

Cloud Computing Fundamentals(MS Azure focused)

- The Azure Fundamentals Learning Path:
<https://docs.microsoft.com/en-us/learn/paths/azure-fundamentals/>
- Azure Docs: <https://docs.microsoft.com/en-us/azure/>

CORE ARCHITECTURAL COMPONENTS

Overview of Regions

Geography (Americas, Europe, Asia Pacific, Middle East and Africa)

- An Azure geography is a discrete market typically containing two or more regions that preserve data residency and compliance boundaries.

Region (e.g. West US, Canada Central, West Europe, Australia East, and Japan West)

- A region is a geographical area on the planet containing at least one, but potentially multiple datacenters that are nearby and networked together with a low-latency network.

Overview of Regions

- All Region(as of 2020 June)



Overview of Regions

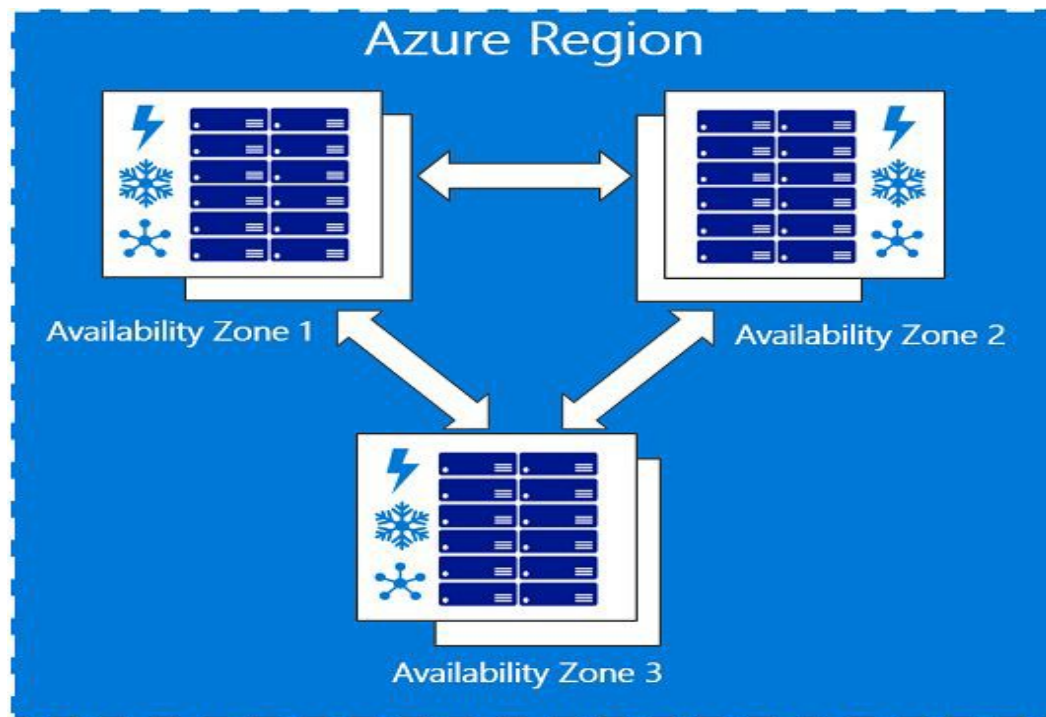
Special Azure regions

- Azure has specialized regions that you might want to use when you build out your applications for compliance or legal purposes.
- A few examples include:
 - **US DoD Central, US Gov Virginia, US Gov Iowa and more:**
 - ✓ These regions are physical and logical network-isolated instances of Azure for U.S. government agencies and partners.
 - ✓ These datacenters are operated by screened U.S. personnel and include additional compliance certifications.
 - **China East, China North, and more:** These regions are available through a unique partnership between Microsoft and 21Vianet, whereby Microsoft doesn't directly maintain the datacenters.

Overview of Regions

Availability Zone (e.g. Zone 1, Zone 2, Zone 3 - within a particular region)

- Availability Zones are physically separate datacenters within an Azure region.
- Each Availability Zone is made up of one or more datacenters equipped with independent power, cooling, and networking.



- ✓ If one zone goes down, the other continues working.
- ✓ Availability Zones are connected through high-speed, private fiber-optic networks.

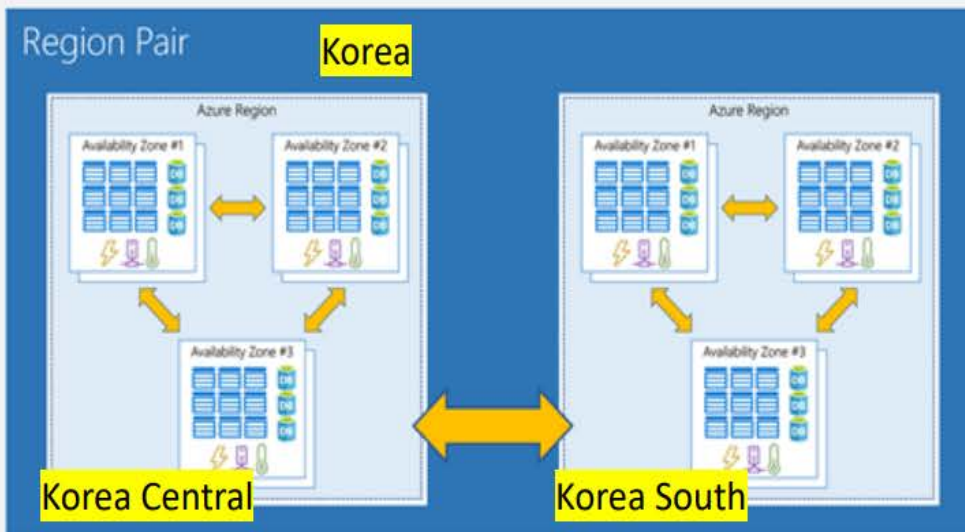
Overview of Regions

Region Pair

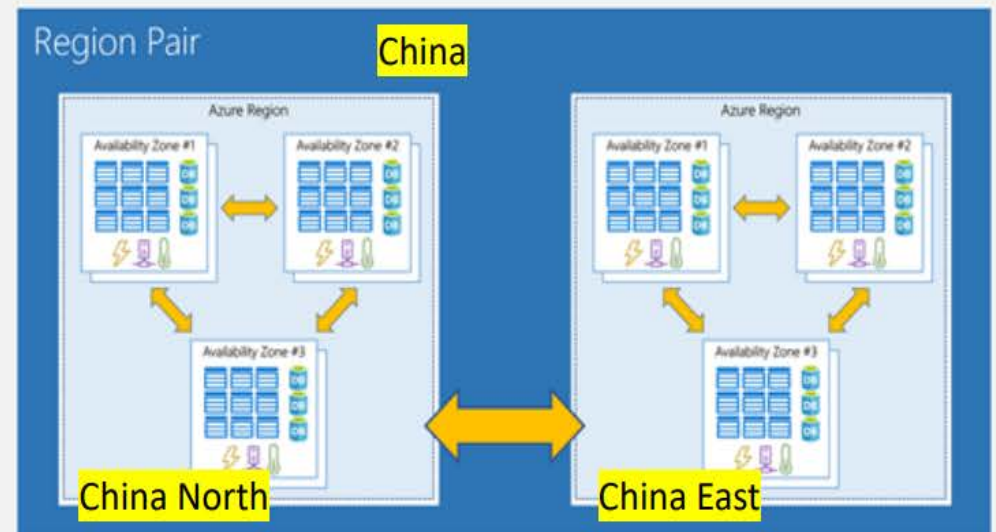
- Each Azure region is **always paired with another region** within the same geography (such as US, Europe, or Asia) at least 300 miles away.
- This approach **allows for the replication of resources** (such as virtual machine storage) across a geography that helps reduce the likelihood of interruptions due to events such as **natural disasters, civil unrest, power outages, or physical network outages** affecting both regions at once.

Geography **Asia Pacific**

Region Pair **Korea**



Region Pair **China**



Overview of Regions

The following regions currently support availability zones.

Americas	Europe	Middle East	Africa	Asia Pacific
Brazil South	France Central	Qatar Central	South Africa North	Australia East
Canada Central	Germany West Central	UAE North		Central India
Central US	North Europe			Japan East
East US	Norway East			Korea Central
East US 2	UK South			Southeast Asia
South Central US	West Europe			East Asia
US Gov Virginia	Sweden Central			China North 3
West US 2	Switzerland North			
West US 3				

Overview of Regions

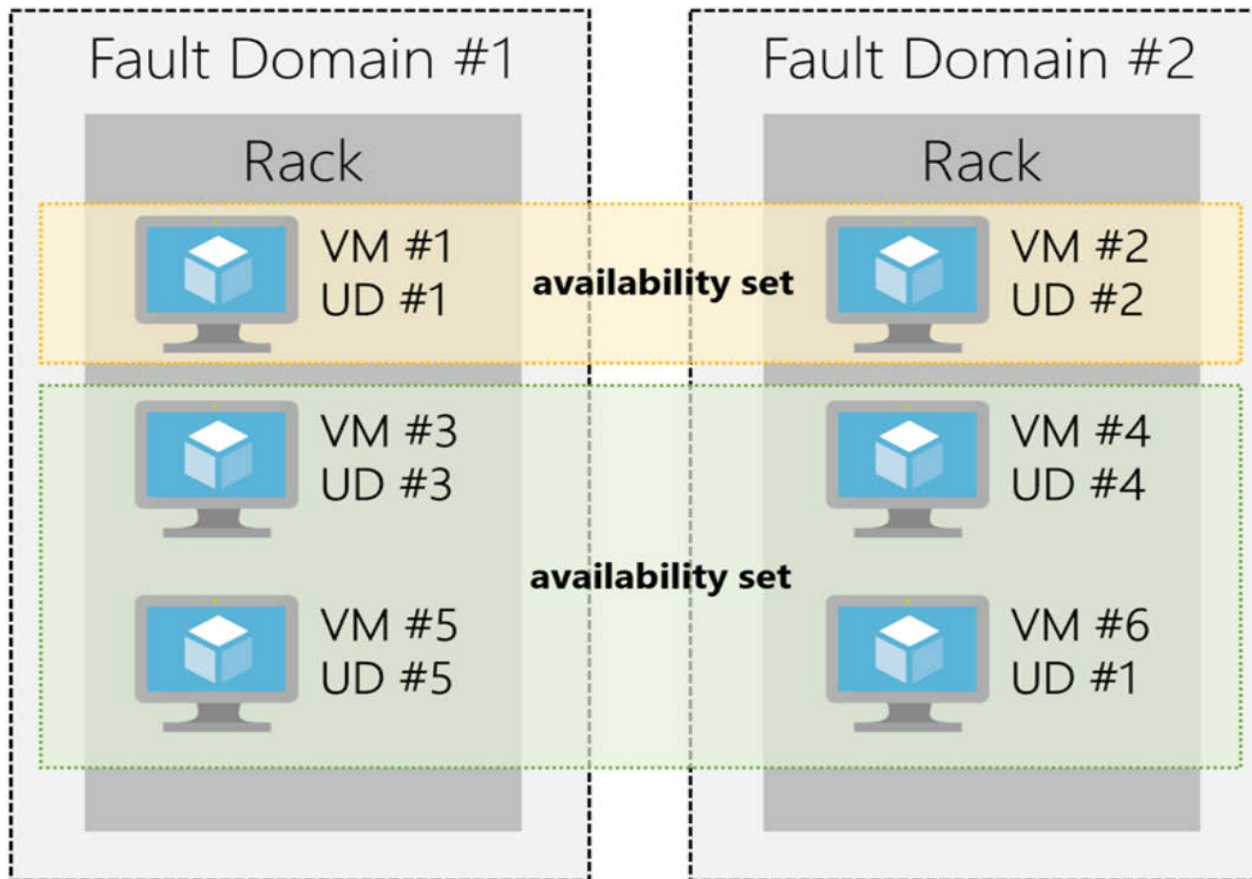
Availability Sets:

- To provide redundancy to application, group two or more VM in an availability set.
 - It ensures that during a planned or unplanned maintenance event, at least one VM will be available and meet the 99.95% SLA.
 - The availability set of a virtual machine can't be changed after it is created.
- ✓ **Update Domain:** When a maintenance event occurs, the update is sequenced through update domains.
 - ✓ **Fault Domain:** Fault domains provide for the physical separation of a workload across different hardware in the datacenter.

Hierarchy:

Geography > Region > Availability Zone > Availability Set > Fault Domain/Update Domain

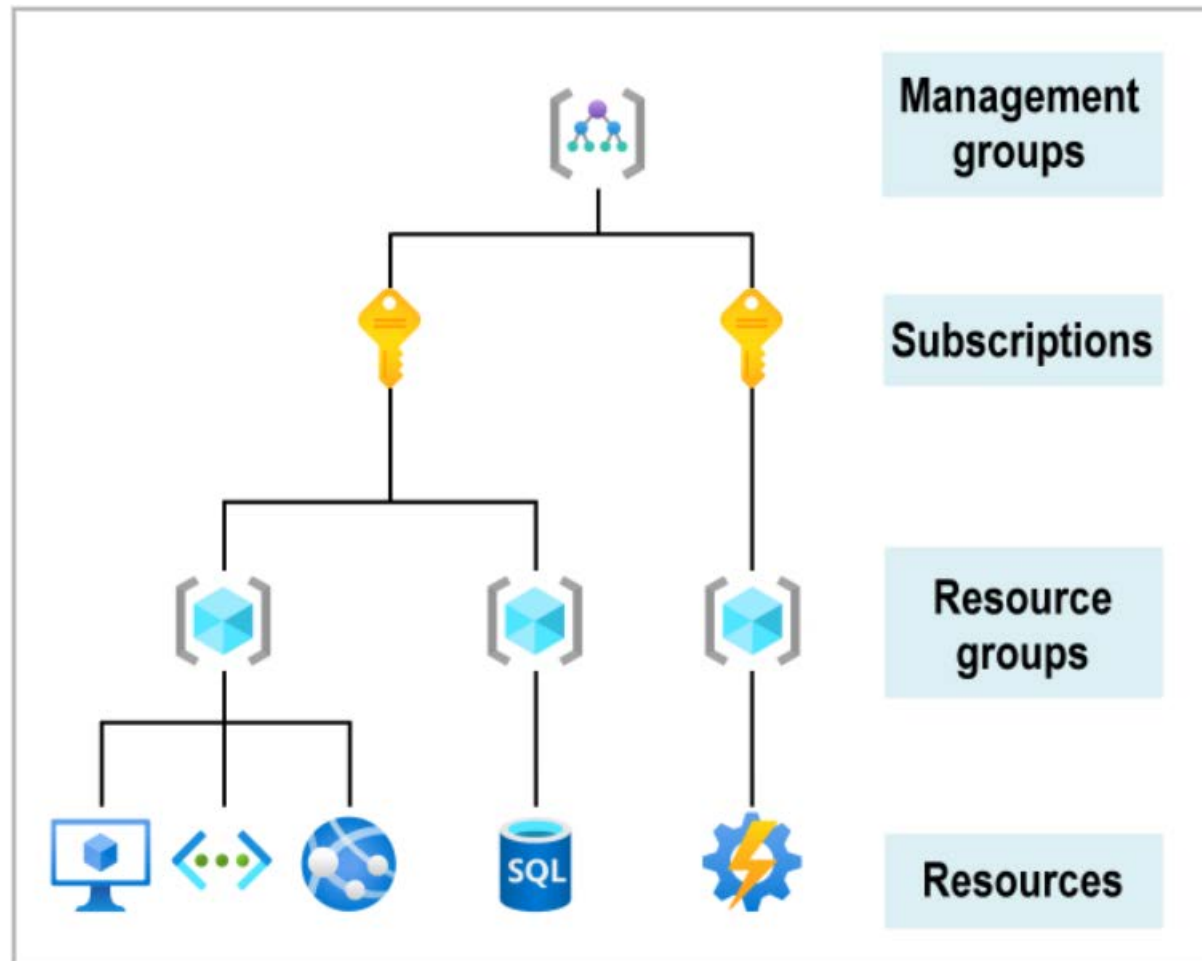
Overview of Regions



- Fault Domain = Separated server racks
- VM in the same fault domain share a common power source and physical network switch

Resource, Subscription & Management Group

Organizing structure for resources in Azure.



Resource, Subscription & Management Group

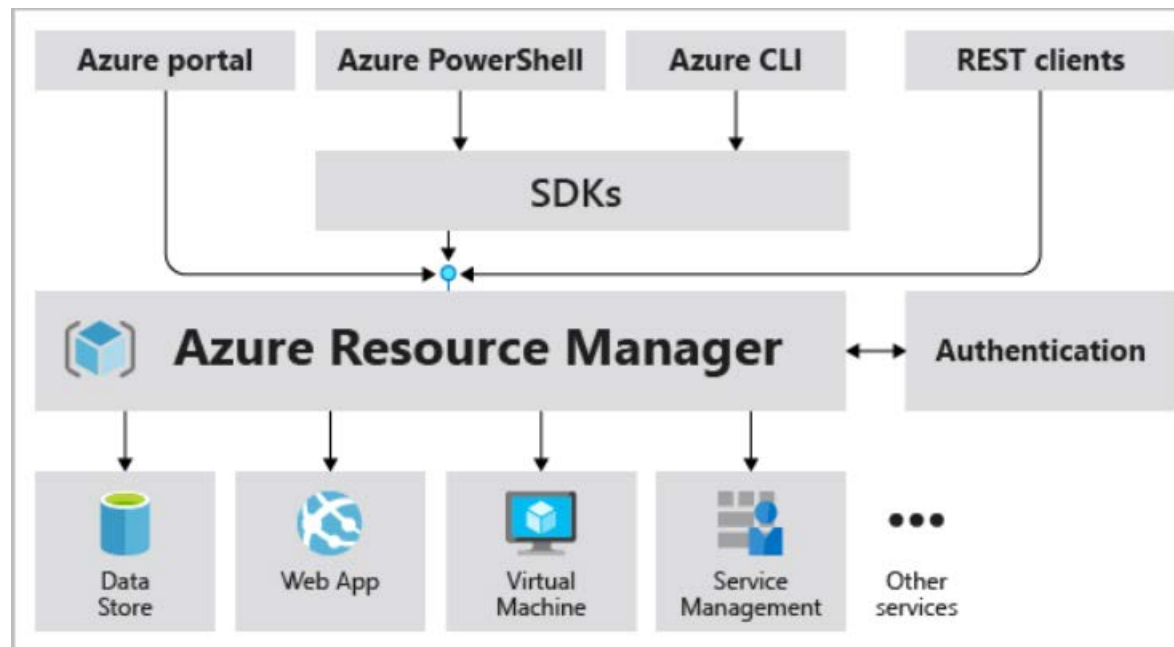
- **Resources:**
 - ✓ A manageable item that is available through Azure.
 - ✓ Virtual machines, storage accounts, web apps, databases, and virtual networks are examples of resources.
- **Resource groups:**
 - ✓ An Azure resource group is a **container** that holds related resources for an Azure solution.
 - ✓ The resource group can include all the resources for the solution, or only resources that you want to manage as a group.
- **Subscriptions:**
 - ✓ A subscription is an agreement with Microsoft to use one or more Microsoft cloud platforms or services, for which charges accrue based on either a per-user license fee or on cloud-based resource consumption.
 - ✓ For each subscription, there are limits or quotas on the amount of resources that you can create and use.
 - ✓ Organizations can use subscriptions to manage costs and the resources that are created by users, teams, or projects.
- **Management groups:**
 - ✓ Management groups provide a governance scope above subscriptions.
 - ✓ These groups help you manage access, policy, and compliance for multiple subscriptions.
 - ✓ All subscriptions in a management group automatically inherit the conditions applied to the management group.

Resource, Subscription & Management Group

Azure Resource Manager

- ✓ Azure Resource Manager is the deployment and management service for Azure.
- ✓ It provides a management layer that enables you to create, update, and delete resources in your Azure account.
- ✓ You use management features like access control, locks, and tags to secure and organize your resources after deployment.

The following image shows the role Resource Manager plays in handling Azure requests.



Resource, Subscription & Management Group

- **Azure Account**

An Azure account is an identity in either Azure AD, or a directory that is trusted by Azure AD, such as a work or school organization.

- **Azure Subscriptions**

- ✓ An Azure subscription is a logical container used to provision resources in Microsoft Azure.
- ✓ It holds the details of all your resources like virtual machines, databases, and so on.
- ✓ Every Azure subscription is associated with Azure AD.
- ✓ Users and services that access the resources of the subscription first need to authenticate with Azure AD.

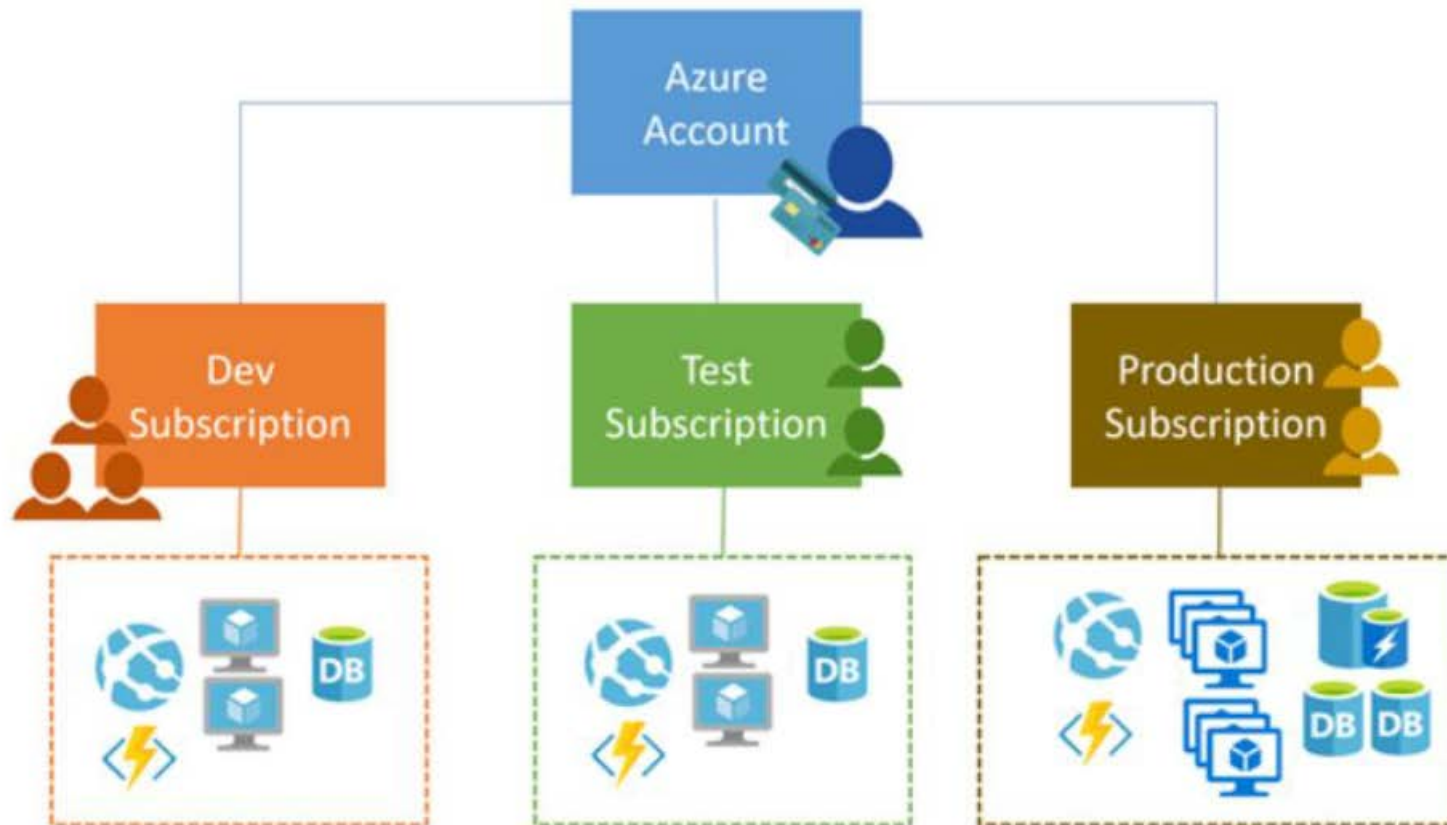
- **Subscription types**

Azure offers free and paid subscription options to suit different needs and requirements. The most commonly used subscriptions are:

- ✓ Free
- ✓ Pay-As-You-Go
- ✓ Enterprise Agreement
- ✓ Student

Resource, Subscription & Management Group

- Azure Subscriptions**



Resource, Subscription & Management Group

Azure Management Group

