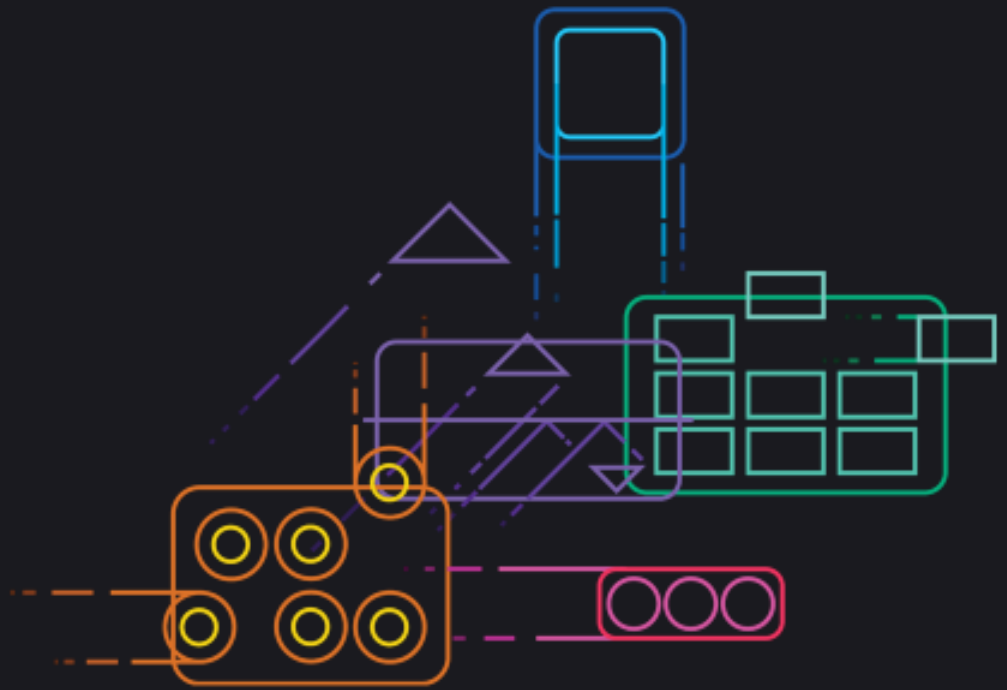
Microsoft

Introducing Azure Cloud & Azure DevOps Server

(Formerly Team Foundation Server / TFS)

- VIKRANTH SUNKARPALLY



Agenda

1. Introduction to cloud computing
2. What is Microsoft Azure?
3. Microsoft Azure Services
4. Creating a Microsoft Azure Account
5. Azure CLI, Azure PowerShell
6. Microsoft Azure Architecture

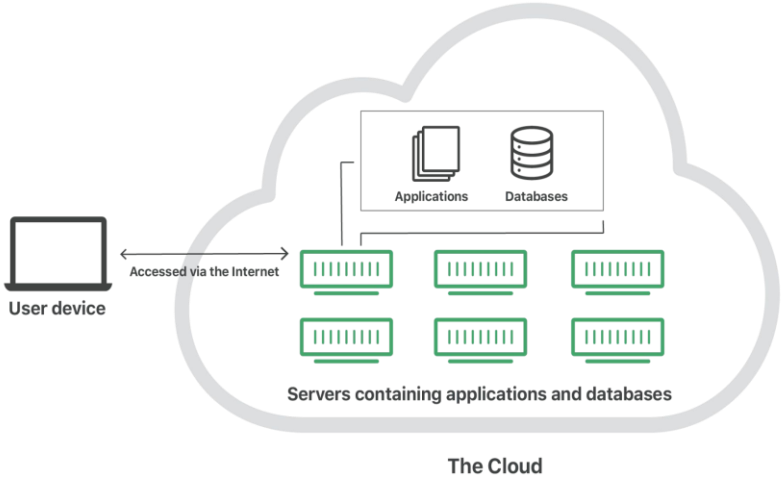
Module 01

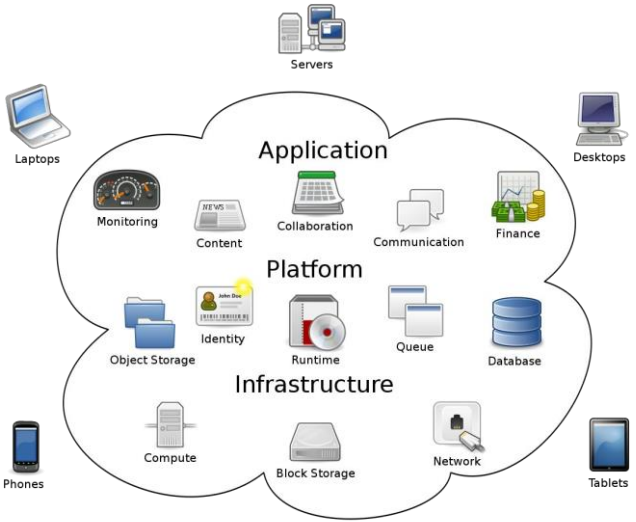
Introduction to Microsoft Azure Cloud

1) What Exactly is Cloud?
2) What are The Benefits of Cloud?
3) Why need to Learn Cloud?
4) What Cloud Options We have ?
5) What Skills Needed to be Cloud Job

What isCloud?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider such as Amazon Web Services (AWS), Microsoft Azure ,Google Cloud Platform(GCP)





What are The Benefits of The Cloud?

Cost Saving
The services are free from capital expenditure.
Rather than purchasing expensive systems and equipment for your business, you can reduce your costs by using the resources of your cloud computing service provider, you just have to pay as you operate it and enjoy the model based on your subscription plan.

Automated Updates on Software
In cloud computing, the server suppliers regularly update your software including the updates on security, so that you do not need to agonize on wasting your crucial time on maintaining the system. You find extra time to focus on the important things like 'How to grow your businesses.

Disaster Recovery
The biggest disaster a company can undergo is "loss of data." However, the cloud is a repository for backed up data, which helps companies recover their lost data with ease
security.

24 X 7 Availability
Most of the cloud providers are truly reliable in offering their services, with most of them maintaining an uptime of 99.9%. The workers can get onto the applications needed basically from anywhere. Some of the applications even function off-line.

Security
Cloud computing offers great security when any sensitive data has been lost. As the data is stored in the system, it can be easily accessed even if something happens to your computer. You can even remotely wipe out data from the lost machines for avoiding it getting in the wrong hands.

Enhanced Collaboration
Cloud applications enhance collaboration by authorizing diverse groups of people virtually meet and exchange information with the help of shared storage. Such capability helps in improving the customer service and product development and also reducing the marketing time.

Scalability
It offers flexible facility which could be turned off, up or down as per the circumstances of the user. For instance, a promotion of sales is very popular, capacity can be immediately and quickly added to it for the avoidance of losing sales and crashing servers. When those sales are done, the capacity can also be shrunk for the reduction of costs.

All over Functioning
Cloud computing offers yet another advantage of working from anywhere across the globe, as long as you have an internet connection. Even while using the critical cloud services that offer mobile apps, there is no limitation of the device used.

Easily Manageable
Cloud computing offers simplified and enhanced IT maintenance and management capacities by agreements backed by SLA, central resource administration and managed infrastructure. You get to enjoy a basic user interface without any requirement for installation. Plus you are assured guaranteed and timely management, maintenance, and delivery of the IT services.

Why Need To Learn Cloud?

High Demand : All Industries embracing cloud, moving from on-premise to Public Cloud, to save cost, which is creating demand for Cloud Engineers hence more opportunities.

Future Proof Career: Cloud Computing is demand from last many years and in future also going to stay and even grow further, which simply create more opportunities for Cloud Architects / Engineers / Application Developers

Increase Your Professional Profile: If you learn Basics of Cloud, then you can transfer your current skills set to Automation, Development, Networking in the cloud, it will definitely increase your professional profile. Additionally if managed to keep learning , keep achieving new skills and gain Cloud Certifications, then it will be more AWESOME!

Personal growth and future Scope: The purpose of Learning Cloud is not just about getting job in a company, if you become skilled enough, you can start your start up company, or you can offer Cloud COnsulting Services, or just as a hobbing solve traditional problems with Cloud Skills, not just that, the skills you gain through Cloud learning Journey you can use it as you see fit, upto your creativity!

High Earning: When the demand of Cloud Professionals is high then the current available talents, you have potential to gain high earning.

What Cloud Options We have ?

Types Of Cloud Based on Usage

Cloud computing is available in three types of usage. They are public, private, and hybrid clouds. Public cloud and private cloud are two terminologies commonly used in the market today. Let's see what do they mean and the difference between public cloud and private cloud.

Public Cloud

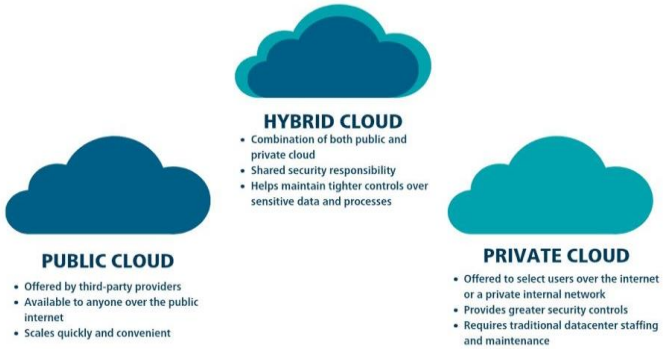
This is a publicly accessible framework where one can store data or use it as a virtual machine. This can be done either by programming or autonomously. Here individual does not have to invest time and effort in buying physical servers but can get started in no time. Public clouds are available to use on pay per approach basis.

Private Cloud

If one needs to have a cloud exclusively for the organization then a private cloud is the best option. Along with the flexibility it provides one can opt for a data center on the premises for security and compliance needs. A dedicated professional is required to manage the private cloud framework.

Hybrid Cloud

Hybrid is a combination of public and private clouds. For certain business needs who can benefit from the combination are the ones who use a hybrid cloud.



What Cloud Options We have ?

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Types of Cloud Computing

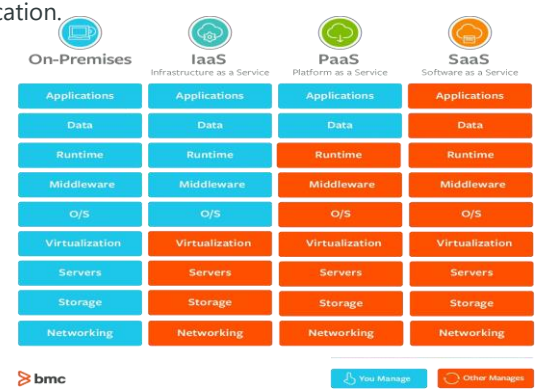
The three main types of cloud computing include Infrastructure as a Service, Platform as a Service, and Software as a Service. Each type of cloud computing provides different levels of control, flexibility, and management so that you can select the right set of services for your needs.

Infrastructure as a Service (IaaS)

IaaS contains the basic building blocks for cloud IT. It typically provides access to networking features, computers (virtual or on dedicated hardware), and data storage space. IaaS gives you the highest level of flexibility and management control over your IT resources. It is most similar to the existing IT resources with which many IT departments and developers are familiar.

Platform as a Service (PaaS)

PaaS removes the need for you to manage underlying infrastructure (usually hardware and operating systems), and allows you to focus on the deployment and management of your applications. This helps you be more efficient as you don't need to worry about resource procurement, capacity planning, software maintenance, patching, or any of the other undifferentiated heavy lifting involved in running your application.



Software as a Service (SaaS)

SaaS provides you with a complete product that is run and managed by the service provider. In most cases, people referring to SaaS are referring to end-user applications (such as web-based email). With a SaaS offering, you don't have to think about how the service is maintained or how the underlying infrastructure is managed. You only need to think about how you will use that particular software.

What Cloud Options We have ?

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Cloud Computing Deployment Models

Below are 3 Cloud Computing Deployment Models

Cloud

A cloud-based application is fully deployed in the cloud and all parts of the application run in the cloud. Applications in the cloud have either been created in the cloud or have been migrated from an existing infrastructure to take advantage of the benefits of cloud computing. Cloud-based applications can be built on low-level infrastructure pieces or can use higher level services that provide abstraction from the management, architecting, and scaling requirements of core infrastructure.

On-premises

Deploying resources on-premises, using virtualization and resource management tools, is sometimes called “private cloud”. On-premises deployment does not provide many of the benefits of cloud computing but is sometimes sought for its ability to provide dedicated resources. In most cases this deployment model is the same as legacy IT infrastructure while using application management and virtualization technologies to try and increase resource utilization.

Hybrid

A hybrid deployment is a way to connect infrastructure and applications between cloud-based resources and existing resources that are not located in the cloud. The most common method of hybrid deployment is between the cloud and existing on-premises infrastructure to extend, and grow, an organization's infrastructure into the cloud while connecting cloud resources to internal system

What Cloud Options We have ?

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Top Cloud Service Provider

Below are Top 3 Cloud Services Provider

Microsoft Azure

The Azure cloud platform is more than 200 products and cloud services designed to help you bring new solutions to life—to solve today's challenges and create the future. Build, run and manage applications across multiple clouds, on-premises and at the edge, with the tools and frameworks of your choice.

AWS

Amazon Web Services (AWS) is the world's most comprehensive and broadly adopted cloud platform, offering over 200 fully featured services from data centers globally. Millions of customers—including the fastest-growing startups, largest enterprises, and leading government agencies—are using AWS to lower costs, become more agile, and innovate faster.

Google Cloud Platform

Google Cloud Platform (GCP), offered by Google, is a suite of cloud computing services that runs on the same infrastructure that Google uses internally for its end-user products, such as Google Search, Gmail, file storage, and YouTube. Alongside a set of management tools, it provides a series of modular cloud services including computing, data storage, data analytics and machine learning.

What Skills Needed to be Cloud Job Ready?

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Basic Cloud Knowledge
Basic Cloud knowledge i.e. in depth understanding of Compute, Storage , Networking, Security is a must

Virtualization & Containerization
In modern world, knowledge of OS Virtualization and Application Containerization is a must.

APIs & JSON
While working with Cloud ,often we have to integrate or work with different api, so API fundamental knowledge and know on JSON is expected

Programming (Optional)
Hands-on knowledge in any programming knowledge will be very useful while developing cloud application , but it's not mandatory, but sometime may be part of Cloud position requirement.

Cloud service platform expertise

Gaining a thorough understanding of the CSP marketplace is a good starting point. Familiarize yourself with **AWS**, **Azure** and **GCP**. Other companies with cloud platforms include IBM, Dell, Cisco Systems, Oracle and

It is essential to differentiate between providers in terms of which may be most appropriate to house different applications or on which to run different types of workloads. You will need to be able to point out the pros and cons of each and select the best option to meet a specific need.

Each of the leading cloud platforms has its own strengths. AWS takes the lead in infrastructure. Microsoft excels in software. Google offers easy integration with other vendor products. IBM has honed artificial intelligence capability. Cisco Systems is a frontrunner in networks. And OpenStack is dominant in the software development market.

Automation
Automation is one of the most significant benefits of cloud services. If applications can be programmed to make their own, correct decisions without human intervention, it can increase efficiency. Of course, cloud professionals have a role to play in facilitating this kind of automation. Specifically, they need to be well versed in the mechanics of a business's cloud architecture and the different components that interact with or depend on one other.

Metrics and analytics
Expertise in metrics and analytics -- and understanding which metrics should be applied to specific cloud services -- will stand you in good stead. That's because these skills enable you to demonstrate the ROI of a business's cloud technology.

Cost Management
The ability to determine and monitor cost and workload estimation are valued skills. For instance, they will enable you to pinpoint if and where certain set data limits are being exceeded, which can lead to a business incurring unforeseen costs. It also enables the identification and elimination of any features that are not being used.

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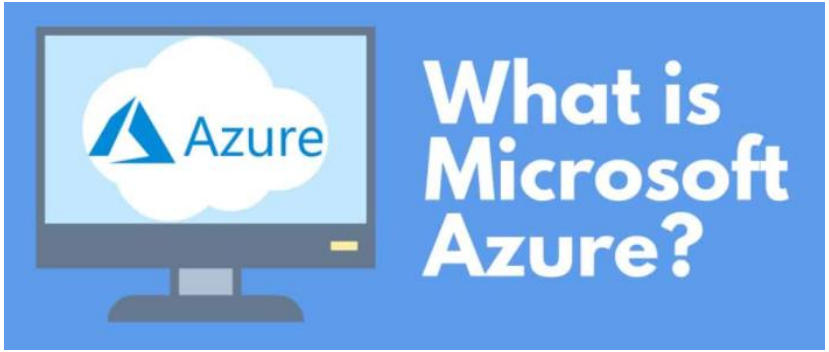
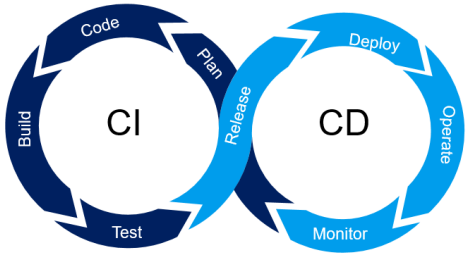


- An Overview of Microsoft Azure (Formerly Windows Azure)
- Microsoft Azure is a platform that enables users to engage in agile cloud computing and is designed for creating and managing apps through Microsoft's data centers.
- The operating system was released commercially just a few years ago, on the 1st of February 2010. It was designed to minimize any ongoing expenses and simplify any IT management processes and has certainly made an impact on the market.

Microsoft Azure: The Benefits

The 5 major benefits of Microsoft Azure



Microsoft Azure Features

1. Cloud Services: PaaS (Platform as a Service) can be utilised to build applications and services.
2. Web sites: Azure allows its users to develop sites on ASP.NET, Node.js, PHP, or Python.
3. Virtual Machines: Primarily a migration tool, allowing developers to migrate apps and infrastructure without altering code.
4. Data: SQL Database extends applications into the cloud, utilising SQL Server.
5. Media: This is a Platform as a Service feature that can be utilised for protecting content, streaming media, and more.

Azure Services

Compute

DevOps

Networking

Integration

Identity

Storage & Database

Data Analytics

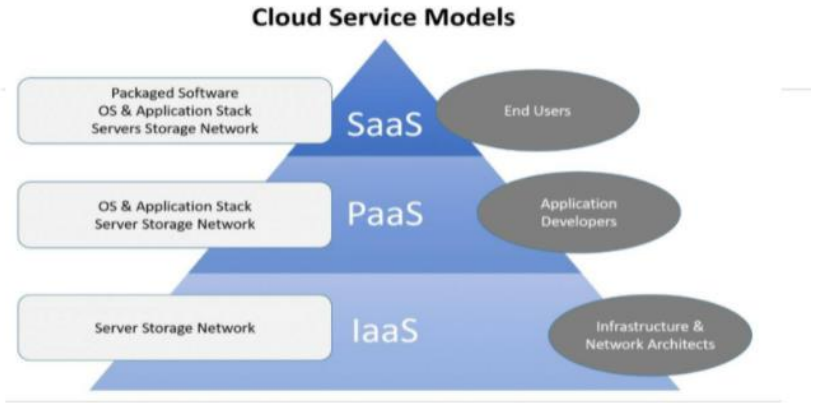
A Brief History of Azure

- **October 2008**: Azure Platform released.
- **March 2009**: SQL Azure Relational Database released.
- **November 2009**: Added PHP, Java, CDN, and more.
- **February 2010**: Azure Platform becomes available on the market.
- **June 2010**: Updates including .NET Framework 4 and Spatial Data Support.
- **October 2010**: Multiple updates, including the introduction of a new Azure Platform Management Portal, Remote Desktop, Full-IIS support, and better dev tools.
- **December 2011**: Adds SQL Azure reporting, Traffic Manager, and more.
- **June 2012**: New features added, such as Web sites, Virtual Machine App's

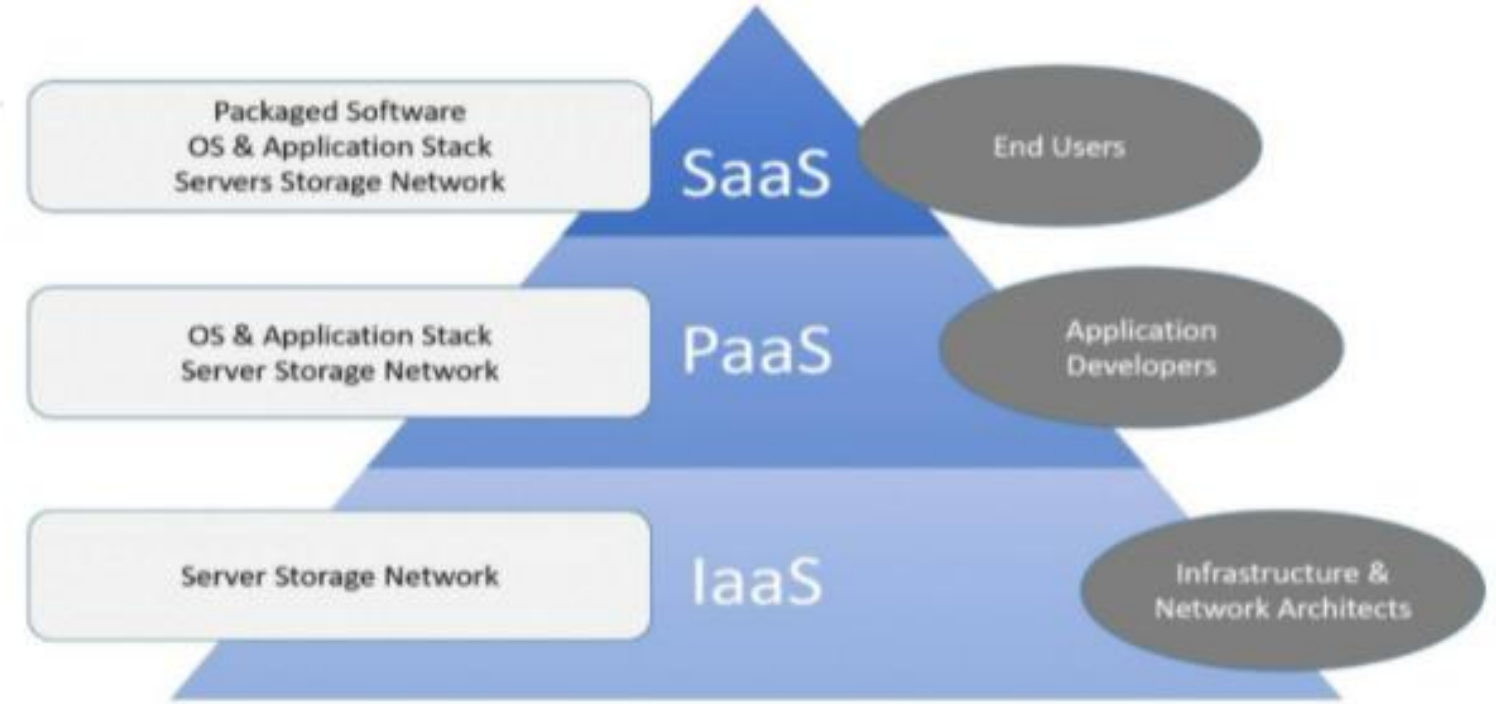
Microsoft Azure Services

Service Models are the reference models on which the Cloud Computing is based. These can be categorized into three basic service models as listed below:

1. Infrastructure as a Service (IaaS)
2. 2. Platform as a Service (PaaS)
3. 3. Software as a Service (SaaS)

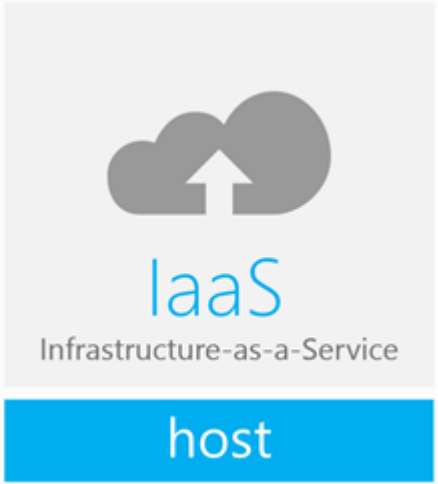


Cloud Service Models



IaaS

- Infrastructure as a Service (IaaS) IaaS is the delivery of technology infrastructure as an on demand scalable service. IaaS provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.
- Usually billed based on usage 'Usually multi tenant virtualized environment 'Can be coupled with Managed Services for OS and application support



PaaS

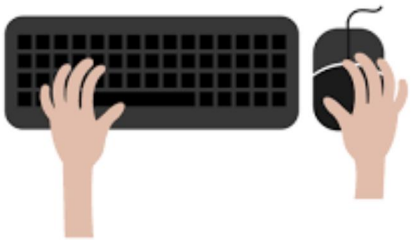
- Platform as a Service (PaaS) the runtime environment for applications, PaaS provides development & deployment tools, etc.
- PaaS provides all the facilities required to support the complete life cycle of building and delivering web applications and services entirely from the Internet.
- Typically, applications must be developed with a particular platform in mind. 'Multi tenant environments 'Highly scalable multi tier architecture

SaaS

- Software as a Service (SaaS) SaaS model allows to use software applications as a service to end users.
- SaaS is a software delivery methodology that provides licensed multi-tenant access to software and its functions remotely as a Web-based service.
- Usually billed based on usage Usually multi tenant environment Highly scalable architecture

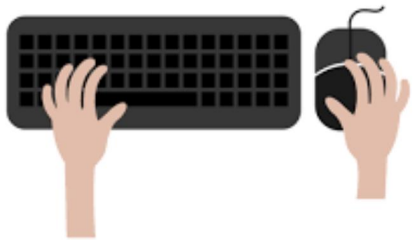
5.Azure CLI Installation

Demo

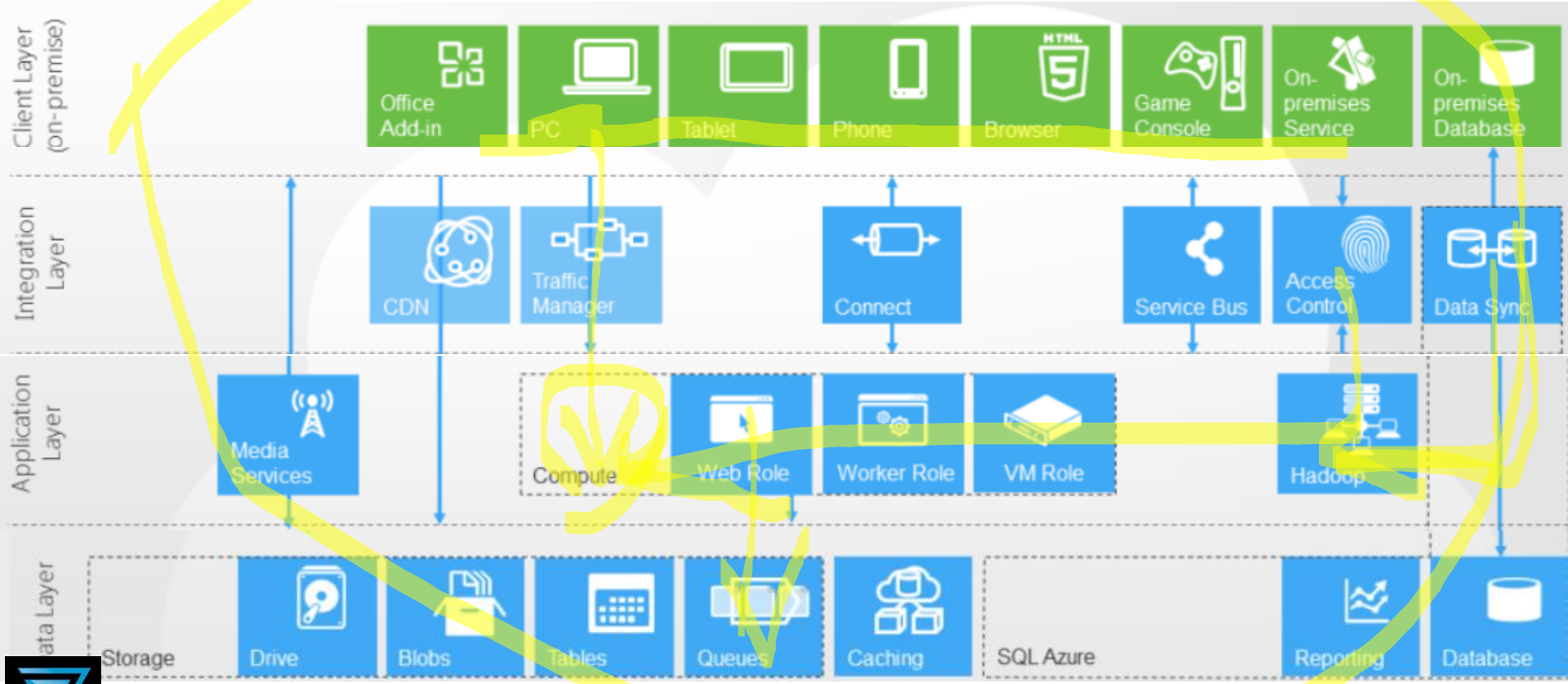


Pre-requisite

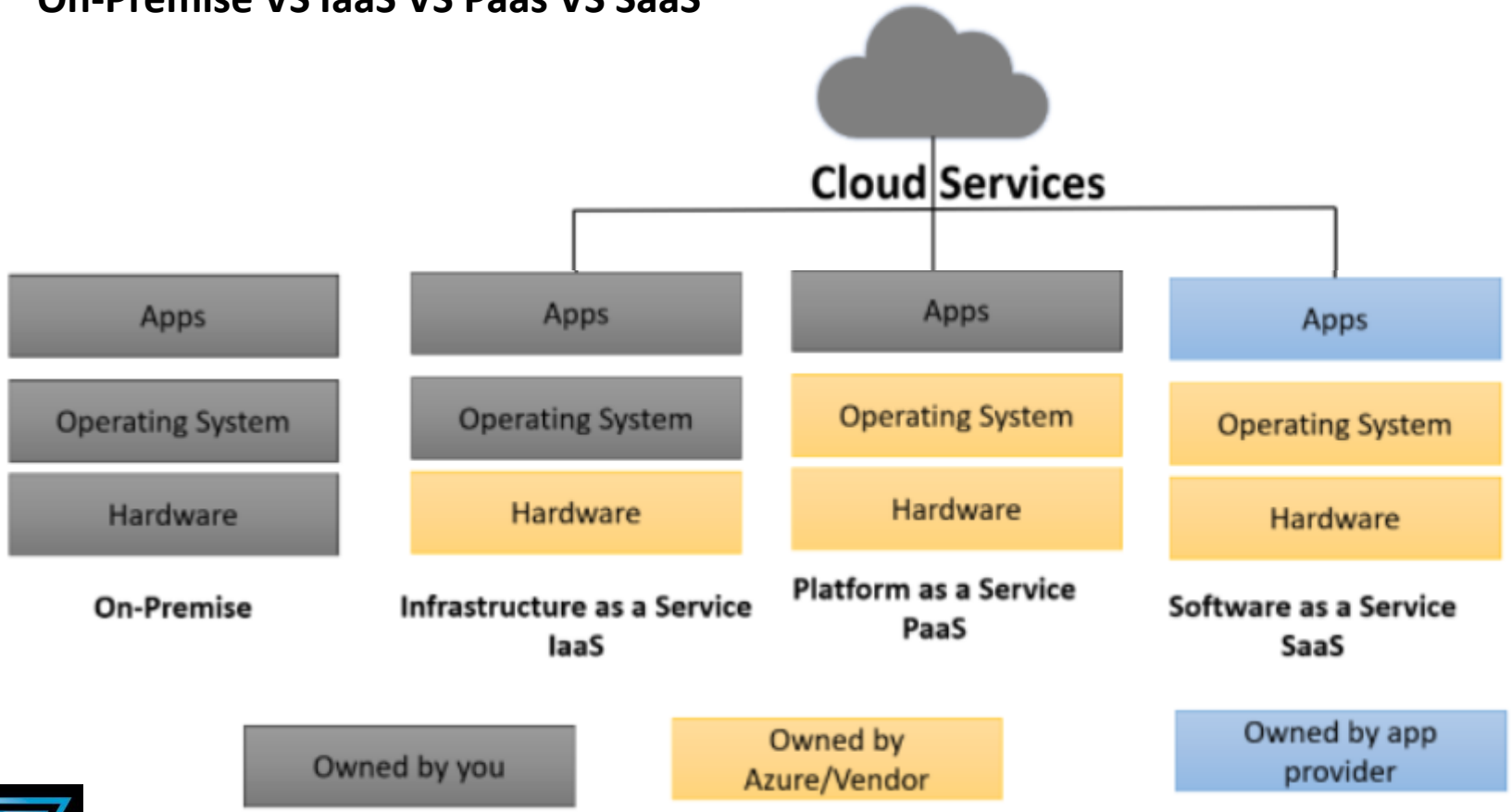
- ✓Need to have one Microsoft Account
- ✓Good Condition Laptop
- ✓GitHub Account
- ✓Docker Hub Account
- ✓Good Network Connectivity
- ✓Azure CLI
- ✓Mobaxterm



6.Microsoft Azure Architecture



On-Premise VS IaaS VS Paas VS SaaS



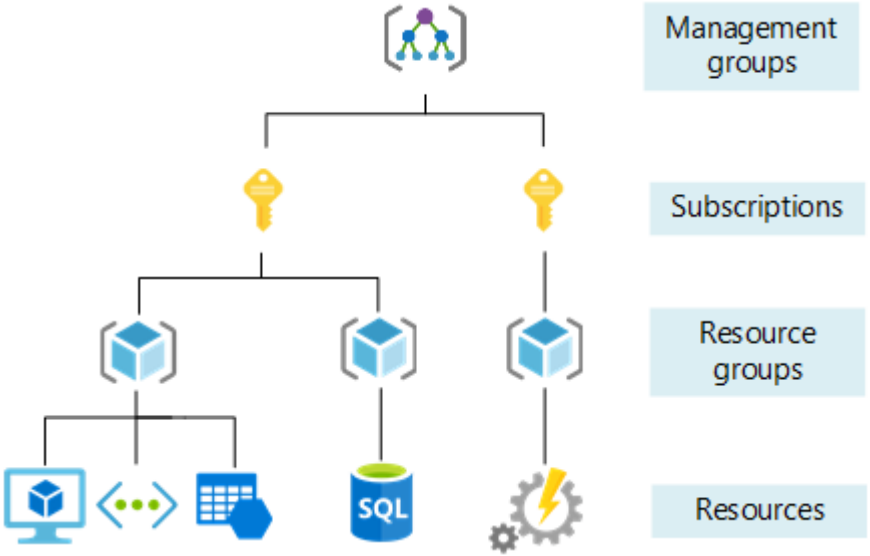
Module 02

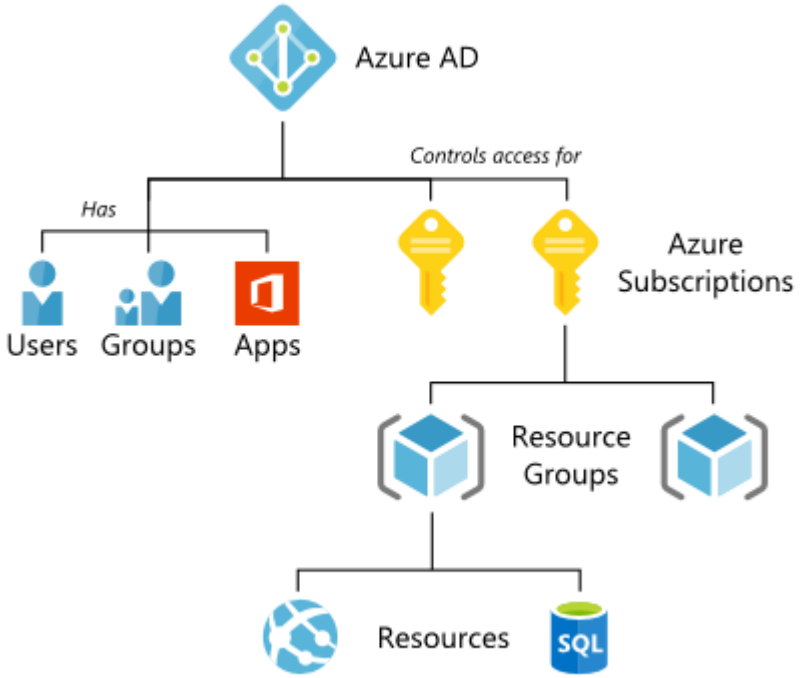
Introduction to Azure Resources & Storage

Agenda

1. Azure Resources & Subscriptions
2. Azure Resource Manager
3. Managing Azure Resources
4. Azure Tags
5. Azure Storage Account & its types
6. Azure Blob Storage
7. Azure Files Storage
8. Azure File Sync

1. Azure Resources & Subscriptions

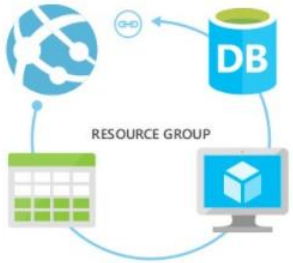




2. Azure Resource Manager

Areas of Focus

Deploy Organize Control



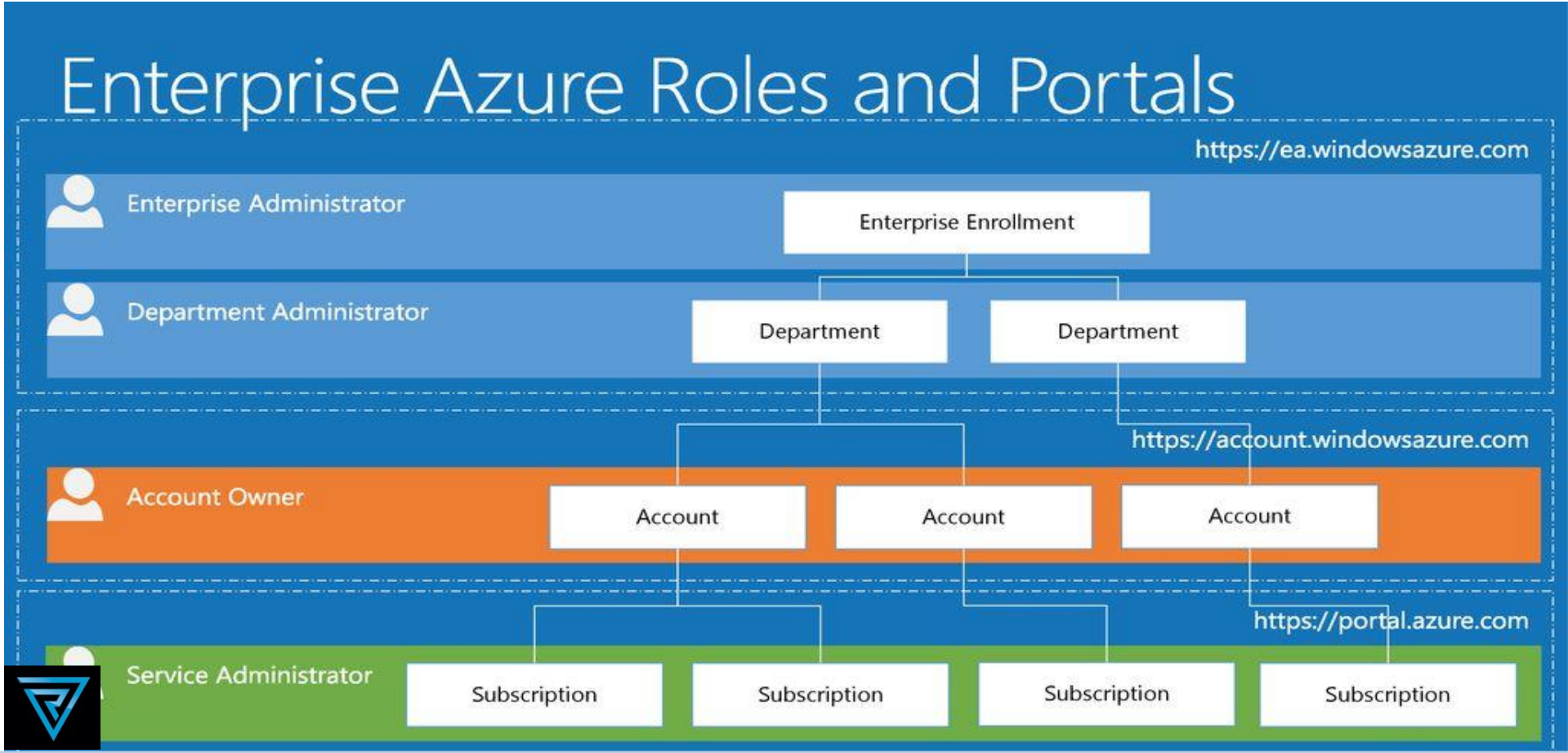
Resource Group

- container for multiple resources
- resources exist in one* resource group
- resource groups can span regions
- resource groups can span services

Deployment

- tracks template execution
- created within a resource group
- allows nested deployments

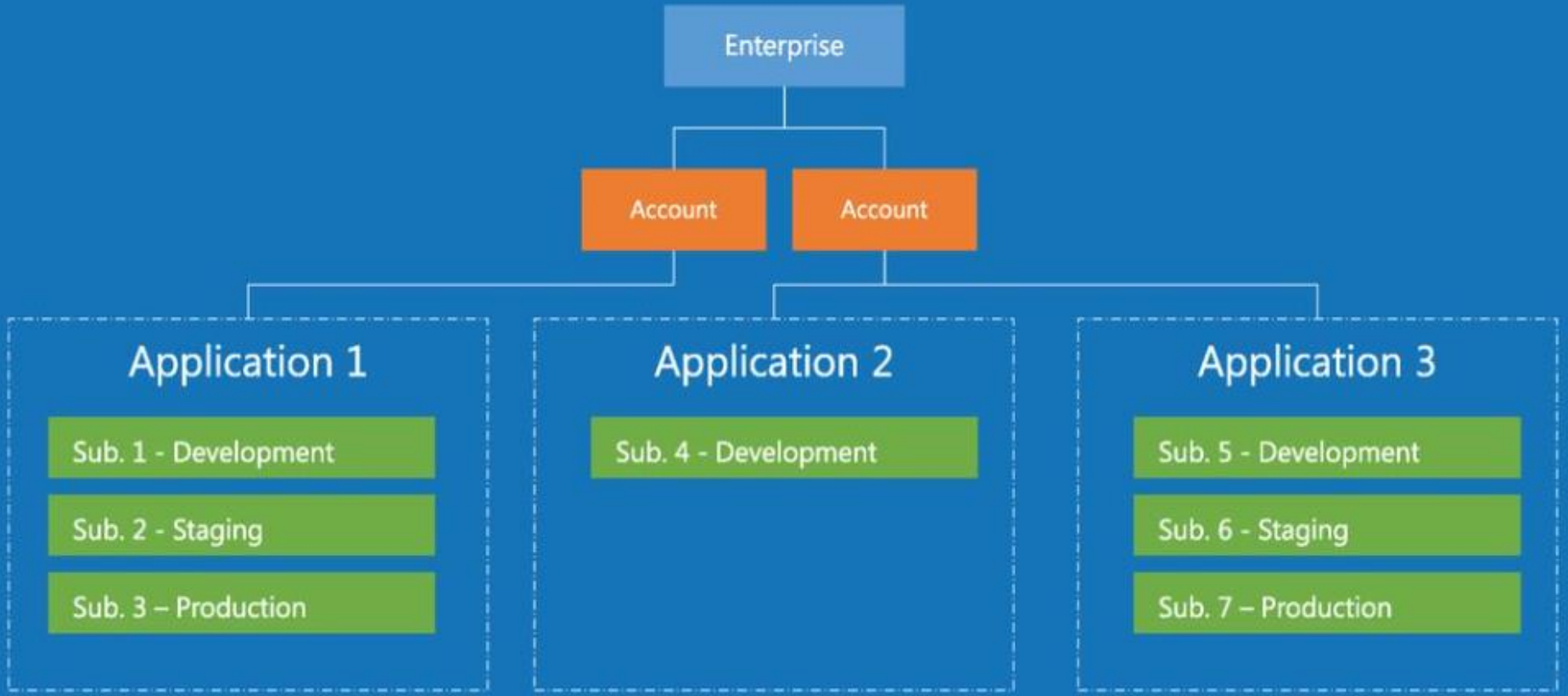
3. Managing Azure Resources



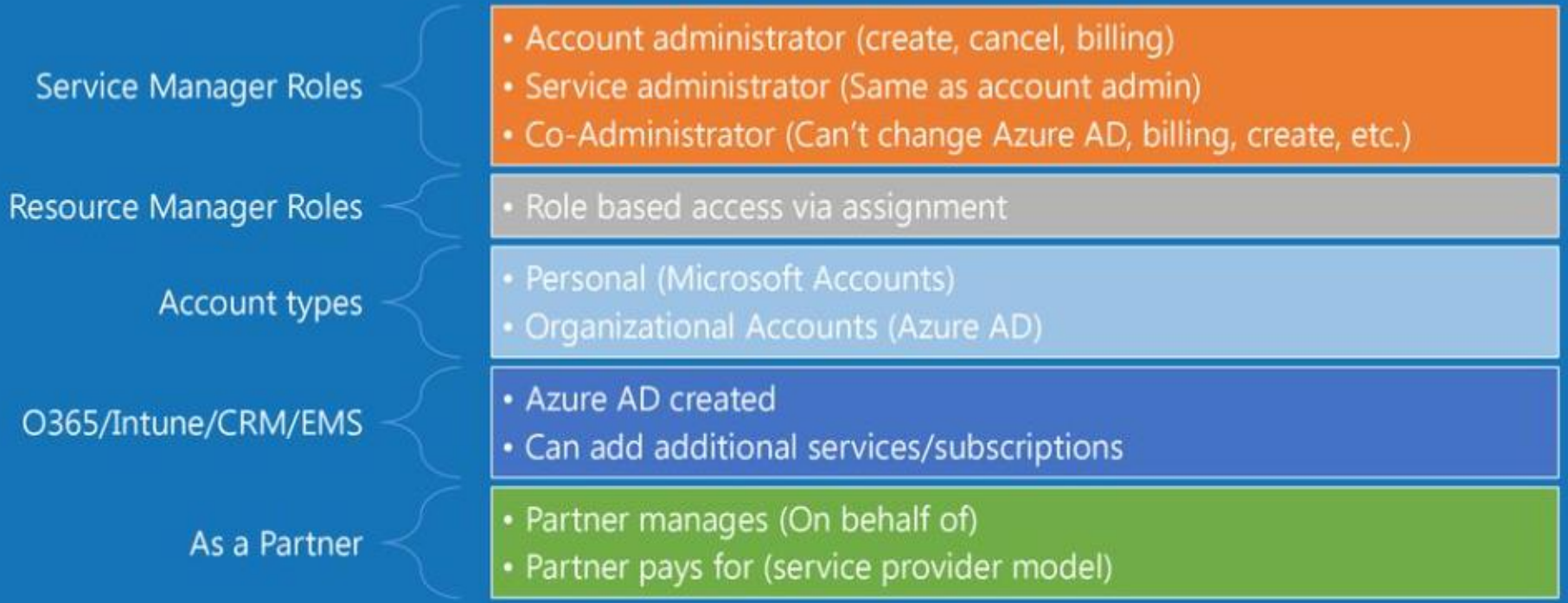
Subscription Limits (subset)

Azure Resource	Resource Manager API	Service Management API
Cores per subscription	20/10,000 per region	20/10,000 Global
Co-administrators per subscription	Unlimited	200/200 Global, with no RBAC model
Storage accounts per subscription	100/100 (250 by contacting support)	100/150 (250 by contacting support)
Cloud Services per subscription	N/A	20/200
Virtual networks per subscription	50/500	50/100
Local networks per subscription	10/500	20/Contact support
Reserved IPs per subscription	20/100	20/Contact support
Public IP addresses (dynamic)	60/Contact Support	400 Global
Reserved public IP addresses	20/Contact support	256 Global
Resource Groups per subscription	800/800	500 Global
Virtual machines per subscription	20/10,000 per region	50/50 per cloud service

Subscription Setup Methodology



How do I manage an Azure Subscription?



Management Portals

Enterprise Portal (https://ea.azure.com/

- Manage access
- Manage accounts
- Manage subscriptions
- View price sheet
- View usage summary
- Manage usage & lifecycle email notifications
- Manage Authentication Types
- Manage Market place access

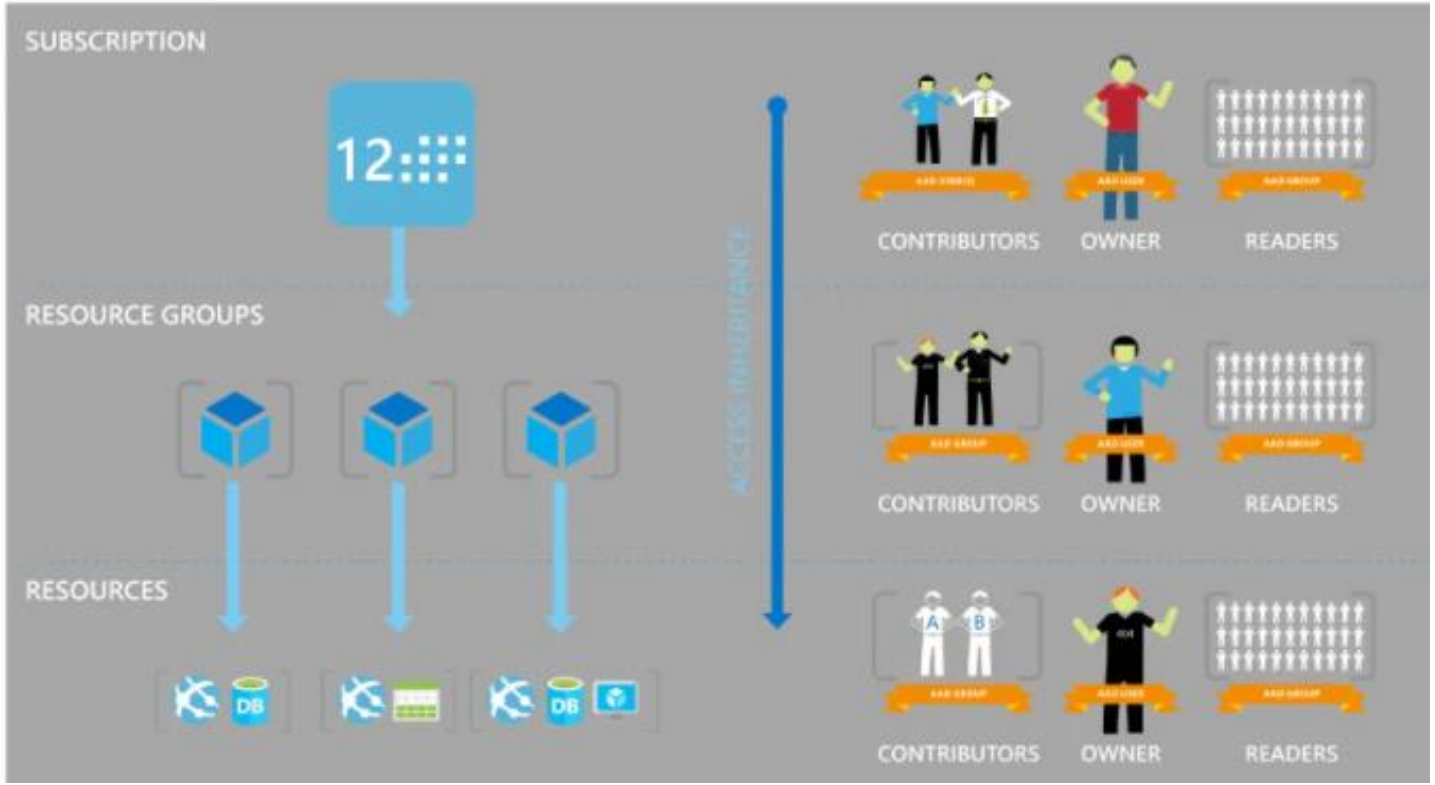
Account Portal (https://account.windowsazure.com

- Edit subscription details
- Enroll in or enable Preview features

Management Portal (https://manage.windowsazure.com or https://portal.azure.com

- Provision/de-provision Azure services
- Manage co-administrators on subscriptions
- Open support tickets for issues within the subscription

Role Based Access Control



AGENDA

Understanding of Microsoft Azure Storage

Microsoft Azure Storage

Azure Storage Basics

Azure Storage Data Service

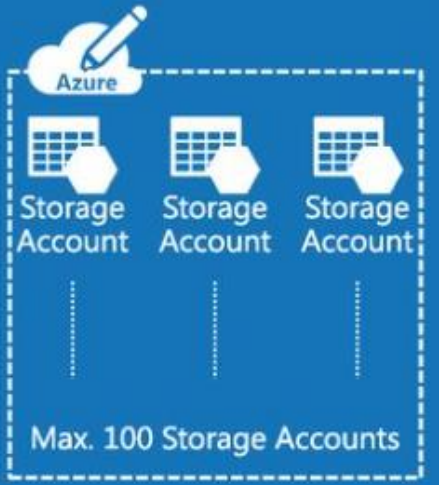
Types of Azure Storage

Securing Storage Accounts

Summery

Azure Storage Accounts

- An Azure Subscription can have up to 100 storage accounts.
  - Soft limit – contact support if you need more
- Store up to 500TB per storage account
- A storage account is uniquely addressable.
  https://<account name>.<service name>.core.windows.net
- Available from anywhere using REST API's
- Open source client libraries available for .NET, Native C++, Java, Android, Node.js, PHP, Python, Ruby, PowerShell, iOS

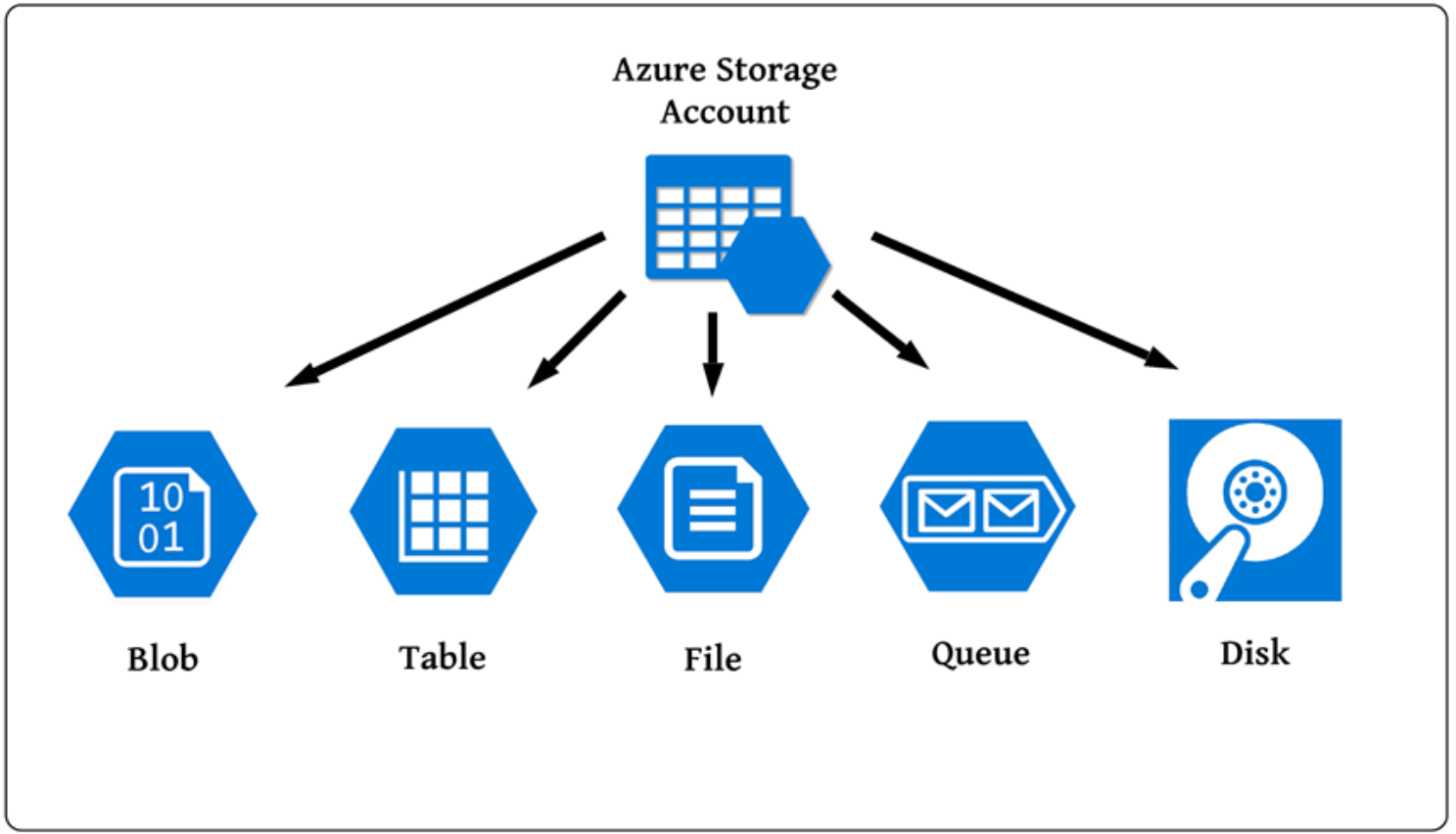


Azure Storage Features

High Availability and durability
Data replication across data centers, zones and regions

Security
Encryption and fine-grained access control service of your data

Scalability
High performance and scalability for high performant application


Azure Storage Account
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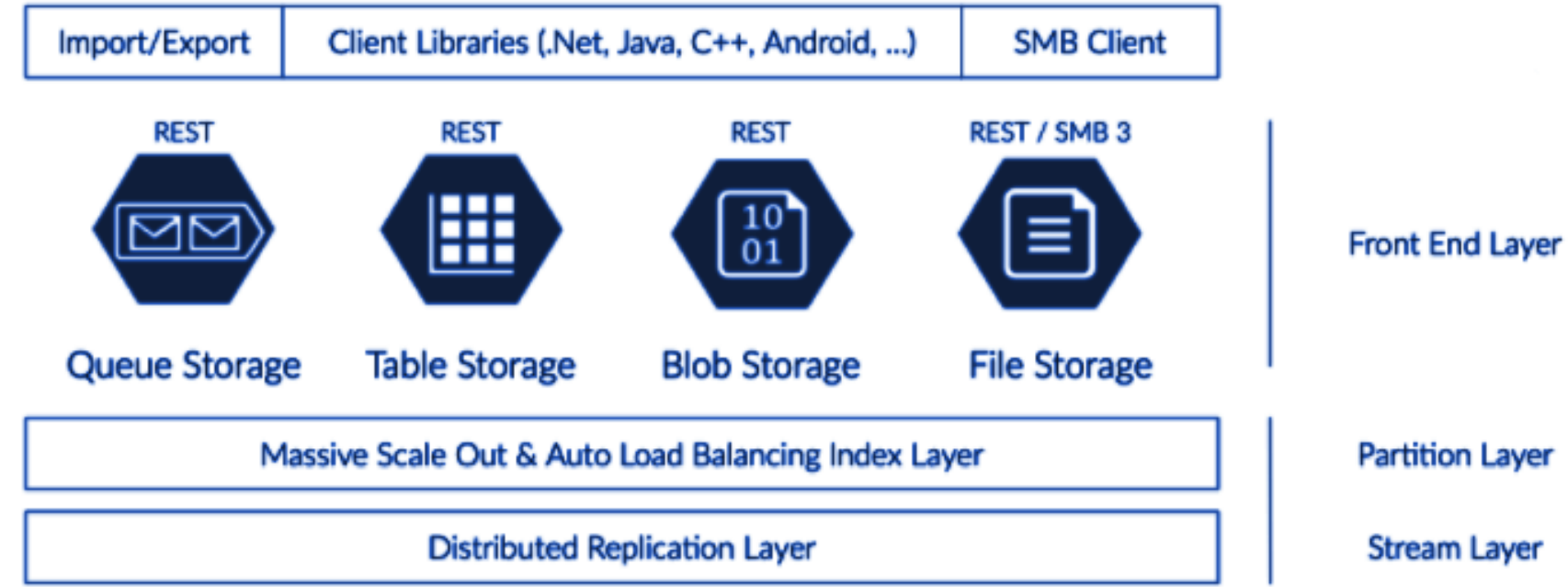
01
Blob
Table
File
Queue
Disk

Azure Storage Architecture



Storage Account Kinds

Storage Account Type	Supported Services	Supported Performance Tiers	Supported Access Tiers	Replication Options	Deployment Model1	Encryption2
General-purpose V2	Blob, File, Queue, Table, and Disk	Standard, Premium	Hot, Cool, Archive	LRS, ZRS4, GRS, RA-GRS	Resource Manager	Encrypted
General-purpose V1	Blob, File, Queue, Table, and Disk	Standard, Premium	N/A	LRS, GRS, RA-GRS	Resource Manager, Classic	Encrypted
Block blob storage	Blob (block blobs and append blobs only)	Premium	N/A	LRS	Resource Manager	Encrypted
FileStorage (preview)	Files only	Premium	N/A	LRS	Resource Manager	Encrypted
Blob storage	Blob (block blobs and append blobs only)	Standard	Hot, Cool, Archive	LRS, GRS, RA-GRS	Resource Manager	Encrypted

Storage Replication

Replication Strategy	LRS	ZRS*	GRS	RA-GRS
Data is replicated across multiple facilities	No	Yes	Yes	Yes
Data can be read from the secondary location as well as from the primary location	No	No	No	Yes
Number of copies of data maintained on separate nodes	3	3	6	6

Securing Storage Account

Azure Active Directory Integration for Blobs and Queue

Azure AD Authorization over the files

Shared Key Authorization

Authorization with Shared Access Signature

Anonymous Access to blobs and Containers

Demo

Module 03

Azure Virtual Machines

Agenda

1. Azure Virtual Machines
2. Data Disks in Azure
3. Azure VMs & Interfaces
4. Custom Images of Azure VM – Demo (https://docs.microsoft.com/en-us/azure/virtual-machines/windows/capture-image-resource)
5. Virtual Machine Scale Sets
6. Virtual Machine Availability Sets

What is Azure Virtual Machines

- VM Sizes
- Supported Workloads
- Software Licensing
- VM Portability
- VM's & Cloud Services

Microsoft Azure VM Sizes

Variable instance sizes to handle complex workloads of any size

A0	A1	A2	A3	A4	A5	A6	A7
Shared Core (low IO)	1 x 1.6Ghz (moderate IO)	2 x 1.6Ghz (high IO)	4 x 1.6Ghz (high IO)	8 x 1.6Ghz (high IO)	2 x 1.6Ghz (high mem)	4 x 1.6Ghz (high mem)	8 x 1.6Ghz (high mem)
768 MB memory 1 Data Disk (1TB) 1 x 500 Max IOPs	1.75 GB memory 2 Data Disks (1TB) 2 x 500 Max IOPs	3.5 GB memory 4 Data Disks (1TB) 4 x 500 Max IOPs	7.0 GB memory 8 Data Disks (1TB) 8 x 500 Max IOPs	14 GB memory 16 Data Disks (1TB) 16 x 500 Max IOPs	14 GB memory 4 Data Disks (1TB) 4 x 500 Max IOPs	28 GB memory 8 Data Disks (1TB) 8 x 500 Max IOPs	56 GB memory 16 Data Disks (1TB) 16 x 500 Max IOPs

A8	A9
8 x 2.2GHz (high compute)	16 x 2.2GHz (high compute)
56GB memory 8 Data Disk (1TB) 8 x 500 Max IOPs 40 Gbps NIC	112 GB memory 16 Data Disks (1TB) 16 x 500 Max IOPs 40 Gbps NIC

Options for Running Your Application in Azure

VM

Container Instances

Batch

Cloud Services

Mobile App

Logic App

Kubernetes Service (AKS)

Web App for Containers

Service Fabric (Mesh)

Web App

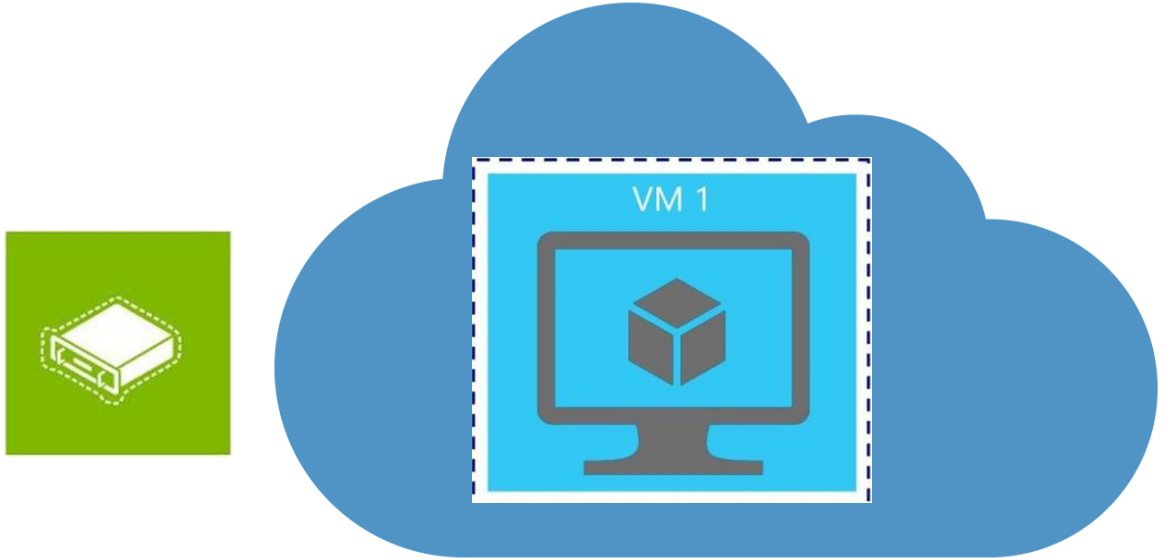
Function App (Functions)

What about software licensing?

Windows 1	1 • Per-hour/per-minute license in the cloud
Microsoft 1 Applications |	1 • License Mobility for Applications (SA) 1 • Per-hour/per-minute license in the cloud | for subset of products (SQL & BizTalk)_
External 1 Applications |	1 • Based upon vendor and product

Virtual Machines & Cloud Services

VMs exist within a Cloud Service

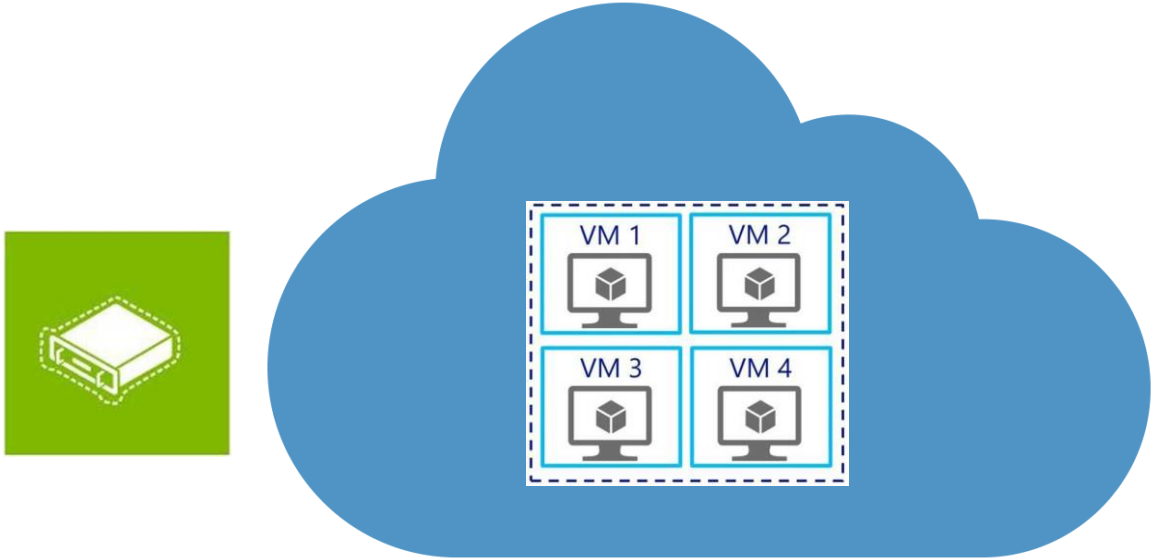


Cloud Service is a boundary

- Public IP Address
- Public DNS Name
- Internet Firewall
- Load Balancing

Virtual Machines & Cloud Services

Multiple VMs can be hosted within the same cloud Service



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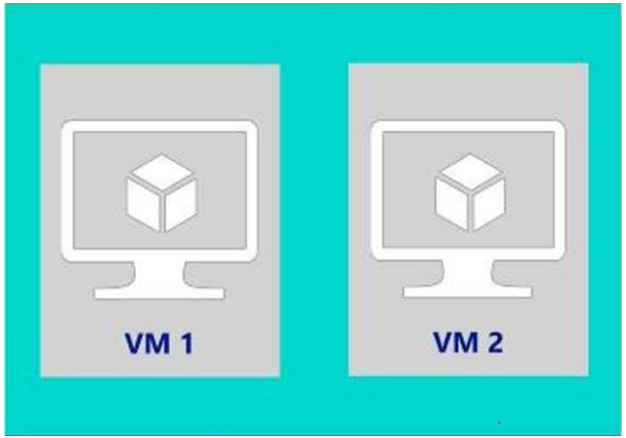
Availability & Service Level Agreements

Availability set



SLA 99.95

99.95% Monthly SLA for VM's

- 438 hours of downtime per year for VM's in an availability set

What's included

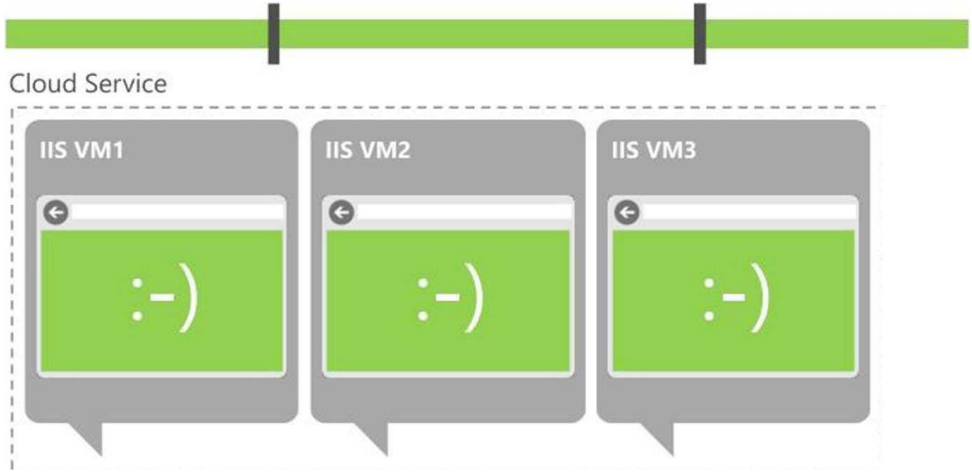
- Compute Hardware failure (disk, cpu, memory)
- Datacenter failures - Network failure, power failure
- Hardware upgrades, Software maintenance - Host OS Updates

What is not included

- VM Guest OS & Applications, VM Guest OS Updates
- Customer on-premises network connectivity and intermediary Internet connectivity

Auto-scaling Microsoft Azure VM's

- Based on CPU Utilization Thresholds
- Scale-up: Start VMs
- Scale-down: Stop VMs



In Upcoming classes, we are going to do the demo’s on below mentioned

- **Application load balancer**
  - **Basic SKU**
  - **Standard SKU**
  - **NAT Rules**
- **Application Gateway**
  - **Basic SKU**
  - **Standard SKU**
  - **NAT Rules**
- **Azure Firewall Settings**
- **Azure DNS Settings**

Hands-on Exercise:

1. Creating and Configuring an Azure VM
2. Deploying a custom image of Azure VM
3. Virtual Machine Scale Sets.