Compute and Networking Services

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- SRE Level 3
- Azure Fundamentals Certified
- Tech Stack: CI/CD, IaC, Linux, K8s, Cloud and Automation.

Important Notes

Identify yourself in Zoom, using your name and last name

Mute your microphone along the course unless you have questions

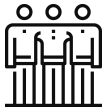
Raise the hand if you have questions during the session

Focus your questions on the presented topic

Turn off your camera in case of connection issues

Academy Code of Conduct

Be respectful, there are no bad questions or ideas.



Be welcoming and patient

Be careful in the words that you choose

Session Goal

At the end of this session, you will be able to:

- Understand the different Compute Services on Azure Cloud.
- Review the evolution of Compute Services, from VMs to Orchestrators and from Containers to Serverless Functions.
- Know the main networking components of a Network in Azure. Virtual Network, Azure Express Route.

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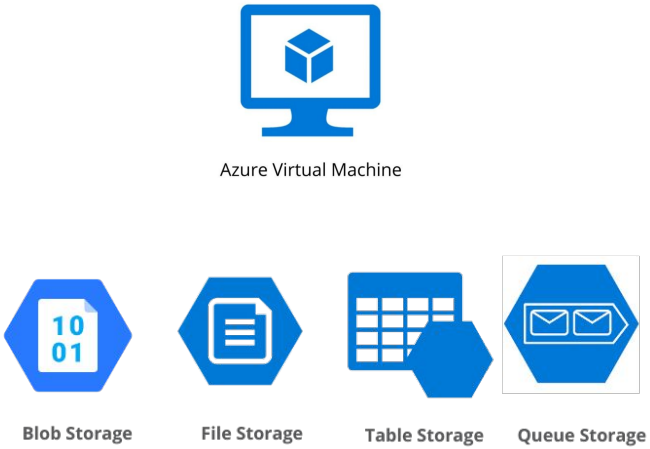
Introduction

Review what is IaaS and Overview of Azure Compute Services

Infrastructure as a service (IaaS)

1. You are responsible for managing the operating systems, data, and applications in most of the cases.
2. IaaS helps you to extend resources rapidly to meet the spikes required for your application.
3. Pay as you use!



Azure Compute Services

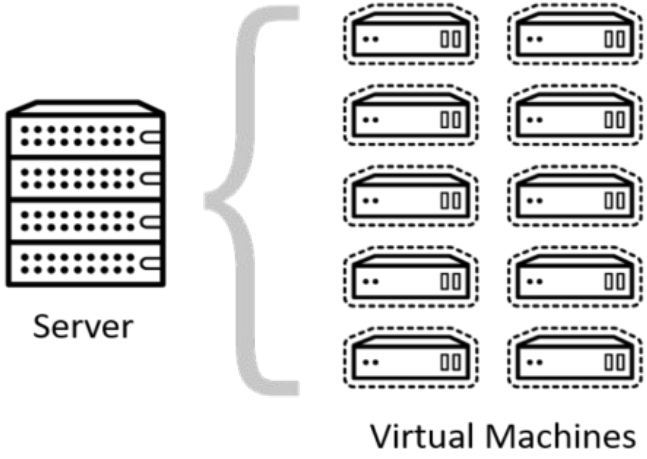
Provision Linux and Windows virtual machines in seconds with the configurations of your choice	Virtual Machines
Achieve high availability by autoscaling to create thousands of VMs in minutes	Virtual Machine Scale Sets
Get deep discounts when you provision unused compute capacity to run your workloads	Azure Spot Virtual Machines
Deploy and scale containers on managed Kubernetes	Azure Kubernetes Service (AKS)
Accelerate app development using an event-driven, serverless architecture	Azure Functions
Develop microservices and orchestrate containers on Windows and Linux	Azure Service Fabric

Azure Compute Services

Develop microservices and orchestrate containers on Windows and Linux	Azure Service Fabric
Quickly create cloud apps for web and mobile with fully managed platform	App Service
Containerize apps and easily run containers with a single command	Azure Container Instances
Cloud-scale job scheduling and compute management with the ability to scale to tens, hundreds, or thousands of virtual machines	Batch
Create highly available, scalable cloud applications and APIs that help you focus on apps instead of hardware	Cloud Services
Deploy your Azure virtual machines on a physical server only used by your organization	Azure Dedicated Host

Virtual Machines

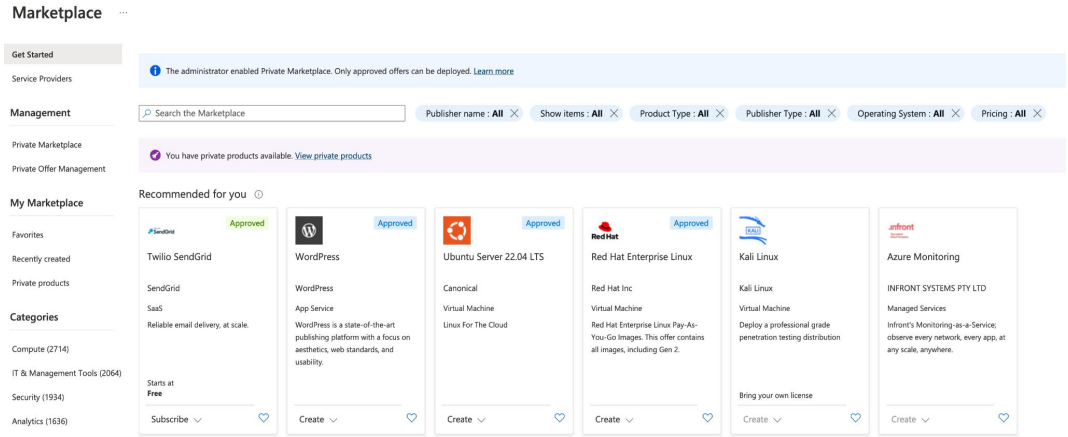
A **Virtual Machine** (VM) is a compute resource that uses software instead of a physical computer to run programs and deploy apps. One or more virtual “guest” machines run on a physical “host” machine.



VM Images

A Template or starting point with pre-configured software, a starting point:

- Azure Marketplace
- Upload your own Images.



VM Sizes

Depending on the requirements, you have a different type of VM Sizes defined. Think as you are provisioning a physical server with CPU, Storage and RAM required for your project.

What are you doing?	Consider these sizes
General use computing / web: Testing and development, small to medium databases, or low to medium traffic web servers	B, Dsv3, Dv3, DSv2, Dv2
Heavy computational tasks: Medium traffic web servers, network appliances, batch processes, and application servers	Fsv2, Fs, F
Large memory usage: Relational database servers, medium to large caches, and in-memory analytics.	Esv3, Ev3, M, GS, G, DSv2, Dv2
Data storage and processing: Big Data, SQL, and NoSQL databases, which need high disk throughput and IO	Ls
Heavy graphics rendering or video editing, as well as model training and inferencing (ND) with deep learning	NV, NC, NCv2, NCv3, ND
High-performance computing (HPC): If you need the fastest and most powerful CPU virtual machines with optional high-throughput network interfaces	H

VM Storage and Networking

As to the VM Size, in terms of storage capacity, you should consider this:

- Choose between HDD or SSD.
- SSD Premium for better performance and critical I/O standards.
- SSD Standard for a normal workload.

Networking:

- Virtual machines communicate with external resources using a virtual network (VNet). The VNet represents a private network in a single region on which your resources communicate.
- Use a NIC to allow your VM being attached to a VNet.
- You can attach a Public IP to this NIC and the IP will then be attached to any VM who has that NIC associated with.

VM Networking

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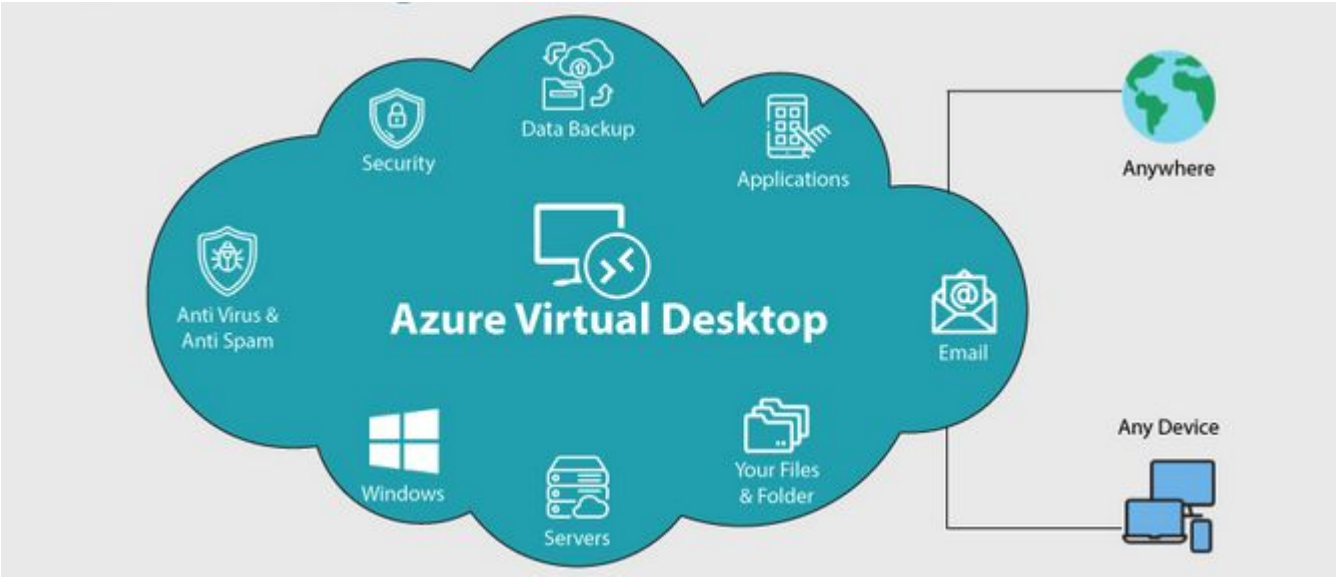
Azure Virtual Desktop

It’s a desktop and app virtualization service that runs on the cloud.

- Set up a multi-session Windows 11 or Windows 10 deployment that delivers a full Windows experience with scalability.
- Bring your existing Remote Desktop Services (RDS) and Windows Server desktops and apps to any computer
- Virtualize both desktops and apps

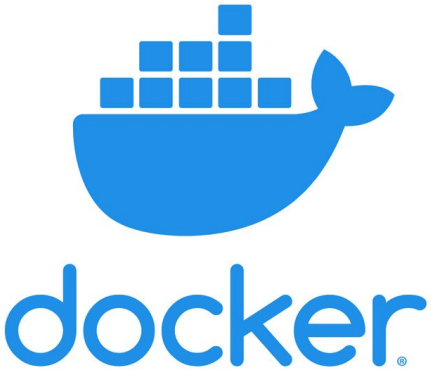
Azure Virtual Desktop



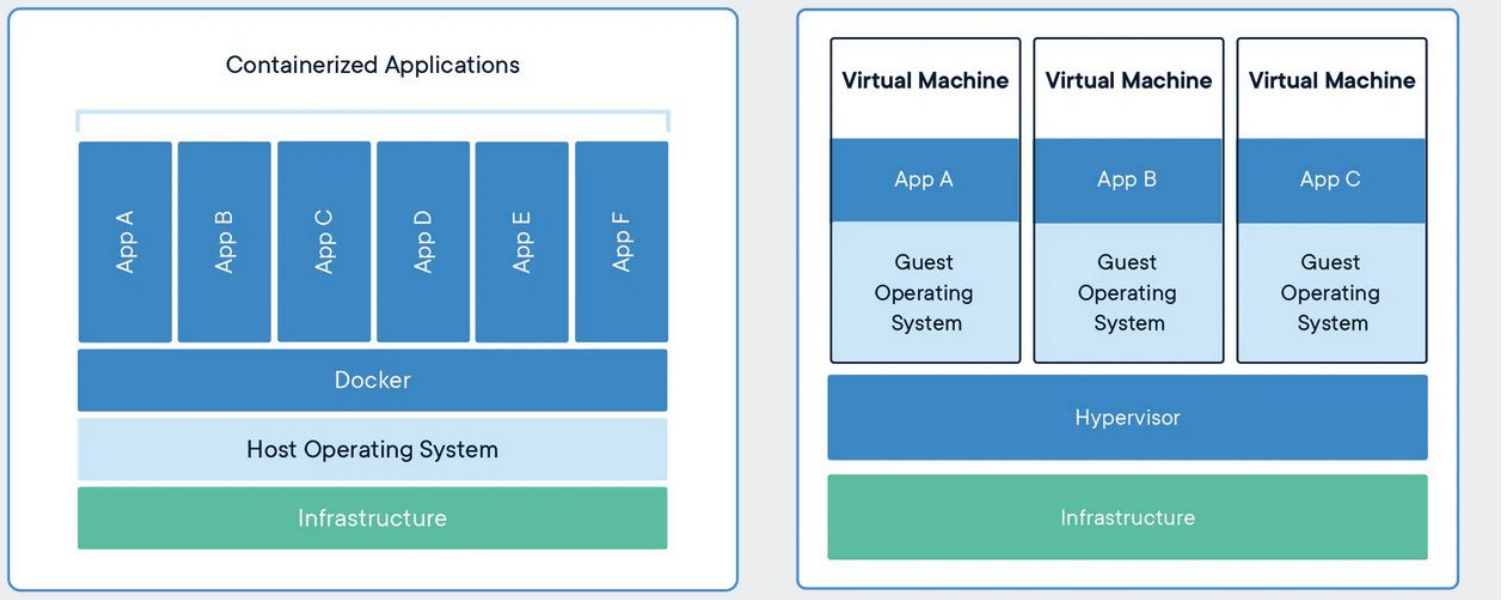
Containers

Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space.

Containers take up less space than VMs (container images are typically tens of MBs in size), can handle more applications and require fewer VMs and Operating systems.

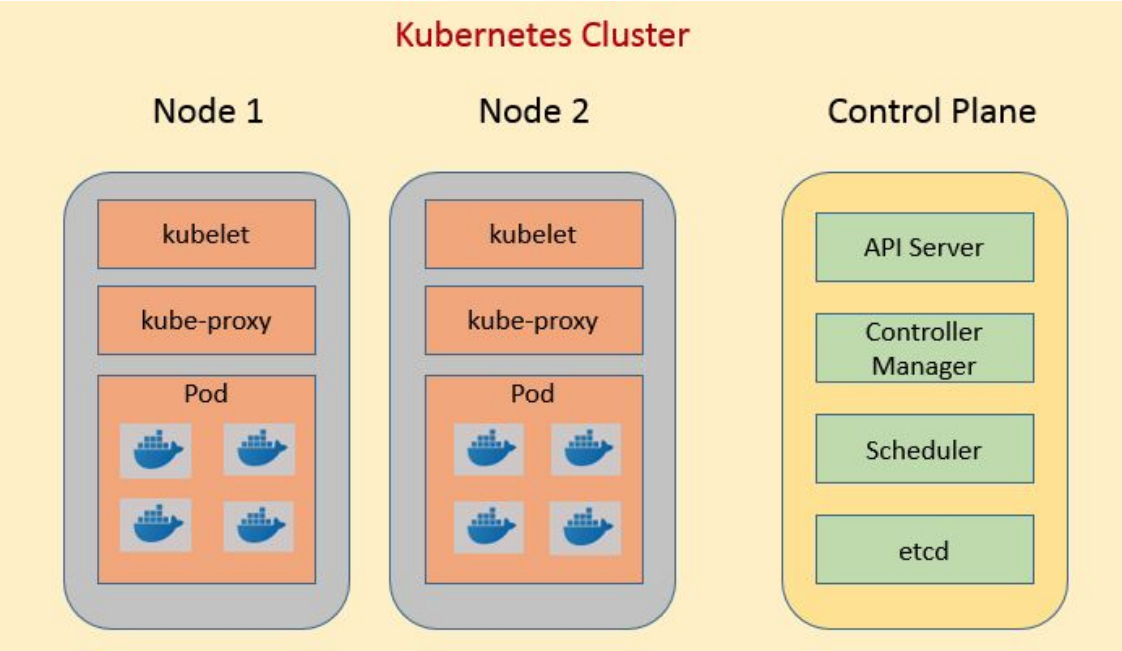


Containers vs. Virtual Machines



AKS - Azure Kubernetes Services

Azure Kubernetes Service (AKS) simplifies deploying a managed Kubernetes cluster in Azure by offloading the operational overhead to Azure.



AKS - Azure Kubernetes Services

- AKS Clusters can be deployed using Azure Web Portal, CLI, ARM Templates and other IaC Frameworks (Terraform, Pulumi).
- Able to manage storage of applications easily.
- Ability to monitor and log debugging.
- Authentication against Active Directory.

Azure Functions

Azure Functions is a serverless solution that allows you to write less code, maintain less infrastructure, and save on costs. Instead of worrying about deploying and maintaining servers, the cloud infrastructure provides all the up-to-date resources needed to keep your applications running.

You can deploy code of different languages: C#, Java, JavaScript, PowerShell, Python.

Azure Functions use cases

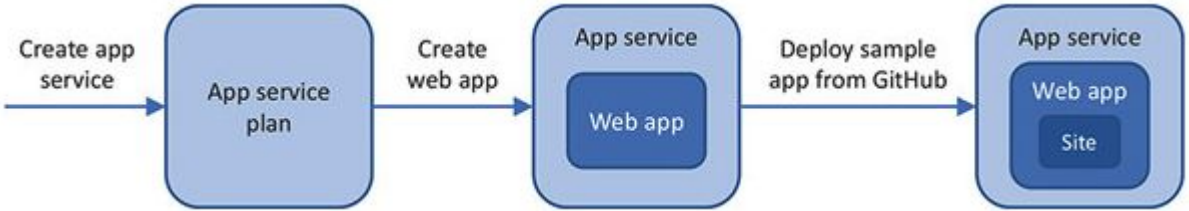
- Build a web API
- Process file uploads
- Build a serverless workflow
- Respond to database changes
- Run scheduled tasks
- Create reliable message queue systems
- Analyze IoT data streams
- Process data in real time

Azure Web Apps

Azure App Service enables you to build and host web applications in the programming language of your choice without managing infrastructure.

Unlike Azure Functions, with Web Apps you define a Service Plan, which establishes the amount of resources up-front the workload coming to you.

They have an approach on serving static content and easy changes.



Azure Container Registry

Build, store, secure, scan, replicate, and manage container images and artifacts with a fully managed, geo-replicated instance of OCI distribution.

Benefits:

- **Geo-replication** to efficiently manage a single registry across multiple regions
- **OCI artifact repository** for adding Helm charts, Singularity support, and new OCI artifact-supported formats.
- **Automated container building and patching,** including base image updates and task scheduling.
- **Integrated security** with Azure Active Directory (Azure AD) authentication, role-based access control, Docker Content Trust, and virtual network integration.

Virtual Networks - VNets

Azure virtual network enables Azure resources to securely communicate with each other, the internet, and on-premises networks.

Key scenarios that you can accomplish with a virtual network include:

- Communication of Azure resources with the internet.
- Communication between Azure resources.
- Communication with on-premises resources.
- Filtering network traffic.
- Routing network traffic.
- Integration with Azure services.

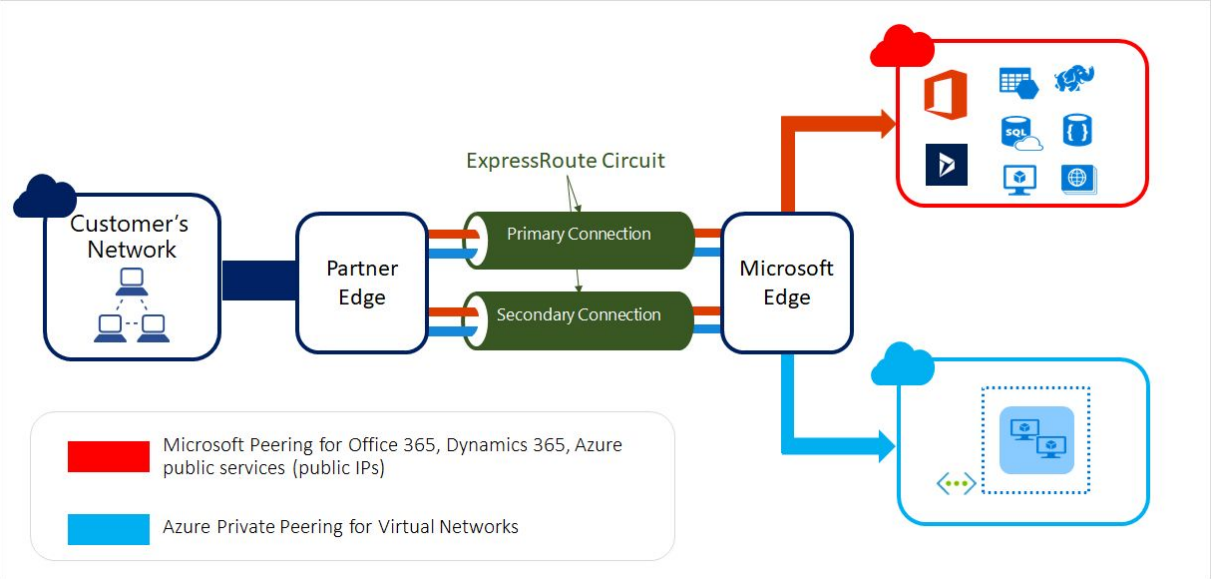
VNets Important Considerations

Azure virtual network enables Azure resources to securely communicate with each other, the internet, and on-premises networks.

- VNets are free of charge. Create up-to 50 of them on every Azure account.
- You can create a peer link between VNets in different regions with a Private Link Peering.
- By default, all resources in a VNet will go outbound to internet.
- Public IP addresses and Load Balancers are the best option to route traffic from outside to internal resources.

Azure Express Route

ExpressRoute lets you extend your on-premises networks into the Microsoft cloud over a private connection with the help of a connectivity provider. With ExpressRoute, you can establish connections to Microsoft cloud services, such as Microsoft Azure and Microsoft 365.



Azure Express Route - Important Considerations

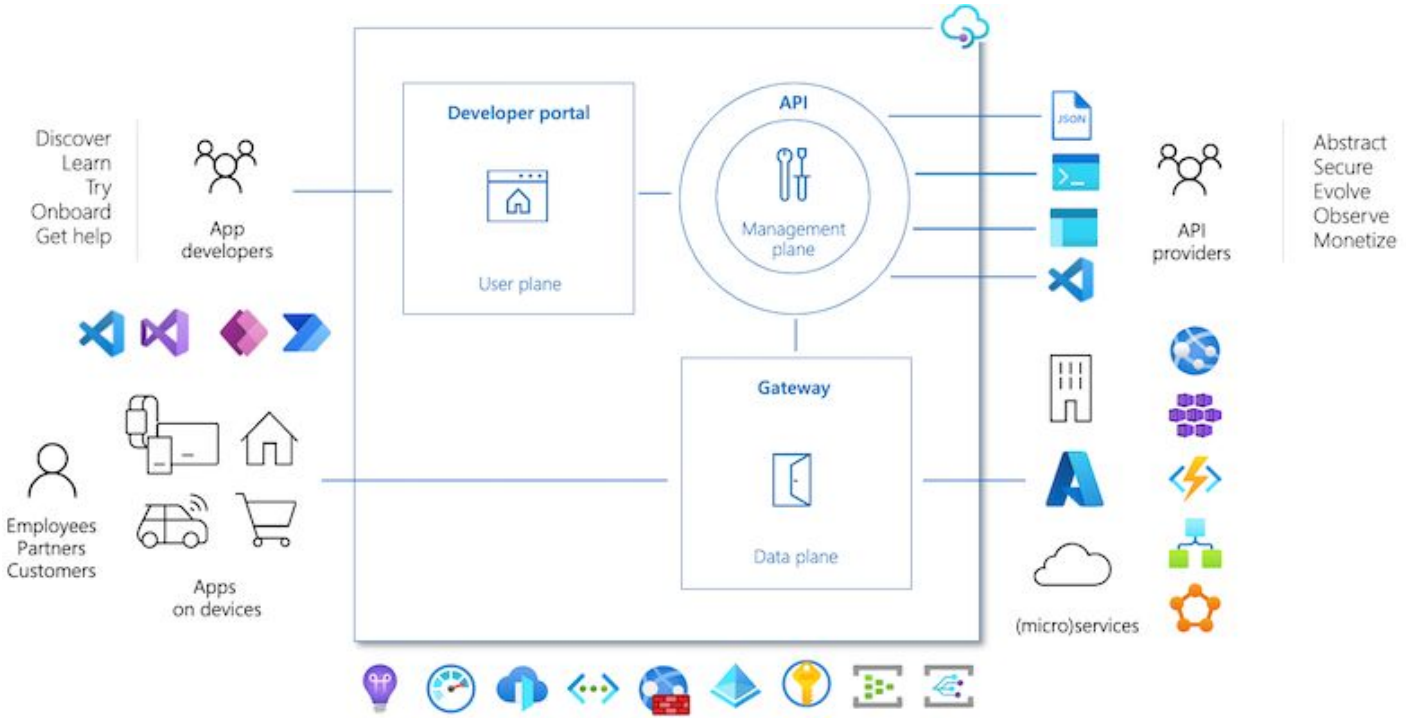
- ExpressRoute doesn’t use Public Internet connections. No VPN indeed is needed.
- A Point-to-Point Ethernet channel can be established.
- Can give you access to Azure regions across all the world.
- It’s BGP based, your provider must have an edge that communicates with Azure Edge.
- ExpressRoute has implicit redundancy, which allows you to meet any required SLA.
- ExpressRoute has a bunch of bandwidth options depending on the requirements for the customer.
- Billing can be dynamic: Unlimited Data, Metered Data or ExpressRoute Premium.

Azure API Management

Azure API Management is a hybrid, multicloud management platform for APIs across all environments. As a platform-as-a-service, API Management supports the complete API lifecycle.

- APIs simplify the integration and experience of different Cloud Services.
- Azure API Management is made up of an API *gateway*, a *management plane*, and a *developer portal*. These components are Azure-hosted and fully managed by default.
- API Management is available in various tiers differing in capacity and features.

Azure API Management



Q&A

Please answer the survey form of this session:

Thank you