Chapter 3 : Cloud Platforms and Tools

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AWS (Amazon Web Services)

AWS is a subsidiary of Amazon that provides on-demand cloud computing platforms and APIs. It launched in 2006 and is the most widely used cloud platform in the world.

Key Services:

- **EC2 (Elastic Compute Cloud)**: Provides resizable compute capacity.
- **S3 (Simple Storage Service)**: Object storage for data backup and distribution.
- **RDS (Relational Database Service)**: Managed database services.
- **Lambda**: Serverless computing; runs code without managing servers.
- **CloudFront**: A content delivery network (CDN).

AWS

Features:

- Broadest set of tools and services.
- Global infrastructure with regions and availability zones.
- Strong ecosystem and third-party support.
- Pay-as-you-go pricing with free tier options.

Use Cases:

- Web hosting
- Big Data analytics
- Machine Learning
- Enterprise application deployment

Azure

Microsoft Azure is a cloud computing platform launched in 2010. It enables building, testing, deploying, and managing applications and services through Microsoft-managed data centers.

Key Services:

Azure Virtual Machines (VM): IaaS compute instances.

Blob Storage: Massively scalable object storage.

Azure SQL Database: Managed relational database service.

Azure Active Directory: Identity and access management.

Azure Functions: Event-driven serverless compute.

Azure

Features:

- Strong integration with Microsoft software ecosystem.
- Enterprise-grade security and compliance.
- Hybrid capabilities through Azure Stack.
- DevOps tools (Azure DevOps, GitHub integration).

Use Cases:

- Enterprise app migration
- Backup and disaster recovery
- IoT and AI workloads
- Office 365 and Dynamics integrations

GCP (Google Cloud Platform)

GCP is Google's suite of cloud computing services launched in 2011. It runs on the same infrastructure that Google uses for its end-user products like Google Search, Gmail, and YouTube.

Key Services:

- **Compute Engine:** Scalable virtual machines.
- **Cloud Storage:** Durable and highly available object storage.
- **BigQuery:** Fully-managed data warehouse for analytics.
- **Kubernetes Engine (GKE):** Managed Kubernetes service.
- **Cloud Functions:** Event-driven serverless compute.

GCP

Features:

- Excellent tools for data analytics and machine learning.
- World-class network infrastructure.
- Open-source and container-focused.
- Integration with Google’s AI services and TensorFlow.

Use Cases:

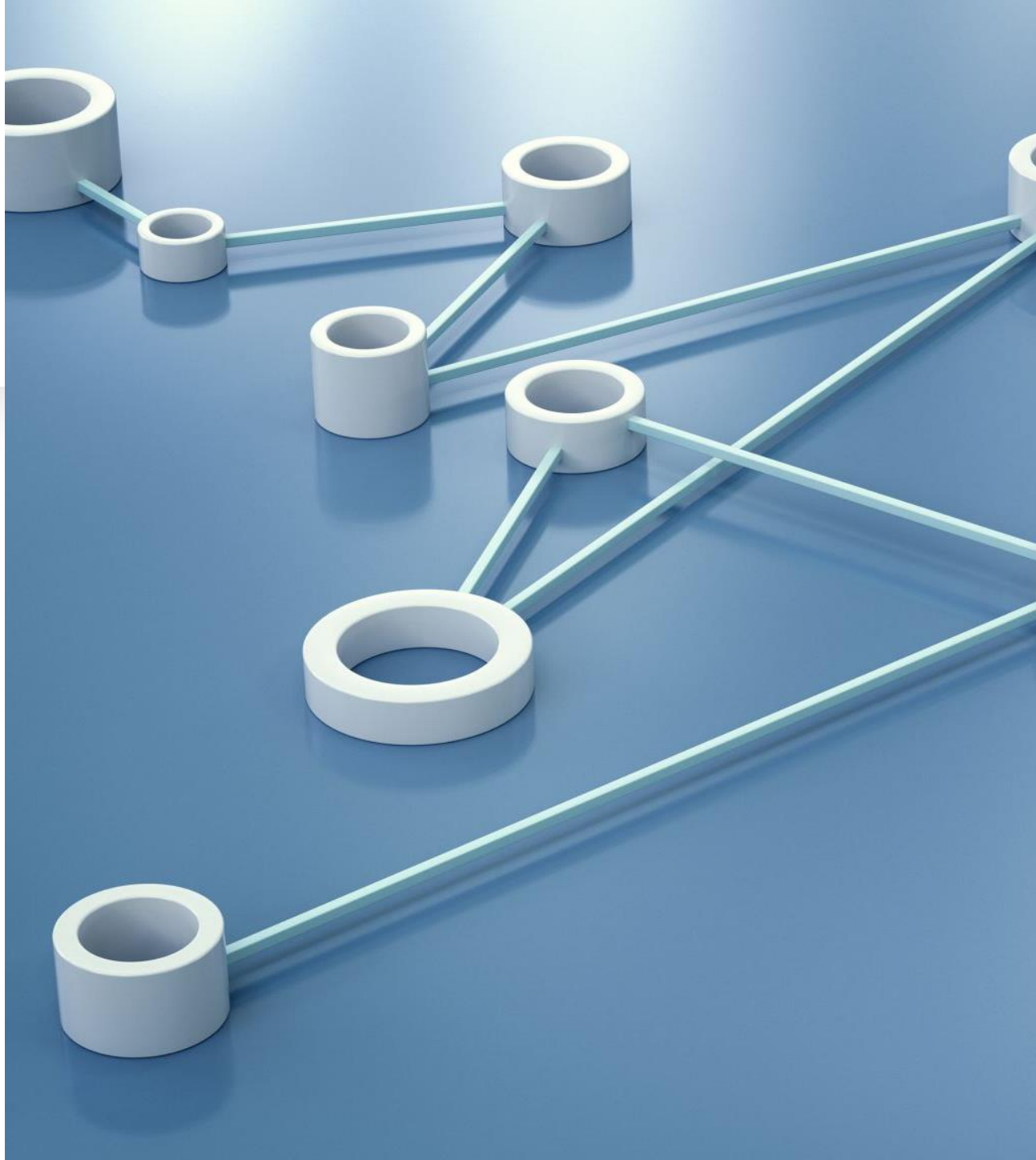
- Machine Learning and AI
- Data analytics and business intelligence
- Application modernization using containers
- High-performance computing

Aws vs Azure vs GCP

Feature	AWS	Azure	GCP
Launched	2006	2010	2011
Parent Company	Amazon	Microsoft	Google
Compute Service	EC2	Azure VM	Compute Engine
Storage Service	S3	Blob Storage	Cloud Storage
Serverless	Lambda	Azure Functions	Cloud Functions
Database	RDS, DynamoDB	Azure SQL, Cosmos DB	Cloud SQL, Firestore
Strengths	Comprehensive services	Microsoft integration	AI/ML, data analytics
Free Tier	Yes	Yes	Yes
Hybrid Support	Medium	Strong (Azure Stack)	Limited

Overview of Cloud Tools

- Cloud platforms such as **AWS**, **Azure**, and **GCP** provide a broad set of tools to help users build, deploy, and manage applications efficiently. These tools can be categorized into various services. The key foundational categories include **Compute**, **Storage**, and **Database** services.



Compute

Compute services provide the processing power needed to run applications, virtual machines, containers, and serverless functions in the cloud.

Common Features:

- Auto-scaling and load balancing
- Various OS and VM types
- Pricing models: Pay-as-you-go, reserved instances

Platform	Service Name	Description
AWS	EC2 (Elastic Compute Cloud)	Virtual servers that can be configured as needed.
AWS	Lambda	Serverless compute service to run code without servers.
Azure	Virtual Machines	Scalable, on-demand compute resources.
Azure	Azure Functions	Serverless code execution based on events.
GCP	Compute Engine	Customizable virtual machines.
GCP	Cloud Functions	Event-driven, serverless functions.

Storage Service

Storage services provide reliable and scalable storage options for files, objects, and block data.

Common Use Cases:

- Backup and restore
- Archiving
- File sharing
- Hosting static websites

Platform	Service Name	Description
AWS	S3 (Simple Storage Service)	Object storage for data archiving, backup, and hosting.
AWS	EBS (Elastic Block Store)	Block-level storage for EC2 instances.
Azure	Blob Storage	Object storage optimized for unstructured data.
Azure	Azure Files	Fully managed file shares.
GCP	Cloud Storage	Scalable object storage for analytics, backup, etc.
GCP	Persistent Disks	Block storage for VMs.

Database Service

- Cloud database services provide managed and scalable database solutions for both structured (SQL) and unstructured (NoSQL) data.

Use Case

- Automated backups and patching
- High availability and disaster recovery
- Elastic scaling based on demand

Platform	Service Name	Type	Description
AWS	Amazon RDS	SQL	Managed relational DB for MySQL, PostgreSQL, etc.
AWS	DynamoDB	NoSQL	Fully managed NoSQL database for high-performance apps
Azure	Azure SQL Database	SQL	Managed SQL DB with built-in AI capabilities.
Azure	Cosmos DB	NoSQL	Globally distributed, multi-model NoSQL database.
GCP	Cloud SQL	SQL	Managed relational database service.
GCP	Firestore	NoSQL	Flexible, scalable NoSQL for mobile/web apps.

Services

Category	AWS	Azure	GCP
Compute	EC2, Lambda	VMs, Azure Functions	Compute Engine, Functions
Storage	S3, EBS	Blob, File Storage	Cloud Storage, Disks
Database	RDS, DynamoDB	SQL DB, Cosmos DB	Cloud SQL, Firestore