Microsoft Azure – Overview & Key Concepts

✅ Overview

Microsoft Azure is a **cloud computing platform** and suite of services offered by Microsoft. It enables individuals, developers, and organizations to **build, deploy, and manage applications and services** through Microsoft-managed data centers around the world.

Azure supports a wide range of cloud models:

- **IaaS (Infrastructure as a Service):** Provision virtual machines, networking, storage.

- **PaaS (Platform as a Service):** Develop and host applications without managing the underlying infrastructure.

- **SaaS (Software as a Service):** Consume software services like Office 365 directly via the cloud.

🔑 Key Concepts

1. Global Infrastructure

- **Regions:** Physical locations across the globe (e.g., East US, Southeast Asia).

- **Availability Zones (AZs):** Data centers within a region providing redundancy and high availability.

- **Resource Groups:** Logical containers for grouping related Azure resources.

- **Azure Resource Manager (ARM):** The deployment and management engine for Azure resources.

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2. Core Azure Services

Category	Examples
Compute	Virtual Machines, App Service, Azure Functions, AKS
Storage	Blob Storage, File Storage, Disk Storage
Networking	Virtual Network (VNet), Load Balancer, Application Gateway

Category	Examples
Databases	Azure SQL, Cosmos DB, PostgreSQL, MySQL
AI & ML	Cognitive Services, Azure Machine Learning
Analytics	Synapse Analytics, Data Lake, Data Factory

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3. Identity, Security & Governance

- **Azure Active Directory (Azure AD):** Identity management and access control.

- **Role-Based Access Control (RBAC):** Fine-grained permissions for resources.

- **Azure Policy & Blueprints:** Enforce organizational standards and governance.

- **Azure Key Vault:** Securely store secrets and encryption keys.

- **Microsoft Defender & Sentinel:** Security posture management and threat detection.

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4. Application Development & DevOps

- **Azure App Service:** Platform for web apps and APIs.

- **Azure Functions:** Serverless compute for event-driven apps.

- **Azure DevOps Services:** CI/CD tools for building and deploying applications.

- **GitHub Integration:** Modern DevOps using GitHub Actions and repositories.

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5. Data, AI & Analytics

- **Databases:** Fully managed relational and NoSQL databases.

- **Azure Synapse Analytics:** Data integration, warehousing, and analytics.

- **Azure Machine Learning:** Tools for building, training, and deploying ML models.

- **Cognitive Services:** Pre-built APIs for vision, speech, language, and more.

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6. Management & Monitoring

- **Azure Monitor:** Real-time performance monitoring and alerts.

- **Application Insights:** App performance and diagnostic tool.

- **Azure Cost Management:** Track and optimize spending across subscriptions.

- **Azure Advisor:** Personalized best practices for performance, cost, and security.

🚀 **Why Use Azure?**

- Global scale and high availability

- Strong hybrid cloud capabilities

- Enterprise-ready security and compliance

- Integration with Microsoft tools (e.g., Windows Server, .NET, Office 365)

- Wide range of services for AI, DevOps, and analytics