Azure Services Breakdown

1. Azure Virtual Machines (VMs) - Sub-Categories

A. General Purpose

- B-series (Burstable): Best for dev/test, low-traffic web servers.
  - B1ls, B1s, B1ms, B2s, B2ms, B4ms, B8ms, B12ms, B16ms, B20ms
- D-series (Balanced): Optimized for business applications, web servers, and database servers.
  - D2s v3, D4s v3, D8s v3, D16s v3, D32s v3, D48s v3, D64s v3
  - D2a v4, D4a v4, D8a v4, D16a v4, D32a v4, D48a v4, D64a v4, D96a v4 (AMD-based)
- DC/DCv2-series: Focused on Confidential Computing with Intel SGX.
  - DC2s, DC4s, DC8s, DC1s v2, DC2s v2, DC4s v2, DC8s v2

B. Compute-Optimized

- F-series: Great for compute-bound applications.
  - F2s v2, F4s v2, F8s v2, F16s v2, F32s v2, F48s v2, F64s v2, F72s v2
- FX-series: Provides high single-thread performance for specialized workloads.
  - FX4, FX6, FX12, FX24, FX48, FX72

C. Memory-Optimized

- E-series: Ideal for in-memory databases, analytics, and large-scale SAP HANA deployments.
  - E2s v3, E4s v3, E8s v3, E16s v3, E20s v3, E32s v3, E48s v3, E64s v3
  - E2a v4, E4a v4, E8a v4, E16a v4, E20a v4, E32a v4, E48a v4, E64a v4, E96a v4 (AMD-based)
- M-series (Massive Memory): Suited for large memory workloads like SAP HANA, SQL Server, and other in-memory applications.

  - M8ms, M16ms, M32ms, M64ms, M128ms, M208s v2, M416s v2 (up to 12TB RAM)

D. Storage-Optimized

- Lsv2-series: Use NVMe SSDs for high-performance storage.
  - L8s v2, L16s v2, L32s v2, L48s v2, L64s v2, L80s v2
- Lsv3-series: Enhanced version of Lsv2 for higher throughput.
  - L8s v3, L16s v3, L32s v3, L48s v3, L64s v3, L80s v3

E. GPU-Optimized

- NC-series (NVIDIA Tesla): Suited for AI training, deep learning, and GPU-accelerated applications.
  - NC6, NC12, NC24, NC24r
- NV-series (NVIDIA GRID): Optimized for virtual desktops and GPU rendering.
  - NV6, NV12, NV24, NV24r
- ND-series (NVIDIA A100): Powerful GPUs for large-scale AI/ML workloads.
  - ND40rs v2, ND96amsr A100 v4

F. HPC (High-Performance Compute)

- HB-series: Memory bandwidth-intensive workloads like scientific simulations and financial modeling.
  - HB60rs, HB120rs v2
- HC-series: Suited for compute-bound workloads requiring massive parallel processing.
  - HC44rs, HC48rs, HC96rs

G. Special/Other

- Spot VMs: Cost-effective intermittent workloads where instances can be terminated when needed.
- Azure Dedicated Host: Provides single-tenant physical servers for more isolation and control.

- DSv3-Type1, ESv3-Type1

2. Azure Serverless - Sub-Categories

A. Azure Functions

A serverless compute service allowing event-driven code execution.

- Triggers: Triggers for different services like HTTP, Blob Storage, Cosmos DB, etc.

- Plans:

  - Consumption Plan: Pay-per-execution.

  - Premium Plan: Pre-warmed instances.

  - App Service Plan: Dedicated VMs.

B. Logic Apps

A service for building workflows to integrate apps, data, and services.

- Standard vs. Consumption Plan.

- Connectors: Offers pre-built integrations with Office 365, Salesforce, SQL Server, SAP, and others.

C. Azure Container Instances (ACI)

Provides lightweight, on-demand containerized applications.

- Supports both Linux and Windows containers and GPU-enabled containers for ML workloads.

D. Azure App Service (Serverless Web Apps)

- Web Apps, API Apps, Mobile Apps.

- Supports deployment slots for staging/production management.

3. Azure Storage - Sub-Categories

A. Blob Storage

For unstructured data, such as text and binary files.

- Access Tiers:
  - Hot: Frequent access.
  - Cool: Infrequent access.
  - Cold: Archival.
  - Archive: Lowest cost, high retrieval latency.
- Types:
  - Block Blobs: General file storage.
  - Append Blobs: For logging.
  - Page Blobs: For VHD disks.

B. Azure Files

Fully managed file shares in the cloud.

- Standard (HDD), Premium (SSD).
- Supports SMB 3.0 and NFS 4.1 protocols.

C. Azure Disk Storage

Persistent storage options for VMs.

- Disk Types:
  - Standard HDD, SSD, Ultra Disk (high IOPS).

D. Azure Data Lake Storage (Gen2)

Optimized for big data analytics, hierarchical namespace compatible with Hadoop.

4. Azure Networking - Sub-Categories

A. Virtual Network (VNet)

Virtual networks for secure communication between Azure resources.

- Includes subnets, NSGs (Network Security Groups), and route tables.

B. Load Balancers

Distribute traffic across multiple servers.

- Public Load Balancer: Internet-facing.

- Internal Load Balancer: Private traffic.

C. Azure Application Gateway

A load balancer with advanced features like Web Application Firewall (WAF) and URL-based routing.

D. Azure VPN Gateway

Secure cross-premises connectivity.

- Point-to-Site, Site-to-Site, VNet-to-VNet configurations.

E. Azure ExpressRoute

Private dedicated connection to Azure.

- ExpressRoute Direct (10/100 Gbps).

- ExpressRoute Global Reach (cross-region).

F. Azure Front Door & CDN

Global load balancing and content delivery.

- Standard vs. Premium Tier with traffic redirection capabilities.

5. Azure Databases - Sub-Categories

A. Azure SQL Database

A fully managed database service.

- Options: Single Database, Elastic Pool, and Serverless.

- Hyperscale for databases exceeding 100TB.

B. Azure Cosmos DB

A globally distributed, multi-model database.

- Supports SQL, MongoDB, Cassandra, Gremlin (Graph), and Table APIs.

- Various Consistency Levels from strong to eventual consistency.

C. Azure Cache for Redis

An in-memory data store for high-performance applications.

- Options include Basic, Standard, Premium, Enterprise, and Enterprise Flash.

D. Azure Synapse Analytics

Unified analytics platform.

- Options include Dedicated SQL Pool, Serverless SQL Pool, and Spark Pool.

6. AI & Machine Learning - Sub-Categories

A. Azure Machine Learning

A platform for building, training, and deploying models.

- Compute Targets: Local, AML Compute, Kubernetes, Azure Databricks.

- Features: Automated ML and Designer (drag-and-drop).

B. Cognitive Services

Pre-built AI services for vision, speech, and language.

- Vision: Computer Vision, Face API, Form Recognizer.

- Speech: Speech-to-Text, Text-to-Speech.

- Language: LUIS, QnA Maker, Translator.

C. Azure OpenAI

Access to GPT-4, DALL·E, and Codex models for AI-driven applications.