Microsoft Azure is the one of biggest cloud service provider worldwide created and operated by Microsoft for building, testing, deploying and managing applications services.

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Figure 1: Azure Core Architecture

Shown as Azure Architecture can be divided into 3 main components, Front Ends, Middle Ware, Services. In specific, front ends includes Azure portal, Azure PowerShell, Azure CLI, Rest clients, which are four different ways of accessing the Azure resources.

In specific, Azure portal is the GUI dashboard provided to users by Azure, through which we can deploy or provision resources. A screenshot of a social media post

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Azure PowerShell, make use of the Windows powershell to give command line access to Azure Resources.

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The Azure CLI is a command -line tool providing a great experience for managing Azure resources. The CLI is designed to make scripting easy, query data, support long-running operations and, more.

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REST clients are APIS which can be used in application’s code to initiate an action on Azure clod.

The Azure Resource Manager is the mediator between the resources and external agents which can interact with the azure resources, which is the Middle Ware. Azure Resource Manager plays a key deploying and managing the azure resources. It helps to organize the resources in one group, this group is called resource group, it also help to deploy, manage and monitor all the resources for the solution as a group, rather than handling these resources individually.

The Azure services includes but not limited in Compute, Networking, File Storage, Database, AI + Machine Learning, Identity and management. The Compute part of core Azure Services includes Azure Virtual Machines, Function App, App, Service, Azure Kubernetes Services.

* The **Azure Virtual Machines** are image service instance that provide on-demand and scalable computing resources with usage-based pricing.
* **Azure Functions** is a solution for easily running small pieces of code, or “functions,” in the cloud. You can write just code you need for the problem at hand, without worrying about the whole application or the infrastructure to run it.
* **Azure App service** is a fully managed “Platform as a Service” (PaaS) that integrates Microsoft Azure Websites, Mobile Services, and BizTalk Services into a single service.
* **Azure Kubernetes (AKS)** is a managed container orchestration service, based on the open source Kubernetes system, which is available on the Microsoft Azure public cloud.

Here is a hands-on example for creating a virtual machine

After logging on to the Azure portal and direct to the Virtual machine page, we could create a VM using the following instruction.

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After creating the VM, this is the overview of the virtual machine.

A screenshot of a computer screen

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Meanwhile, we could create the website using our virtual machine IP address using Putty. Using the html, we could build our website for the virtual machine on the Putty terminal.

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Another Azure Service is Networking, in which contains 5 core azure services, Virtual Networks, Load Balancers, Application Gateway, DNS Zones, and CDN Profiles. In specific:

* **Azure Virtual Network (VNet**) is a representation of your own network in the cloud. It’s a logical isolation of the Azure cloud dedicated to your subscription. Each VNet you create has its own CIDR block, and can be linked to other VNets and on-premises networks as long as the CIDR blocks do not overlap.
* The **Load Balancers** is a layer-4 (TCP, UDP) load balancer that provides high availability by distributing incoming traffic among healthy VMs.
* The **Application Gateway** is a wen traffic load balancer that enables you to manage traffic to your web applications. This type of routing is known as application layer (OSI layer 7) load balancing.
* **DNS Zone** is a data resource that contains the DNS records for a domain name. You can use Azure DNS to a DNS zone and manage the DNS records for a domain in Azure. Lastly,
* **Azure Content Delivery Network (CDN)** is a global CDN solution for delivering high-bandwidth content. With Azure CDN, you can cache static objects loaded from Azure blob storage, a web application, or any publicly accessible web server, by using the closest point of presence (POP) server.

The storage service includes blob storage, file storage, tables storage, queues storage, data lake storage, and data box storage.

* **Azure blob storage** is a service for storing large amount of unstructured object data, such as binary data. Common uses of blob storage include: Serving images of documents directly to a browser.
* **Storing files** for distributed access. Streaming video and audio. Azure files offers fully managed file shares in the cloud are accessible via the industry standard Server Message Block (SMB) protocol.
* **Azure file** shares can mount concurrently by cloud or on-premises deployments of Windows, Linux, and MacOS. Azure Table Storage stores large amount of structured data. The service is a NoSQL datastore which accept the authenticated calls from inside and outside the Azure cloud.
* **Azure tables** are ideal for storing structured, non-relational data. Azure Queue storage is a service for storing large amount of message that can be accessed from anywhere in the world via authenticated calls using HTTP or HTTPS. A single queues message can be up to 64 KB in size, and a queen can contain millions of messages, up to the total capacity limit of storage account.
* **Azure Data Lake Storage** is an enterprise-wide hyperscale repository for big data analytics workloads. Azure Data Lake enables you to capture data of any size, type, and ingestion speed on one single place for operational and exploratory analytics.
* The **Data Box** can move stored or in-flight to Azure quickly and cost-effectively: Data Box offline devices easily move data to Azure when busy networks are not an option. Data Box online appliances transfer data to and form Azure over the network.

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Azure also have a core service is Database + Analytics.

* **Azure SQL database** is an intelligent, scalable. Cloud database service that provides the broadest SQL Server engine compatibility and up to 212% return on investment .
* **Azure Cosmos DB** is a fully managed database service with turnkey global disturbution and transparent multi-master replication. Get single-digit millisecond read and write latencies at the 99th percentile, automatic and elastic scaling of throughput and storage.
* **Azure Data service** is a fully managed service for composing data storage, processing, and movement service into streamlined, scalable, and reliable data production pipelines.
* **Event hubs** is a fully managed, real-time data ingestion service that is simple, trusted and scalable. Stream millions of events per second from any source to build dynamic data pipelines and immediately respond to business challenges.
* **Azure Data lake analytics** is a distributed, cloud-based data processing architecture offered by Microsoft in the Azure cloud. It’s based on YARN, the same as the open-source Hadoop platform. It pairs with Azure Data Lake Store, a cloud-basedstorage platform designed for Big Data analytics.

AI + Machine Learning

* **Azure Cognitive Service** are APIs, SDKs, and services available to help developers build intelligent applications without having direct AI or data science skills or knowledge. Azure Cognitive Service enable developers to easily add cognitive features into their applications.
* **Azure Bot Services** is Microsoft’s artificial intelligence (AI) chatbot offered as a service on the Azure cloud service marketplace. Azure Bot Service offers the ability to add intelligent agents that ate capable of conversation without having to commit the resources to develop one’s own AI.
* **Microsoft Azure Machine** Learning Studio is a collaborative, drag-and-drop tool ca nuse to build, test, and deploy predictive analytics solutions on your data. Machine Learning Studio publishes models as web services that can easily be consumed by custom apps or BI tools such as Excel.

The last core Azure Service I will introduce is Management

* **Log data** collected by Azure Monitor is stored in a Log Analytics workspace, which is based on Azure Data Explorer. It collects telemetry from a variety of source and uses the Kusto query language used by Data Explorer to retrieve and analyze data.
* **Azure Cost Management** is a native Azure cost management solution. It help you to analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money.
* **Azure Automatio**n delivers a cloud-based automation and configuration service that provides consistent management across your Azure and non-Azure environments. It consists of process automation, update managements, and configuration features.
* **Metrics** are available for interactive analysis in the azure portal with Metrics Explorer. They can be added to an Azure dashboard for visualization in combination with other data and used for near-real time alerting. Read more about Azure Monitor. Metrics including their sources of data in Metrics in Azure Monitors.