Research & Development (R&D) Document

Azure Global Infrastructure

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1. ☑ Introduction

Microsoft Azure's global infrastructure is designed to deliver high availability, resilience, scalability, and compliance. With one of the largest cloud footprints in the world, Azure enables customers to deploy applications closer to their users while meeting regulatory and data sovereignty requirements.

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2. 🌍 Azure Geographies

🔶 **Definition:**

Azure Geographies are discrete markets typically containing **two or more regions** that preserve data residency and compliance boundaries.

🔶 **Purpose:**

- Ensure **data residency**, sovereignty, and **compliance requirements**.

- Support **disaster recovery** strategies across multiple regions.

🔶 **Examples:**

Geography	Contained Regions
United States	East US, West US, Central US, etc.
Europe	North Europe, West Europe, UK South, etc.
Asia Pacific	Southeast Asia, East Asia, Japan East, etc.
India	Central India, South India, West India

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3. 📍 Azure Regions

◈ Definition:

An **Azure Region** is a set of data centers deployed within a defined perimeter and connected through a low-latency network.

◈ Key Characteristics:

- Over **65+ regions** worldwide (more than any other cloud provider).
- Customers choose the region closest to them to minimize latency and meet legal obligations.

◈ Region Types:

- **Public regions** (available to all users)
- **Government regions** (for government use)
- **Secret/Defense regions** (restricted, used for national defense)

◈ Examples:

- **East US**
- **West Europe**
- **Central India**
- **Australia East**

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4. 🏢 Availability Zones (AZs)

◈ Definition:

Availability Zones are **physically separate locations within an Azure region**, each having its own power, cooling, and networking.

◈ Purpose:

- Increase **fault tolerance** and **availability**.
- Prevent a single point of failure.

◈ **Structure:**

- Each region with AZ support has at least **3 separate zones**.

- Services like **VMs**, **AKS**, and **Azure SQL** can be deployed across AZs.

◈ **Example:**

In the **East US 2** region, Zone 1, Zone 2, and Zone 3 are completely isolated facilities.

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5. 🗄 Azure Data Centers

◈ **Definition:**

A **data center** is a physical facility that houses Azure's compute, storage, and network infrastructure.

◈ **Features:**

- Energy-efficient design (supports sustainability goals).

- Highly secure (24/7 surveillance, multi-layer access).

- Globally distributed for **low-latency** and **high redundancy**.

◈ **Types:**

- **Regional Data Centers**: Linked to specific regions.

- **Edge Data Centers**: Bring content closer to users for performance (used with Azure CDN).

6. 📊 Diagrammatic Representation

7. 📋 Comparison Table

Component	Description	Number / Scope	Use Case
Geographies	Political/market boundary zones	5+ major geographies	Data residency and legal compliance
Regions	Group of data centers in a geography	65+ globally	Application deployment, compliance, latency
Availability Zones	Independent data center clusters in a region	3+ per AZ-supported region	High availability and disaster recovery
Data Centers	Physical building with Azure hardware	200+ worldwide	Actual processing, storage, and networking

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8. 🔗 References

- 🌐 [Microsoft Azure - Global Infrastructure Overview](#)

- 🌐 [Azure Regions and Availability Zones - Microsoft Learn](#)