INTRODUCTION

**What is Azure?**

- **Azure** is Microsoft's **cloud computing platform**, launched in 2010.

- It provides **on-demand access** to computing, storage, networking, AI, and databases — all without needing physical servers.

- Azure operates on a **pay-as-you-go model**, meaning you pay only for what you use.

Think of Azure as a **huge IT infrastructure available online**, where you can rent services instead of building them yourself

Why Azure?

- **Scalability** – Easily handle small apps or global systems.

- **Flexibility** – Supports multiple languages (Python, Java, .NET, Node.js).

- **Integration** – Works with Microsoft tools (Office 365, Power BI, Dynamics).

- **Security & Compliance** – Enterprise-grade standards and certifications.

- **Global Reach** – Data centers in **60+ regions worldwide**.
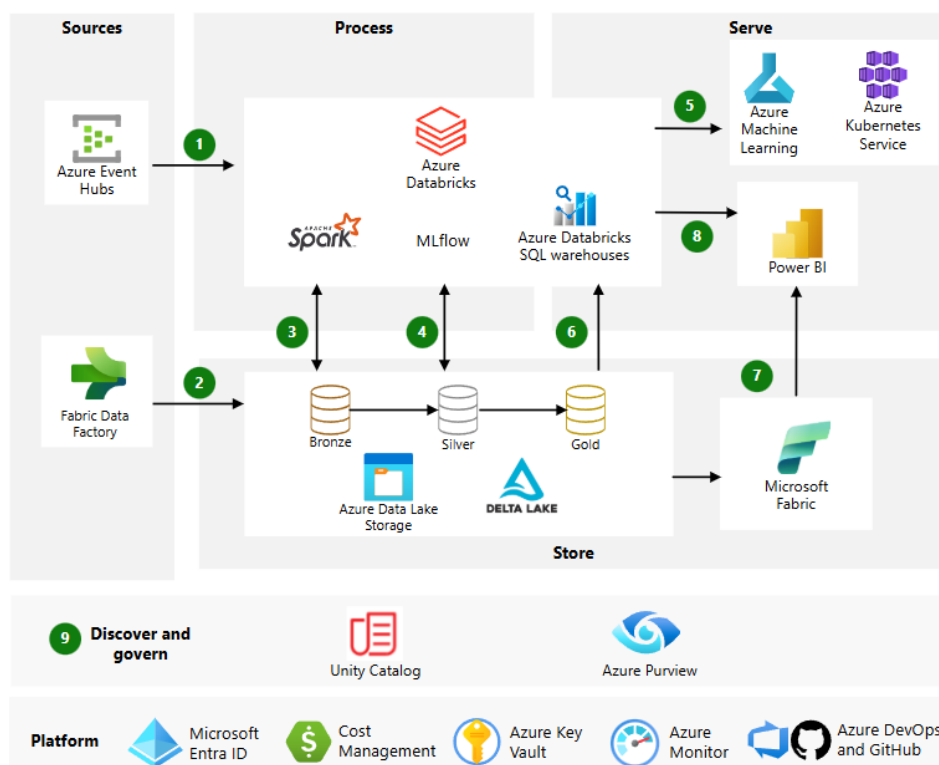
Core Azure Services

a) Compute Services (Brain of Azure)

- **Virtual Machines (VMs):** Cloud-based servers for apps/databases.

- **App Services:** Host web/mobile apps without managing servers.

- **Azure Functions (Serverless):** Run code on demand, pay only for execution.

- **AKS (Azure Kubernetes Service):** Container orchestration for microservices.

b) Storage Services (Memory of Azure)

- **Blob Storage:** Store unstructured data (images, videos, backups).

- **Disk Storage:** Attach persistent disks to VMs.

- **Queue & Table Storage:** Messaging + NoSQL key-value storage.

c) Networking Services (Connections of Azure)

- **Virtual Network (VNet):** Create private cloud networks.

- **Load Balancer:** Distribute traffic across servers.

- **VPN Gateway:** Secure connections between on-prem and Azure.

- **Azure Firewall / DDoS Protection:** Security at the network level.

d) Databases (Knowledge of Azure)

- **Azure SQL Database:** Managed relational database.

- **Cosmos DB:** Globally distributed NoSQL database.

- **PostgreSQL & MySQL:** Fully managed open-source DB options.

Advanced Azure Services

a) AI & Machine Learning

- **Azure Machine Learning:** Build & deploy ML models.

- **Cognitive Services:** Prebuilt AI (vision, speech, language).

- **Azure Bot Service:** Create intelligent chatbots.

b) Analytics & Big Data

- **Azure Synapse Analytics:** Data warehousing for BI.

- **Azure Databricks:** AI + data processing (integrated with MLflow, Spark).

- **Azure Data Lake Storage:** For massive unstructured data storage.

c) DevOps & Management

- **Azure DevOps:** CI/CD pipelines.

- **Azure Monitor:** Logs & monitoring.

- **Azure Resource Manager (ARM):** Infrastructure as code.

Security, Governance & Pricing

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

- **Role-Based Access Control (RBAC):** Assign roles to users.

- **Compliance:** ISO, HIPAA, GDPR certifications.

- **Pricing Models:**

  o Pay-as-you-go

  o Reserved instances (discounts for 1–3 years)

  o Free tier for basic services

  o
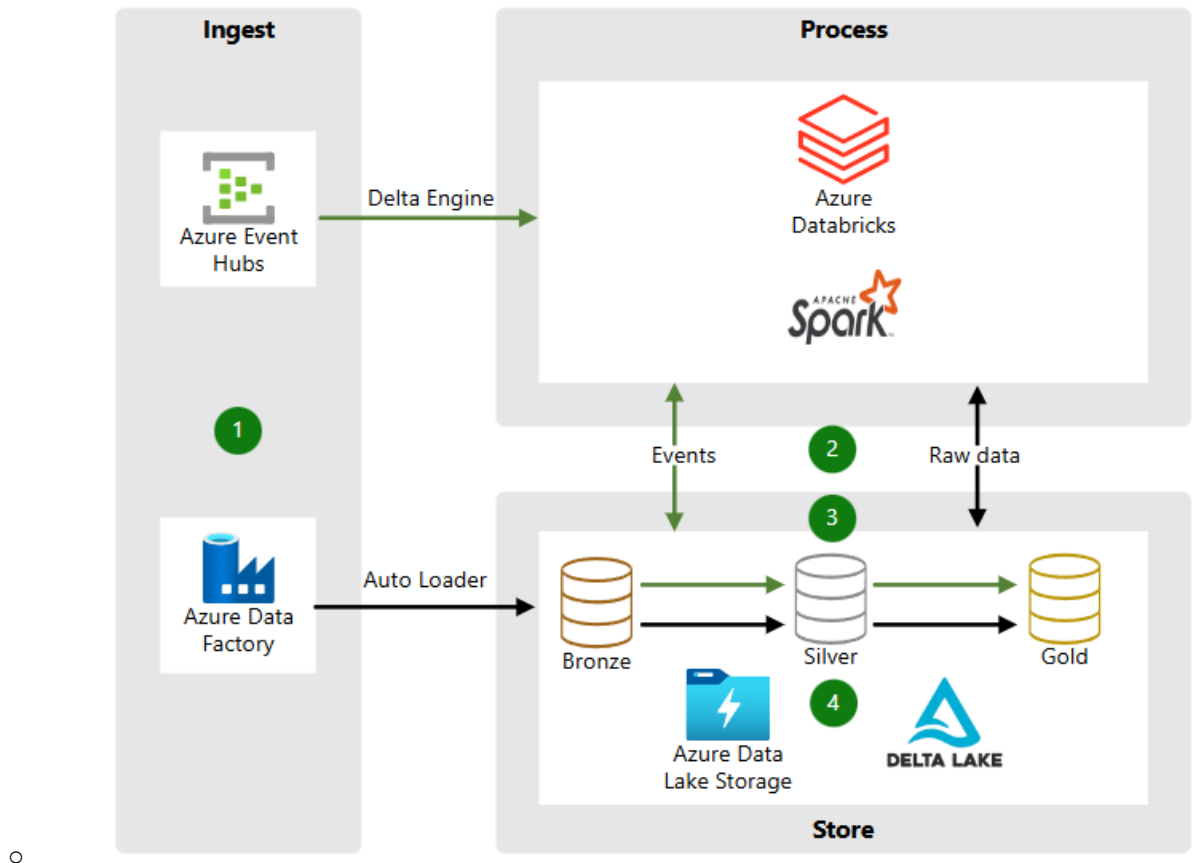
Real-World Use Cases

- **Startups:** Launch apps without servers.

- **Enterprises:** Run ERP/CRM systems in the cloud.

- **Healthcare:** Store and analyze medical images.

- **Finance:** Fraud detection using AI models.

- **Retail:** Predict customer demand using analytics.

Feature	Azure	AWS	Google Cloud
Strength	Microsoft ecosystem	Largest service catalog	AI/ML focus
Global Reach	60+ regions	30+ regions	35+ regions
Enterprise Adoption	Very strong	Strong	Medium
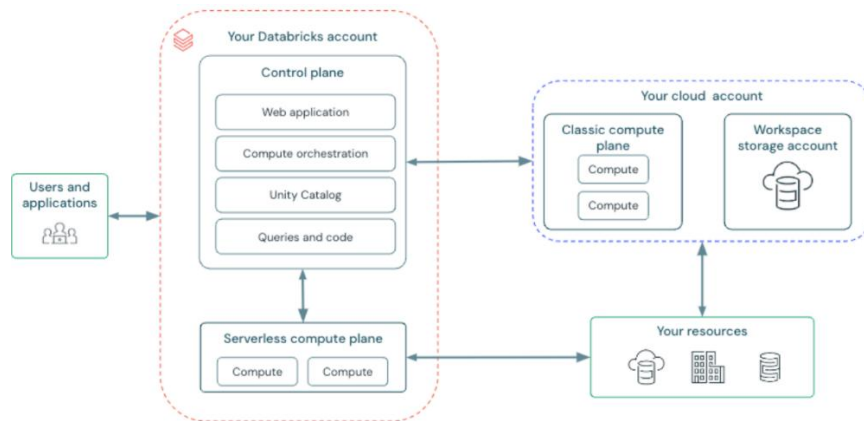
Conclusion

Azure is not just a cloud service — it's a **complete ecosystem** for businesses, developers, and researchers. From **hosting websites** to **AI-powered predictions**, Azure provides tools to build, scale, and secure modern applications with global reliability.