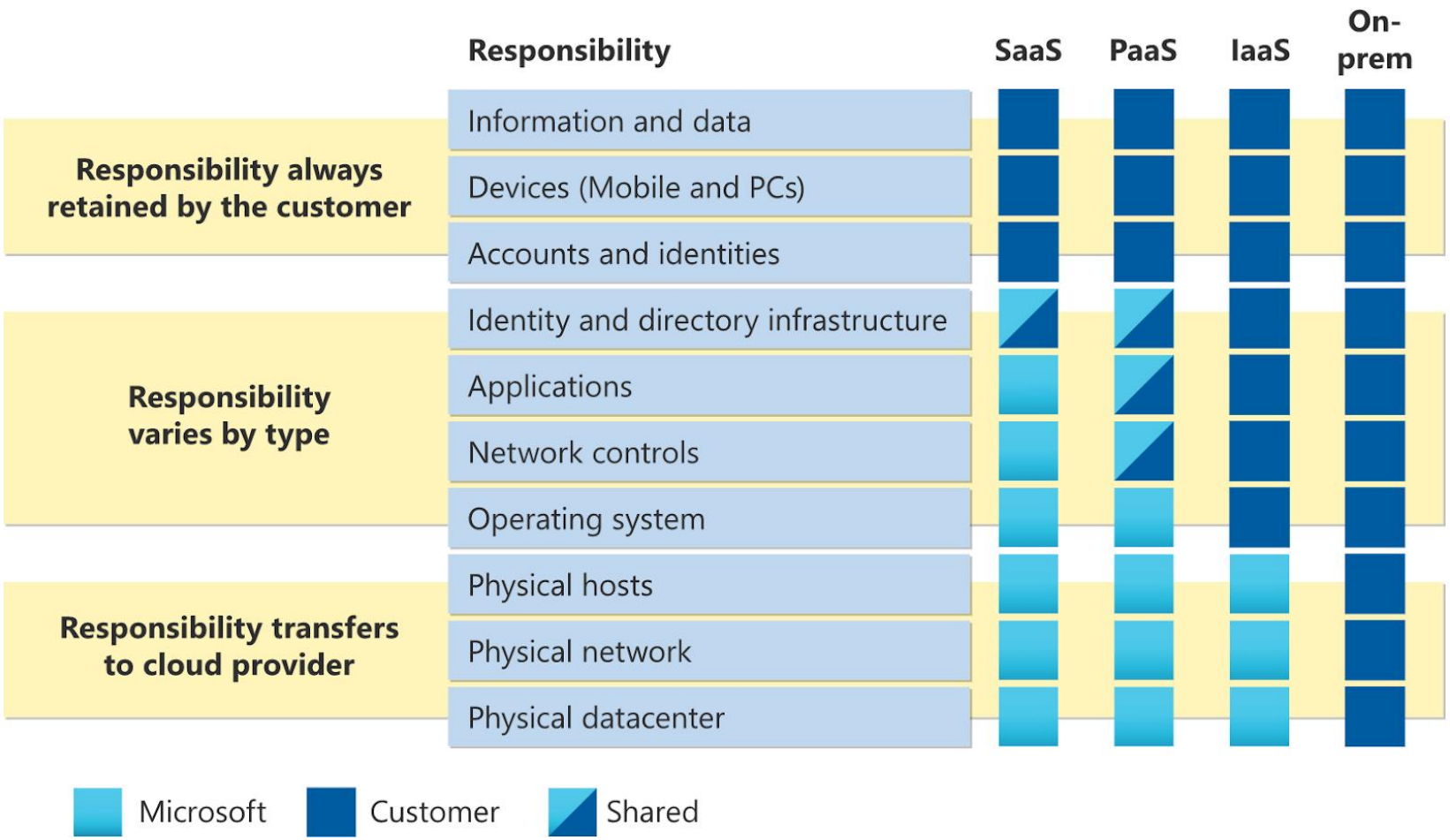
- What is cloud computing?
- Cloud deployment models
- Cloud service types
- Benefits of cloud computing
- Azure Global Datacenter Presence
- Azure Resource Hierarchy

What is Cloud Computing?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing[1].

[1]https://aws.amazon.com/what-is-cloud-computing/

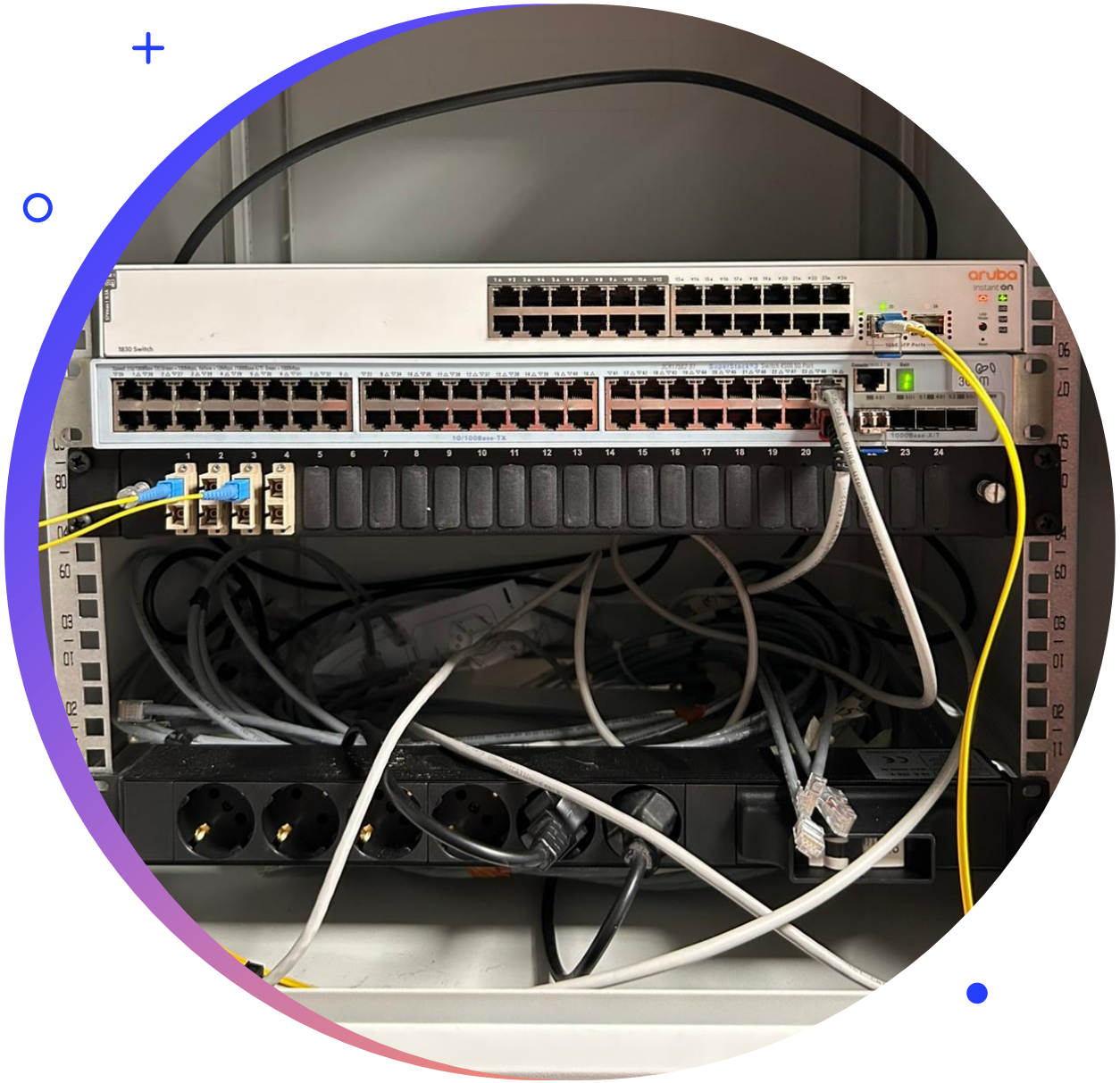
Shared Responsibility Model



On Premise

Refers to the traditional way of managing

- Computing resources
- Networking
- Storage
- Software



Network infrastructure

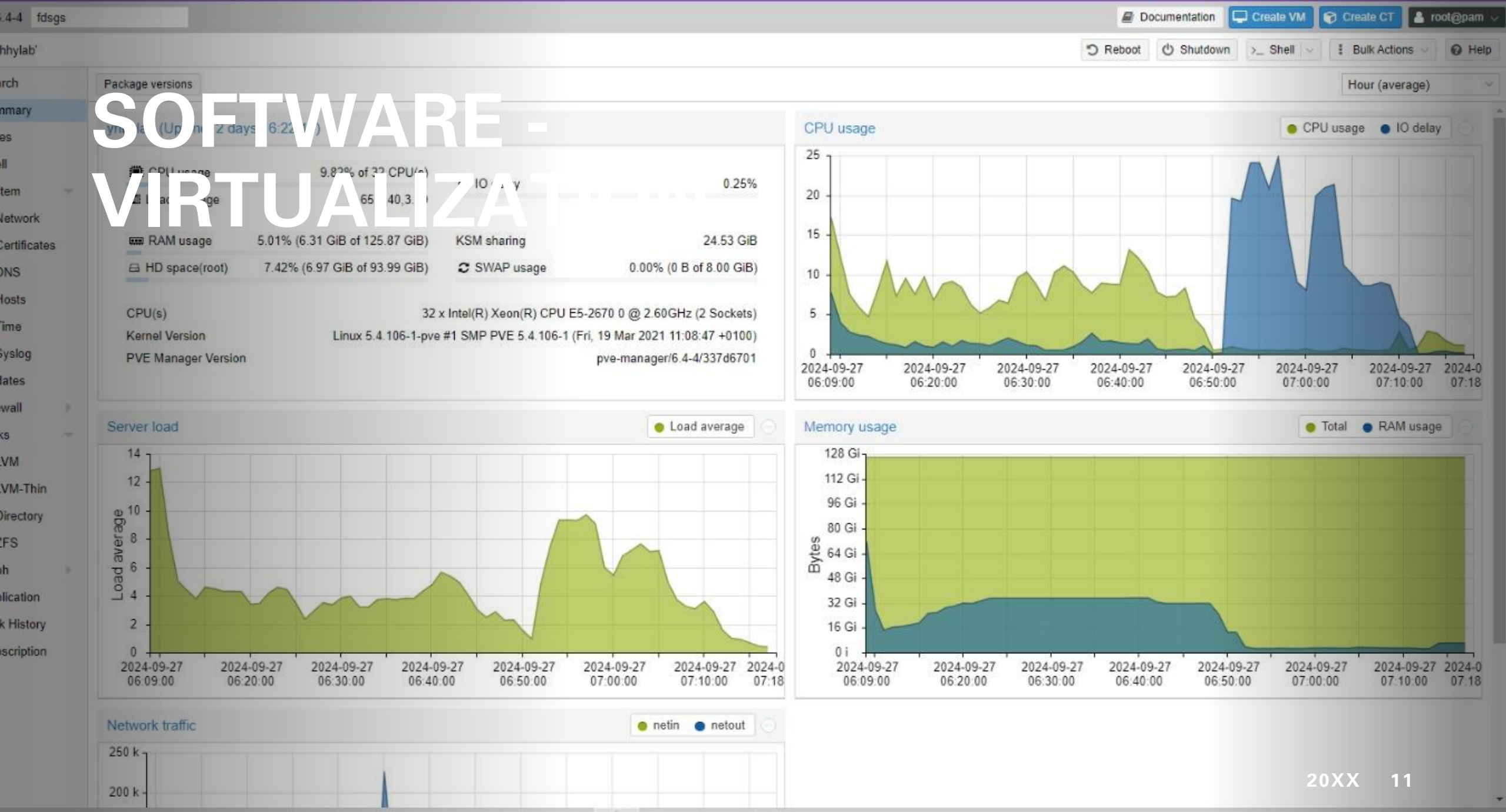
Power - UPS

SERVERS

Air conditioning

SOUNDPROOFING

SOFTWARE - VIRTUALIZA



Staff

- Maintains the system

CLOUD DEPLOYMENT MODELS

Public cloud, Private Cloud, Hybrid Cloud

Public Cloud

- Making IT resources available to anyone who wants to use or purchase them over the Internet
- All hardware, software, storage and network devices are owned and managed by the cloud provider.

Public Cloud Advantages

- Minimal investment
- No setup cost
- No maintenance
- Dynamic scalability

Public Cloud Disadvantages

- Less secure
- Low customization

Private Cloud

- Services and infrastructure are always maintained on a private network
- Hardware and software are dedicated solely to single user.

Private Cloud Advantages

- Better control
- Data security and privacy
- Supports legacy systems
- Customizations

Private Cloud Disadvantages

- Less scalable
- Cost

Hybrid Cloud

- Combines private cloud with a public cloud
- Allows data and apps to move between the two environments.

Hybrid Cloud Advantages

- Flexibility and control
- Cost
- Security

Hybrid Cloud Disadvantages

- Difficult to manage
- Slow data transmission

Comparison of cloud deployment models

Factors	Public Cloud	Private Cloud	Hybrid Cloud
Initial Setup	Easy	Complex, requires a professional team to setup	Complex, requires a professional team to setup
Scalability and Flexibility	High	High	High
Cost-Comparison	Cost-Effective	Costly	Between public and private cloud
Reliability	Low	Low	High
Data Security	Low	High	High
Data Privacy	Low	High	High

HTTPS://WWW.GEEKSFORGEEKS.ORG/CLOUD-DEPLOYMENT-MODELS/

CLOUD SERVICE TYPES

IaaS, PaaS, SaaS, FaaS

Infrastructure as a Service

Essential compute, storage and networking resources

- Virtual machines
- Networking
- Load balancers
- Firewalls

Platform as a Service

Complete development and deployment environment in the cloud

Supports the complete web application lifecycle: building, testing, deploying managing and updating

No access to hardware

- Azure Web App
- Azure Sql Server

Software as a Service

Connect to and use cloud-based apps over the internet

Access to configuration only

- Email
- Calendaring
- office tools

Function as a Service (Serverless)

Consumption based pricing models

$0 if don’t use

- Azure Functions
- Serverless Kubernetes
- Cosmos db Serverless

CLOUD PRICING

Calculating Cost

Usually, 2 or 3 metrics are used

e.g., Cosmos Db

Operations

+

Consumed Storage

+

Optional dedicated gateway

+

Backup storage

Prices changes between regions!

Free Services

Some services are always free or have a free below a certain limit

- Virtual network
- Private IP address
- Azure Migrate
- Inbound Internet traffic
- 5GB of outbound internet traffic
- Azure Policy
- Azure AD
- 1 Million executions Azure Functions
- Azure App Services (F1, Free)

Pay for Time

Certain services charge by time (minute or hour)

- Virtual machine
- App Services
- Databases
- Load balancers
- Managed storage
- Public IP address

Pay per GB

- Database storage
- Backups
- Unmanaged disk
- Network traffic (between regions)
- Network traffic (more than 5GB/month egress from Azure)

Pay per Operations

Usually charged in bulk - per 10,000 requests, per million requests, etc

- Unmanaged storage (reads, writes, deletes)
- Databases (queries)
- Messaging

Pricing Calculator

https://azure.microsoft.com/en-us/pricing/calculator/

BENEFITS OF CLOUD COMPUTING

High availability

The amount of time that a system is operational.

Four nines, 4 minutes per month down time.

%99.99

Scalability

The ability of a system to handle growth of users or work.

- Vertical scaling (adding more resources to an existing component)
- Horizontal scaling (adding more instances of a component).

Elasticity

The ability of a system to automatically grow and shrink based on application demand.

Reliability

System or service will operate without failures over a specified period.

Predictability

Ability to forecast and control costs, performance, and resource utilization.

Security

Covers measures and protocols to protect data, applications, and infrastructure from unauthorized access, data breaches, and cyber threats.

Governance

Involves the establishment of policies, processes, and controls to ensure that cloud resources and services are used in compliance with organizational policies and industry regulations.

Manageability

Refers to the ease with which IT resources and services can be monitored, configured, and maintained.

AZURE GLOBAL DATACENTER PRESENCE

Regions

Refers to a specific geographic location where a cloud provider has datacenters.

Each region is essentially a cluster of datacenters that are relatively close to each other, typically within a specific geographic area or country.

Regions Key Points

- Regions are strategically located around the world to provide cloud services to users in different geographic locations.
- Each region is independent and has its own set of datacenters, networking infrastructure, and resources.
- Regions are designed to be isolated from each other to ensure data sovereignty, compliance, and redundancy.

Region Pairs

- A region pair is a concept related to disaster recovery and high availability.
- It involves pairing two regions, typically within the same geographic area but separated by a considerable distance.
- One region in the pair is designated as the primary region, and the other is the secondary region.

Region Pairs Key Points

- The primary purpose of region pairs is to provide redundancy and business continuity. If one region in the pair experiences an outage or disaster, services can failover to the secondary region to minimize downtime.
- Region pairs are carefully chosen to ensure geographic separation, so they are less likely to be affected by the same natural disasters or other events.
- Data replication and synchronization mechanisms are used to keep data consistent between the primary and secondary regions.

Azure Space

https://datacenters.microsoft.com/globe/explore

AZURE RESOURCE HIERARCHY

Subscription

- Billing and licensing container
- It represents an agreement with Microsoft to use Azure services and resources.
- When you create an Azure subscription, you gain access to a set of Azure resources and services that you can use based on your subscription type and payment plan.

Resource Groups

- Logical container for organizing and managing Azure resources.
- Help you organize resources for a specific project, application, or department.

Resource Groups

- Resources can be moved between resource groups or deleted together by managing the resource group.

- Access control for resources within a resource group is often set at the resource group level, making it easier to manage permissions.

The resource hierarchy

- Azure Account: Represents your entire Azure environment, including all subscriptions.
- Subscription: Contains one or more resource groups.
- Resource Group: Contains one or more resources.
- Resource: Represents individual Azure services or components (e.g., virtual machines, databases, storage accounts).

THANK YOU

Taha Yiğit ALKAN
yigitalkan@akdeniz.edu.tr
Website