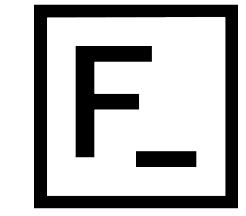




Monica Beate Tvedt **Teknologidirektør**



Forte_ Digital

TIDLIGERE

- Agency Director - Head of Microsoft Development, Mixed Reality & Microservices at Sopra Steria
- Head of UMS Innovation Center at Unified Messaging Systems
- Global Head of SaaS Development at Unified Messaging Systems
- Senior Software Engineer Consultant, Webstep @ Sparebanken Vest
- Software Engineer, CellVision
- Gründer

PROSJEKT 2020

- Kunde: **ASKO**
Rolle: Arkitekt og Front-end lead
- Kunde: **Kværner**
Rolle: Arkitekt og Mobilspesialist
- Kunde: **COVID-19 Digital Feberpoliklinikk**
Rolle: Løsningsarkitekt

FOREDRAG 2020

*Oslo Business Forum 2020, Relevans 2020,
Global AI on Tour 2020, Women in Tech 2020,
Lørn.Tech.*

DIVERSE INTERESSER

*Alpint, tennis, programmering, tegne,
lese bøker*

Azure Fundamentals Day 1

- 1.0 Introduction to Azure Fundamentals
- 2.0 Discuss Azure Fundamentals Concepts
- 3.0 Describe Azure Core Architectural Concepts
- 4.0 Explore Azure Database and Analytics Services
- 5.0 Explore Azure Compute Services
- 6.0 Explore Azure Storage Services
- 7.0 Explore Azure Networking Services

Why Should I get the AZ-900 Azure Fundamentals Certification?



What is AZ-900 Azure Fundamentals?

The **Azure Fundamentals** is the entry-level cloud certification for Microsoft Azure

The Certification is generally referred to by its exam code **AZ-900**

The certification is about knowing Azure Core services, the fundamentals of cloud computing and getting to know the Azure Portal.



The Azure Roadmap - Role Based Certifications

Fundamentals



Azure Fundamentals
• AZ-900



Azure Data Fundamentals
• DP-900



Azure AI Fundamentals
• AI-900

Associate



Azure Developer
• AZ-204



Azure Data Engineer
• DP-200
• DP-201



Azure AI Engineer
• A1-100

Expert



Azure Solutions Architect
• AZ-300
• AZ-301



Azure DevOps Engineer
• AZ-400

Specialty



IoT Developer
• AZ-220



SAP Workloads
• AZ-120

Who is the AZ-900 Azure Fundamentals for?

Consultants, Sales or Management to help inform VPs or CEOs reason for their company to utilize Microsoft Azure

Developers to show they have familiar knowledge with cloud concepts.

Developers who **already** have cloud knowledge in another cloud provider (ie. AWS), and want to be able to perform **cross-cloud work**.

Developers who want to prepare for a harder **Role-Based Certification**, ie. the AZ-204 Azure Developer Associate.



2-5 years of experience



2+ Years of experience

To be able to pass AZ-900, how long do I need to study?

You're already a
Developer

8
Hours of
study

You're a
Graduate

15
Hours of
study

You don't have a
**Technical
background**

25
Hours of
study

Where do I take the AZ-900 exam?

Pearson VUE

OnVUE online proctoring exam from your office or your own home. Passing grade: 700. 40-60 questions. Duration: 60 min. Seat Time: 90 min.

Demo: Scheduling your exam

<https://docs.microsoft.com/en-us/learn/certifications/exams/az-900>



1.0

Introduction to Azure Fundamentals.

Azure is a **cloud computing platform** with an ever-expanding set of services to help you build solutions to meet your business goals.

Azure services range from simple web services for hosting your business presence in the cloud to running fully virtualized computers for you to run your custom software solutions.

Azure provides a wealth of **cloud-based services** like remote *storage, database hosting, and centralized account management*. Azure also offers new capabilities like *AI and Internet of Things (IoT)*.



What is Cloud Computing?

The delivery of computing services over the internet, which is otherwise known as the cloud, rather than a local server or a personal computer.

Multiple physical machines that act as one system.

These services include servers, storage, databases, networking, software, analytics, and intelligence.

Pay-as-you-go pricing model: You typically pay only for the cloud services you use. No up-front cost!

On-Premise

- You own the servers
- You hire the IT people
- You pay or rent the real-estate
- You take all the risk

Very Expensive, High Maintenance, High Security

Cloud Providers

- Someone else owns the servers
- Someone else hires the IT people
- Someone else pays or rents the real-estate
- You are responsible for configuring cloud services and code, someone else takes care of the rest

Flexible, Scalable, Secure, Cost-Effective, High Configurability, Geo-distribution

What are the benefits of Cloud Computing?

Cost effective

You pay only for what you consume, no up-front cost.

Global

Launch workloads anywhere in the world, just choose a region.

Secure

Cloud providers take care of physical security and you also have the ability to configure access down to granular level

Reliable

Data backup, disaster recovery, data replication, fault tolerance

Scalable

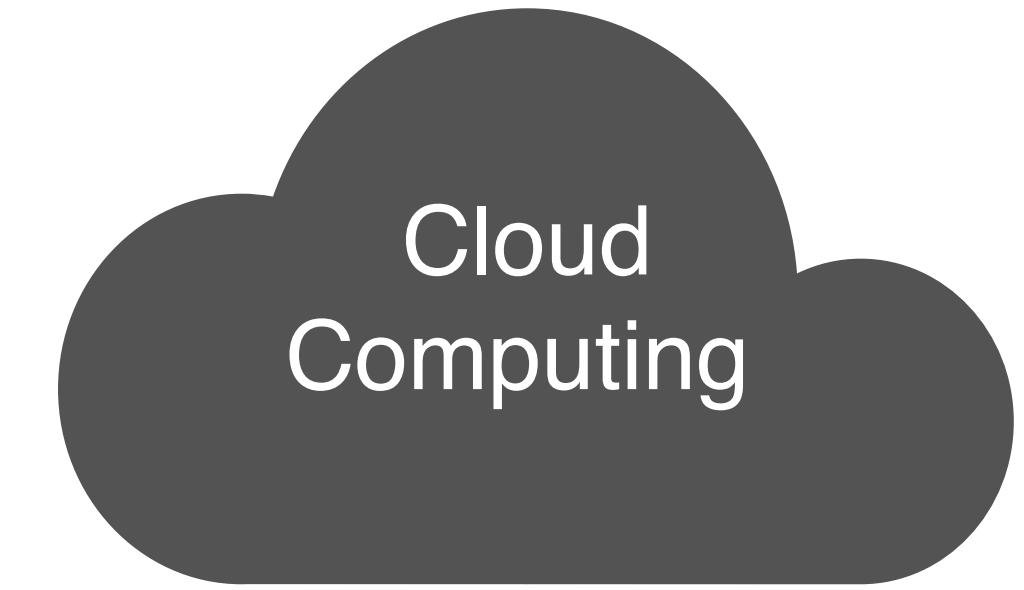
Increase or decrease resources and services based on demand

Elastic

Automate Scaling during spikes and drop in demand

Current

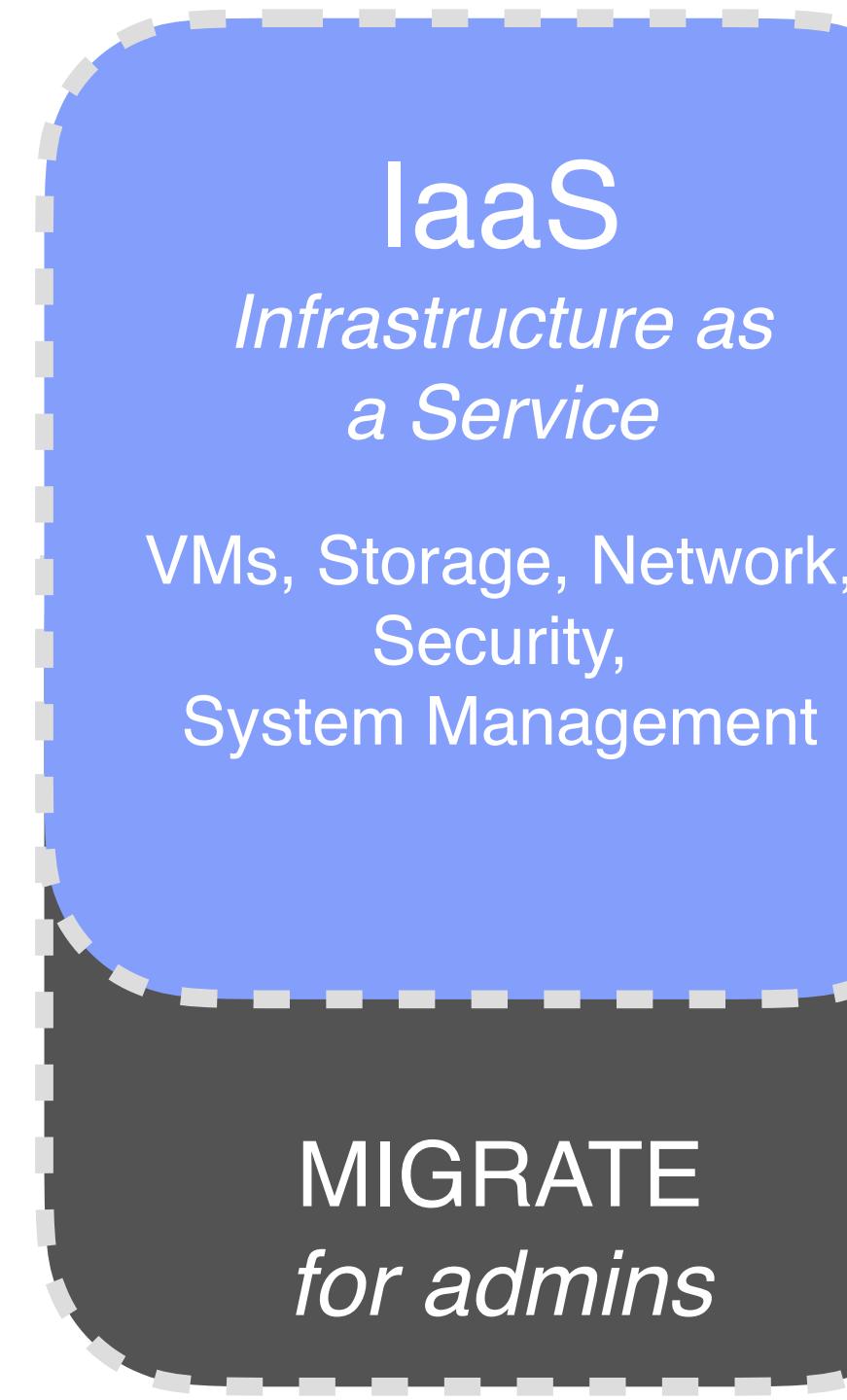
Underlying hardware and managed software is patched, upgraded and replaced by the cloud provider without interruption to you

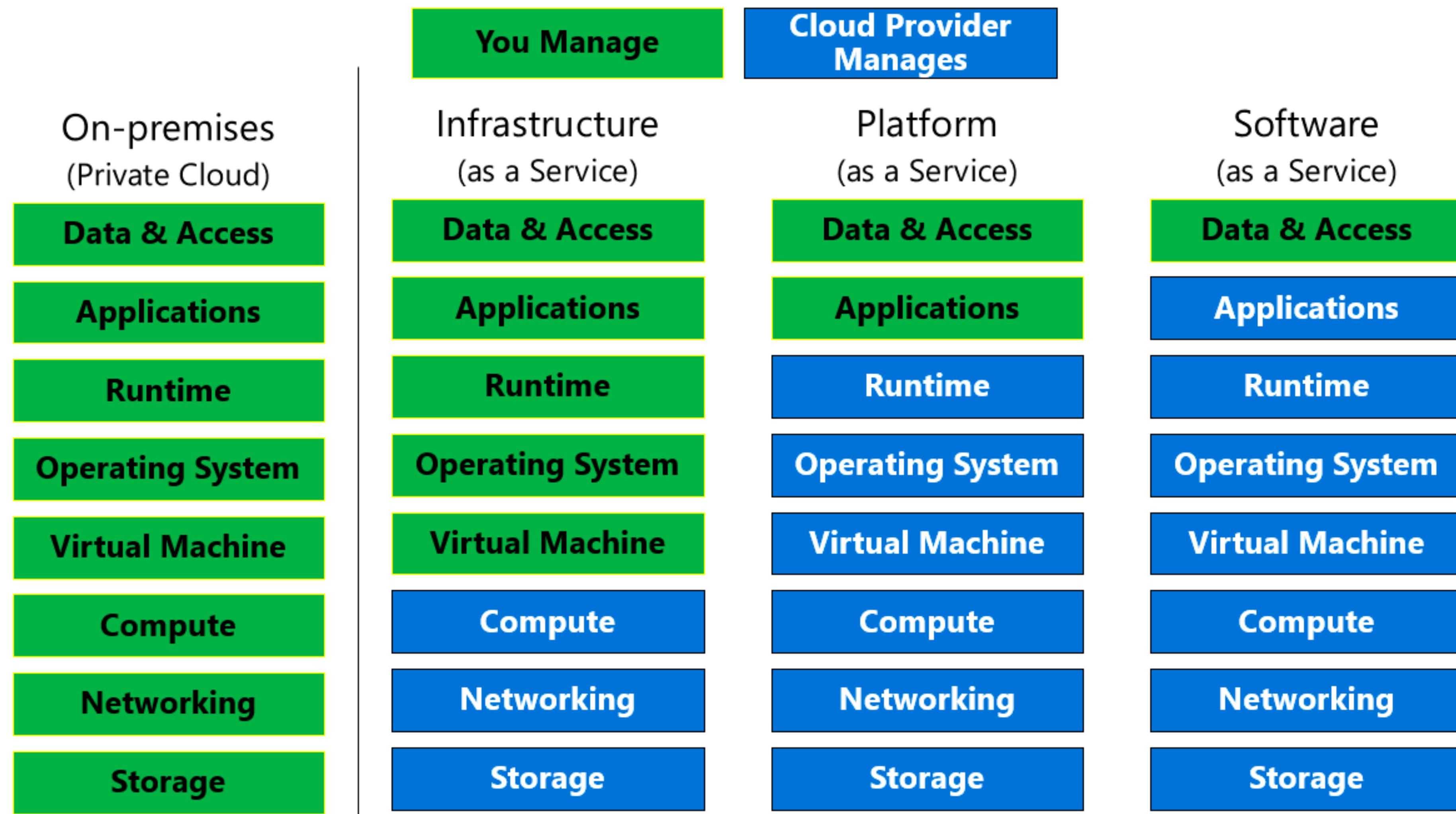


What are Cloud Services?

Cloud computing falls into one of the following computing models.

These models define the different level of shared responsibility that the cloud provider and cloud tenant are responsible for.





Cloud Deployment Models

Public Cloud

Everything is build on the Cloud Provider: Cloud-Native

Private Cloud

Everything is build on the company's datacenter: On-Premise

Hybrid Cloud

Using both **On-Premise** and a **Cloud Service Provider** (Cloud-Native).
This computing environment combines a public cloud and a private cloud by allowing data and applications to be shared between them.

What is Azure?



Azure is Microsoft's Cloud Provider Service.

Azure, announced at Microsoft's Professional Developers Conference (PDC) in October 2008, went by the internal project codename "Project Red Dog", and formally released in February 2010, as **Windows Azure** before being renamed to **Microsoft Azure** on March 25, 2014.

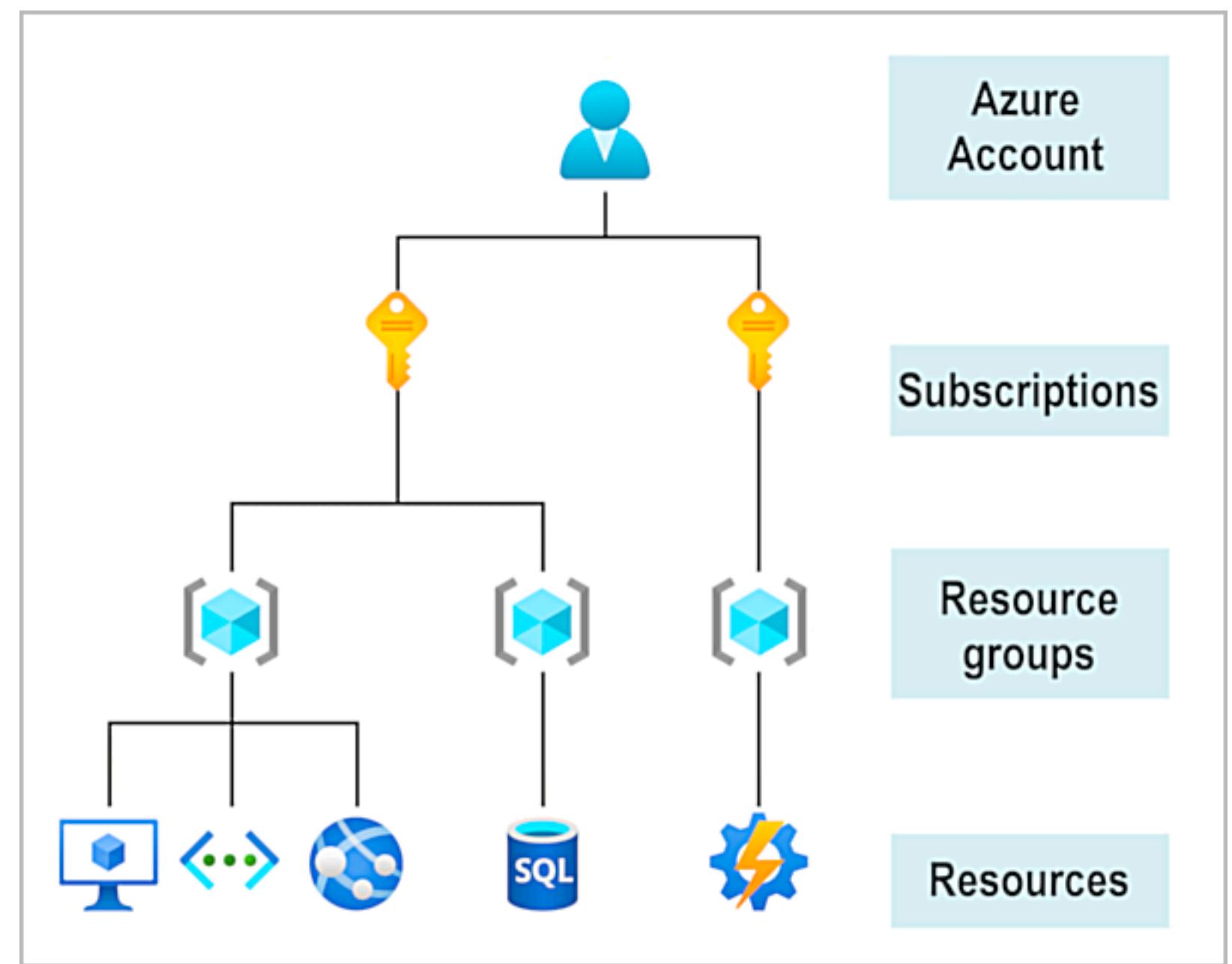
Azure Meaning: bright blue in color like a cloudless sky.

Azure Accounts

The Azure free account includes

- Free access to popular Azure products for 12 months.
- A credit to spend for the first 30 days.
- Access to more than 25 products that are always free.

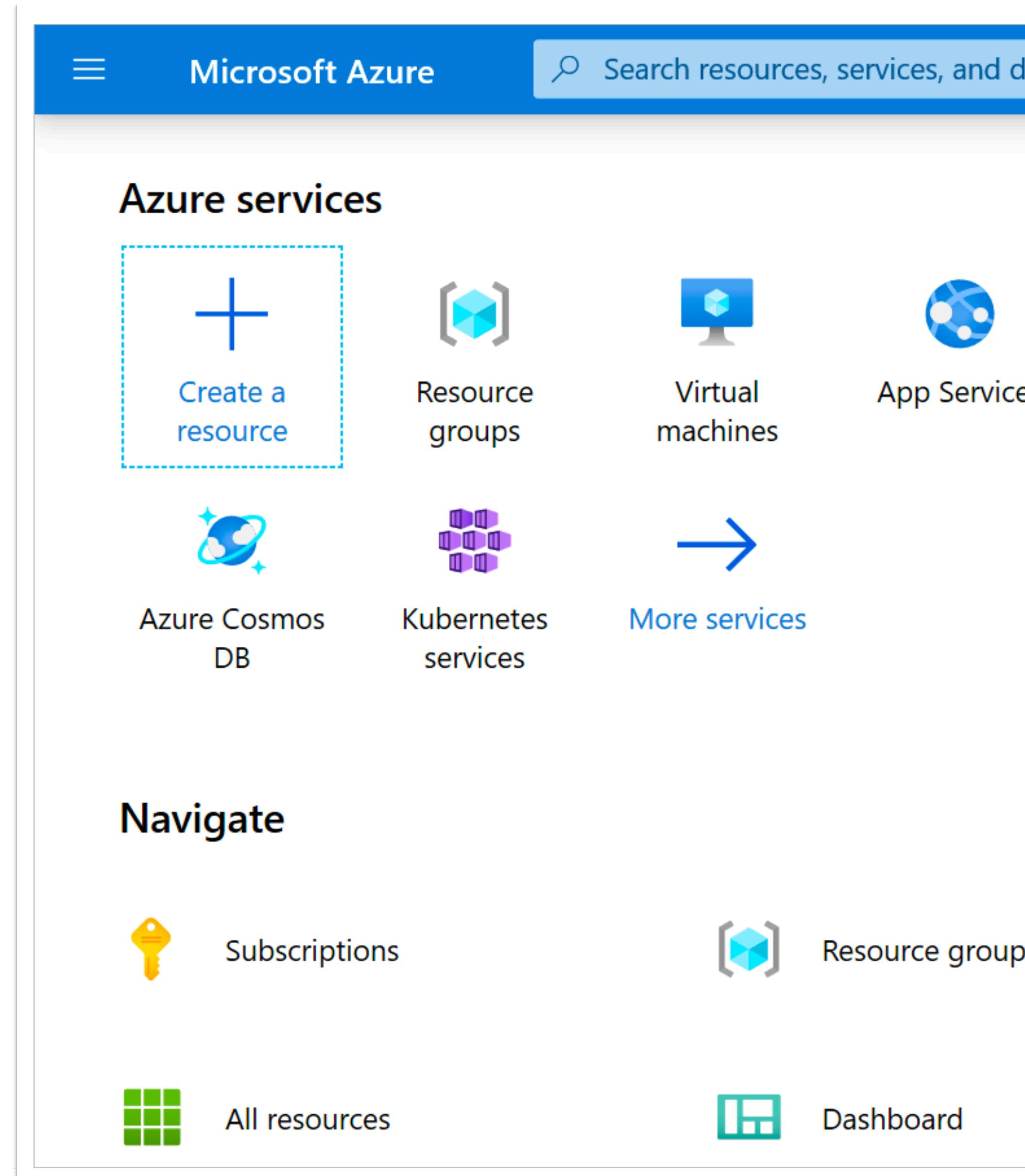
The Azure free account is an excellent way for new users to get started and explore. [To sign up, you need a phone number, a credit card, and a Microsoft or GitHub account](#). The credit card information is used for identity verification only. You won't be charged for any services until you upgrade to a paid subscription.



Let's take a look..

The Azure Portal is a web-based, unified console that provides an alternative to command-line tools. With the Azure portal, you can manage your Azure subscription by using a graphical user interface.

<https://portal.azure.com>



Knowledge Check

Which of the following statements is *not* true about cloud computing?

- A. IaaS, PaaS, and SaaS are examples of cloud computing service models.
- B. Cloud computing resources are usually limited to specific geographic regions.
- C. Cloud computing typically decreases your operating expenses.
- D. Three cloud computing deployment models are public cloud, private cloud, and hybrid cloud.

Knowledge Check

Which of the following choices is not a cloud computing category?

- A. Platform-as-a-Service (PaaS).
- B. Networking-as-a-Service (NaaS).
- C. Infrastructure-as-a-Service (IaaS).
- D. Software-as-a-Service (SaaS).

Knowledge Check

True or false: You need to purchase an Azure account before you can use any Azure resources.

Knowledge Check

True or false: In an IaaS environment, the cloud tenant is responsible for routine hardware maintenance.

2.0

Discuss Azure Fundamentals Concepts.

Cloud computing is a consumption-based model

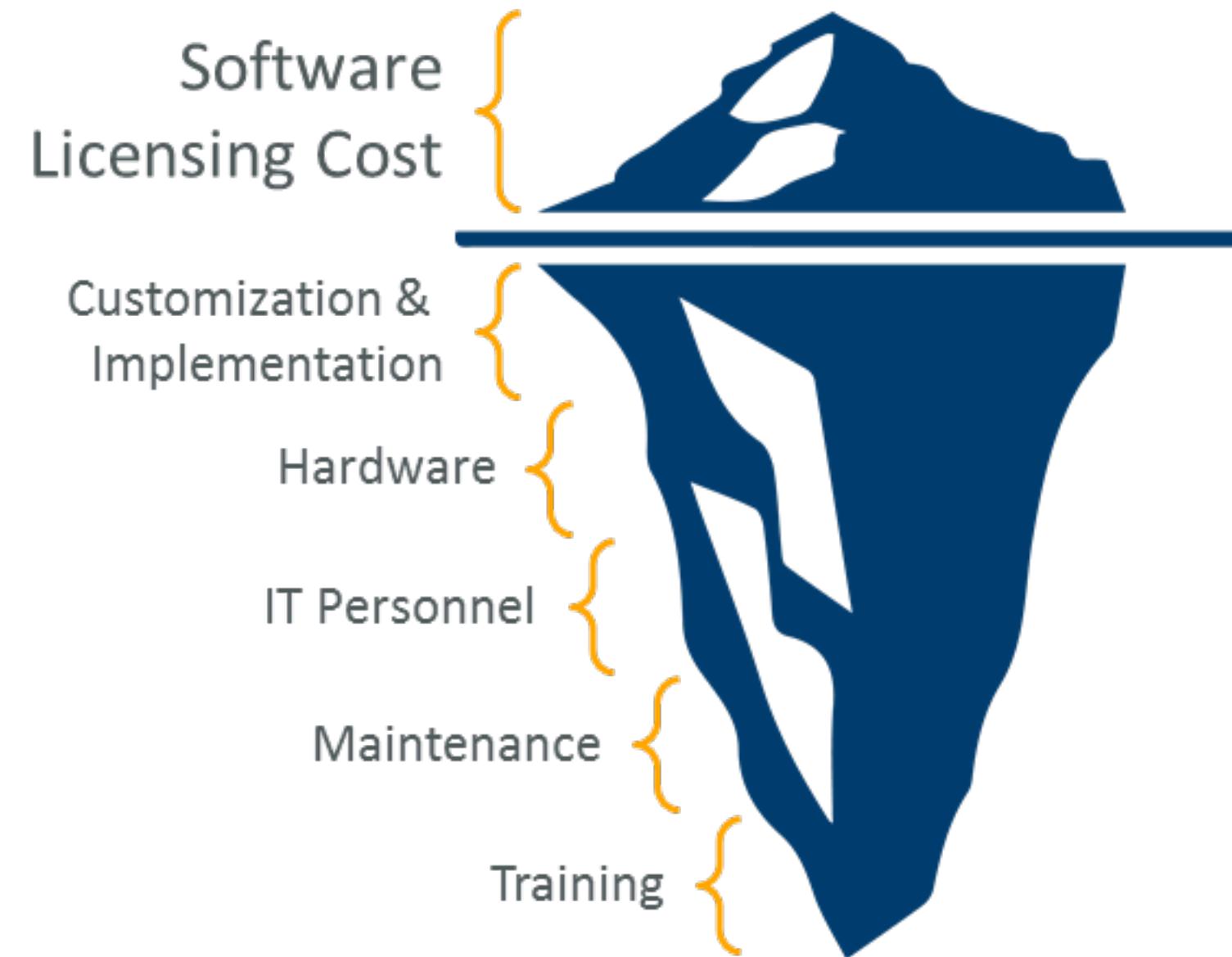
Cloud service providers operate on a *consumption-based model*, which means that end users only pay for the resources that they use. Whatever they use is what they pay for.

A consumption-based model has many benefits, including:

- No upfront cost.
- No need to purchase and manage costly infrastructure that users might not use to its fullest.
- The ability to pay for additional resources when they are needed.
- The ability to stop paying for resources that are no longer needed.

Total Cost of Ownership (TCO)

CAPEX: On-Premise



OPEX: Azure, Cloud Provider



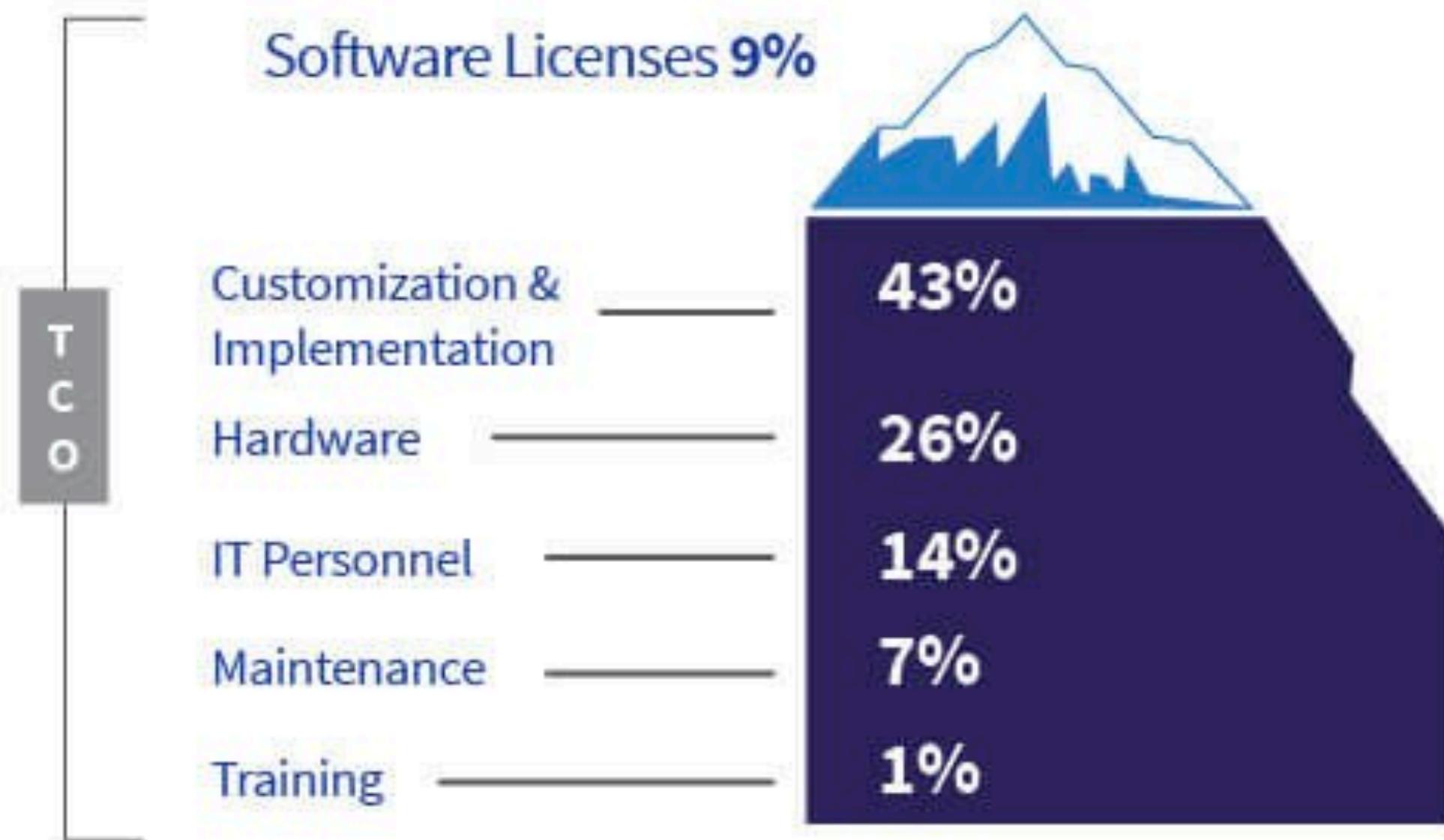
Ongoing Costs

- Apply patches, upgrades
- Downtime
- Performance tuning
- Rewrite customizations
- Rewrite integrations
- Upgrade dependent applications
- Ongoing burden on IT (hardware)
- Maintain/upgrade network
- Maintain/upgrade security
- Maintain/upgrade database

Ongoing Costs

- Subscription fees
- Training
- Configuration
- System Administration

On-Premise Software



"Customers can spend up to four times the cost of their software license per year to own and manage their applications."

- Gartner
"The End of Software"

Cloud Computing



"Cloud computing yields substantial economies of scale and skill, and lowers total cost of ownership (TCO)."

- The Hurwitz Group
"The Compelling TCO Case for Cloud Computing"

Capital Expenses vs. Operating Expenses

There are two different types of expenses:

- **Capital Expenditure (CapEx)** is the up-front spending of money on physical infrastructure, and then deducting that up-front expense over time. The up-front cost from CapEx has a value that reduces over time.
- **Operational Expenditure (OpEx)** is spending money on services or products now, and being billed for them now. You can deduct this expense in the same year you spend it. There is no up-front cost, as you pay for a service or product as you use it.

To summarize, CapEx requires [significant up-front financial costs](#), as well as ongoing maintenance and support expenditures. By contrast, OpEx is a consumption-based model, so you are only responsible for the cost of the computing resources that you use.

Knowledge Check

Which of the following statements is true?

- A. With Operating Expenses (OpEx), you are responsible for purchasing and maintaining your computing resources.
- B. With Operating Expenses (OpEx), you are only responsible for the computing resources that you use.
- C. With Capital Expenses (CapEx), you are only responsible for the computing resources that you use.

Knowledge Check

Which of the following options isn't a type of cloud computing?

- A. Distributed cloud.
- B. Hybrid cloud.
- C. Private cloud.
- D. Public cloud.

Knowledge Check

Which of the following choices isn't a benefit of using cloud services?

- A. Scalability.
- B. Geographic isolation.
- C. Disaster recovery.
- D. High availability.

3.0

Describe Azure Core Architectural Concepts.

Cloud Architecture Terminologies

- **Availability**

Your ability to ensure a service remains available.

- **Scalability**

Your ability to grow rapidly or unimpeded.

- **Elasticity**

Your ability to shrink and grow to meet the demand.

- **Disaster Recovery**

Your ability to recover from a failure

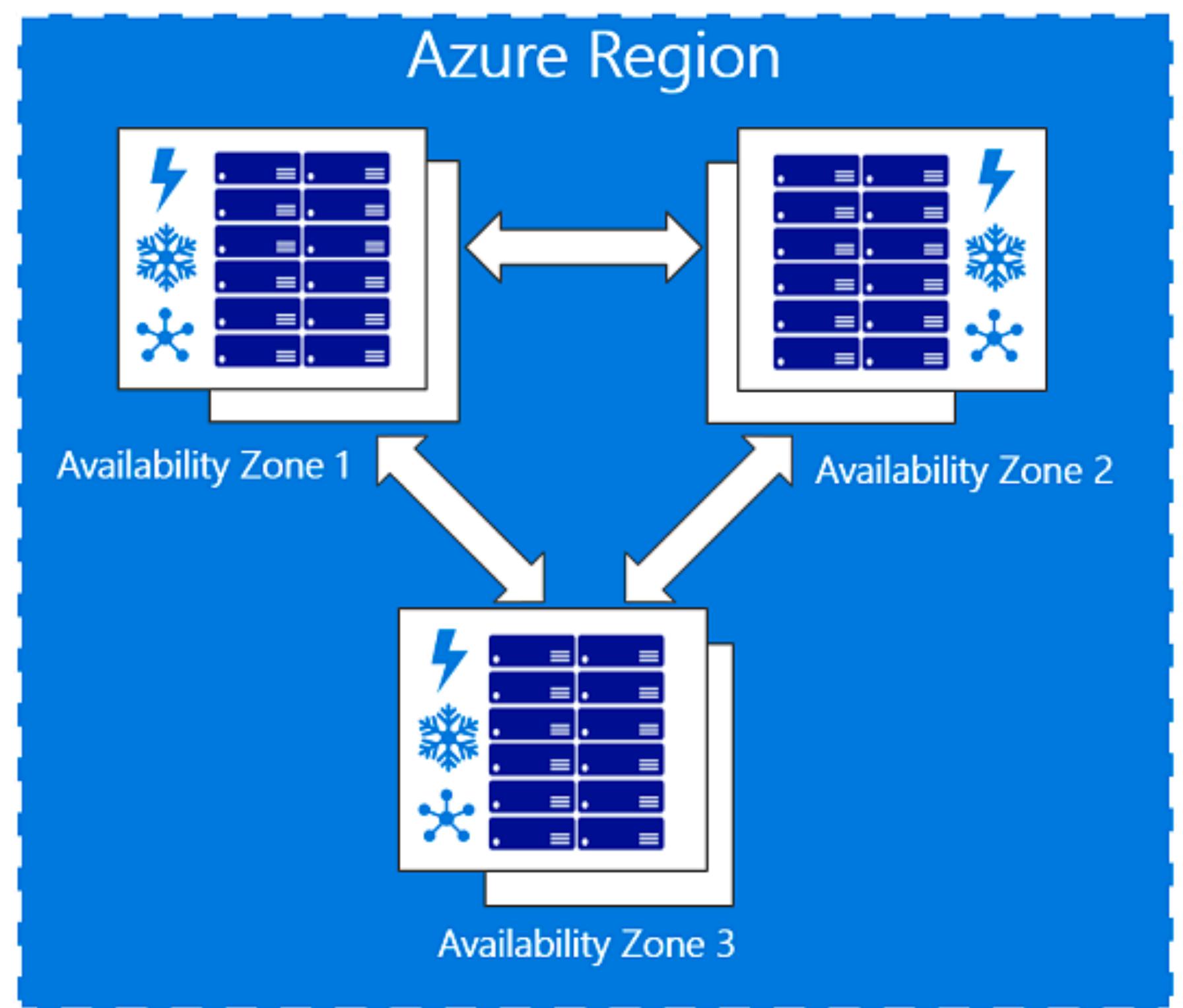
High Availability

Your ability for your service to remain available by ensuring there is no single point of failure and/or ensure a certain level of performance.

Availability Zone is a unique physical locations within a region. Each zone is made up of one or more datacenters equipped with independent power, cooling, and networking. Availability zones are connected through high-speed, private fiber-optic networks.

Running your workload across multiple **availability zones** ensures that if AZ1 or AZ2 (Availability Zones /Data Centers) becomes unavailable, your service/ applications still remains available. Thus, protects your applications and data from datacenter failures

<https://azure.microsoft.com/nb-no/global-infrastructure/geographies/#geographies>



A photograph of a datacenter floor showing multiple rows of server racks. The racks are dark grey or black and are densely packed. Numerous cables in various colors (blue, green, red, yellow) are visible, hanging from the top of the racks and running along the floor. The lighting is dramatic, with strong highlights and shadows, creating a futuristic and high-tech atmosphere. In the background, there are more server racks and what appears to be a control room or monitoring station.

Datacenter in Washington



Project Natick

<https://natick.research.microsoft.com/>





Microsoft

High Scalability

Your ability to increase your capacity based on the increasing demand of traffic, memory and computing power.

Vertical Scaling - Scaling Up

Upgrading to a bigger server (RAM, CPU, etc.)

Horizontal Scaling - Scaling Out

Adding more servers

Scale up VS Scale out

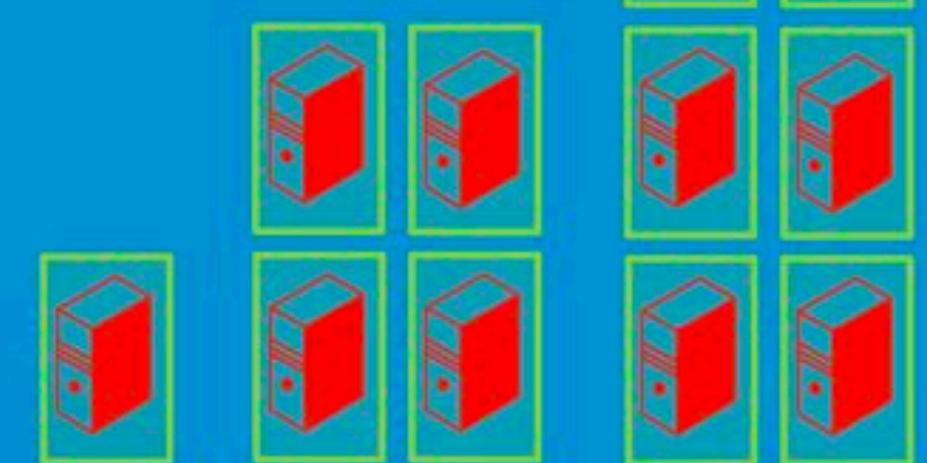
Scale up



larger instance size: scale up

- Increases baseline performance
- Usually disruptive (requires an outage)

Scale out



larger instance count: scale out

- More granular performance adjustment
- Non-disruptive



High Elasticity

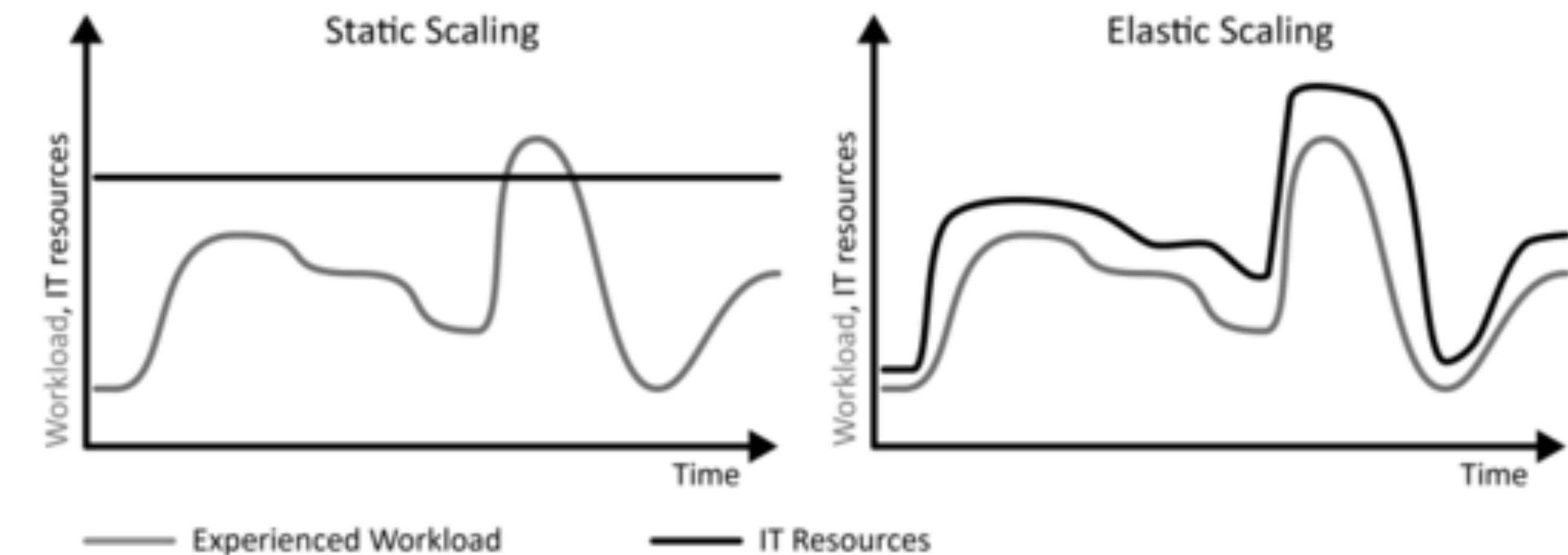
Your ability to **automatically** increase or decrease your capacity based on the current demand of traffic, memory and computing power.

Horizontal Scaling - Scaling Out

Adding more servers

Horizontal Scaling - **Scaling In**

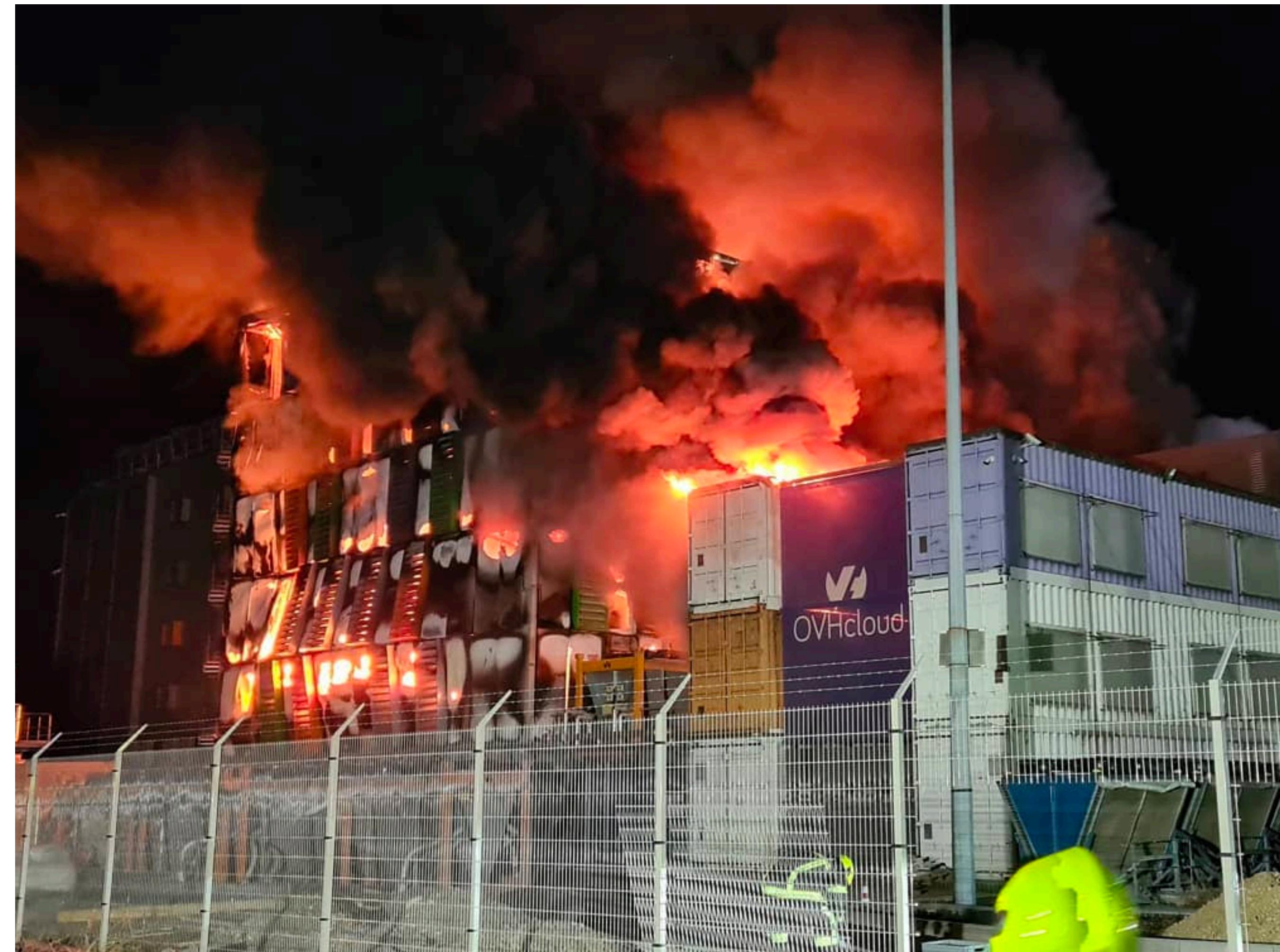
Removing more servers



High Durability

Your ability to **recover** from a disaster and to prevent the loss of data. Solutions that recover from disaster is known as **Disaster Recovery (RD)**.

- **Create a disaster recovery plan**
 - People, Backups, Technology, Location
- **Network outage**
 - Reduced functionality, cached data or downtime?
- **Recovery automation**

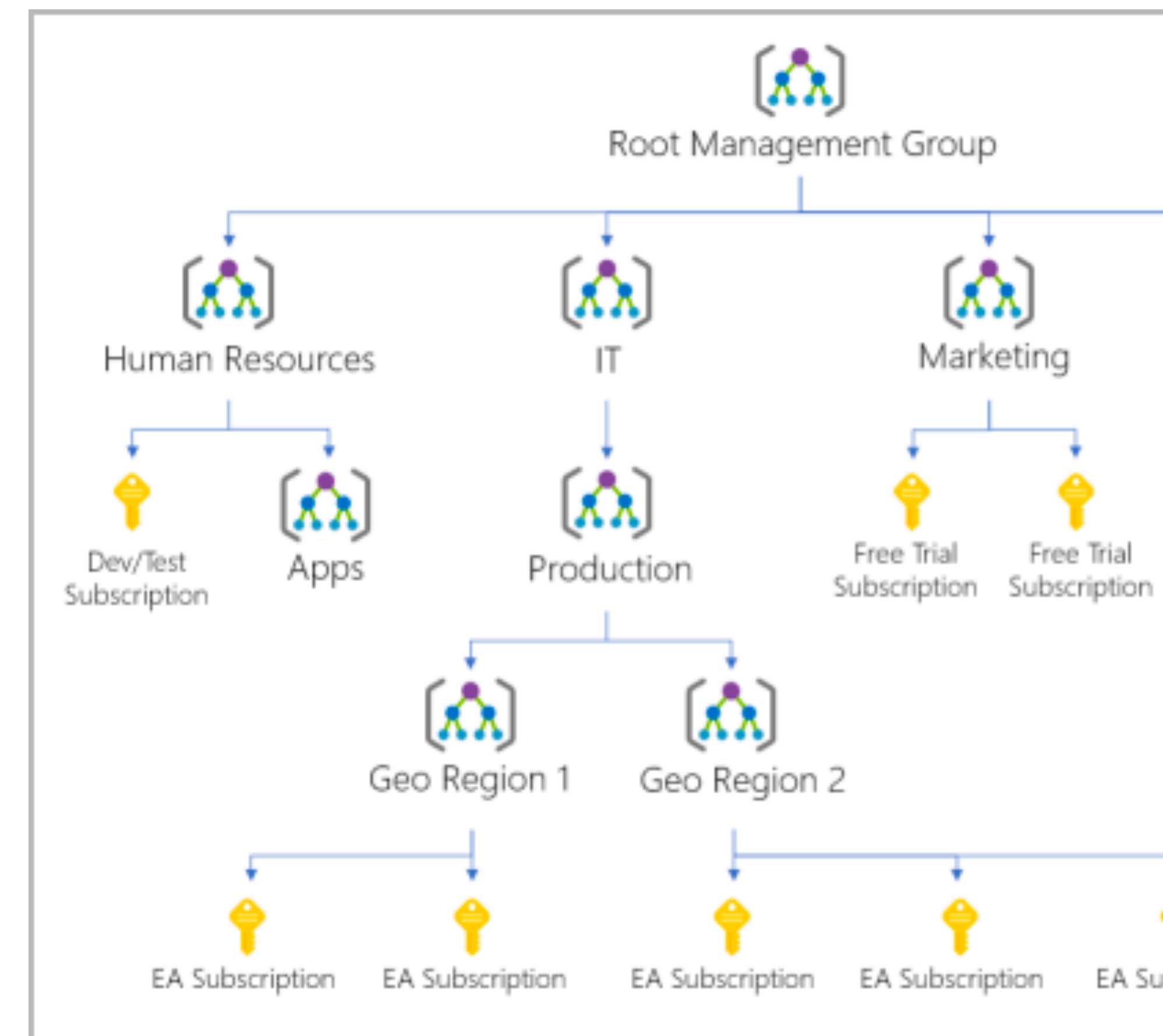


Azure Management groups

If your organization has many subscriptions, you might need a way to efficiently manage access, policies, and compliance for those subscriptions.

Azure management groups provide a level of scope above subscriptions.

You organize subscriptions into containers called management groups and [apply your governance conditions to the management groups](#).



Paired Regions

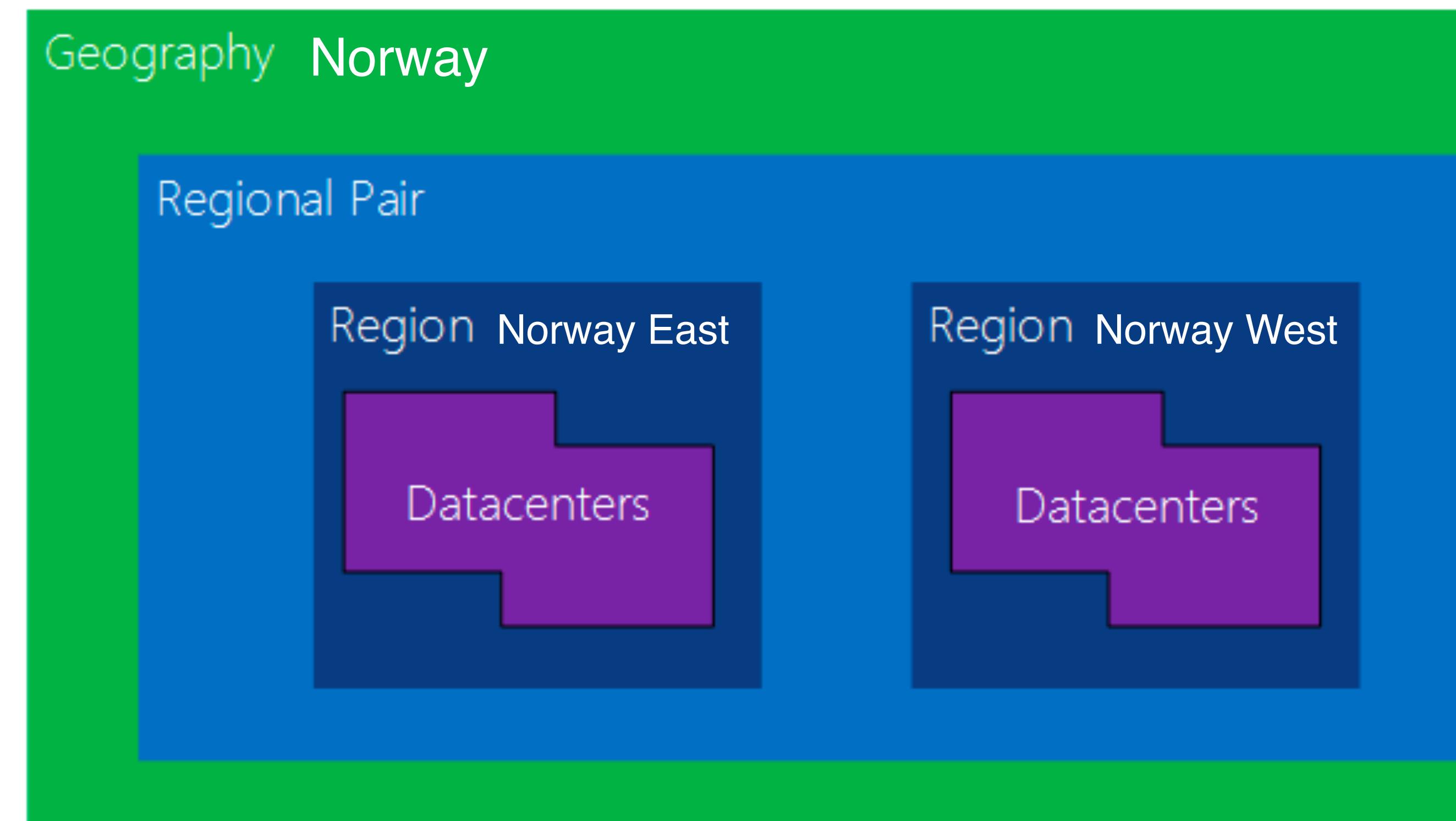
A region is a grouping of multiple datacenters
ie. Norway East)

Azure has **58 regions available across 140 countries**. Most of all cloud providers.

Each region is paired with another region 300 miles away (48 mil).

Only one region is updated at a time to ensure no outages.

Some Azure Services rely on Paired Regions for Disaster Recovery ie. Azure Geo-Redundant Storage



Demo:

Let's create a website hosted in Azure.

Our humble spec:

- CMS, Wordpress
- Database, MySql

Knowledge Check

Which of the following can be used to manage governance across multiple Azure subscriptions?

- A. Azure initiatives.
- B. Management groups.
- C. Resource groups.

Knowledge Check

Which of the following is a logical unit of Azure services that links to an Azure account?

- A. Azure subscription.
- B. Management group.
- C. Resource group.

Knowledge Check

Which of the following features doesn't apply to resource groups?

- A. Resources can be in only one resource group.
- B. Role-based access control can be applied to the resource group.
- C. Resource groups can be nested.

4.0

Explore Azure Database and Analytics Services.

Benefits and usage of:

- **Azure Cosmos DB**

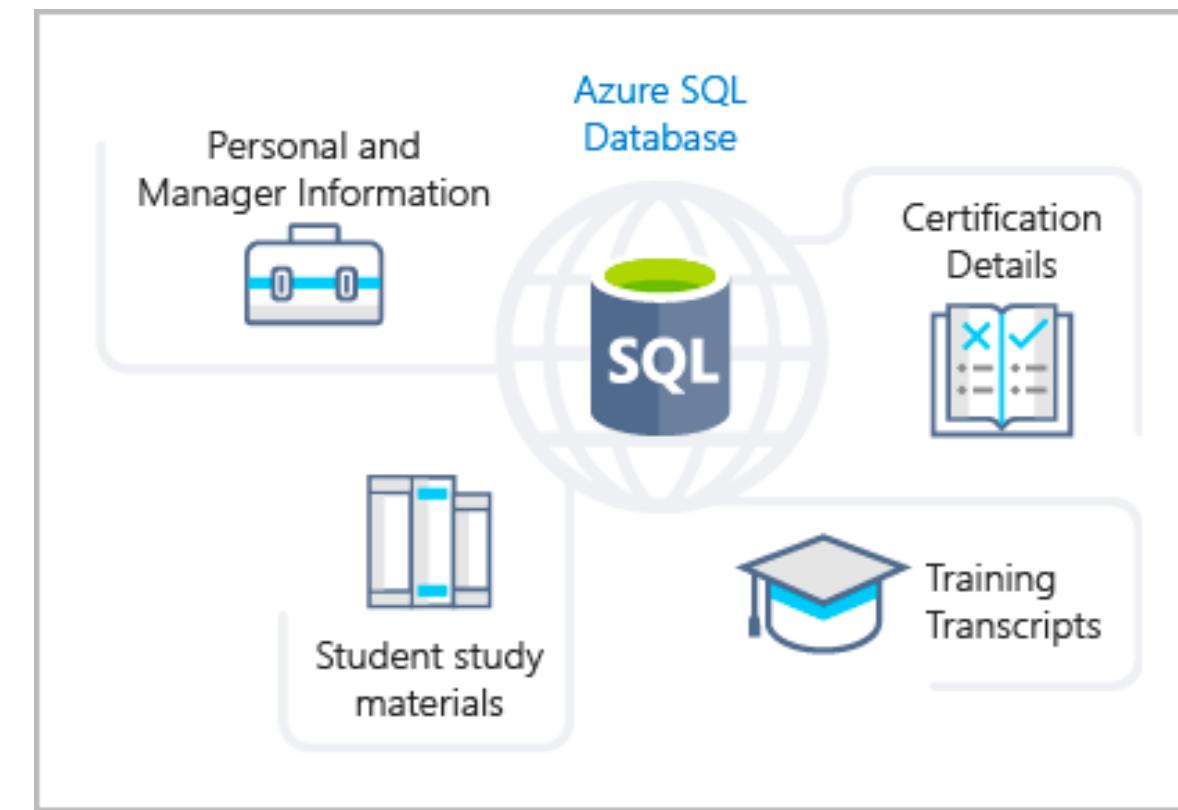
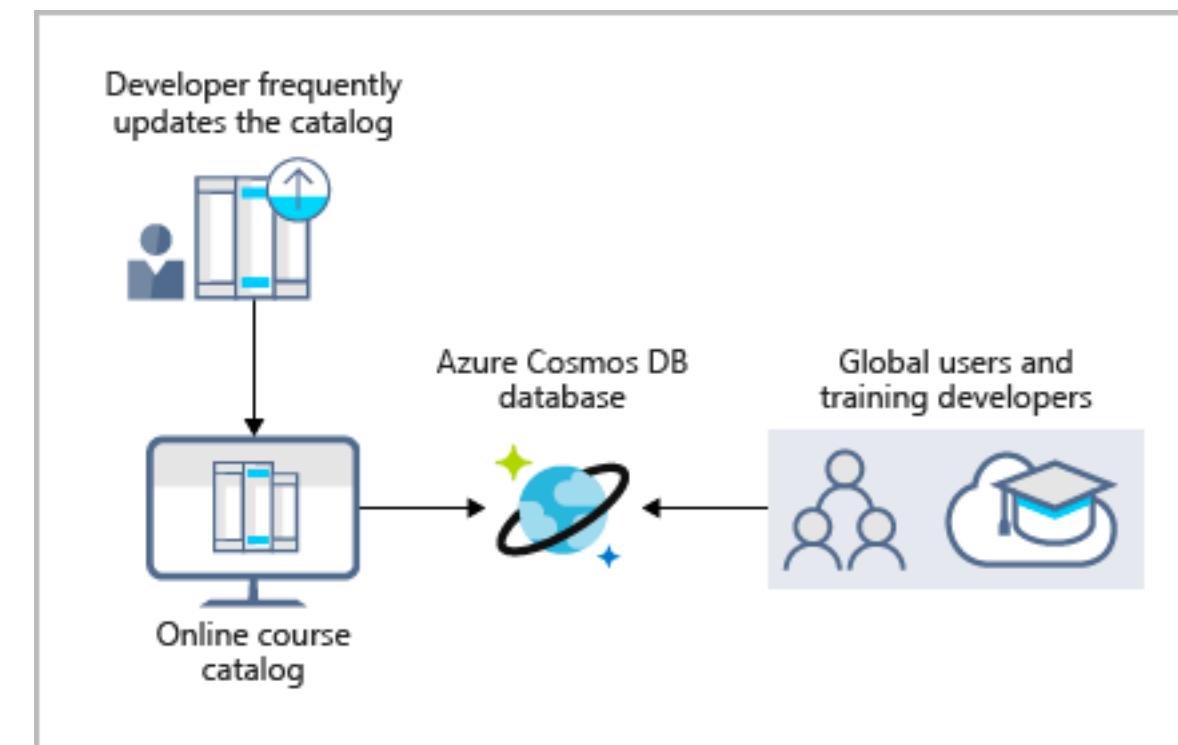
A flexible NoSQL globally distributed database. Designed for scale with 99.999% availability. Azure Cosmos DB supports SQL, MongoDB, Cassandra, Tables, and Gremlin APIs.

- **Azure SQL Database**

A SQL database with auto-scale, built-in high availability, backups and robust security. 99.99% availability. Supports both relational data and non-relational structures such as JSON and XML. You can migrate your existing SQL Server databases with minimal downtime by using the Azure Database Migration Service.

- **Azure Database for MySQL, PostgreSQL, and MariaDB**

Offers built-in security, fault tolerance, and data protection that you would otherwise have to buy or design, build, and manage. 99.99% availability. With Azure Database for MySQL, you can use point-in-time restore to recover a server to an earlier state, as far back as 35 days.

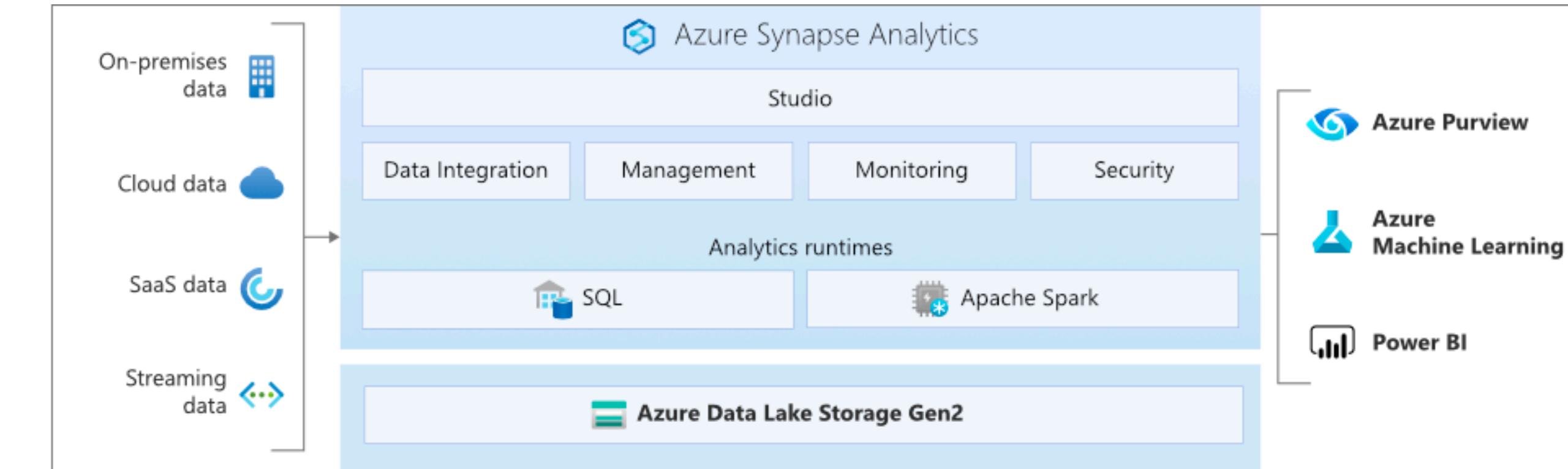


Benefits and usage of:

- **Azure Synapse Analytics (Tool)**

A service that brings together enterprise data warehousing and big data analytics with integral security at every level of scale at no extra cost.

A [unified experience to ingest, prepare, manage, and serve data](#) for immediate BI and machine learning needs.



- **Azure HDInsight (service)**

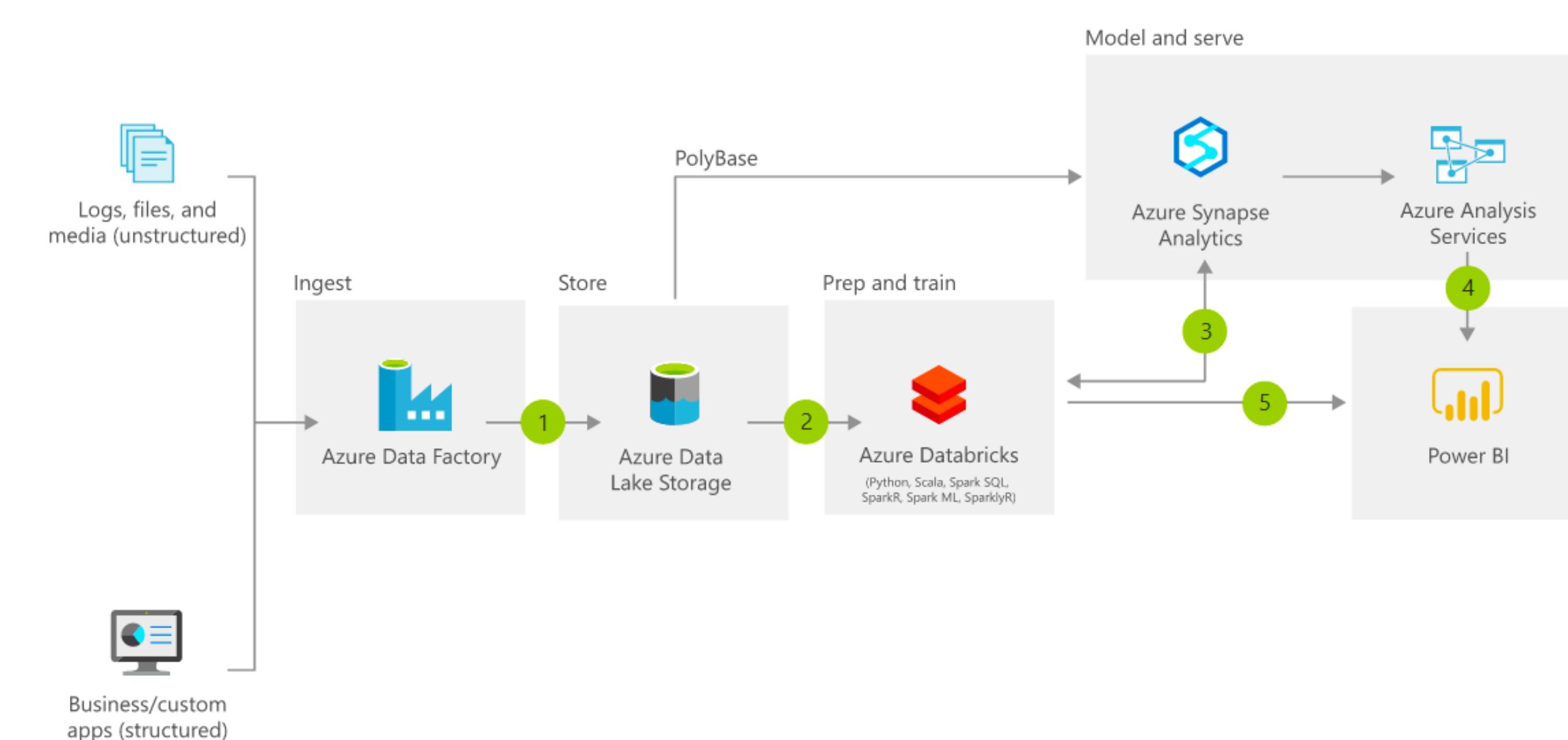
Run popular open-source frameworks—including Apache Hadoop, Spark, Hive, Kafka, and more—using Azure HDInsight, a customizable, enterprise-grade service for open-source analytics.

- **Azure Databricks (service)**

Data processing. Unlock insights from all your data and build artificial intelligence (AI) solutions.

- **Azure Data Lake Analytics (service)**

Develop and run massively parallel data transformation and processing programs in U-SQL, R, Python, and .NET over petabytes of data. With no infrastructure to manage, you can process data on demand, scale instantly, and only pay per job.



Knowledge Check

Your development team is interested in writing Graph-based applications that take advantage of the Gremlin API. Which option would be ideal for that scenario?

- A. Azure Cosmos DB.
- B. Azure SQL Database.
- C. Azure Databricks.
- D. Azure Database for PostgreSQL.

Knowledge Check

Your company has millions of log entries that it wants to analyze.
Which option would be ideal for analysis?

- A. Azure Cosmos DB.
- B. Azure SQL Database.
- C. Azure Synapse Analytics.
- D. Azure Database for PostgreSQL.

5.0

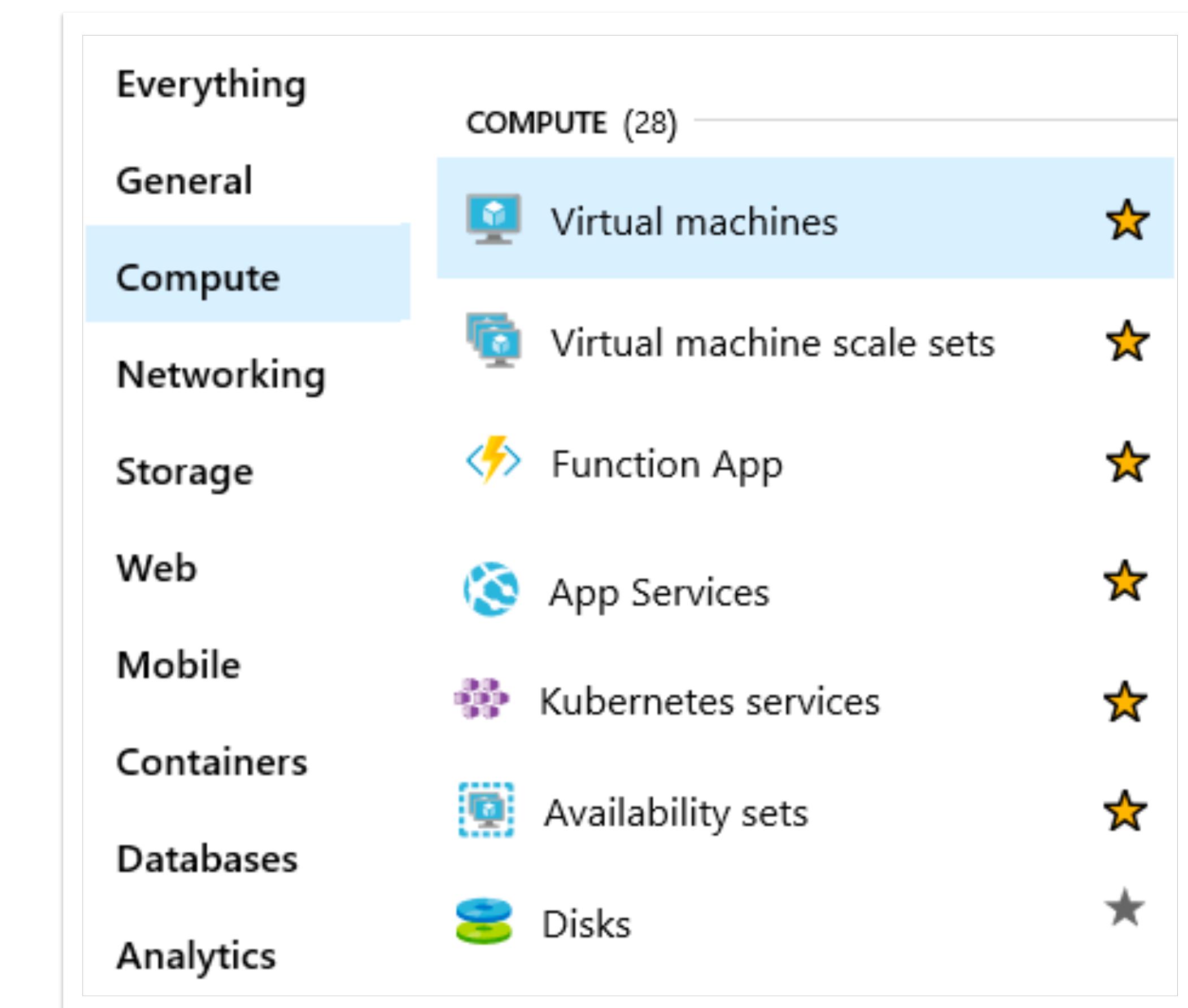
Explore Azure Compute Services.

Compute services

Azure compute is an on-demand **computing service for running cloud-based applications.**

It provides computing resources such as disks, processors, memory, networking, and operating systems.

The resources are available on-demand and can typically be made available in minutes or even seconds. **You pay only for the resources you use, and only for as long as you're using them.**



The screenshot shows the Azure portal's sidebar with 'Compute' selected. The main area displays a list of 28 compute-related services, each with a small icon and a yellow star rating.

Category	Service	Rating
COMPUTE (28)	Virtual machines	★
	Virtual machine scale sets	★
	Function App	★
	App Services	★
	Kubernetes services	★
	Availability sets	★
	Disks	★
	Others	Others
General	Cloud services	★
Networking	Network Watcher	★
Storage	Storage accounts	★
Web	Web sites	★
Mobile	Mobile apps	★
Containers	Docker	★
Databases	Relational databases	★
Analytics	Machine learning	★

Benefits and usage of:

- **Azure Virtual Machines**

Windows or Linux virtual Machines.

You choose your OS, Memory, CPU, Storage. You share hardware with other customers.

[Use when you want total control over the operating system \(OS\) or custom hosting configurations.](#)

- **Azure App Service**

With Azure App Service, you can quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform without managing infrastructure.

- **Azure Container Instances and Kubernetes Services**

Containers are lightweight, virtualized application environments.

Kubernetes makes it easy to deploy, manage and scale containerized applications.

[Use if you need a *microservice architecture supporting various Operating systems*.](#) For example, you might split a website into a container hosting your front end, another hosting your back end, and a third for storage.

- **Azure Functions**

Event-driven using triggers, Serverless functions that run code without the need of managing servers. Focusing on business logic and triggers. [Use when your application logic is event driven.](#)

(Serverless RESTful APIs using Http Triggers)

Knowledge Check

Which of the following services should be used when the primary concern is to perform work in response to an event (often via a REST command) that needs a response in a few seconds?

- A. Azure Functions.
- B. Azure App Service.
- C. Azure Container Instance.

6.0

Explore Azure Storage Services.

Azure Storage

Azure Storage is a service that you can use to store files, messages, tables, and other types of information. Clients such as websites, mobile apps, desktop applications, and many other types of custom solutions can read data from and write data to Azure Storage.

- **Azure Blob Storage**

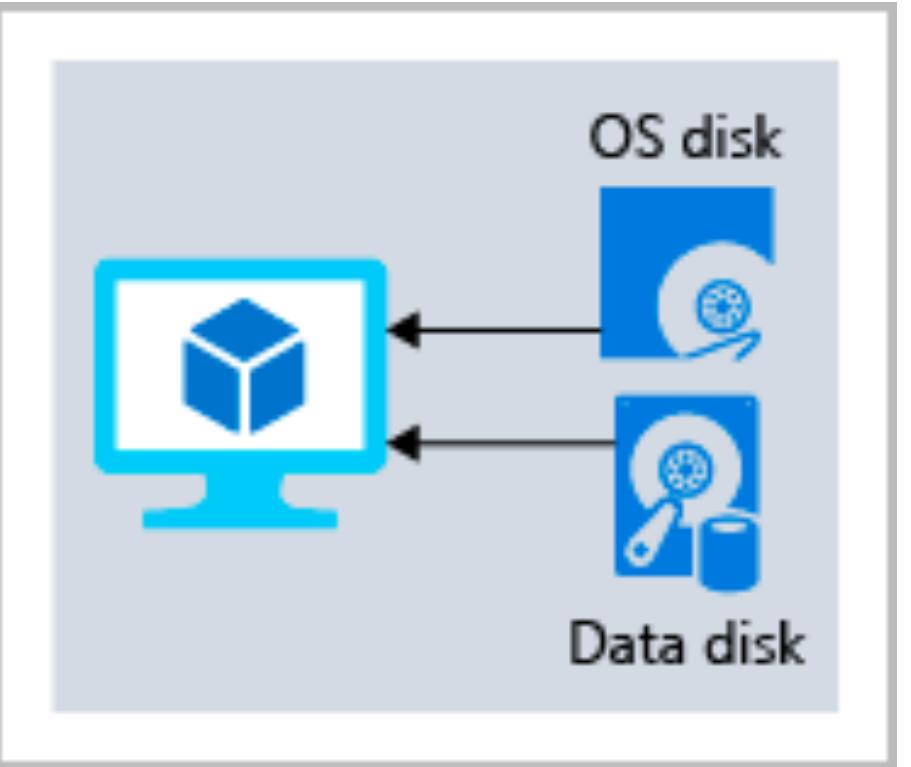
Object Serverless Storage. Store very large files and large amounts of unstructured files. Pay for what you store, unlimited storage, no-resizing volumes. Use for massive amounts of video/audio/image data, growing log files, backup, disaster recovery.

- **Azure Files Storage**

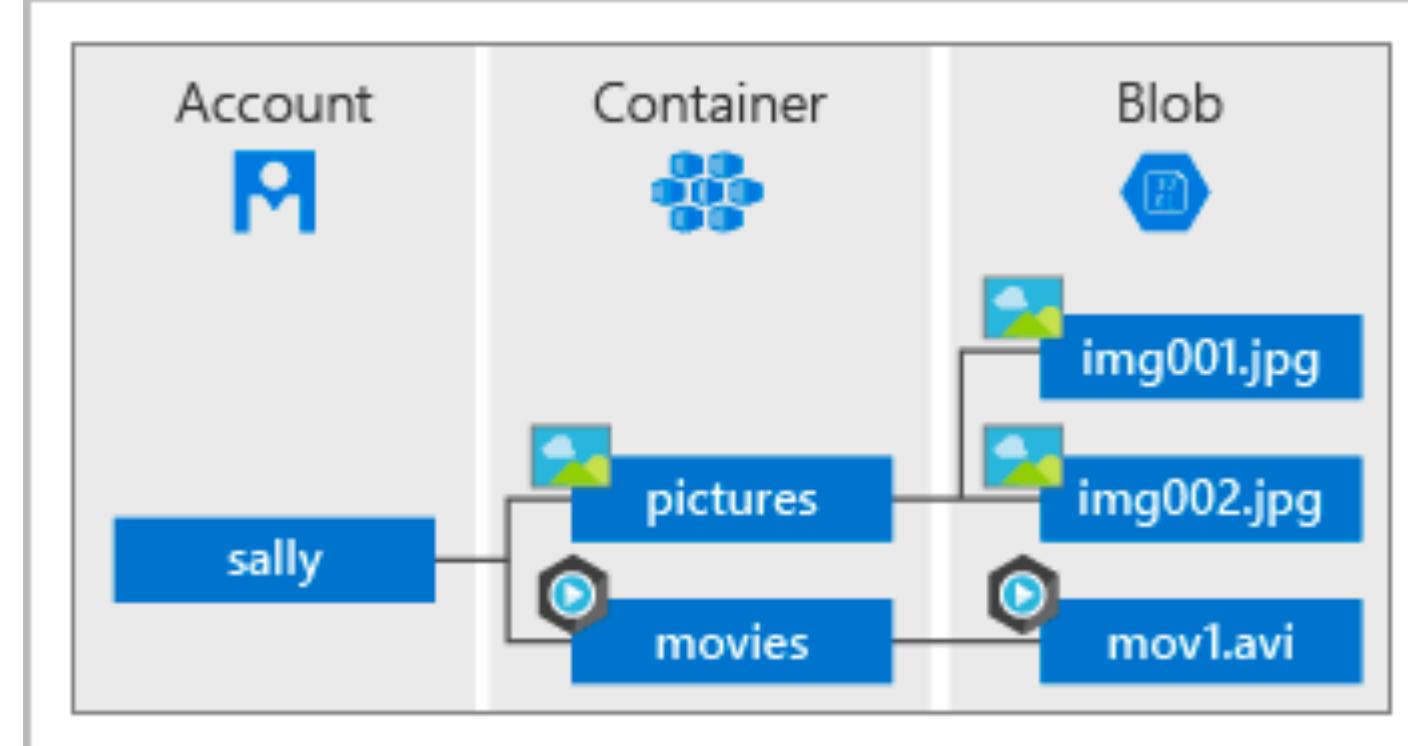
A shared volume that you can access and manage like a file server.
(Configs, plugins)

- **Azure Disk Storage**

A virtual volume. Choose SSD or HDD, encryption by default, attach volumes to Virtual Machines. Use this disks as you would in on-premises scenarios.



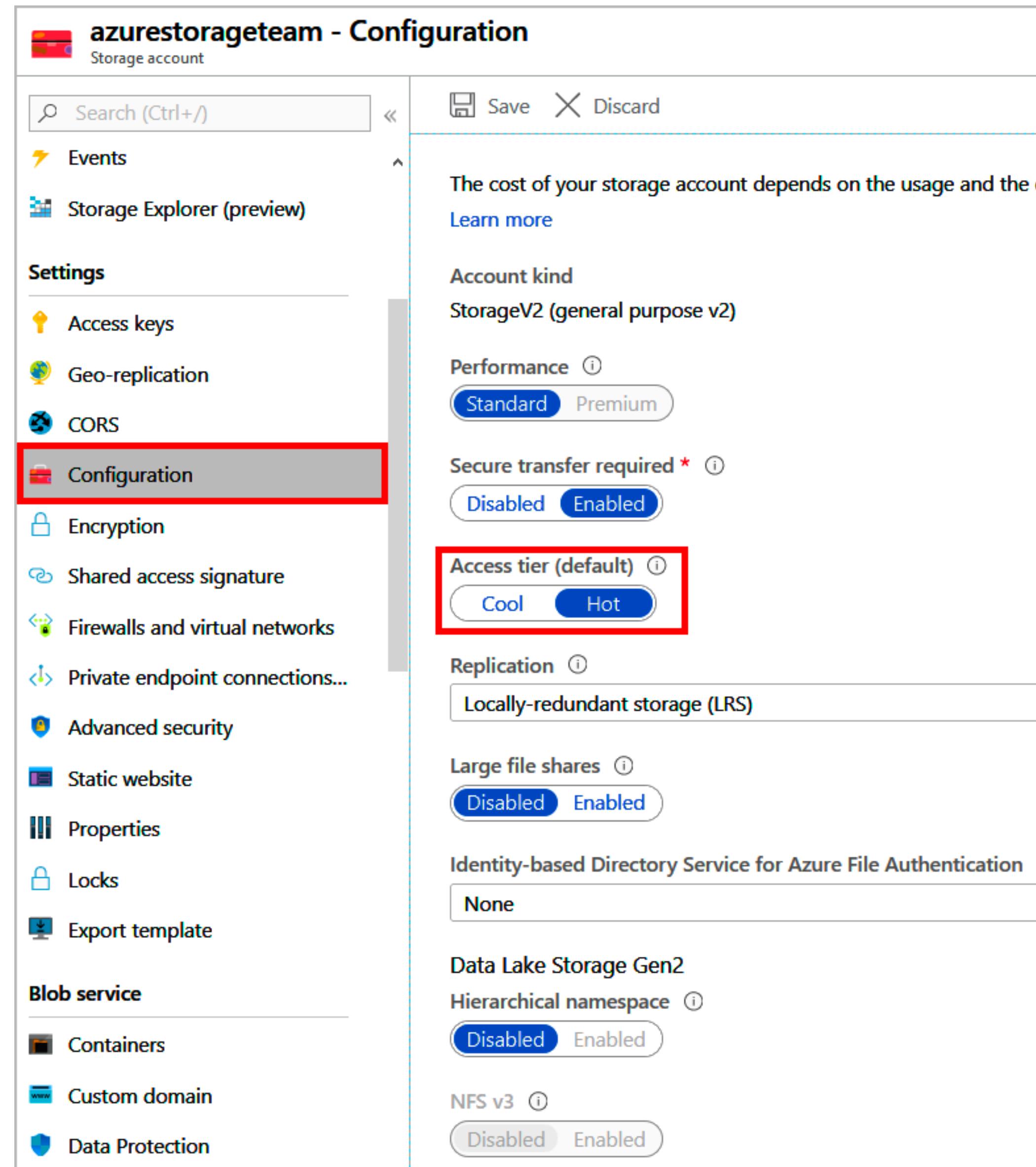
Azure Disk used as a separate data disk for this VM



Azure storage account, Containers and Blobs. Blobs are stored in containers owned by a storage account.

Azure Blob Access Tiers

- **Hot access tier:** Optimized for storing data that is accessed frequently (images for your website).
- **Cool access tier:** Optimized for data that is infrequently accessed and stored for at least 30 days (for example, invoices for your customers).
- **Archive access tier:** Appropriate for data that is rarely accessed and stored for at least 180 days, with flexible latency requirements (for example, long-term backups).



Knowledge Check

What is the first step that you would take in order to share an image file as a blob in Azure Storage?

- A. Create an Azure Storage container to store the image.
- B. Create an Azure Storage account.
- C. Upload the image file and create a container.
- D. Use a Shared Access Signature (SAS) token to restrict access to the image.

Knowledge Check

Which Azure Storage option is better for storing data for backup and restore, disaster recovery, and archiving?

- A. Azure Files Storage.
- B. Azure Disk Storage.
- C. Azure Blob Storage.

7.0

Explore Azure Networking Services.

Azure Networking Services

- **Azure Virtual Network:** enable Azure resources, such as VMs, web apps, and databases, to communicate with each other (*private subnets*), with users on the internet (*public subnets*), and with your on-premises client computers securely. You can think of an Azure network as [a set of resources that links other Azure resources](#).
- **Azure VPN Gateway:** A site-to-site VPN connection between an Azure Virtual Network and your local network.
- **Azure Express Route:** A connection between your on-premise to Azure Cloud Services. Has a greater bandwidth and higher levels of security.

Homework Assignment

Complete Azure Learn Modules Part 1 and Part 2 online with knowledge checks.

Make sure all modules are marked as completed.

1. <https://docs.microsoft.com/en-us/learn/parts/az-900-describe-cloud-concepts/>
2. <https://docs.microsoft.com/en-us/learn/parts/az-900-describe-core-azure-services/>

Thank you.