Azure Solution Architect Training

Module - 2

Introduction to Azure

Agenda

- ❑ What is Azure
- ❑ Azure Regions
- ❑ Which Azure region is right for me
- ❑ Azure Region Pairs
- ❑ Region Pairs Benefits
- ❑ Azure Availability Zones
- ❑ Azure Datacenters
- ❑ Azure Fault Domains
- ❑ Azure Upgrade Domains
- ❑ Azure Availability Set
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- ❑ Azure Services
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- ❑ Azure Subscription
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- ❑ Azure Management tools
- ❑ Hands-On Lab
  - Create a Microsoft Azure Account

What is Azure

- Azure is a cloud offering from Microsoft that individuals and organizations can use to create, deploy, and operate cloud-based apps and infrastructure services.

Open and Flexible

Cloud Platform

Build, Deploy, and Manage Applications across Global Network

Build Applications using Any Language, Tool, or Framework

Integrate

Public Cloud Applications

with your Existing IT Environment

Azure Regions

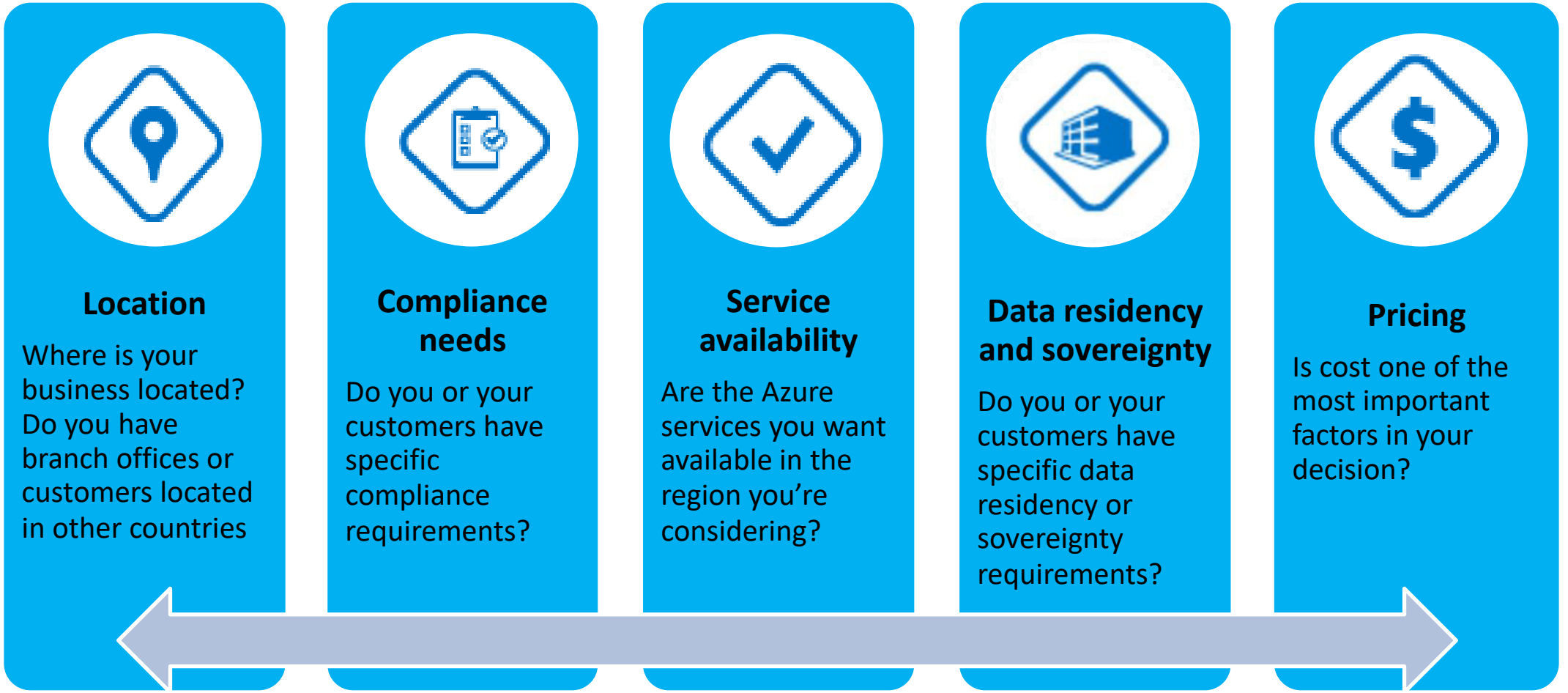
Azure Region

- The Azure datacenters are located around the world in strategic places that best meets the customer demands.
- These areas are known as Azure regions and are placed at a distance from each other in case there is a natural disaster that would affect more than one region at a time.
- Azure operates out of 36* regions around the world (with plans announced for 6* additional regions).
- Geographic expansion is a priority for Azure because it enables the customers to achieve higher performance and it supports their requirements and preferences regarding data location.

* 1st February 2018

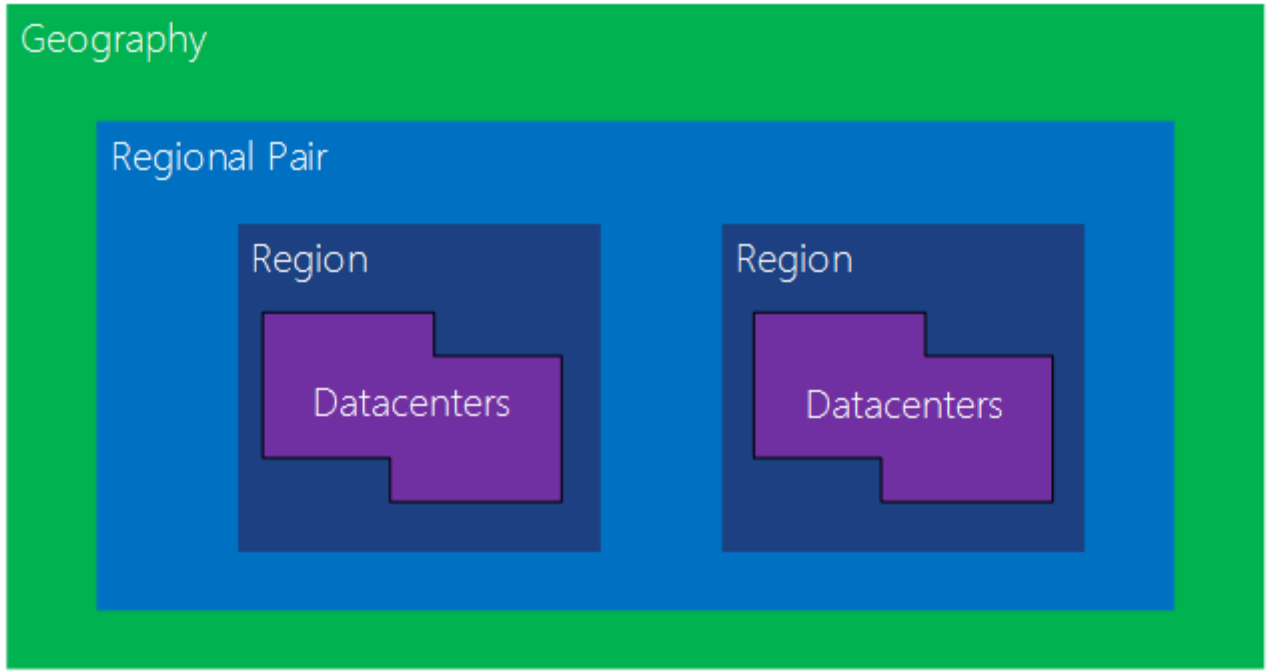
Which Azure region is right for me

- Consider these factors when choosing your region.



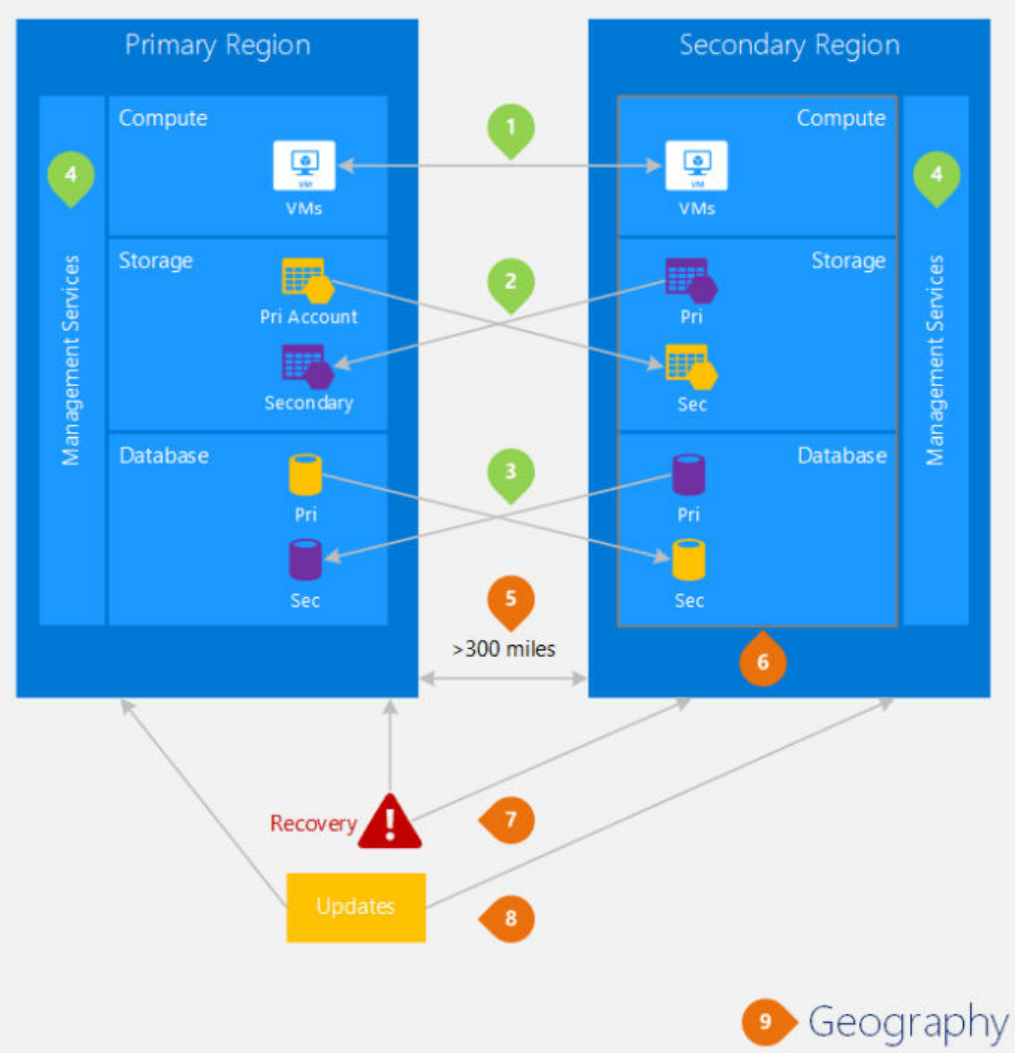
Azure Region Pairs

- An Azure geography is a defined area of the world that contains at least one Azure Region.
- An Azure region is an area within a geography, containing one or more datacenters.
- Each Azure region is paired with another region within the same geography (such as US, Europe, or Asia). This approach allows for the replication of resources.



Region Pairs Benefits

- Figure shows a hypothetical application which uses the regional pair for disaster recovery.
- The green numbers highlight the cross-region activities of three Azure services (Azure compute, storage, and database) and how they are configured to replicate across regions.
- The unique benefits of deploying across paired regions are highlighted by the orange numbers.



Region Pairs Benefits

- **Physical isolation [5]**
  - When possible, Azure prefers at least 300 miles of separation between datacenters in a regional pair.
  - Physical datacenter separation reduces the likelihood of natural disasters, civil unrest, power outages, or physical network outages affecting both regions at once.

- **Platform-provided replication [6]**
  - Some services such as Geo-Redundant Storage provide automatic replication to the paired region.

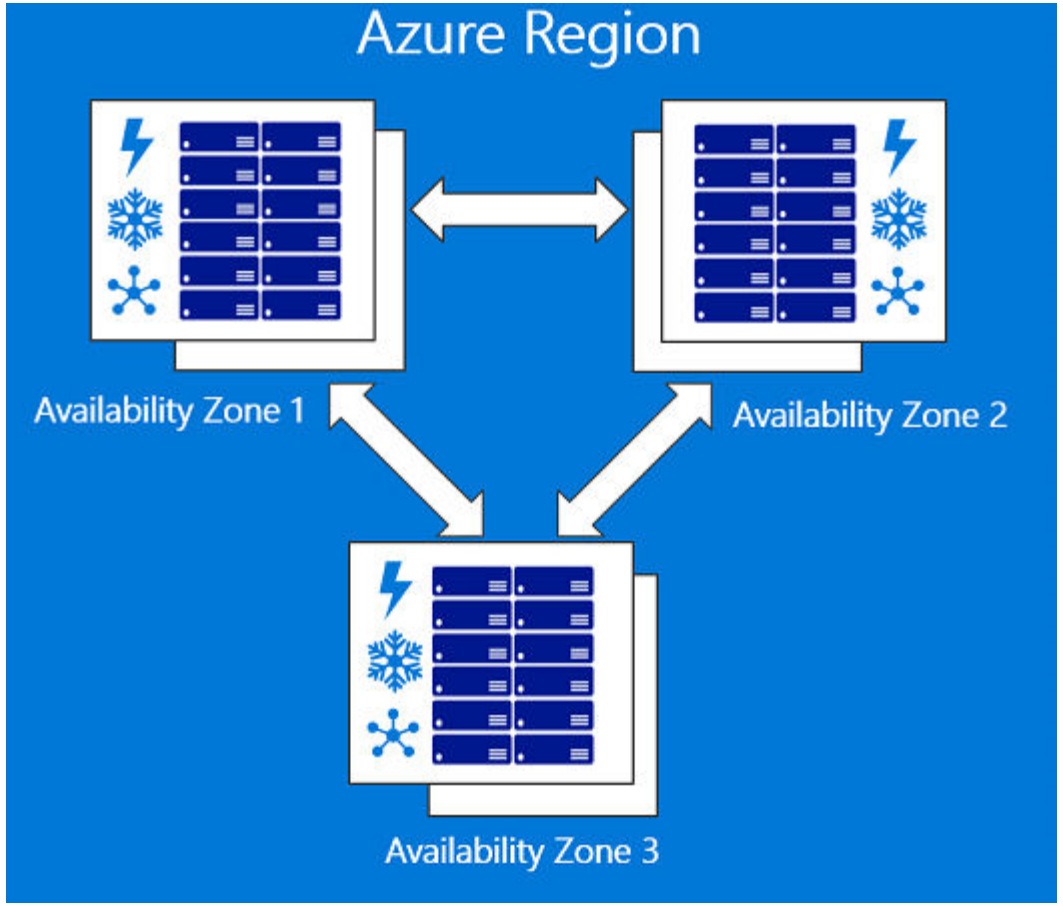
- **Region recovery order [7]**
  - In the event of a broad outage, recovery of one region is prioritized out of every pair.
  - Applications that are deployed across paired regions are guaranteed to have one of the regions recovered with priority.

- **Sequential updates [8]**
  - Planned Azure system updates are rolled out to paired regions sequentially (not at the same time) to minimize downtime.

- **Data residency [9]**
  - A region resides within the same geography as its pair in order to meet data residency requirements for tax and law enforcement jurisdiction purposes.

Azure Availability Zones

- An Availability Zone is a physically separate zone within an Azure region.
- There are three Availability Zones per supported Azure region.
- Each Availability Zone has a distinct power source, network, and cooling, and is logically separate from the other Availability Zones within the Azure region.
- By architecting your solutions to use replicated VMs in zones, you can protect your apps and data from the loss of a datacenter.
- If one zone is compromised, then replicated apps and data are instantly available in another zone.
- Regions that support Availability Zones*
  - East US 2
  - US Central
  - West Europe
  - France Central



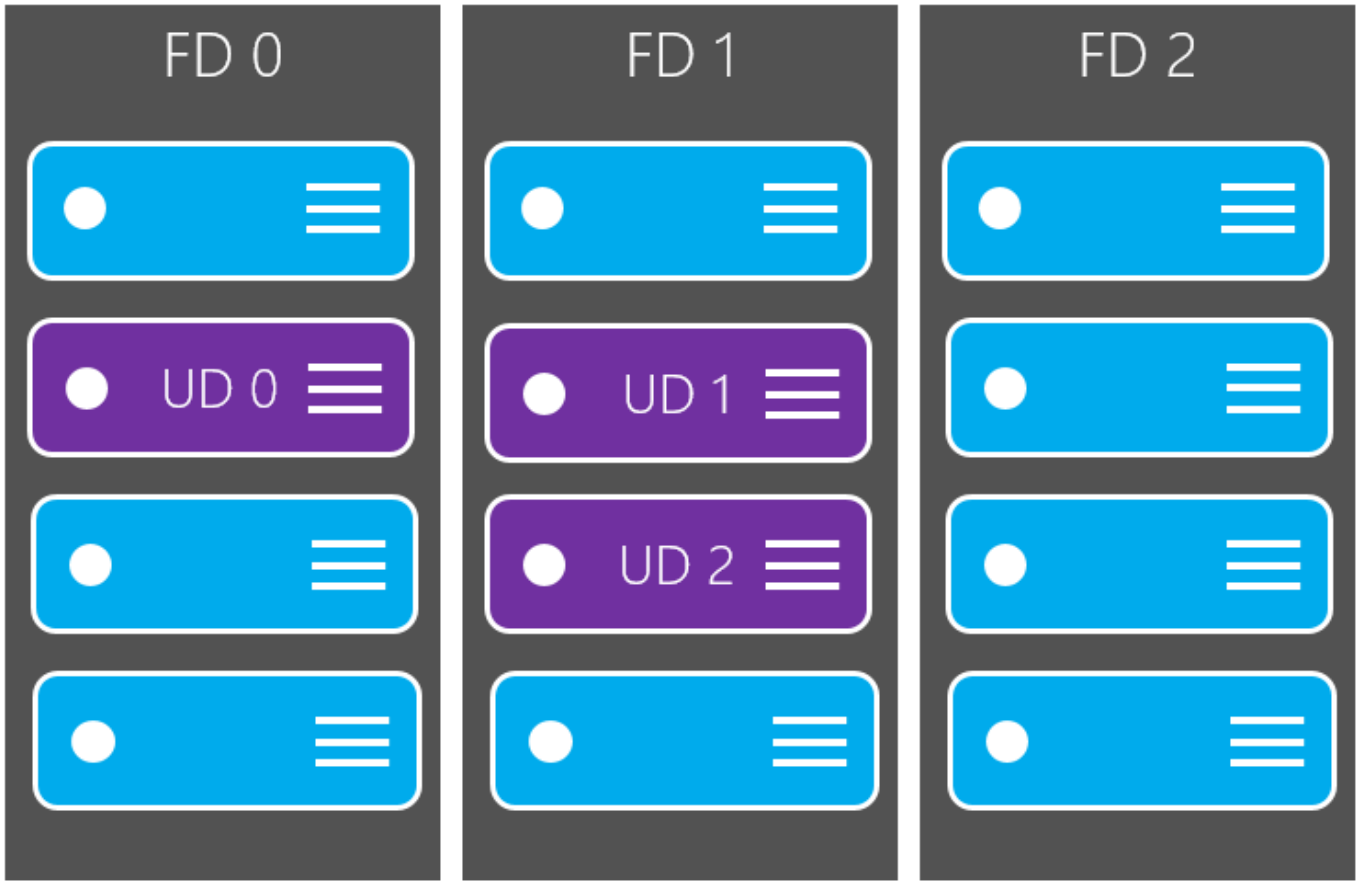
* 1st February 2018

Azure Datacenters

- Azure hosts its services in a series of globally distributed datacenters.
- These datacenters are located in a specific location and are grouped together in regions.
- Datacenters within a given region are divided into “clusters,” which host the Azure services.
- Within each datacenter, the racks of equipment are built to be fault tolerant on a networking, physical host servers, storage, and power level.
- The physical host servers are placed in high availability units called a cluster.
- Clusters are thousands of servers in pluggable units.

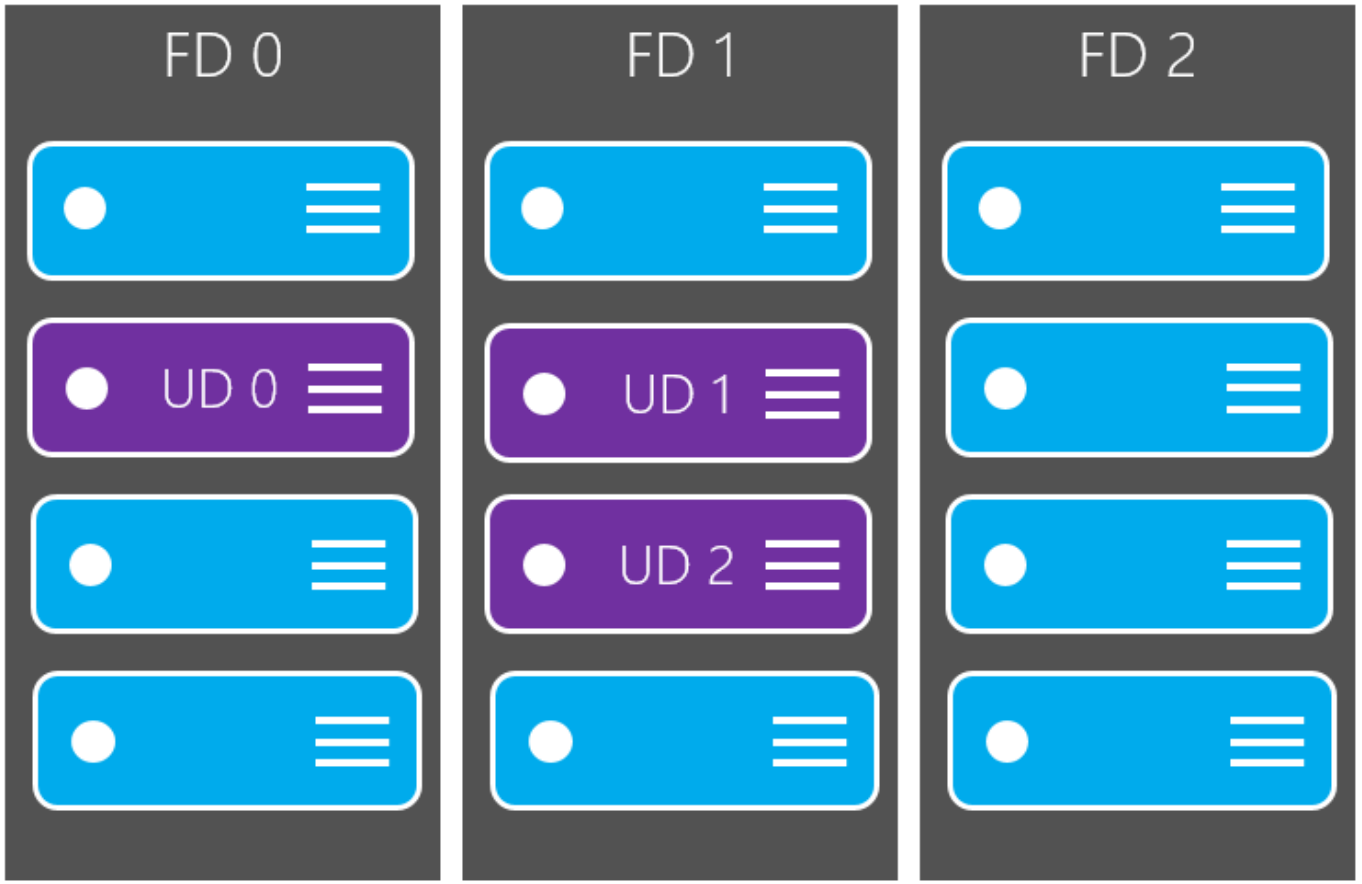
Azure Fault Domains

- One single rack is referred to as a Fault Domain (FD).
- A Fault Domain is a generally said to be a single point of source of failure.
- FDs define the group of virtual machines that share a common power source and network switch.
- By default, the virtual machines configured within your Availability Set are separated across two FDs.
- A service owner can not control the allocation of a fault domain.



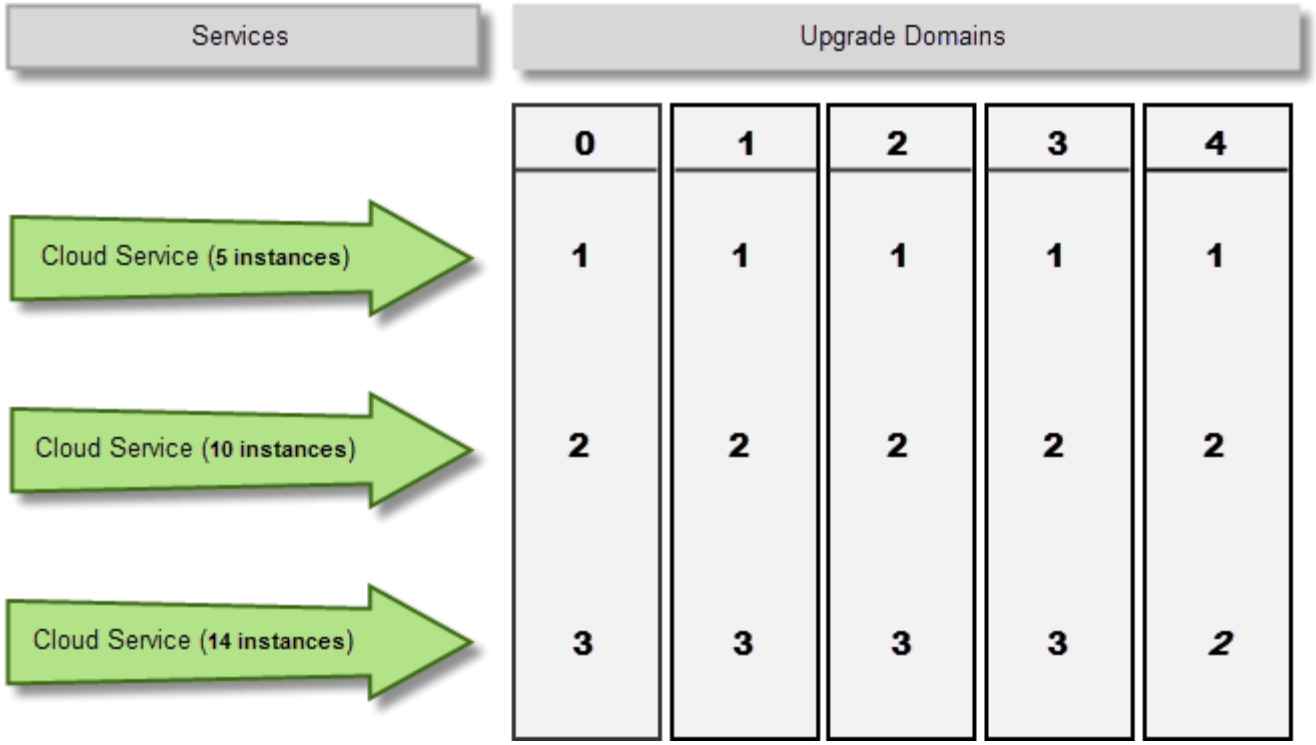
Azure Upgrade Domains

- Upgrade domains define a logical unit of deployment for an application.
- Windows Azure when possible will distribute instances evenly into multiple upgrade domains with each upgrade domain as a logical unit of a deployment.
- When upgrading a deployment, it is then carried out one upgrade domain at a time.
- By stopping only the instances running within one upgrade domain, Windows Azure ensures that an upgrade takes place with the least possible impact to the running service.
- The default number of upgrade domains is 5 and the maximum is 20.



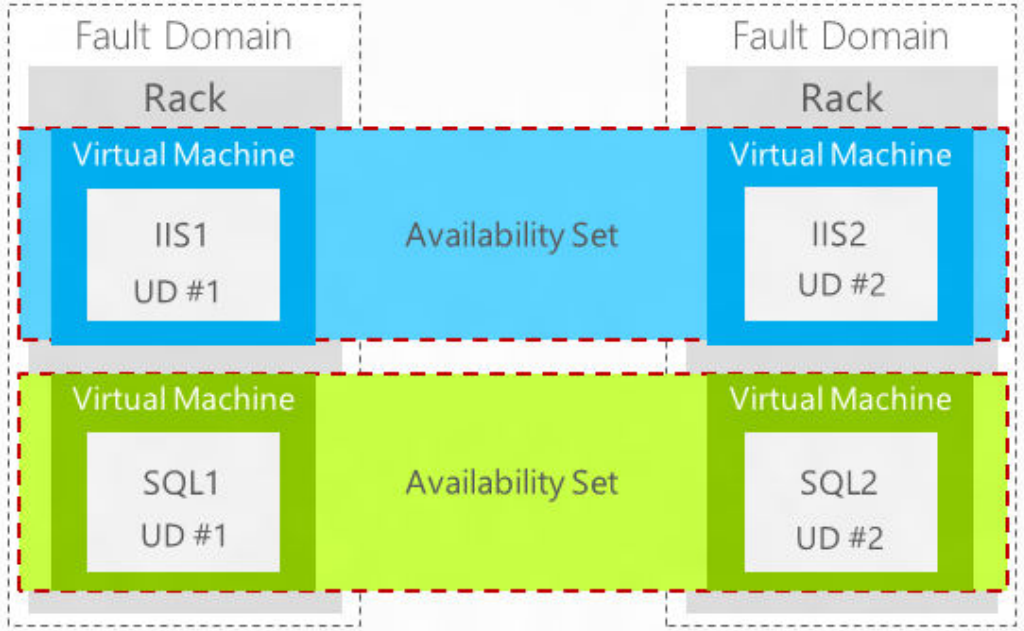
Azure Upgrade Domains

- Windows Azure distributes instances of a role evenly (when possible) across a set number of upgrade domains.
- Note that a service instance allocation to a particular upgrade domain is determined by Windows Azure at deployment time and it cannot be controlled by the service owner.
- Note that number of upgrade domains does not have to equal to number of fault domains so a single application could easily exist in several upgrade domains but only deployed to two separate fault domains.



Azure Availability Set

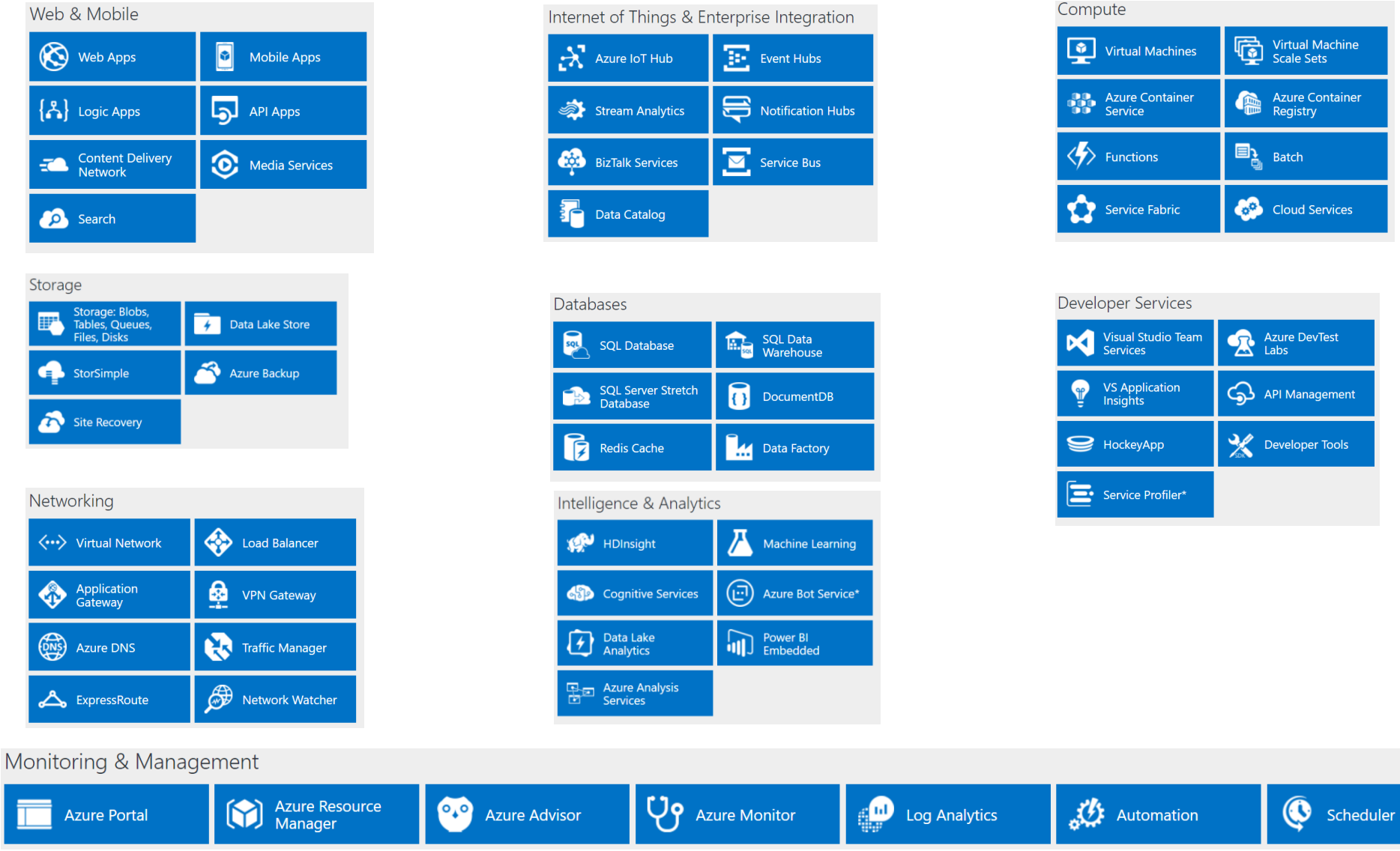
- Availability Sets are used within Microsoft Azure to ensure that virtual machines are deployed into different Fault Domains.
- Azure ensures that the VMs you place within an Availability Set run across multiple physical servers, compute racks, storage units, and network switches.
- If a hardware or Azure software failure occurs, only a subset of your VMs are impacted, and your overall application stays up and continues to be available to your customers.
- The following diagram shows two availability sets with two virtual machines in each set.
- A maximum of 100 VM can reside in an Availability Set.
- This allows Microsoft Azure to provide an SLA of 99.95% for the service provided by the virtual machines within the availability set.



Azure Storage Availability

- You can choose different replication options.
  - Locally redundant storage (LRS)
    - Replicates your data three times within the region in which you created your storage account.
  - Zone redundant storage (ZRS)
    - Replicates your data three times across two to three facilities, either within a single region or across two regions.
  - Geo-redundant storage (GRS)
    - Replicates your data to a secondary region that is hundreds of miles away from the primary region.
  - Read-access geo-redundant storage (RA-GRS)
    - Replicates your data to a secondary region, as with GRS, but also then provides read-only access to the data in the secondary location.

Azure Services



Azure Feature Availability

- Some services or VM features are only available in certain regions, such as specific VM sizes or storage types.

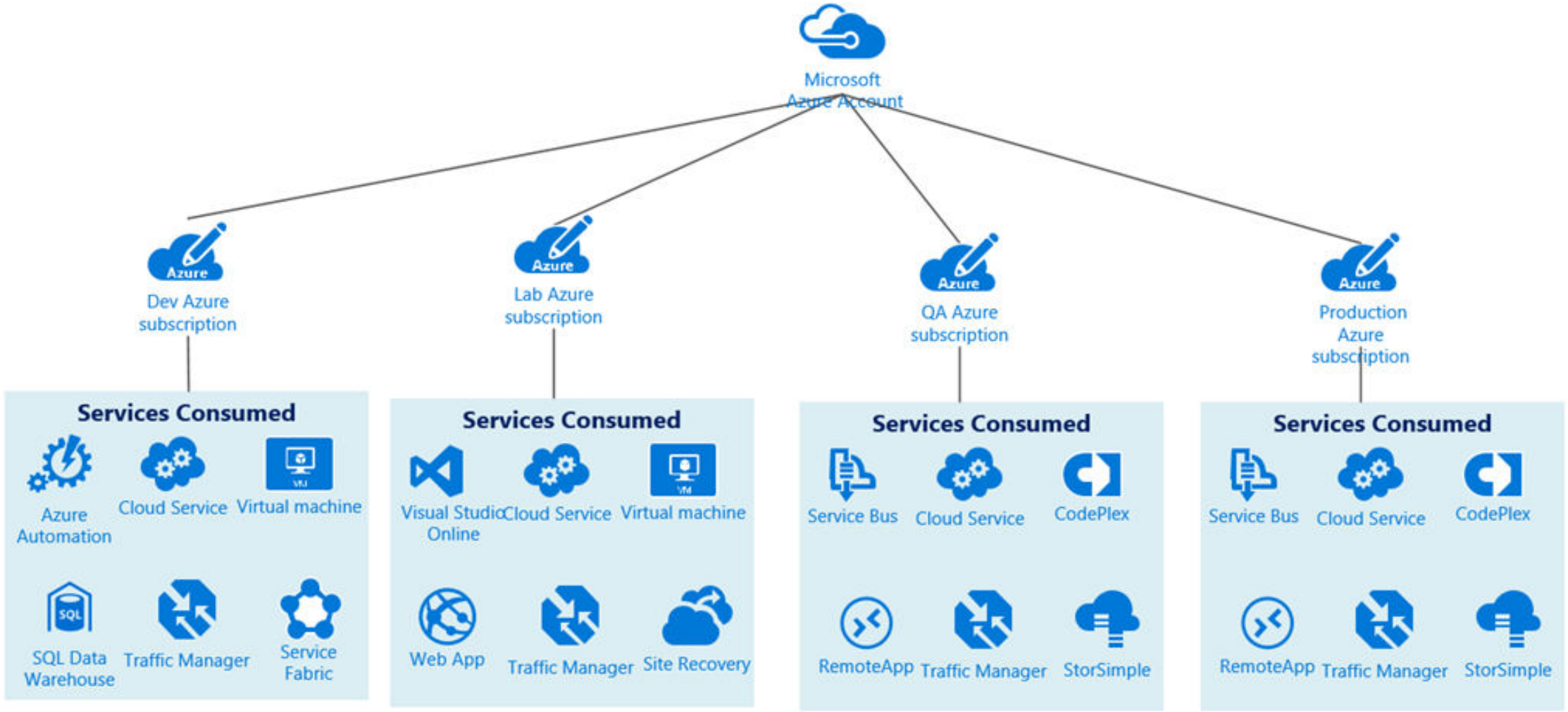
- There are also some global Azure services that do not require you to select a particular region, such as:
  - Azure Active Directory
  - Traffic Manager
  - Azure DNS

- URL https://azure.microsoft.com/en-us/regions/services/

Azure Subscription

- A Windows Azure subscription has two aspects:
  - The Windows Azure account, through which resource usage is reported and services are billed.
- Each subscription also is subject to quotas, which determine the maximum quantity of services and resources that can reside in the same subscription.
- These limits typically apply on per-subscription and per-region levels.
- All cloud services belongs to Subscription.
- Each Subscription have an ID.
  - https://account.azure.com
- Let's relate this concept with real world.
  - We created separate subscription for Dev , Test and Production environment.

Azure Subscription



Azure Support Plans

- Developer
  - The Developer plan is designed for test or nonproduction environments.
  - It includes technical support for Azure during business hours with an initial response time of less than eight hours.

- Standard
  - The Standard plan offers the same features as the Developer plan, and the initial response time is less than two hours.

- Professional Direct
  - This plan is designed for organizations that depend on Azure for business-critical apps or services.
  - It includes the same features as the Standard plan in addition to basic advisory services, pooled support account management, escalation management, and an initial response time of less than one hour.

- Premier
  - This is the highest level of support, and it extends to all Microsoft products, including Azure.
  - With Premier, you receive customer-specific advisory services, a dedicated support account manager and a response time of less than 15 minutes, in addition to all the Professional Direct features.

Azure Management Tools

- Azure Portals
- Windows PowerShell
- Azure Automation
- Azure CLI
- Visual Studio

Hands-On Lab

How to Create a Microsoft Azure Account

- Link https://azure.microsoft.com
- Step 1: Select free account from the top left of the Azure homepage
- Step 2: Click the green button on the blue banner labelled "Start for free“
- Step 3: If you do not have a Microsoft account then click "Create Microsoft account". If you already have a Microsoft account simply sign in with you credentials and move to Step 7
- Step 4: Enter the email address and password you wish to associate with your new Microsoft account.
- Step 5: You will receive an email with a code. Check your inbox and then enter here to verify.
- Step 6: Enter a phone number to associate with your account. You will then receive a code by text that you should enter here to verify.
- Step 7: Give Azure a couple of seconds to load
- Step 8: Complete this form. Although this is a free trial account you will need to enter your credit/debit card details
- Step 9: Agree to the terms and conditions then click "Sign up“
- Step 10: You're now signed up and ready to go. Click the green button to start using Microsoft Azure.

Thank You