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Microsoft Azure Developer Associate (AZ-204)

COURSE OUTLINE
MODULE 01

Introduction to Azure IaaS Compute Solutions

Implementing Azure Batch Service and Disk Encryption

Designing and Developing Applications That Use Containers

Implementing Azure App Service Web Apps and Mobile Apps

Implementing Azure App Service API Apps and Azure Functions

Developing Solutions That Use Azure Table Storage and Cosmos DB

Developing Solutions That Use Relational Database and Azure Blob Storage

Implementing Authentication and Access Control In Azure

Implementing Secure Data Solutions and Integrate Caching & CDN

Instrument Monitoring, Logging and Scalability Of Apps & Services

Connecting to and Consuming Azure and Third-party Services

Developing Event-based and Message-based Solutions in Azure

Module 1 – Introduction to Azure IaaS Compute Solutions

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Topics

- Overview of Microsoft Azure
- Azure Geography and Regions
- Azure Portal and Subscriptions
- Azure Cost Management, Advisor and Monitor Services
- Azure Developer Tools
- Azure Virtual Machines
- Using Azure SDKs for deployment
- Configure Azure Virtual Machines for Remote Access
- Provision an Azure VM Using Code

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Objectives

After completing this module, you should be able to:

- Understand the Microsoft Azure Cloud
- Understand the different IaaS Compute Services
- Create and deploy VMs by using the Azure Portal
- Provision VMs using PowerShell
- Configure Azure VMs for remote access
- Create and deploy VMs by using C# code

Overview of Microsoft Azure

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What is Microsoft Azure?

01

Microsoft Azure is a growing collection of integrated cloud services which developers and IT professionals use to build, deploy and manage applications through a global network of Microsoft's datacenters.

02

Azure's flexible computing power gives small and medium sized business on-demand enterprise-level computing power. Virtual machines can be deployed in minutes providing additional processing power and storage.

03

The cloud environment allows businesses to quickly deploy applications in the cloud, which saves on infrastructure costs while reducing the hardware and maintenance burdens on in-house IT management

Features of Microsoft Azure

Focus on the Public Cloud

88% of companies are already using the public cloud and 13% are already running more than 1,000 Virtual Machines in the public cloud , as per Annual reports in 2015

Highly efficient tool

Azure is equipped to handle most of the traditional tasks of design , deployment, and management of platforms

Technology of the future

Cloud technologies like Azure are evolving at a rapid clip, outpacing the average rate of growth in the IT sector as a whole

Easy to adopt and learn

With Microsoft enjoying an effective monopoly in the personal computer OS market, most users will be familiar with the Windows operating system

Tremendous Potential

Cloud infrastructure is set to dominate the IT space than any other cloud service providers, with an incredible 154% YOY growth rate

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Microsoft Azure Geographies and Regions

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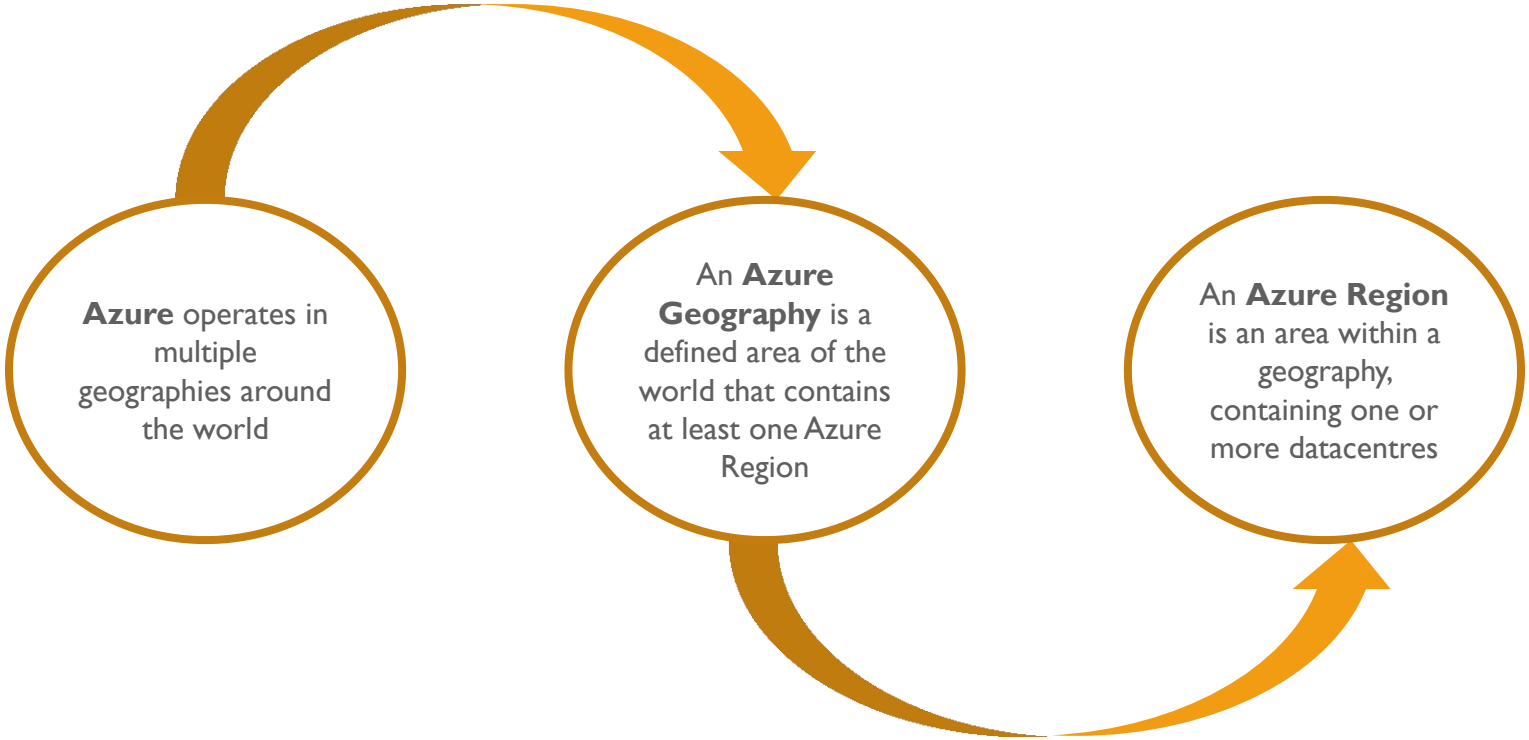
Microsoft Azure Geographies and Regions



Current Microsoft Azure Geographies and R

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Microsoft Azure Services

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What is a Compute Service?

A Compute Service in Azure:

- Provides the building level products, which dictate and determine the execution of an application on Azure Platform
- Manages and scales up to thousands of Windows and Linux Virtual Machines
- Processes events with serverless codes
- Runs large-scale parallel and batch computing jobs
- Builds and operates always-on, scalable, distributed applications

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Basic Compute Services in Azure

Virtual Machine: Deploy any workload, language and any operating system virtually

Azure Kubernetes Service (AKS): Highly available, secure and fully managed Kubernetes service on Azure Cloud

Container Registry: Store and manage container images across all types of Azure deployments

Azure Container Instances: Develop apps fast without managing VMs or having to learn new tools—it is just your application, in a container, running in the cloud

Basic Compute Services in Azure

Functions: Write code regardless of infrastructure and provisioning of servers

Batch: Scale up to thousands of VMs along with staging data and executing compute pipelines

Service Fabric: Simplify microservice-based application development and lifecycle management

Cloud Services: Support for Java, Node.js, PHP, Python, .NET and Ruby, while you get to focus on apps, not hardware

Azure Developer Tools

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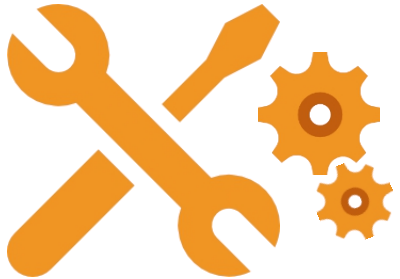
What are Developer Tools?

Azure is well integrated with SDKs and developer tools to allow seamless development flow from project setup to deployment and resource management

These tools assist you in quickly creating environments using reusable templates and artifacts

They detect, triage and diagnose issues in your Web Apps and services



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Azure SDKs

Azure SDKs provide an additional set of templates and tools which can be used to deploy infinitely-scalable applications and APIs, configure diagnostics, create and manage app service resources and integrate your data

You can download and install these language-specific SDKs and tools for your preferred platform:

- .NET SDK
- Node SDK
- Java SDK
- PHP SDK
- Python SDK
- Ruby SDK
- Android
- iOS
- Swift
- Windows
- Xamarin
- Mobile SDK

Different Developer Tools Supported By Azure

Visual Studio Team Services: The perfect complement to your IDE with which you can share code, track work, and ship software for any language—all in a single package

Application Insights: An extensible Application Performance Management (APM) service for web developers on multiple platforms and is used to monitor live web application

API Management: Helps organizations publish APIs to external, partner and internal developers to unlock the potential of their data and services

Visual Studio Code: It is a free code editor redefined and optimized for building and debugging modern web and cloud applications

Getting Free Azure Credits

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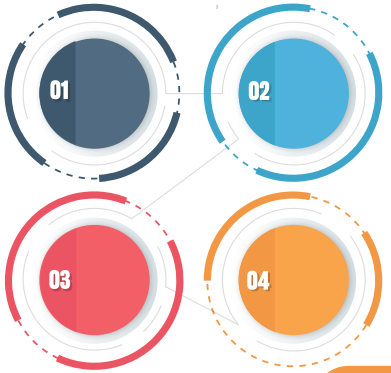
Create Your Free Azure Account

Start free with ₹13,300 ($200- may vary in different domains) in credit and keep going with free options

Explore our cloud by trying out any combination of Azure services for 30 days



https://azure.microsoft.com/en-in/free/

You need to provide your credit card information for identity verification, but you will never be charged unless you choose to subscribe

Provision up to 14 virtual machines, 40 SQL databases or 8 TBs of storage for a month and more services

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Azure Portal

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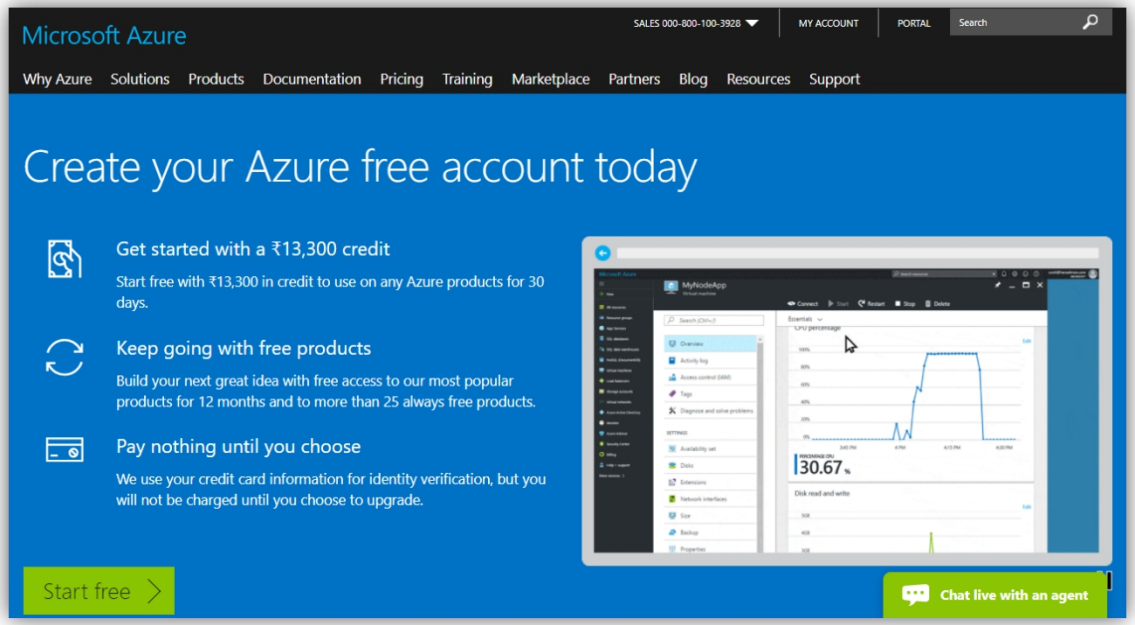
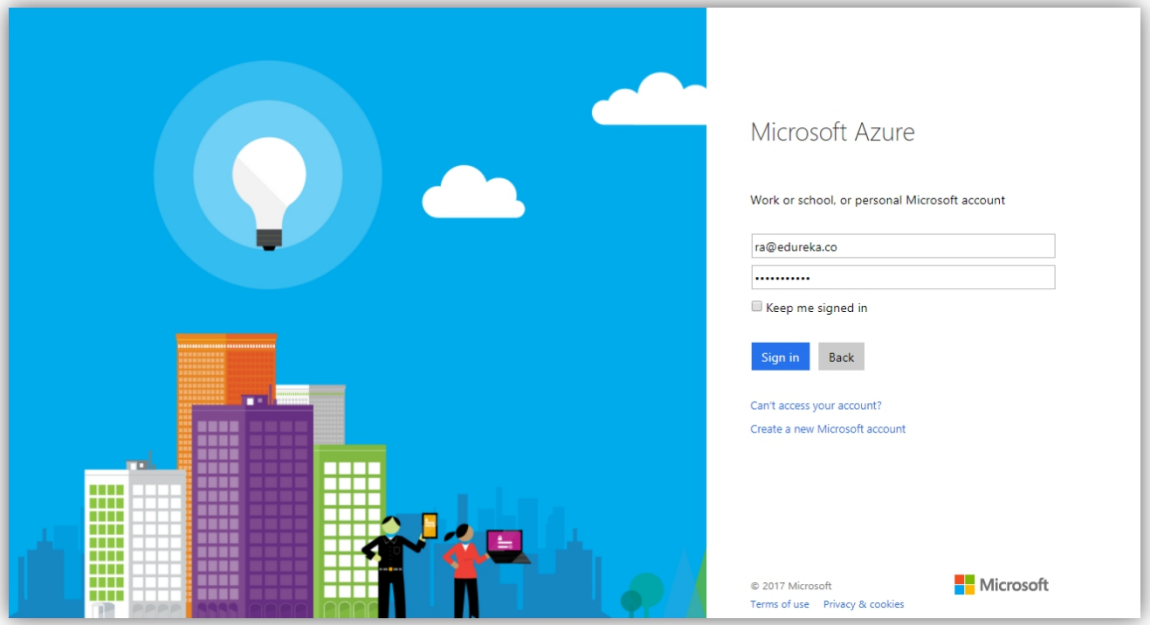
Azure Free Trial Portal

Once you click on the link provided in previous slide, you will be redirected to the Free Trial page > **Start Free**:



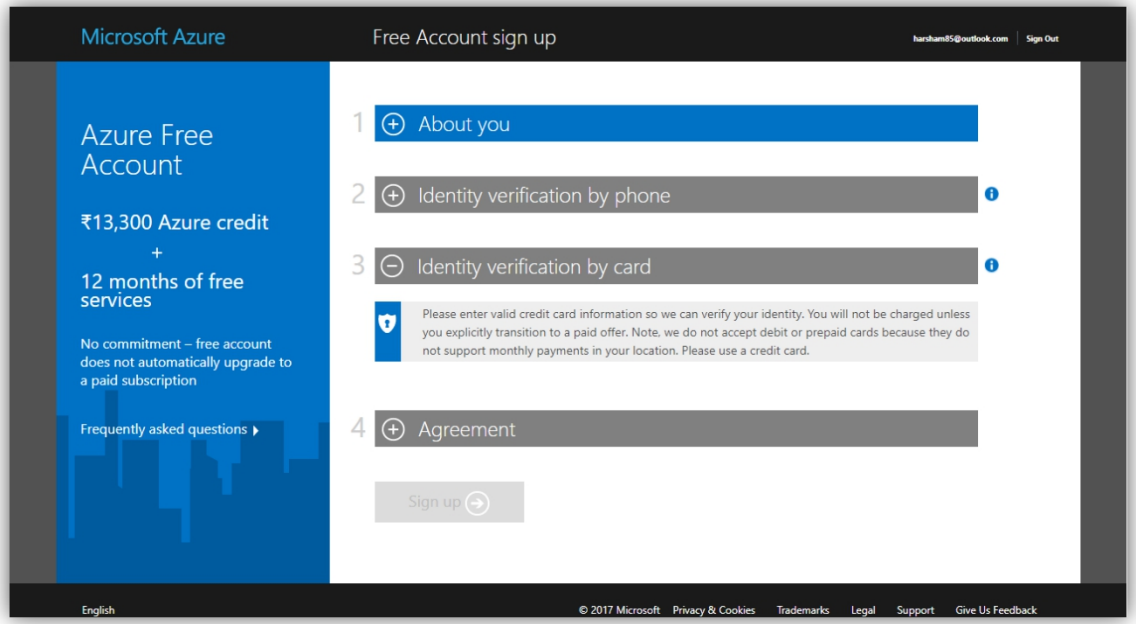
Login with a Microsoft Account

To create a Azure Subscription, you need to have any **Microsoft Account** > Enter the credentials:



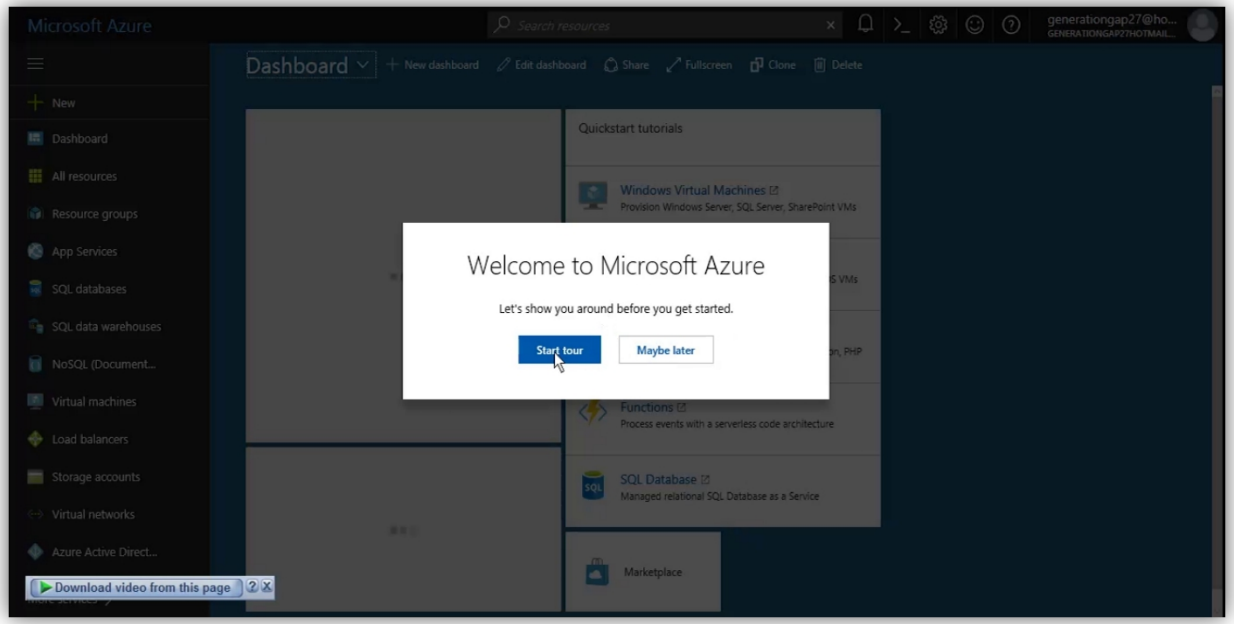
Register for Microsoft Azure

Before you get to use the portal, you need to enter a valid **Credit card** and other identification details as shown:



Access Your Microsoft Azure Portal

Once you are successfully registered on Microsoft Azure, you will have the access to your Azure Portal:



Azure Subscription

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What is an Azure Subscription?

A Microsoft Azure subscription grants you **access** to the **use** the Azure services that are subscribed

The subscription holder can manage the services through the Microsoft Azure Portal

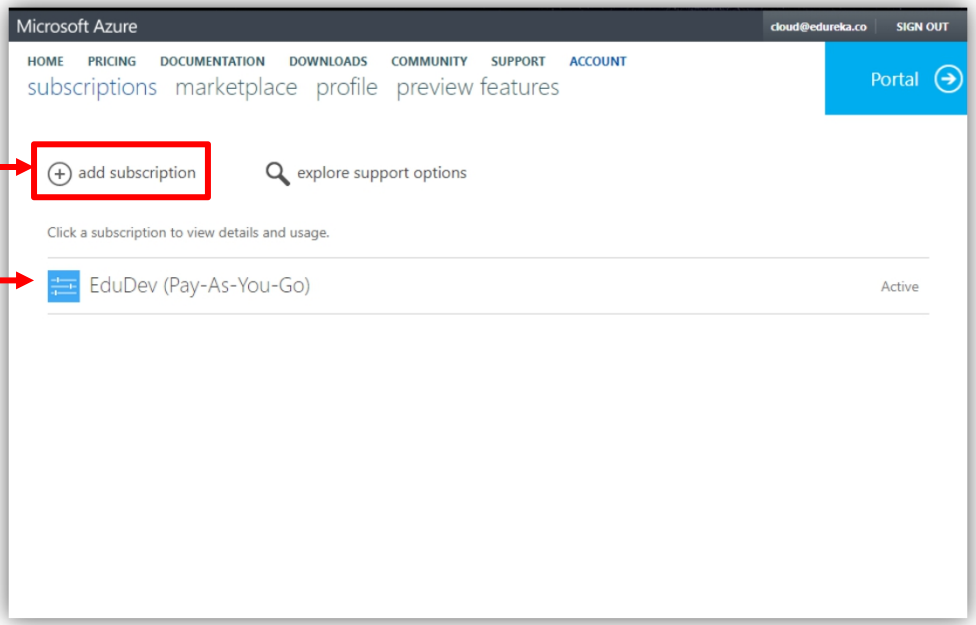
The services are billed as reported through the resource usage in Microsoft Azure account

How to Create Azure Subscription?

Login to your admin account on Azure and go to : https://account.windowsazure.com/Subscriptions

Click on *add subscription*

List of existing subscriptions



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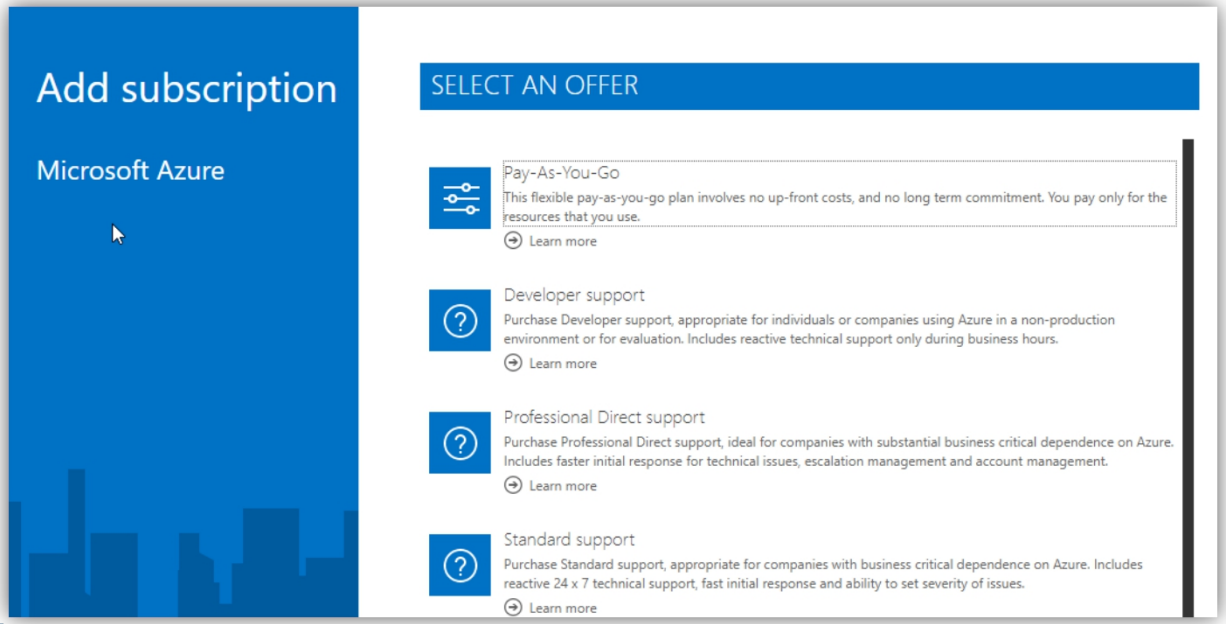
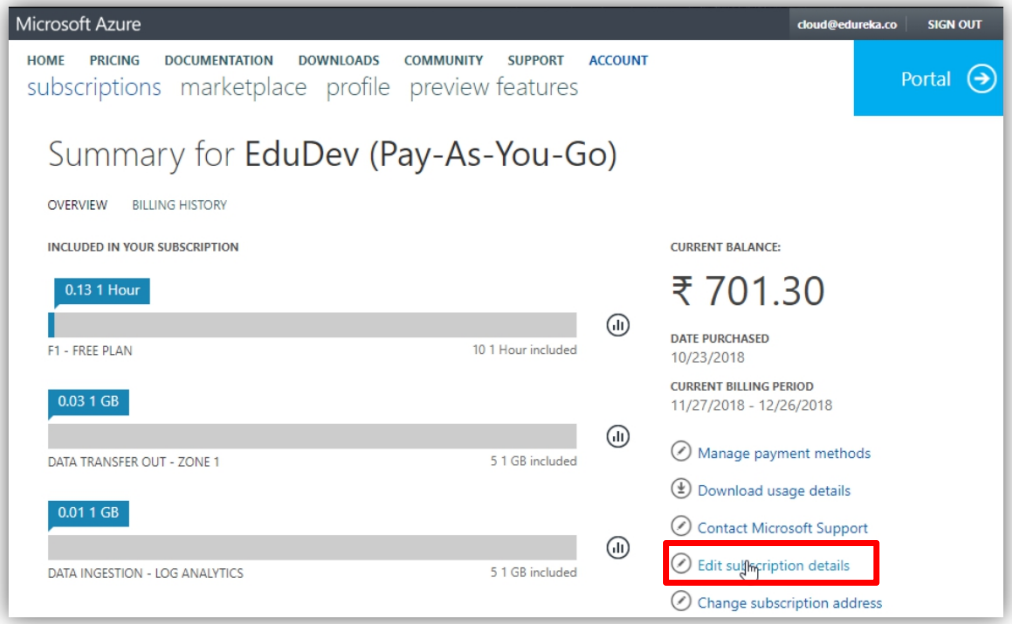
How to Create Azure Subscription? (Cont.)

2 You will find the "Add Subscription" pop-up window on the screen , select a subscription offer from the available options



How to Create Azure Subscription? (Cont.)

3 Enter the details and click Sign-up to add the subscription. To rename new subscription, choose the subscription and in Summary windows Click on "Edit Subscription Details " as shown



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Azure Resource Manager

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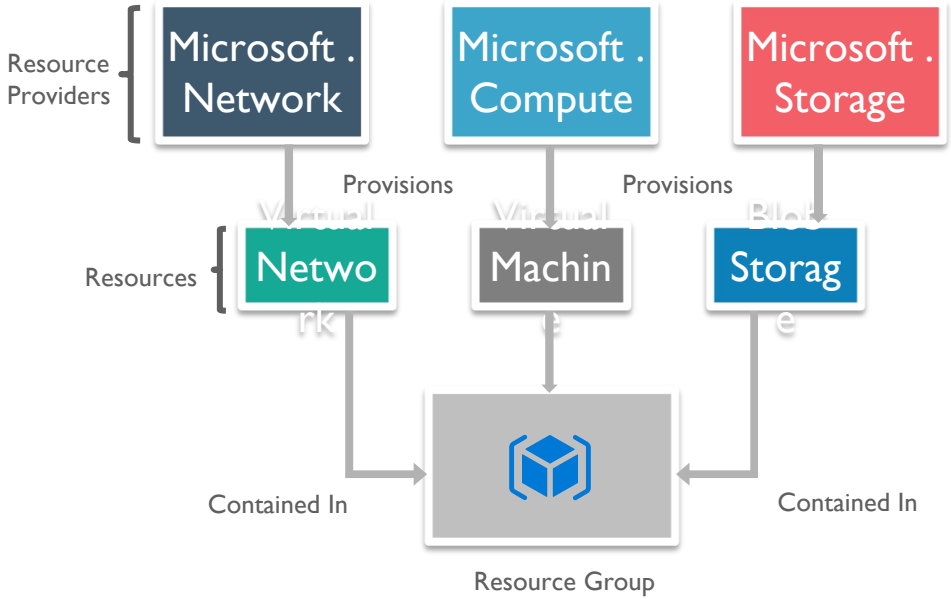
What is Azure Resource Manager?

With the advent of Azure Resource Manager in 2014, the concept of a *Resource Group* was introduced.

A Resource Group is a container for resources that share a common lifecycle



What is Azure Resource Manager? (Cont.)

01

Azure Resource Manager makes it easy for you to deploy, monitor and manage resources in your app so you no longer have to deploy parts of your app separately and then manually put them together

02

Azure Resource Manager gives you control over who can perform actions on the resources

03

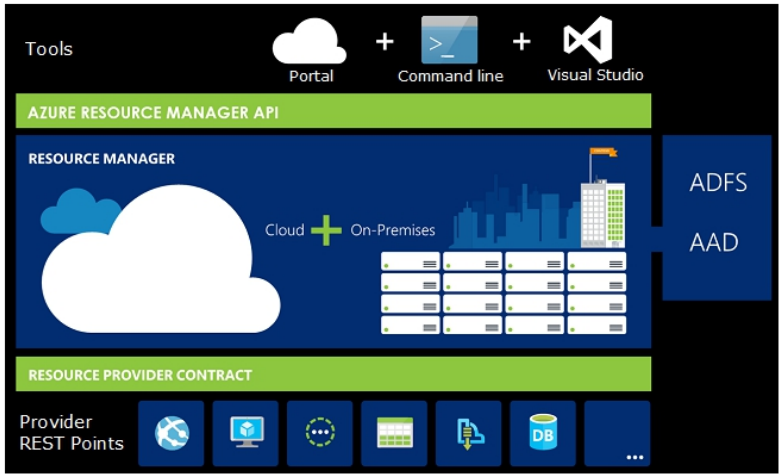
It lets you manage permissions by defining roles and adding users or groups to the roles

Consistent Management Layer

- Resource Manager provides a consistent management layer to perform tasks through Azure PowerShell, CLI, portal, REST API, and client SDKs

- The API passes requests to the Resource Manager service, which authenticates and authorizes the requests

- Resource Manager then routes the requests to the appropriate resource providers

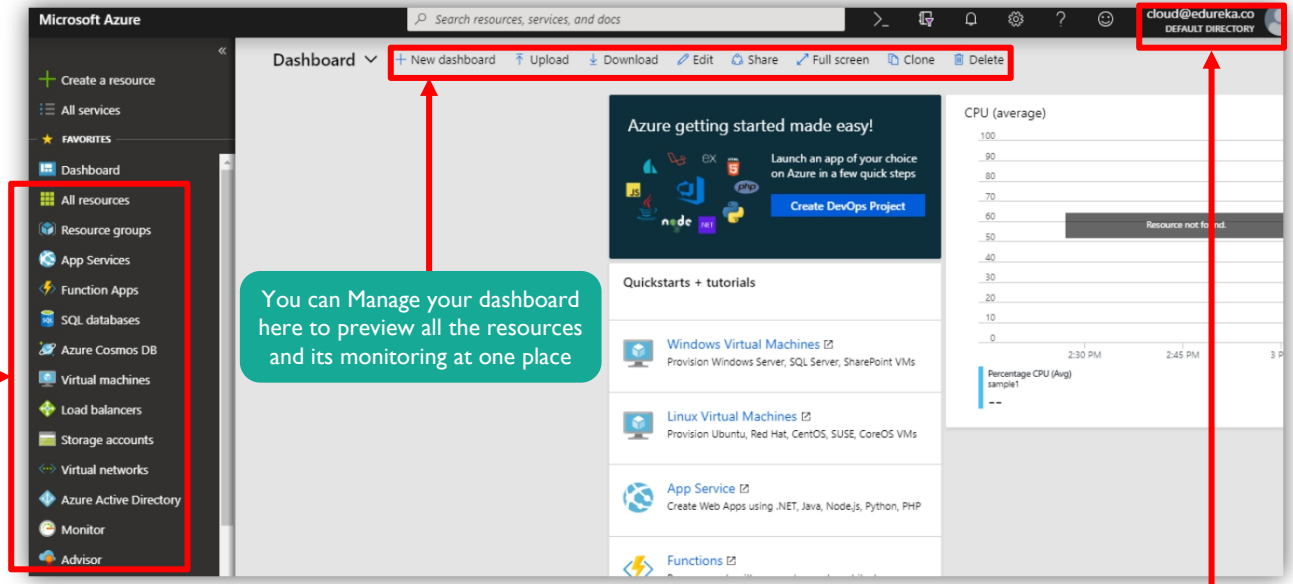


The image shows how all the tools interact with the same Azure Resource Manager API

Azure Preview Portal – Dashboard

On logging in your Azure account, you will be redirected to the Azure portal home page

All the resources that can be deployed through Azure Resource Manager model



You can Manage your dashboard here to preview all the resources and its monitoring at one place

You can find your Subscription related information and about your Bills and credentials

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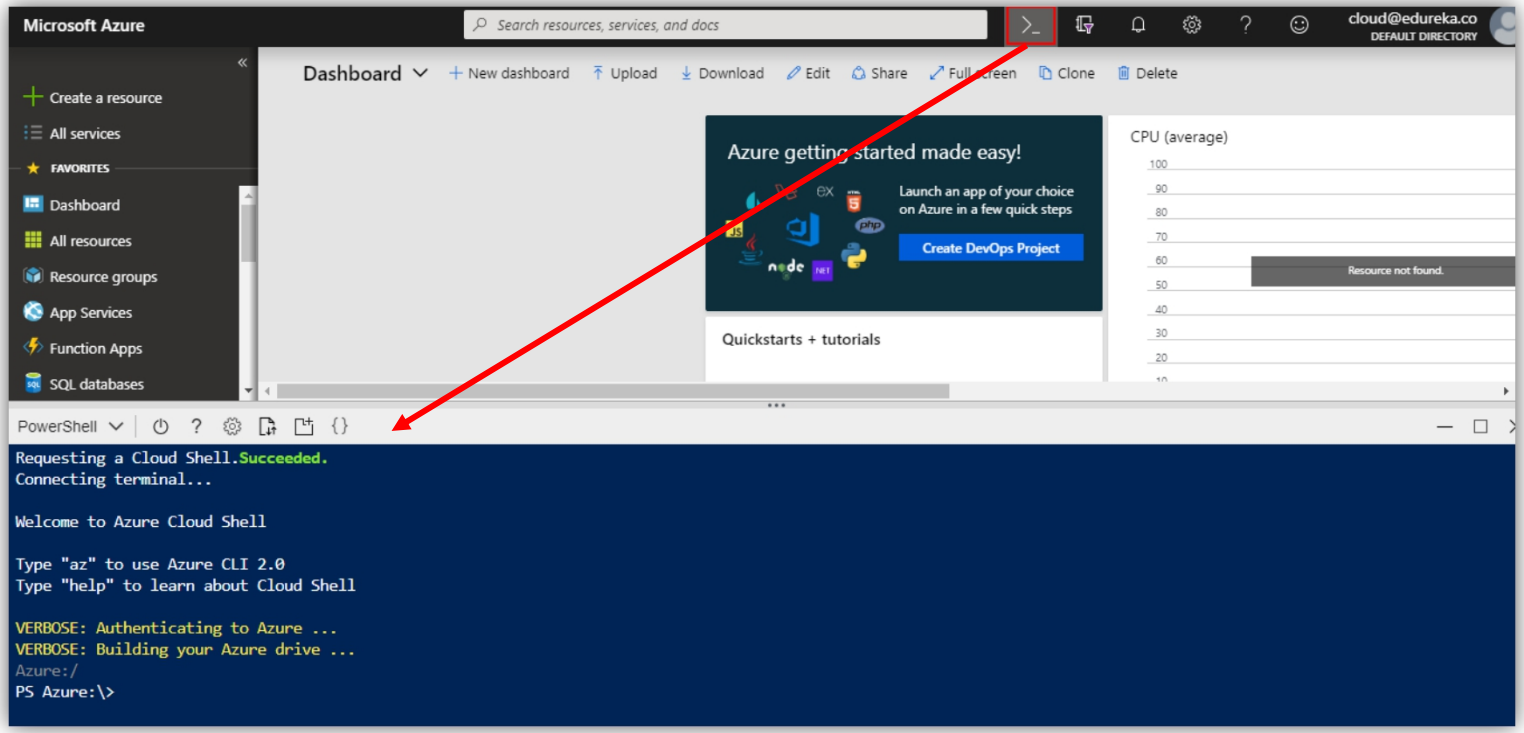
Bash and PowerShell Integration in Azure Portal



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Azure Cost Management, Advisor & Monitor Services

- Monitor cloud spend
- Drive organisational accountability
- Optimise cloud efficiency

Azure Cost Management

Azure Advisor

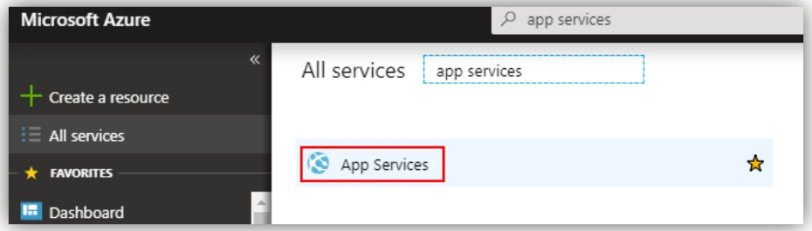
- Optimise Azure resources for high availability, security, performance and cost
- Free, personalised recommendation guide to Azure best practices

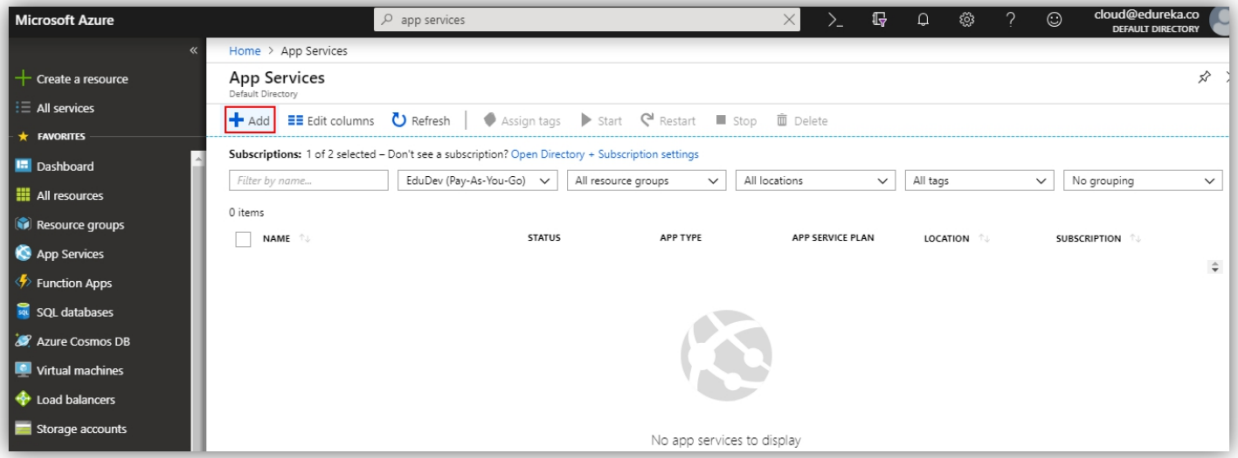
Azure Monitor

- Full-stack visibility
- Intelligent insights
- Proactive optimisation
- Open and extensible

How to Create Resources on Azure Portal?

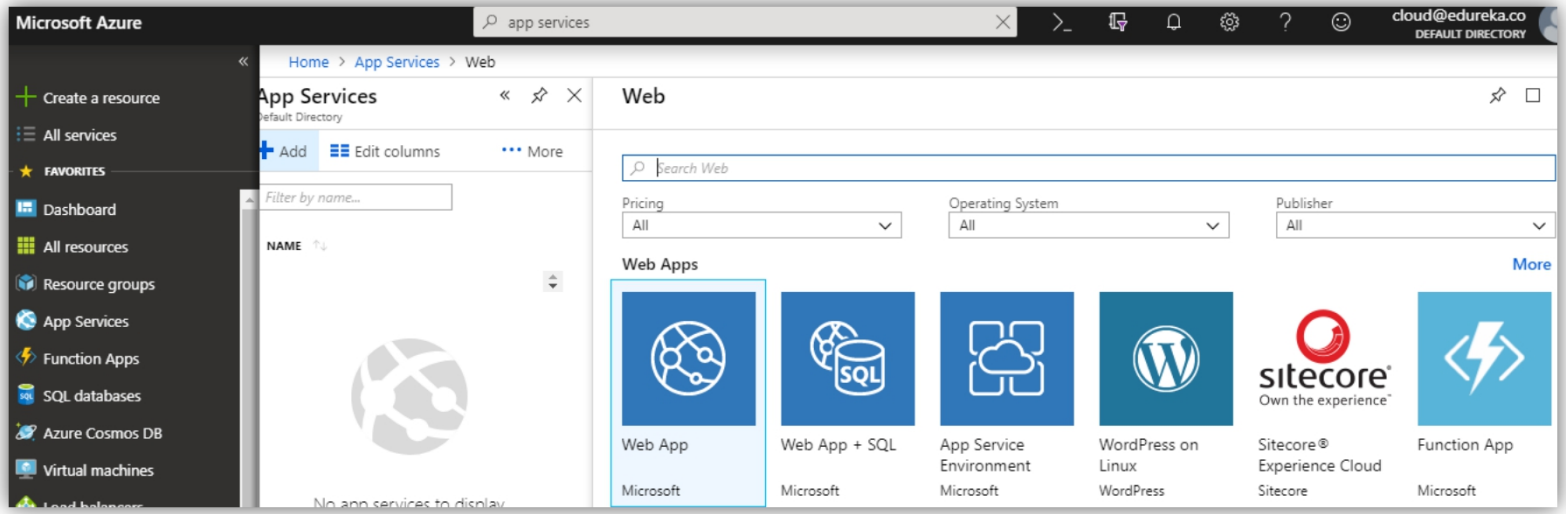
You can Create a Web App in the Azure Portal . Open your Azure Subscription > Click **All Services** > Click **App Services** > Click **Add**





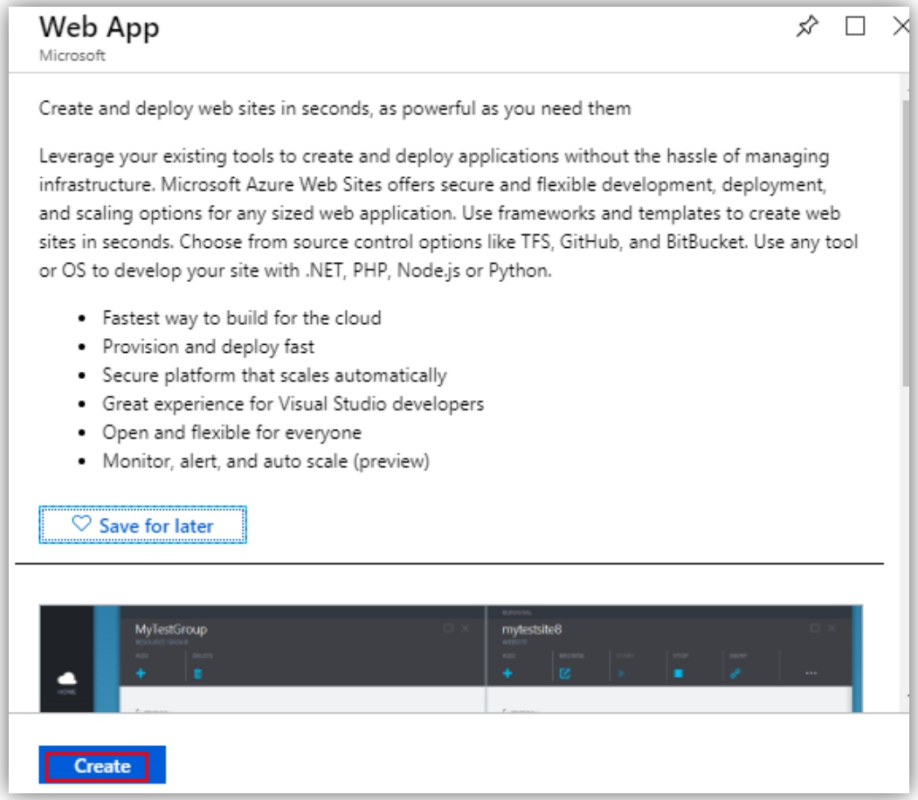
Choosing the Type of App Service

Click on the Type of App Service you want to create (here **Web App**)



Creating a Web App

Click Create

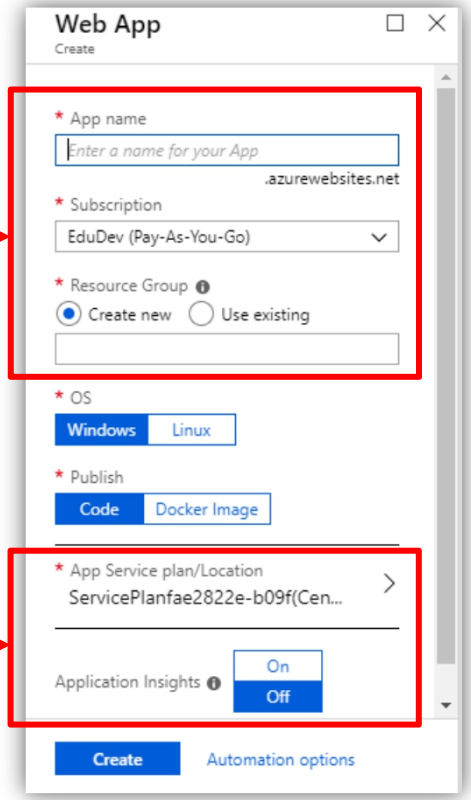


Configuring Web App Details

Enter the details > Click **Create**

- Enter a unique name for your web app
- Select your azure subscription
- Create a new Resource Group

- Choose the default service plan
- Keep Applications Insight **Off**



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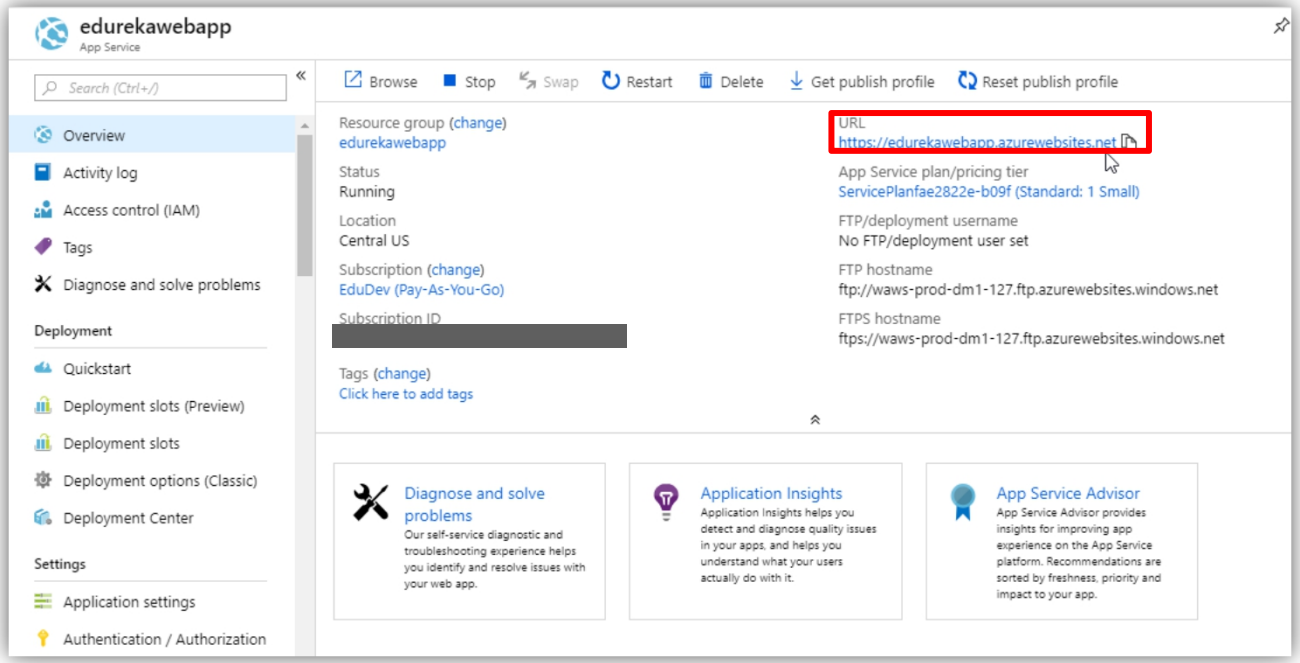
Viewing the Web App

You can now view your web app and perform further operations on it > Click on **URL**



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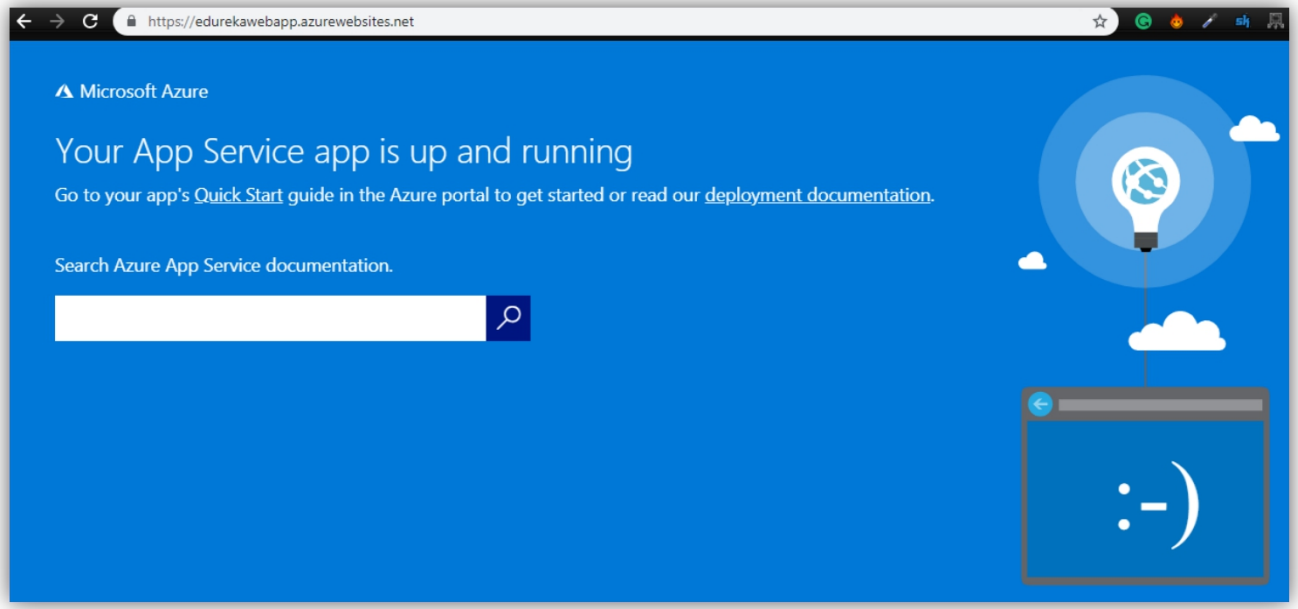
Web App

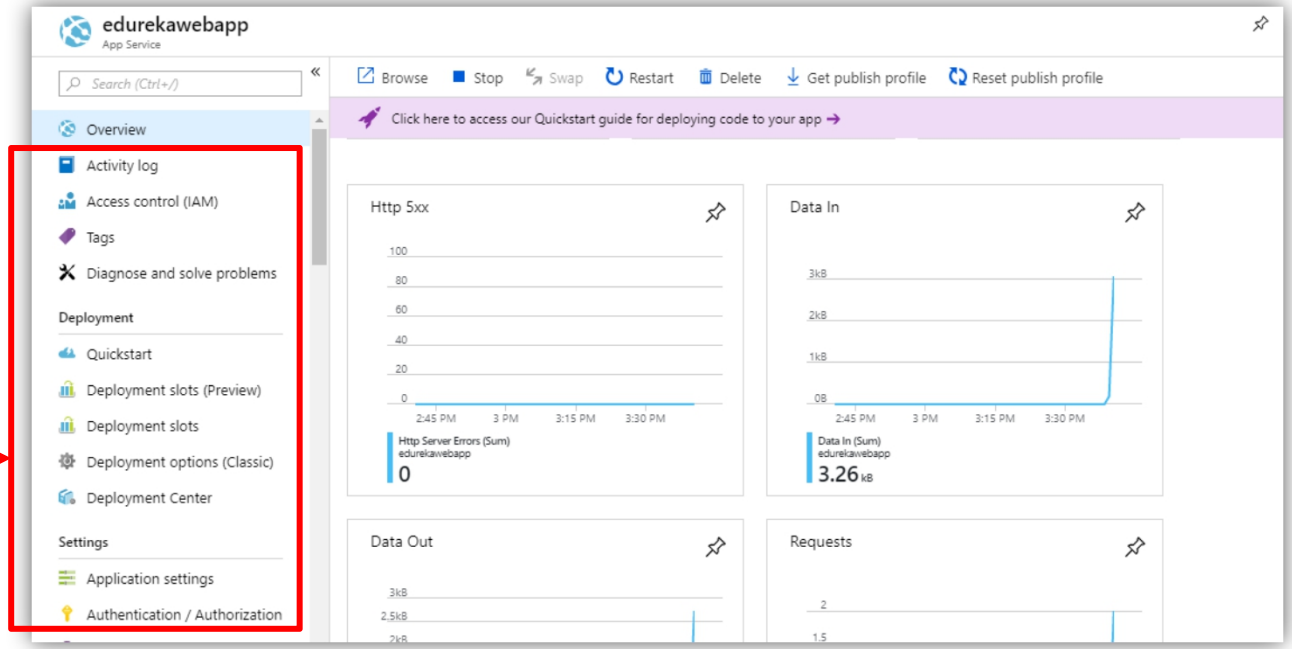
This is the app that has been deployed.



Managing a Resource on Azure Portal

Below is how you manage the web app :

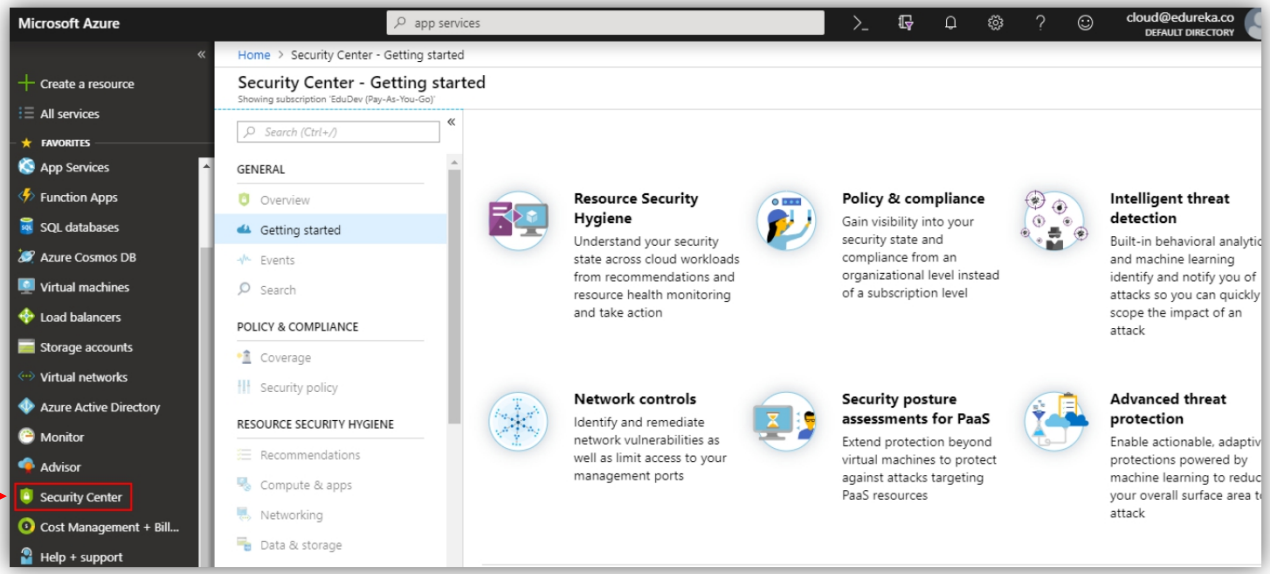
You can generate Activity logs and setup alerts.
You can also setup access to the resource and can perform other configurations and diagnostics which will be briefed in later modules



Azure Portal – Security Centre

In the Preview portal dashboard menu, Select **Security Centre** and check out the security options available:

Azure recommends any sort of security threats/latest tweaks related to any Resource along with providing proper solutions to them. In this blade you can manage security of the whole Infrastructure resources



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Azure Virtual Machine

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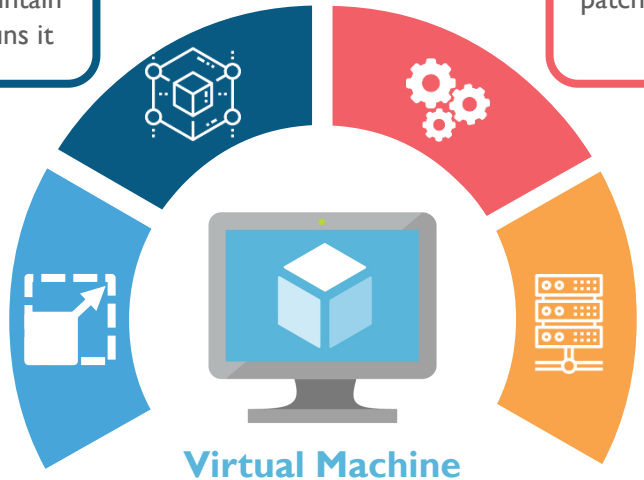
Overview of Azure Virtual Machines

Provides flexibility of virtualization without having to buy and maintain the physical hardware that runs it

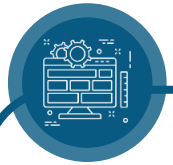
A VM is maintained by configuring, patching, and installing the software that runs on it



Azure VM is one of several types of on-demand, scalable computing resources that Azure offers

Azure VM resource offer a variety of VM sizes and compatibility with Hyper-V fixed-size virtual hard disks

Different Purposes of Azure VM



Azure VMs offer a quick and easy way to create a computer with specific configurations required to code and test an application

Using Azure VMs for your application can be economically viable, you pay for extra VMs when you need them and shut them down when you don't

Virtual machines in an Azure virtual network can easily be connected to your organization's network

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Azure VM Design Considerations

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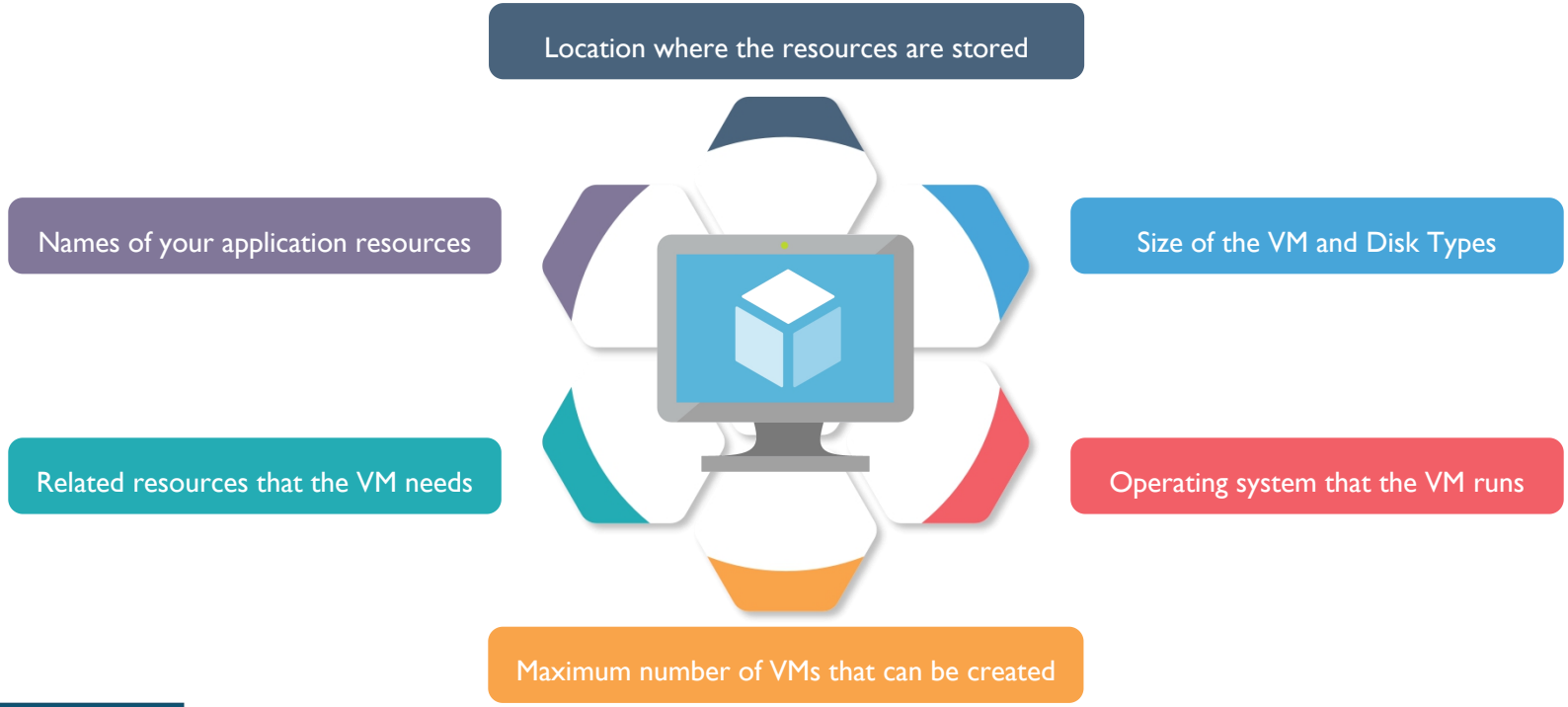
Azure VM Design Considerations

These are the important design aspects of a VM before you build out an application infrastructure in Azure:



Different VM Sizes and Use Case Domains

Type	Sizes	Description	Use case
General purpose	B, Dsv3, Dv3, DSv2, Dv2, Av2, DC	Balanced CPU-to-memory ratio	**Development and test servers code repositories** and most applications
Compute optimized	Fsv2, Fs, F	High CPU-to-memory ratio	Suitable for scenarios like **batch processing**, **web servers**, **analytics** and **gaming**
Memory optimized	Esv3, Ev3, M, GS, G, DSv2, Dv2	High memory-to-core ratio	**Large SQL and NoSQL databases**, ERP, SAP, data warehousing solutions and enterprise-grade applications
Storage optimized	Lsv2, Ls	High disk throughput and IO	For Big data and NoSQL databases such as **Cassandra, MongoDB, Cloudera and Redis** and Data warehousing applications, large transactional databases
GPU	NV, NVv2, NC, NCv2, NCv3, ND, NDv2 (Preview)	Specialized virtual machines available with single or multiple GPUs	**Graphics rendering, video editing, remote visualization**
High performance compute	H	Our fastest and most powerful CPU virtual machines with optional high-throughput network interfaces (RDMA)	Batch processing, analytics, **molecular modeling and fluid dynamics**

VM Disk Types

	Ultra SSD (preview)	Premium SSD	Standard SSD	Standard HDD
Disk Type	Solid State Drives (SSD)	Solid State Drives (SSD)	Solid State Drives (SSD)	Hard Disk Drives (HDD)
Scenario	IO-intensive workloads such as SAP HANA, top tier databases (e.g.: SQL, Oracle), and other transaction-heavy workloads.	Production and performance sensitive workloads	Web servers, lightly used enterprise applications and dev/test	Backup, non-critical, infrequent access
Disk Size	65,536 gibibyte (GiB) (Preview)	32,767 GiB	32,767 GiB	32,767 GiB
Max Throughput	2,000 MiB/s (Preview)	900 MiB/s	750 MiB/s	500 MiB/s
Max IOPS	160,000 (Preview)	20,000	6,000	2,000

Creating an Azure Virtual Machine

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Methods to Create an Azure VM

You have several methods for creating your Virtual Machine depending on the environment you are in:

Method	Description
Azure portal	Create a Windows VM using the portal
Templates	Create a Windows VM with a Resource Manager template
Azure PowerShell	Create a Windows VM using PowerShell
Client SDKs	Deploy Azure Resources using C#
REST APIs	Create or update a VM

Demo 1 – Creating an Azure Virtual Machine Using Portal

(Refer Demo doc 1)

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Demo 2 – Creating an Azure Virtual Machine Using PowerShell

(Refer Demo doc 2)

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Login to Azure – PowerShell

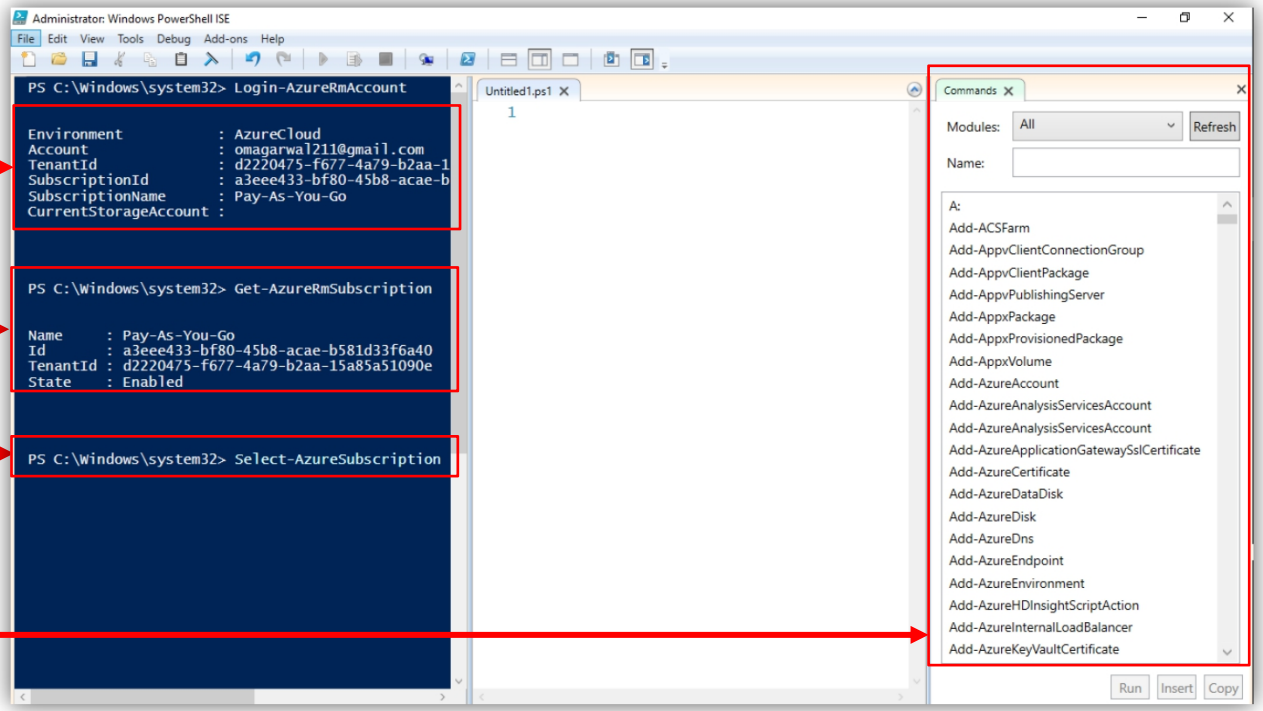
Enter the **Login-AzureRmAccount** cmdlet in the console to login to Azure:

Once you Run the command, a Microsoft window will appear, where you need to enter your registered E-mail and password

Run this command to check the Subscriptions under the above Account

Set the correct subscription in case of multiple subscriptions by providing the SubscriptionId parameter value

You can easily insert/run the desired commands directly from this menu



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Configure Azure VMs for Remote Access

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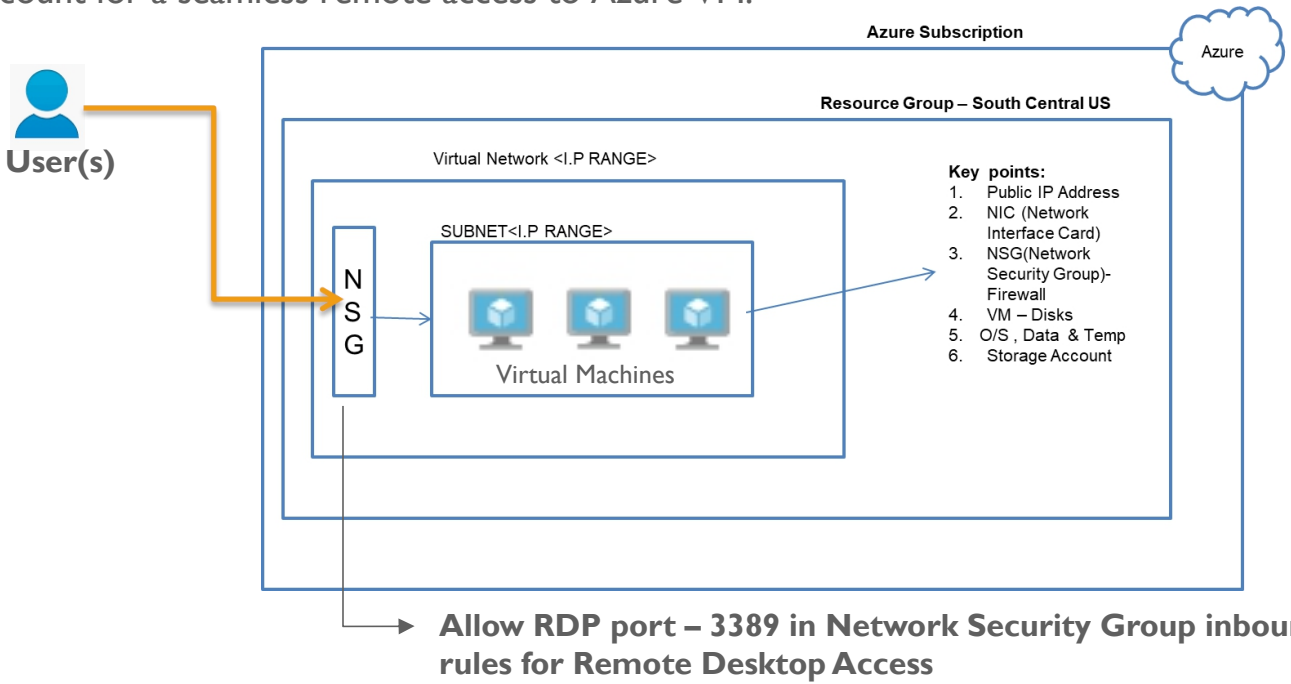
Allow Remote Access to Azure Virtual Machines

To allow access to Azure Virtual Machines, below are the steps to be configured:

- Create an Azure Resource Group in the selected region
- Create an Azure Virtual Machine in the Resource Group created above by filling in the following details in Azure Portal:
  - Select Operating System (Windows / Linux)
  - Select Right Compute Size – CPU , RAM , Disk , Temp Disk , IOPS
  - Select Disk type (SSD , HDD)
  - Enter VM Username and Password
  - Enter Virtual Network Name and IP Address Range
  - Define Subnet Range
  - Define Public IP Address
  - Create Network Security Group(NSG)
  - **Allow RDP port – 3389 in Inbound rules of NSG to allow remote access to this VM**

Allow Remote Access to Azure VM in NSG

To allow remote access to Azure Virtual Machine, below are the some of the key design considerations to be taken into account for a seamless remote access to Azure VM.



Demo 3 – Implementing Azure Virtual Machine for Remote Access

(Refer Demo doc 3)

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Creating a Linux Virtual Machine

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Linux Virtual Machines

Azure Linux Virtual Machines provides on-demand, high-scale, secure, virtualized infrastructure using Red Hat, Ubuntu, or the Linux distribution of your choice

Unlike Windows and Linux VM creation, for creating a Linux VM you need to specify a **SSH public key** for authentication instead of regular Username and Password

When you use an SSH client to connect to your Linux VM, the remote VM tests the client to make sure it has the private key, and then grants access to the VM

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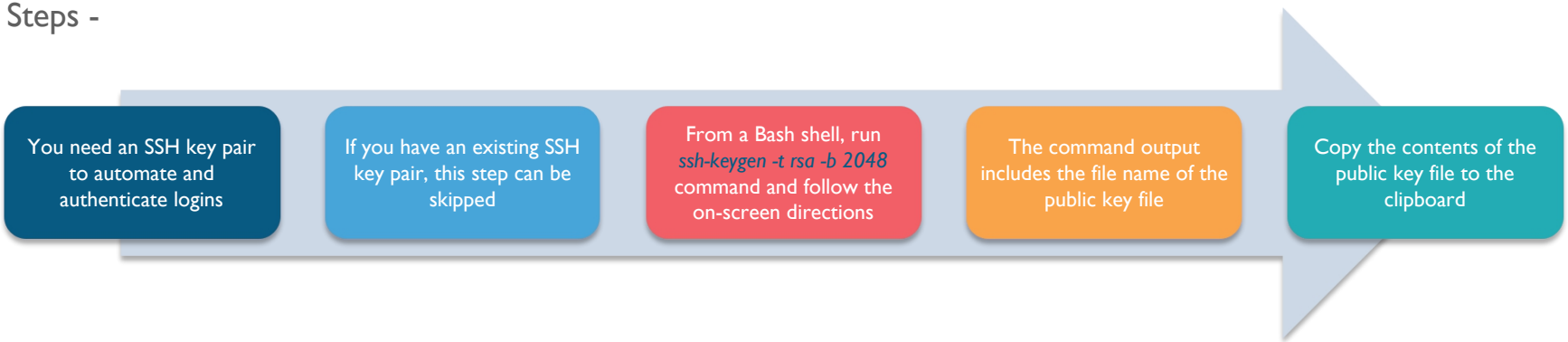
Create an SSH Key Pair

Steps -



- You can also use a SSH keygen, a tool for creating new authentication key pairs for SSH
- Such key pairs are used for automating logins, single sign-on, and authenticating hosts
- **PuTTYgen** is a SSH keygen tool you can use on Windows to generate key pairs, click on below links to get it:
  - For Windows: https://www.ssh.com/ssh/putty/windows/puttygen
  - For Linux: https://www.ssh.com/ssh/putty/linux/puttygen

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Demo 4 – Creating a Linux Virtual Machine on Azure Portal Using PuTTyGen

(Refer Demo doc 4)

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Provision an Azure VM Using Code

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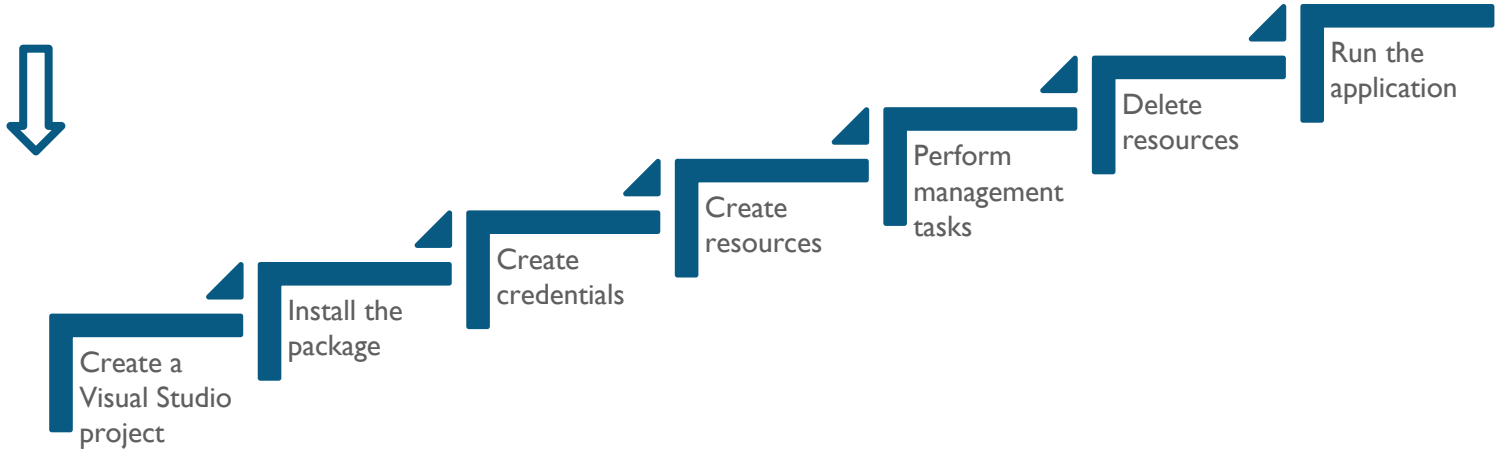
Create and Manage Windows VMs in Azure Using C#

- An Azure Virtual Machine (VM) needs several supporting Azure resources
- This demo covers creating, managing, and deleting VM resources using C#
- You learn how to:



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Demo 5 – Create and Manage Windows VMs in Azure Using C#

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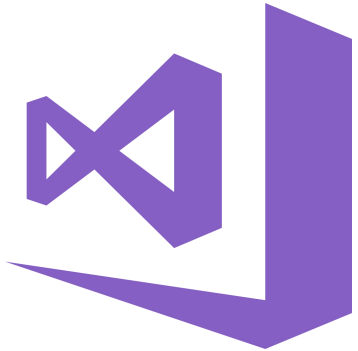
Pre-requisite – Visual Studio IDE

- **Pre-requisite**:
  - If you haven't already, install Visual Studio
  - Select .NET desktop development on the Workloads page, and then click Install
  - In the summary, you can see that .NET Framework 4 - 4.6 development tools is automatically selected for you
  - If you have already installed Visual Studio, you can add the .NET workload using the Visual Studio Launcher



Summary

What Is Microsoft Azure?

01 Microsoft Azure is a growing collection of integrated cloud services which developers and IT professionals use to build, deploy and manage applications through a global network of Microsoft's datacenters.

02 Azure's flexible computing power gives small and medium sized business on-demand enterprise-level computing power. Virtual machines can be deployed in minutes providing additional processing power and storage.

03 The cloud environment allows businesses to quickly deploy applications in the cloud, which saves on infrastructure costs while reducing the hardware and maintenance burdens on in-house IT management

Microsoft Azure

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Basic Compute Services In Azure

Compute Services

Virtual Machine: Deploy any workload, language and any operating system virtually

VM Scale set: Create thousands of identical virtual machines in minutes

Azure Container: Create a container hosting solution optimized for Azure

Container Registry: Store and manage container images across all types of Azure deployments

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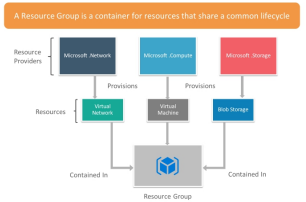
What Is Azure Resource Manager?

With the advent of Azure Resource Manager in 2014, the concept of a *Resource Group* was introduced.



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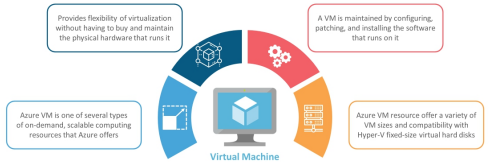
Overview Of Azure Virtual Machines



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Allow Remote Access to Azure Virtual Machines

To allow access to Azure Virtual Machines, below are the steps to be configured:

- Create an Azure Resource Group in the selected region
- Create an Azure Virtual Machine in the Resource Group created above by filling in the following details in Azure Portal:
  - Select Operating System (Windows / Linux)
  - Select Right Compute Size – CPU , RAM , Disk , Temp Disk , IOPS
  - Select Disk Type (SSD , HDD)
  - Enter VM Username and Password
  - Enter Virtual Network Name and IP Address Range
  - Define Subnet Range
  - Define Public IP Address
  - Create Network Security Group(NSG)
  - **Allow RDP port – 3389 in Inbound rules of NSG to allow remote access to this VM**

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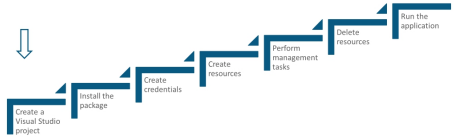

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Thank You

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