Microsoft Azure

Administrator Associate Training

Introduction to Microsoft Azure

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- Which Azure region is right for me
- Azure Region Pairs
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- What is Azure Monitoring
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- Metrics
- Characteristics of Metrics
- Alerts
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Introduction to Microsoft Azure

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.

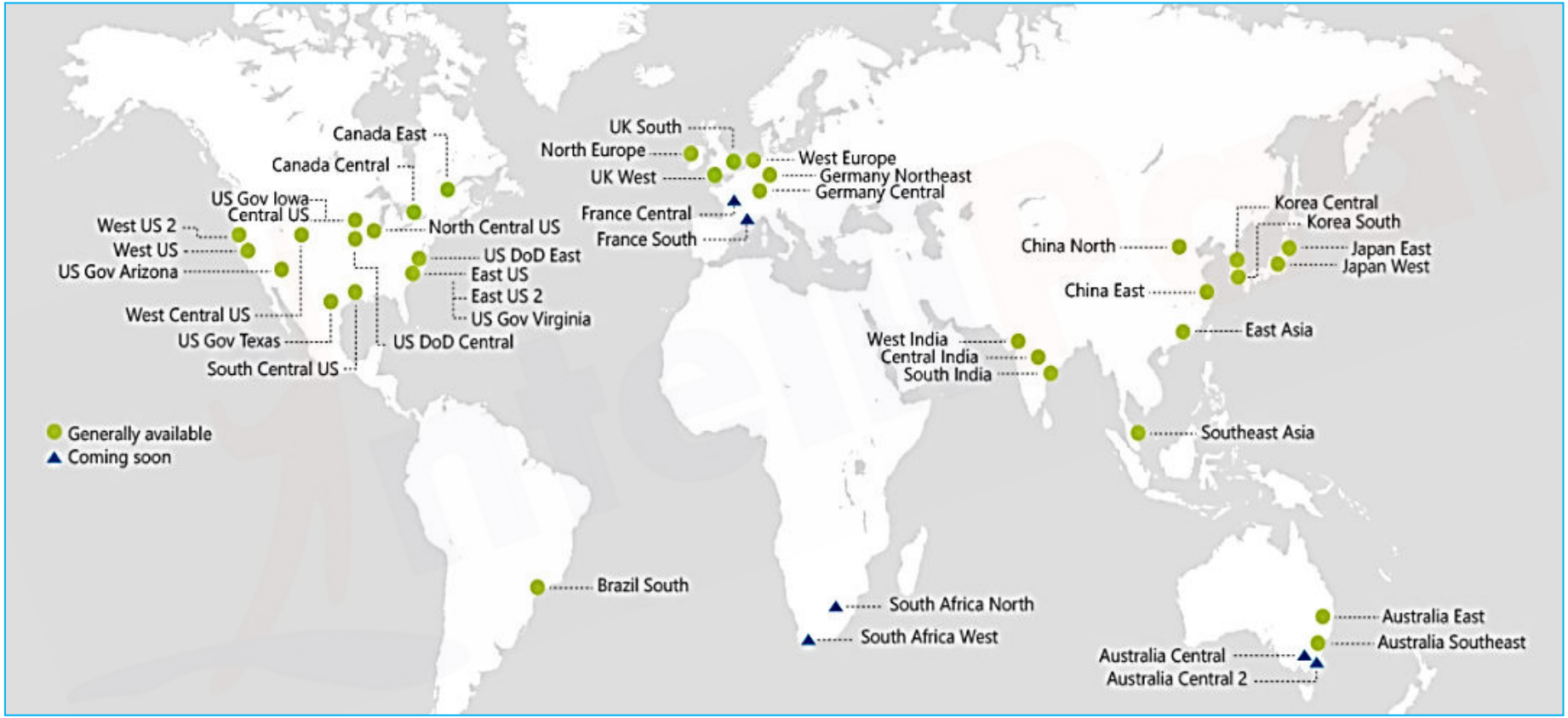
Open and Flexible Cloud Platform

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 Regions

- 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.

Which Azure region is right for me?

Location

Where is your business located? Do you have branch offices or customers located in other countries

Compliance needs

Do you or your customers have specific compliance requirements?

Service availability

Are the Azure services you want available in the region you're considering?

Data residency and sovereignty

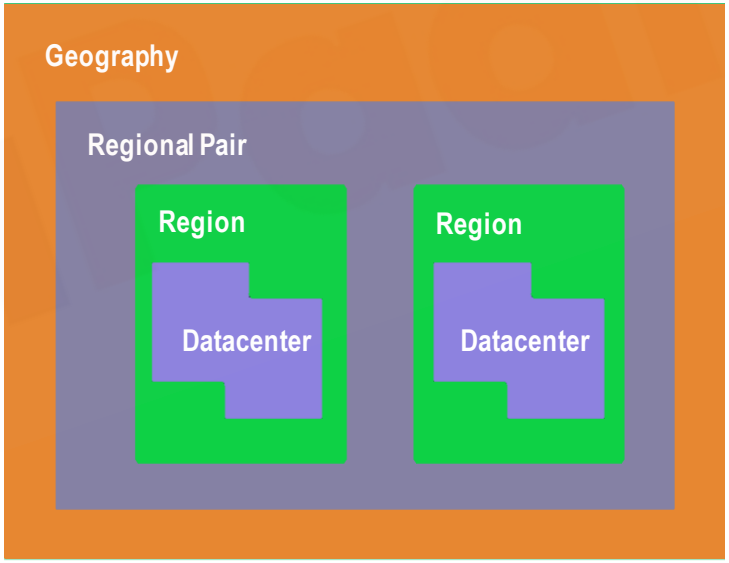
Do you or your customers have specific data residency or sovereignty requirements?

Pricing

Is cost one of the most important factors in your decision?

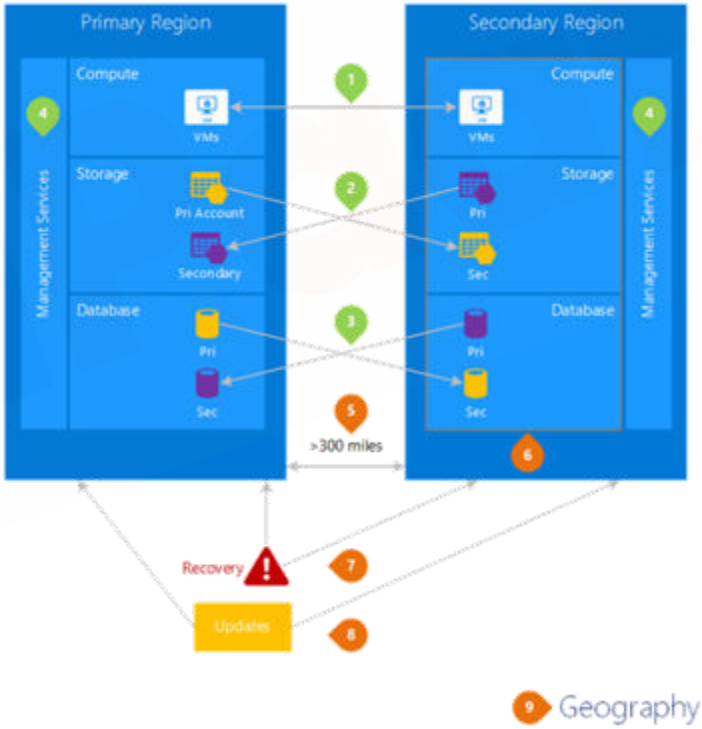
Azure Region Pairs

- 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]

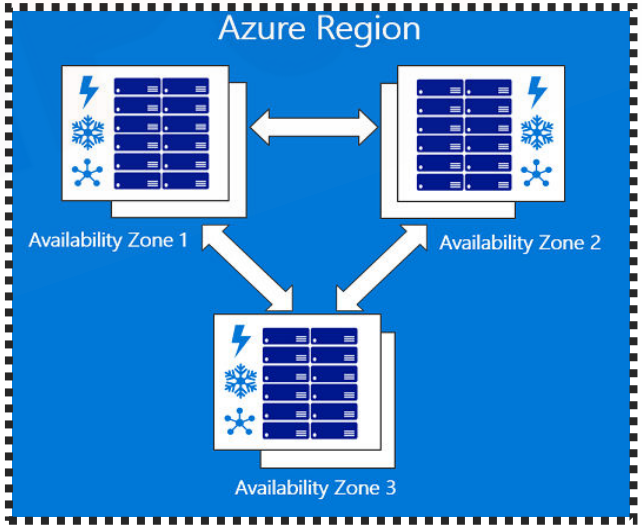
- Planned Azure system updates are rolled out to paired regions sequentially (not at the same time) to minimize downtime.

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.

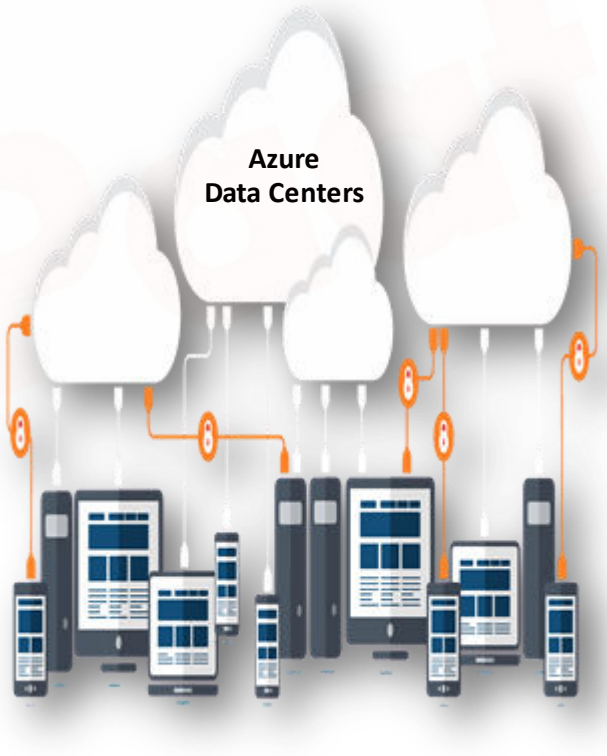
Azure Availability Zones

- 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



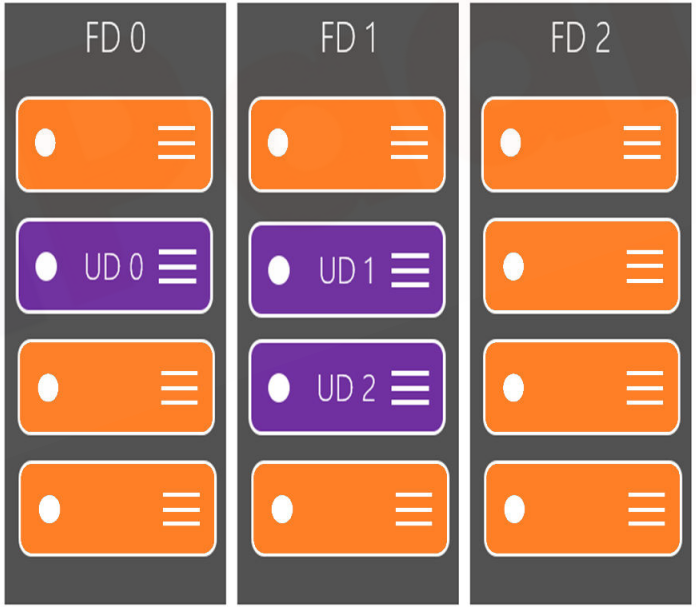
Azure Datacenters

- 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.



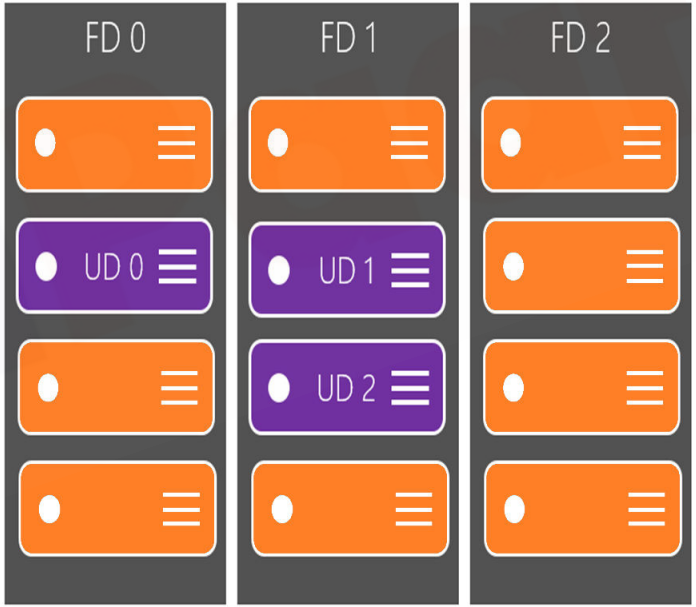
Azure Fault Domains

- 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.



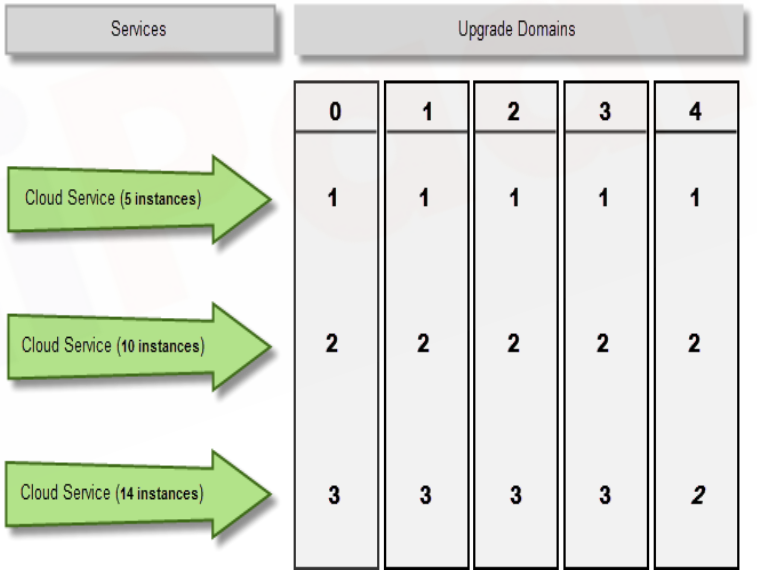
Azure Upgrade Domains

- 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.



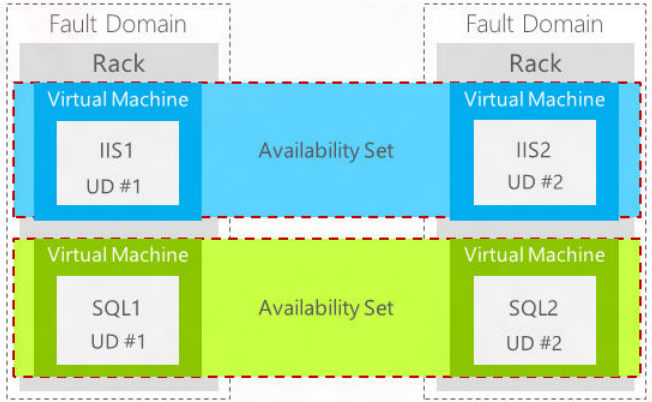
Azure Upgrade Domains

- 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)

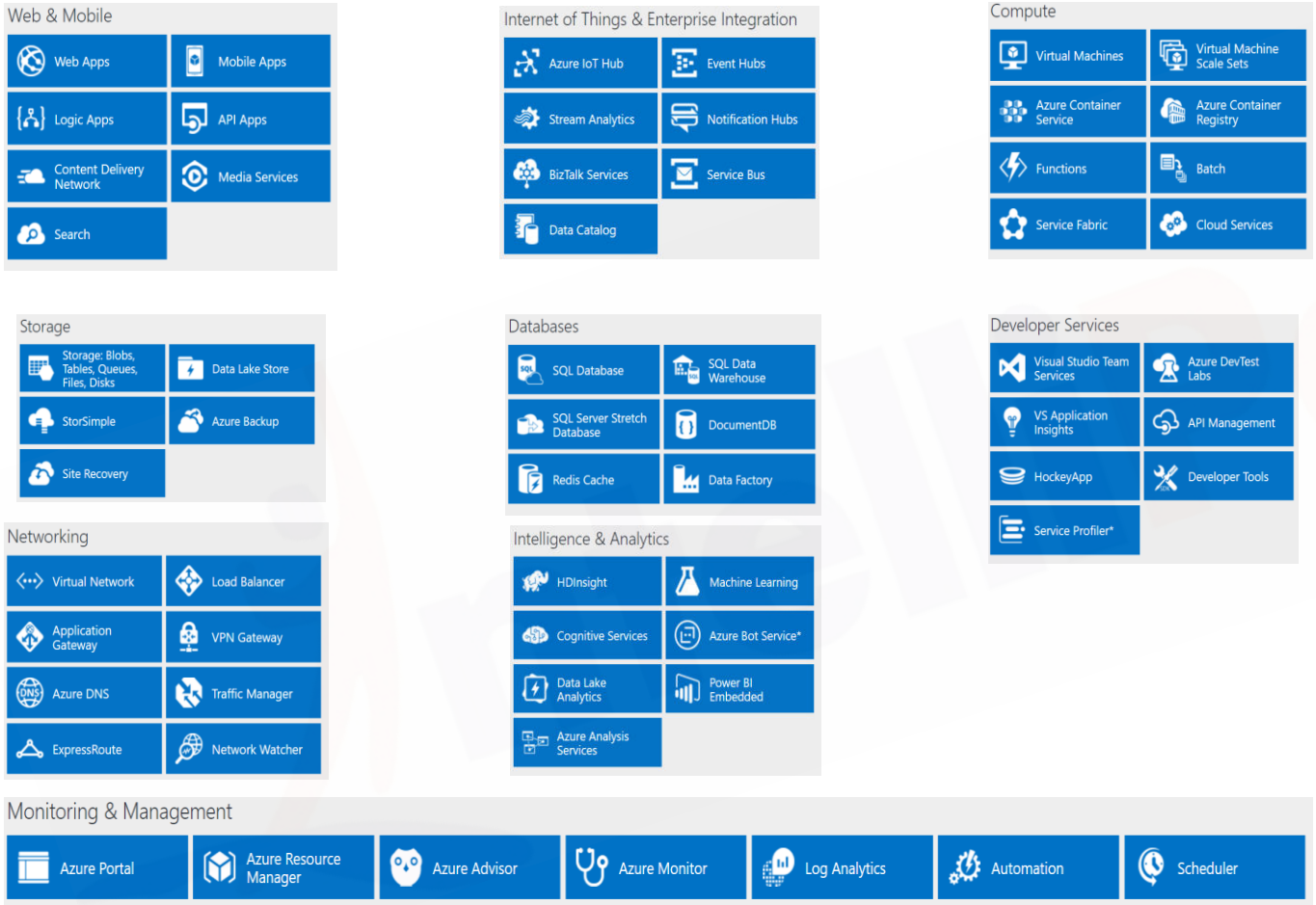
- Replicates your data three times across two to three facilities, either within a single region or across two regions.

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.



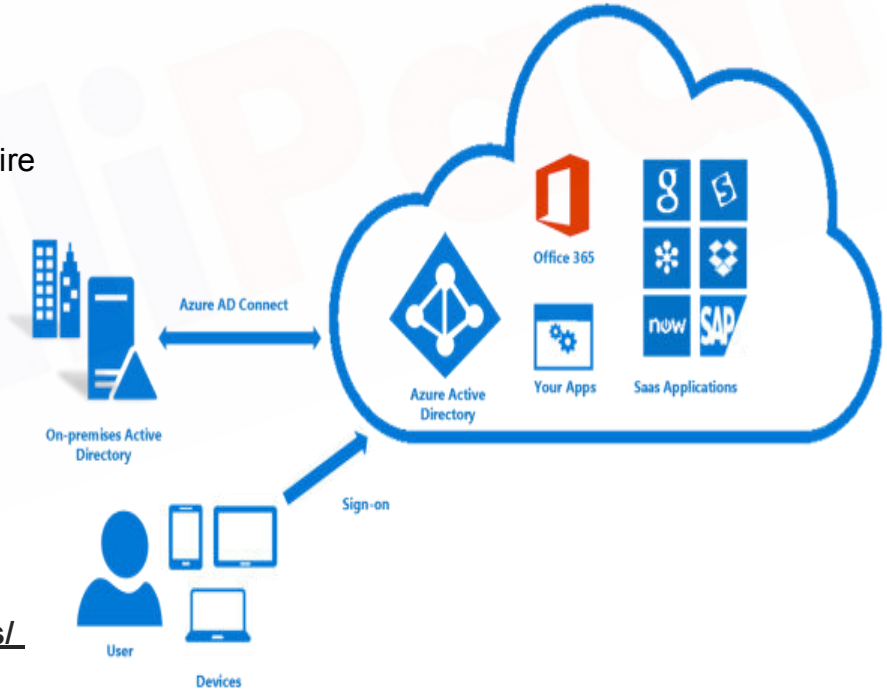
Azure Services

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

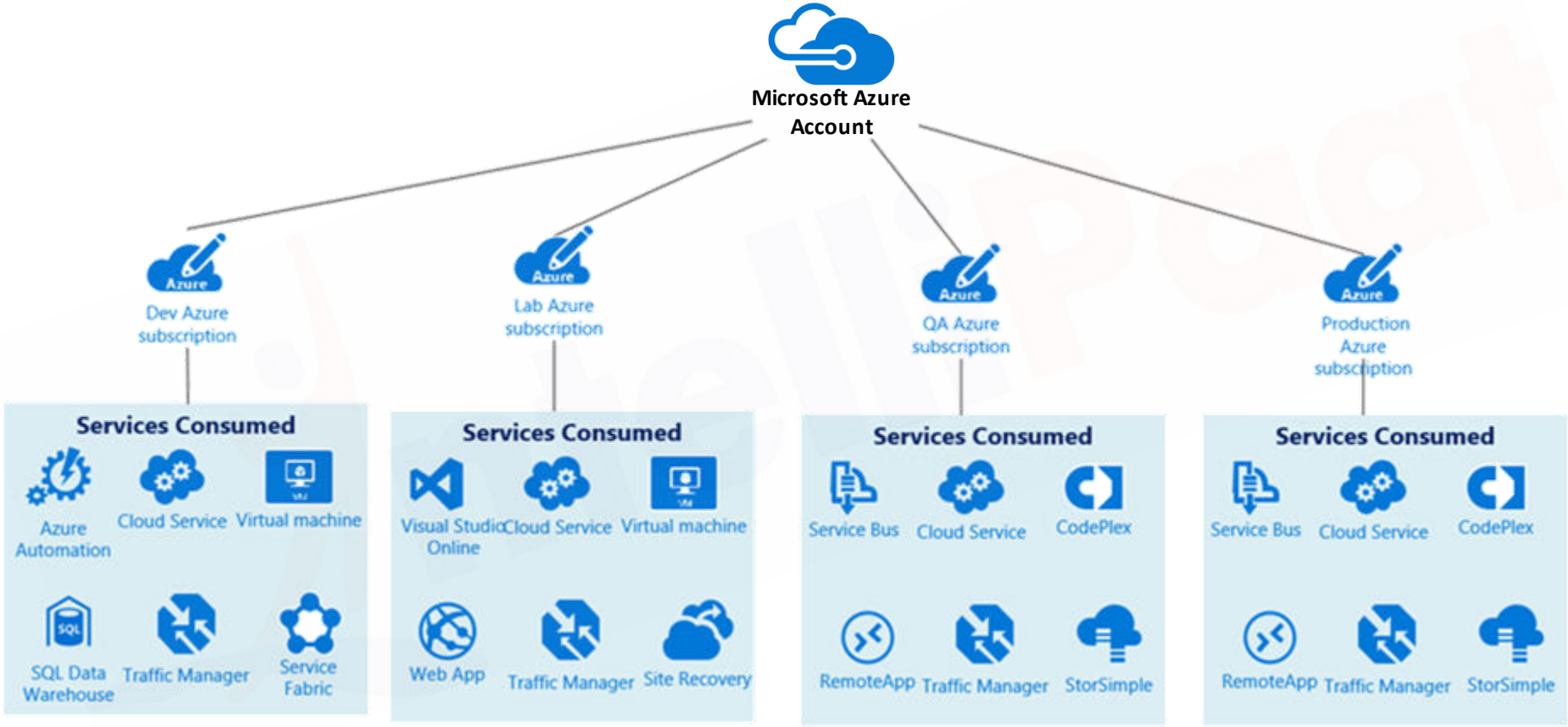
- URL **https://azure.microsoft.com/en-us/regions/services/**



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.

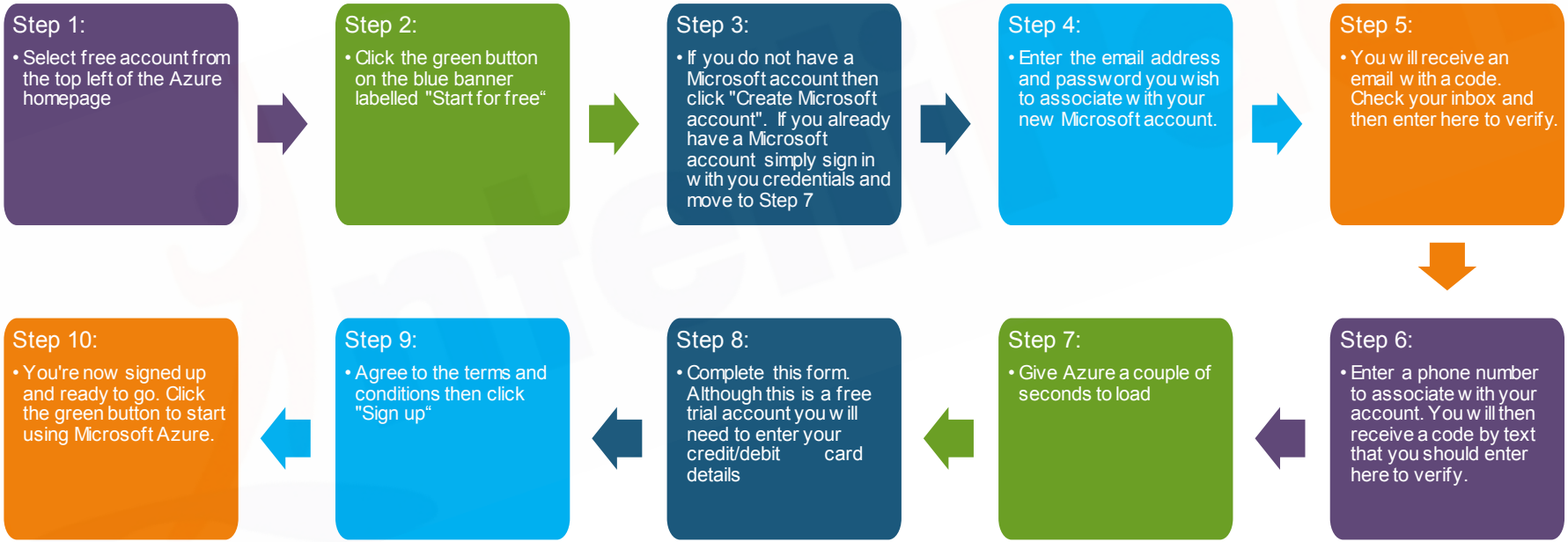
Azure Subscription



Manage Azure Subscriptions

How to Create a Microsoft Azure Account?

Link https://azure.microsoft.com

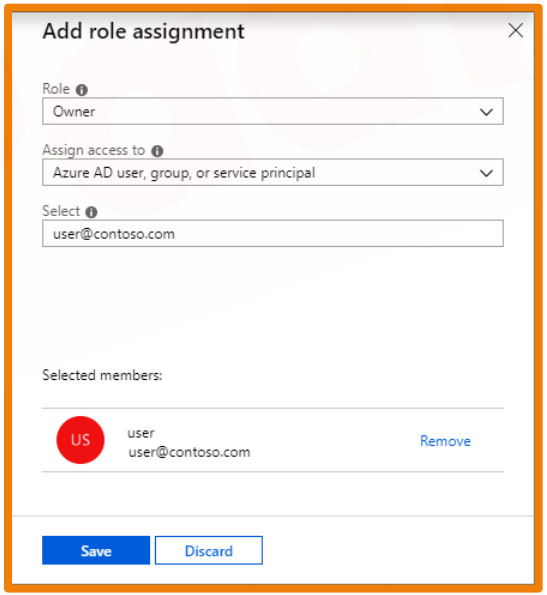


Add or change Azure Subscription Administrators

Add an RBAC Owner for a subscription in Azure portal

To add someone as an administrator for an Azure subscription, assign them the Owner role (an RBAC role) at the subscription scope. The Owner role can manage the resources in the subscription that you assigned and doesn't have access privilege to other subscriptions.

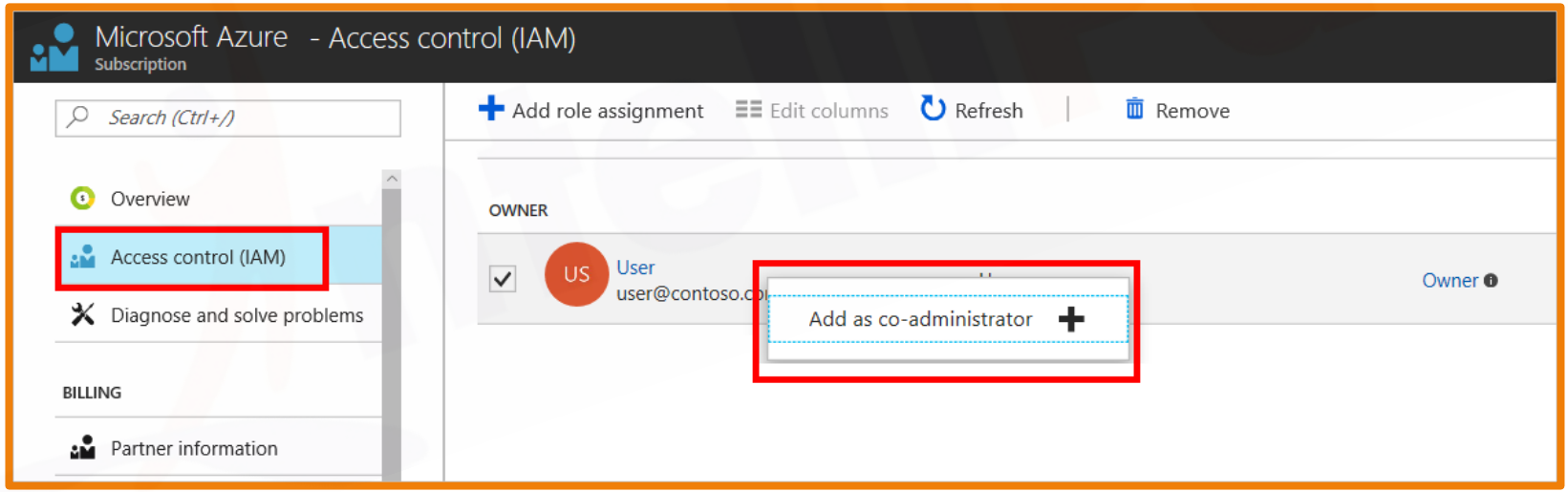
1. Visit Subscriptions in Azure portal.
2. Select the subscription that you want to give access.
3. Select Access control (IAM) in the list.
4. Select Add role assignment. **If the Add role assignment button is missing, you do not have permission to add permissions.)**
5. (In the Role box, select Owner.
6. In the Assign access to box, select Azure AD user, group, or service principal.
7. In the Select box, type the email address of the user you want to add as Owner. Select the user, and then select Save **(As shown in the image).**



Add or Change Co-administrator

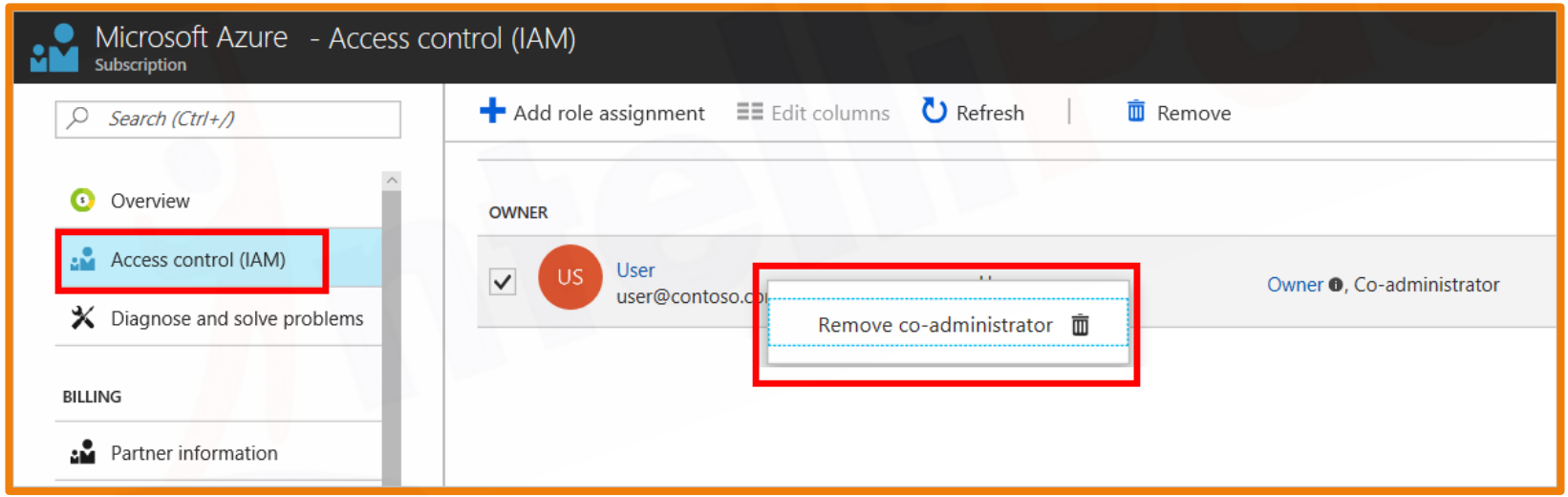
Only an Owner can be added as a Co-administrator. Other users with roles such as Contributor and Reader cannot be added as Co-administrators.

- Right-click the Owner user you just added, and then select Add as co-administrator. If you do not see the Add as co-administrator option, refresh the page or try another Internet browser.



Add or change Co-administrator

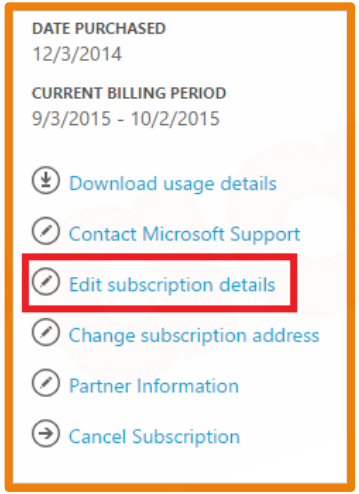
To remove the Co-administrator permission, right-click the Co-administrator user and then select Remove co-administrator.

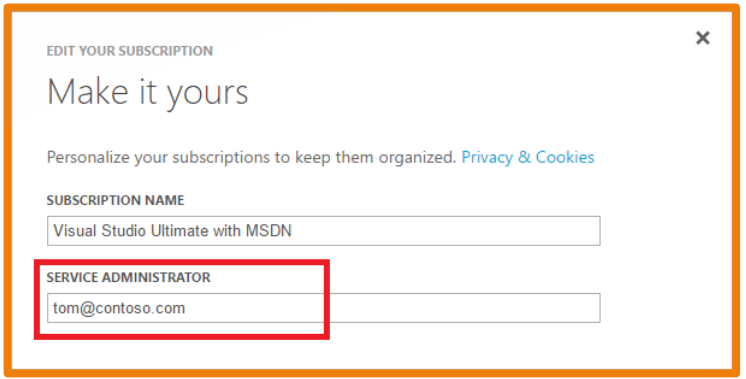


Change the Service administrator for an Azure subscription

Only the Account administrator can change the Service administrator for a subscription. By default, when you sign up, the Service administrator is the same as the Account administrator. If the Service administrator is changed to a different user, then the Account administrator loses access to Azure portal. However, the Account administrator can always use Account Center to change the Service administrator back to themselves.

1. Make sure your scenario is supported by checking the limits for changing Service administrators.
2. Sign in to Account Center as the Account administrator.
3. Select a subscription.
4. On the right side, select Edit subscription details.
5. In the SERVICE ADMINISTRATOR box, enter the email address of the new Service administrator





Azure Support Plans

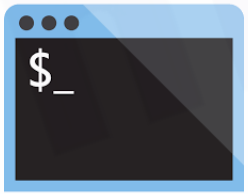
Developer	Standard	Professional Direct	Premier
• The Developer plan is designed for test or nonproduction environments. • It includes technical support for Azure during business hours with an initial response time of **less than eight hours.**	• The Standard plan offers the same features as the Developer plan, and the initial response time is **less than two hours.**	• 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.**	• 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

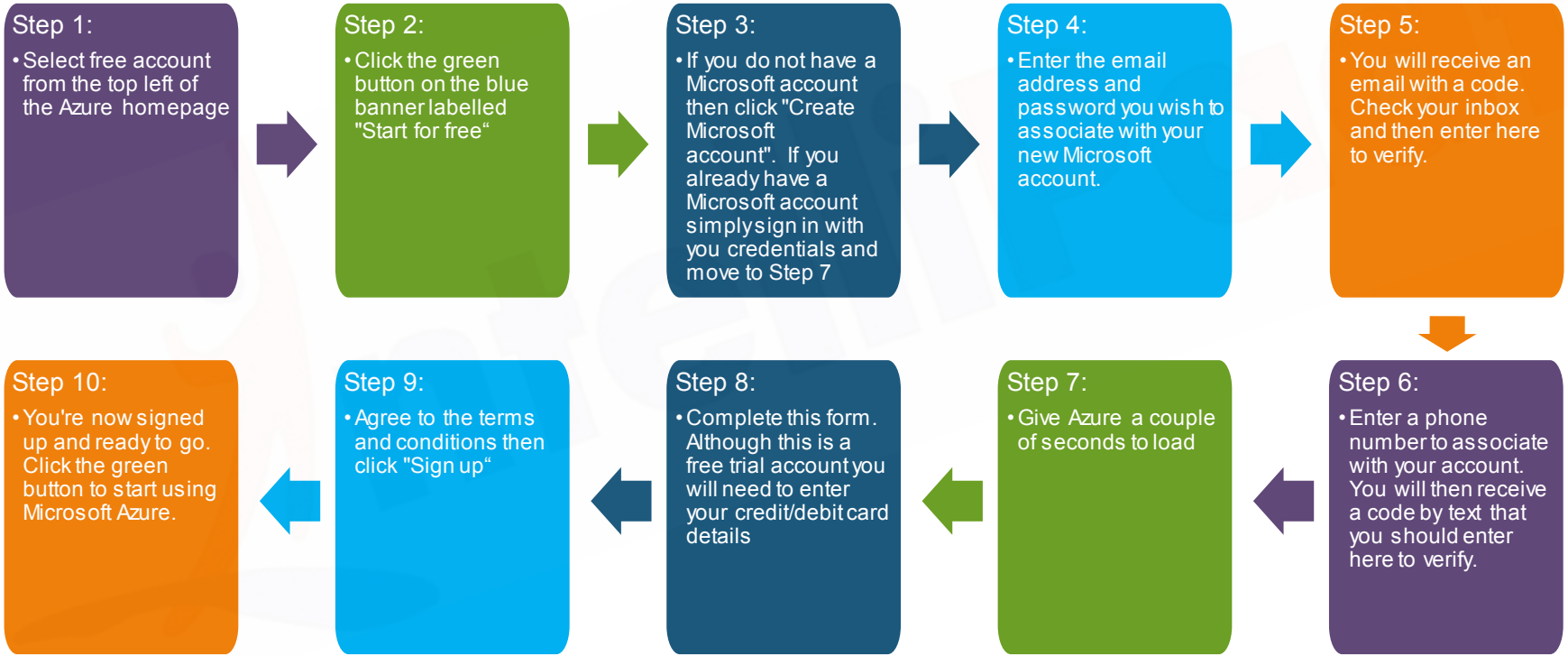


Azure CLI

Visual Studio

Hands-On Lab

How to Create a Microsoft Azure Account?



Azure Monitoring

What is Azure Monitoring?

- Azure Monitor is the platform service that provides a single source for monitoring Azure resources.
- Azure Monitor provides base-level infrastructure metrics and logs for most services in Microsoft Azure.
- Azure Monitor makes metrics available for many Azure resources.
- These metrics convey the performance and health of those resources.
- In many cases metric values can point to something being wrong with a resource.
- You can create metric alerts to monitor for abnormal behavior and be notified if it occurs.

Azure Monitoring: Monitor Azure Environment

There are a range of tools for monitoring, which work together to offer comprehensive monitoring and include:

Azure Monitor

- It gives you access to performance metrics and events that describe the operation of the Azure infrastructure.

Application Insights

- The Azure service that offers application performance monitoring and user analytics.

Log Analytics

- It provides rich tools to analyze data across sources, allows complex queries across all logs, and can proactively alert on specified conditions.
- You can even collect custom data into its central repository so you can query and visualize it.

Azure Monitoring: Metrics

- Azure Monitor enables you to consume telemetry to get into the performance and health of your workloads.
- The most important type of Azure telemetry data is the metrics (also called performance counters).
- Metrics are a valuable source of telemetry and enable you to do the following tasks:

Track the performance of your resource.	Get notified of an issue that impacts the performance of your resource.	Configure automated actions, such as autoscaling a resource or firing a runbook.	Perform advanced analytics or reporting on performance or usage trends of your resource.	Archive the performance or health history of your resource for compliance or auditing purposes.

Azure Monitoring: Characteristics of Metrics

Metrics have the following characteristics:

- All metrics have one-minute frequency.
- You receive a metric value every minute from your resource, giving you near real-time visibility.
- Metrics are available immediately.
- You can access 30 days of history for each metric.
- Some metrics can have name-value pair attributes called dimensions.
- These enable you to further segment and explore a metric in a more meaningful way.

Azure Monitoring: Alerts

- Alerts offer a method of monitoring in Azure that allows you to configure conditions over data and become notified when the conditions match the latest monitoring data.
- Azure uses the following terms to describe alerts and their functions:

Alert	Active	Resolved	Notification	Action
• Aa definition of criteria (one or more rules or conditions) that becomes activated when met.	• The state when the criteria defined by an alert is met.	• The state when the criteria defined by an alert is no longer met after previously having been met.	• The action taken based off of an alert becoming active.	• A specific call sent to a receiver of a notification (for example, emailing an address or posting to a webhook URL). Notifications can usually trigger multiple actions.

Azure Monitoring: Activity Log

- The Azure Activity Log provides insight into subscription-level events that have occurred in Azure.
- This includes a range of data, from Azure Resource Manager operational data to updates on Service Health events.
- Using the Activity Log, you can determine the ‘what, who, and when’ for any write operations in your subscription.
- You can retrieve events from your Activity Log using the Azure portal, CLI, PowerShell cmdlets, and Azure Monitor REST API.
- You can use the audit logs to find an error when troubleshooting or to monitor how a user in your organization modified a resource.
- Activity logs are retained for 90 days.
- You can query for any range of dates, as long as the starting date is not more than 90 days in the past.

Azure Monitoring: Diagnostic Logs

- Azure resource-level diagnostic logs are logs emitted by a resource that provide rich, frequent data about the operation of that resource.
- Resource-level diagnostic logs differ from the Activity Log.

The Activity Log provides insight into the operations that were performed on resources in your subscription using Resource Manager, for example, creating a virtual machine or deleting a logic app.

The Activity Log is a subscription-level log. Resource-level diagnostic logs provide insight into operations that were performed within that resource itself, for example, getting a secret from a Key Vault.

- Resource-level diagnostic logs also differ from guest OS-level diagnostic logs.
- Guest OS diagnostic logs are those collected by an agent running inside of a virtual machine or other supported resource type.

Azure Monitoring: Action Groups

- You can configure a list of actions with action groups.
- These groups then can be used when you define activity log alerts.
- These groups can then be reused by each activity log alert you define, ensuring that the same actions are taken each time the activity log alert is triggered.
- An action group can have up to 10 of each action type.
- Each action is made up of the following properties:

Name	Action type	Details
• A unique identifier within the action group.	• Send an SMS, send an email, call a webhook, send data to an ITSM tool, call an Azure app, or run an Automation runbook.	• The corresponding phone number, email address, webhook URI, or ITSM Connection Details.

Azure Monitoring: Service Health Notification

- Service health notifications are published by Azure, and contain information about the resources.
- Service health notifications can be informational or actionable, depending on the class.
- There are various classes of service health notifications:

Action required	Assisted recovery	Incident	Maintenance	Information	Security
• Azure might notice something unusual happen on your account, and work with you to remedy this.	• An event has occurred and engineers have confirmed that you are still experiencing impact. Azure engineering needs to work with you directly to restore your services to full health.	• An event that impacts service is currently affecting one or more of the resources in your subscription.	• A planned maintenance activity that might impact one or more of the resources under your subscription.	• Potential optimizations that might help improve your resource use.	• Urgent security-related information regarding your solutions that run on Azure.

Azure Monitoring: SMS Alert

- Action groups enable you to configure a list of receivers.
- These groups can then be leveraged when defining activity log alerts; ensuring that a particular action group is notified when the activity log alert is triggered.
- One of the alerting mechanisms supported is SMS; the alerts support bi-directional communication.
- A user can respond to an alert to:

Unsubscribe from alerts	Re-subscribe to alerts	Request help
• A user can unsubscribe from all SMS alerts for all action groups, or a singular action group.	• A user can re-subscribe to all SMS alerts for all action groups, or a singular action group.	• A user can ask for more information on the SMS.

Hands-On

Hands-On

- ❑ Configure Monitoring
- ❑ Configure Alert
- ❑ Get Notification
- ❑ Review Activity Log
- ❑ Review Diagnostic Log

QUIZ

Quiz 1

What are azure regions?

A	The only regions where Azure can be used, and can't be used anywhere
B	Regions where Azure is cheaper than non-azure regions
C	The datacenters located around the world in strategic places that best meets the customer demands.
D	Regions where Azure cloud works fast

Answer 1

What are azure regions?

A	The only regions where Azure can be used, and can't be used anywhere
B	Regions where Azure is cheaper than non-azure regions
C	The datacenters located around the world in strategic places that best meets the customer demands.
D	Regions where Azure cloud works fast

Quiz 2

What are azure regions?

A	The only regions where Azure can be used, and can't be used anywhere
B	Regions where Azure is cheaper than non-azure regions
C	The datacenters located around the world in strategic places that best meets the customer demands.
D	Regions where Azure cloud works fast

Answer 2

What are azure regions?

A	The only regions where Azure can be used, and can't be used anywhere
B	Regions where Azure is cheaper than non-azure regions
C	The datacenters located around the world in strategic places that best meets the customer demands.
D	Regions where Azure cloud works fast

Quiz 3

Do scale sets work with Azure availability sets?

A	Yes
B	No

Answer 3

Do scale sets work with Azure availability sets?

A	Yes
B	No

Quiz 4

Which one of them is Azure Management tool?

A	Azure DNS
B	Azure Monitor
C	Azure Virtual Machine
D	Azure Migrate

Answer 4

Which one of them is Azure Management tool?

A	Azure DNS
B	Azure Monitor
C	Azure Virtual Machine
D	Azure Migrate

Quiz 5

Which one of them is Azure Activity Log?

A	Provides logs of azure used all across the globe
B	Provides insights into subscription-level events that have occurred in Azure
C	Gives you alerts on excessive usage of resources
D	Provision resources for you

Answer 5

Which one of them is Azure Activity Log?

A	Provides logs of azure used all across the globe
B	Provides insights into subscription-level events that have occurred in Azure
C	Gives you alerts on excessive usage of resources
D	Provision resources for you

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