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Cloud Technologies – All about Cloud Technologies (wordpress.com)

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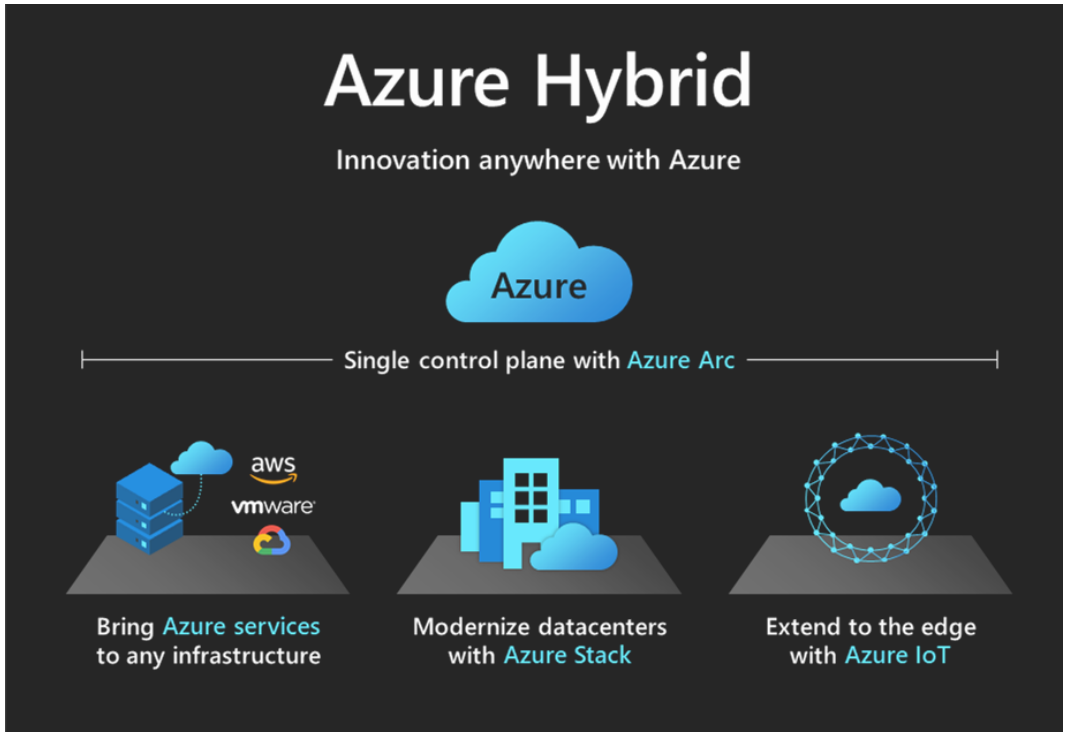
HEAD OF IT INFRASTRUCTURE & AUTOMATION

22 Plus years of broad technical experience in the areas of Infrastructure, Cloud & Security architect, solution design, pre-sales & implementation in the technology platform such as Microsoft Windows, Linux, VMware, Storage and Networking Technologies. Strong technical expertise in migration of infrastructure workloads to public, private & Hybrid cloud, Infra & Application Automation, Business process Automation.

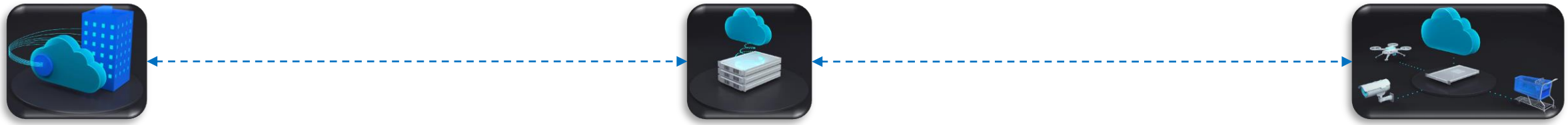
Session Details

Hybrid Cloud with Microsoft Azure Stack



Agenda

- What is Stack Hub?
- Why Use Azure Stack Hub?
- Compare Azure Stack Hub, Azure Stack HCI, and Azure Stack Edge
- Integrate hybrid cloud consistency
- Azure Stack Hub Systems
- Running Azure in your datacenter
- Capacity planning considerations
- Choose an identity provider
- Connection models
- Licensing model
- Naming decisions
- Connect Azure Stack Hub to Azure
- Using ExpressRoute
- External Monitoring
- Backup and disaster recovery



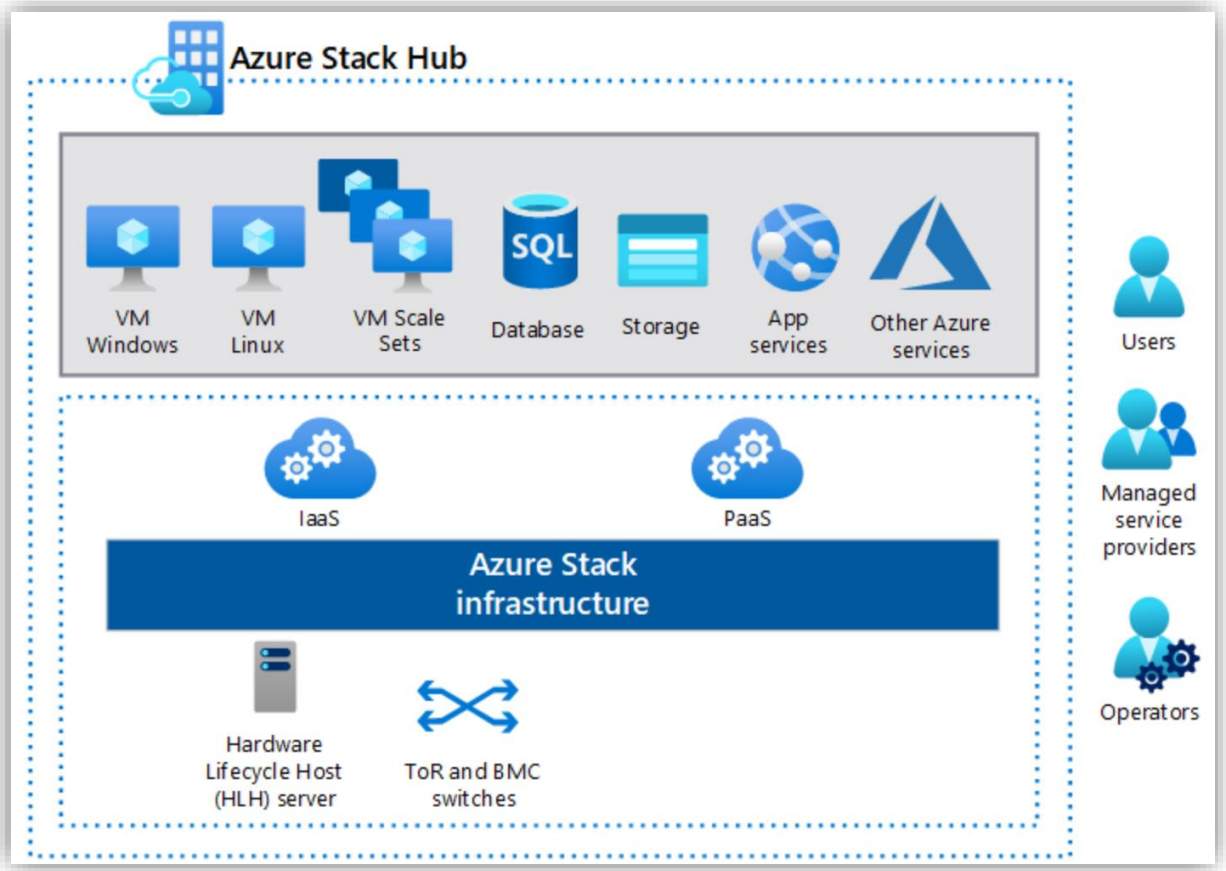
What is Stack Hub?

Azure Stack Hub is an extension of Azure that provides a way to run apps in an on-premises environment and deliver Azure services in your datacenter

- Azure for on-premises environments
- Subset of IaaS and PaaS services available in the Azure public cloud in your datacenter
- Integrated system of a pre-built rack (4 to 16 physical servers)
- Equivalent tools to design, develop, deploy, and manage services
- Support multitenancy - the host (provider) offers resources to multiple groups of users

Azure Stack Hub is not:

- A replacement for virtualization technology
- A customizable infrastructure
- A solution that eliminates the responsibility for the underlying infrastructure

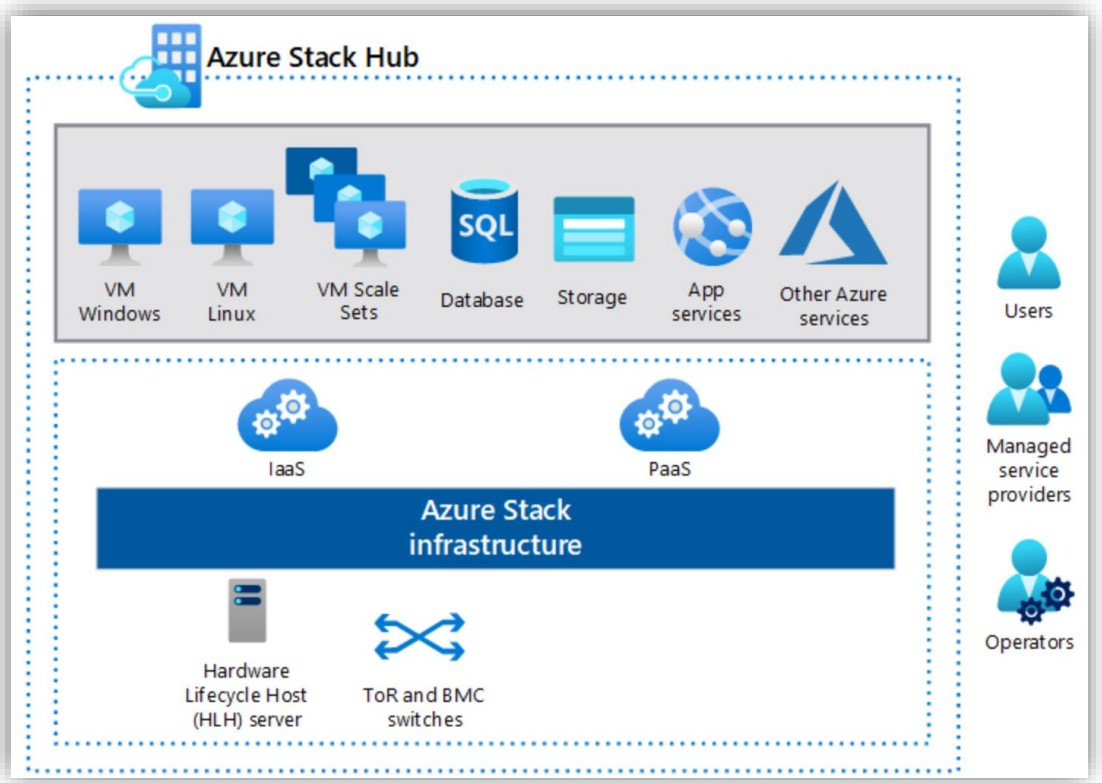


Why Use Azure Stack Hub?

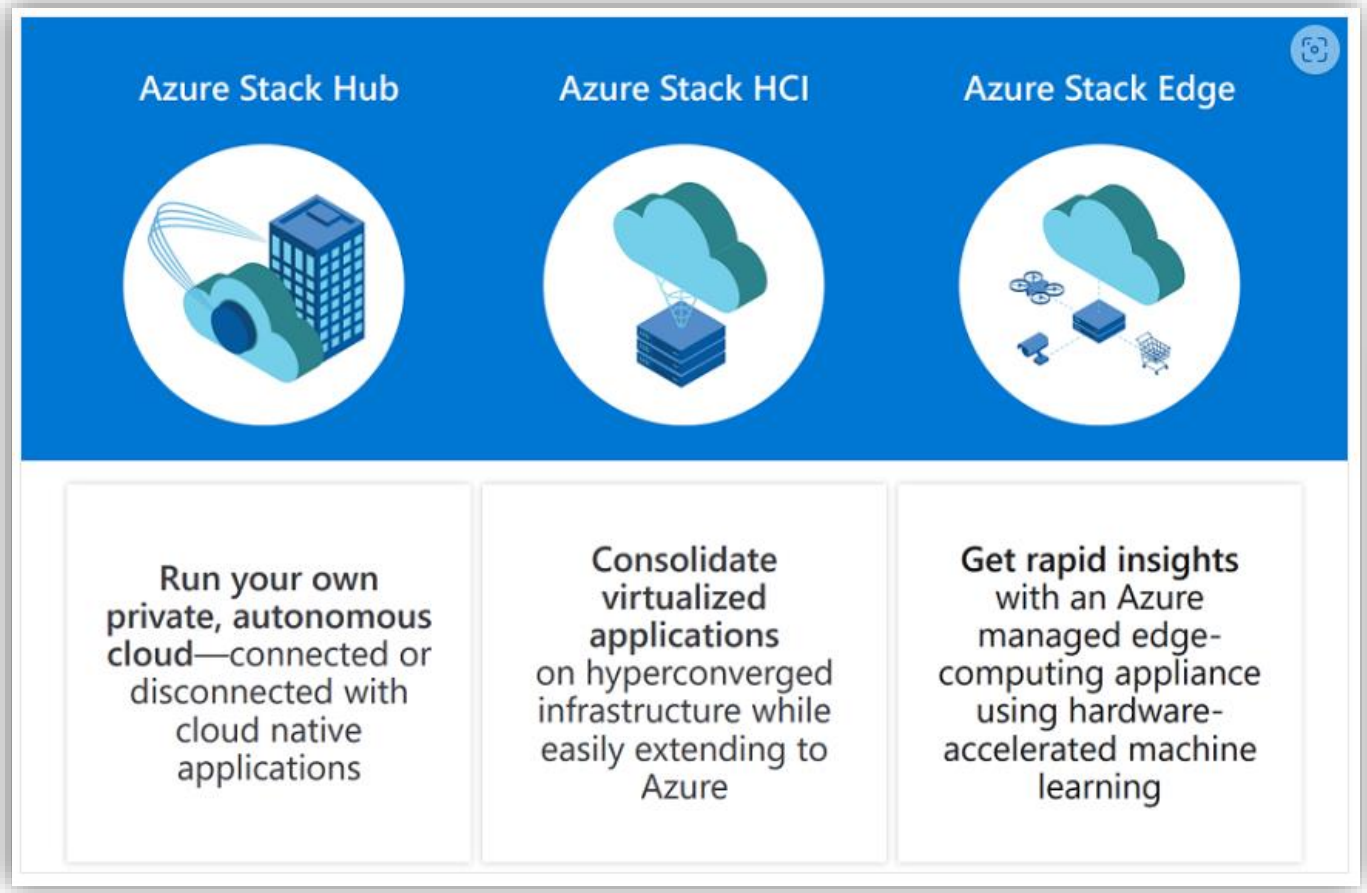
Azure provides a rich platform for developers to build modern apps. However, some cloud-based apps face obstacles like latency, intermittent connectivity, and regulations. Azure and Azure Stack Hub unlock new hybrid cloud use cases for both customer-facing and internal line-of-business apps

- Edge and disconnected solutions
- Cloud apps that meet varied regulations
- Cloud app model on-premises

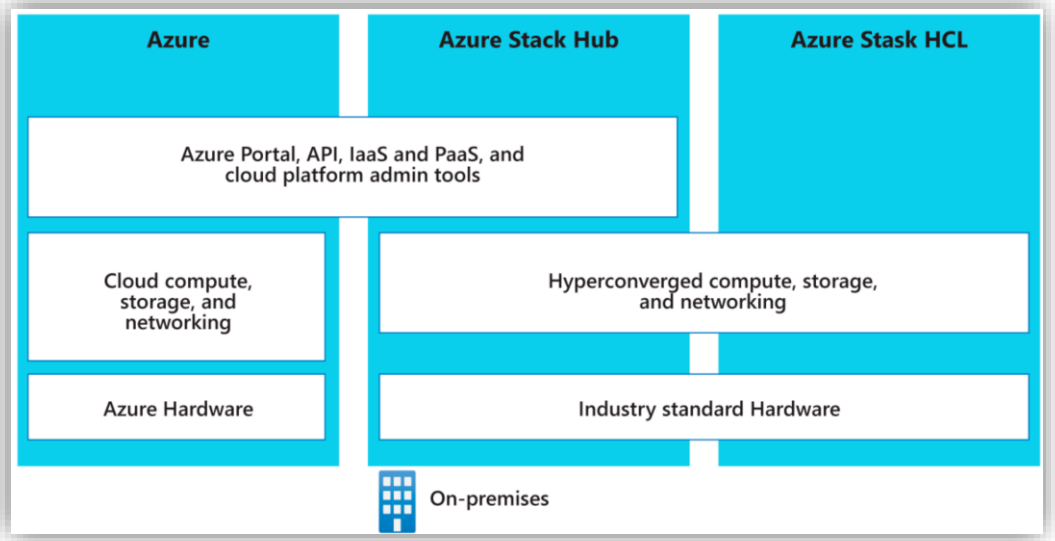
Azure Stack Hub allows you to deploy a subset of IaaS and PaaS services available in the Azure public cloud into your own datacenter or in a datacenter managed by a service provider. These services include virtual machines, App Service web apps, API apps, and functions, SQL and MySQL databases, containers, Event Hubs, IoT Hubs, Service Fabric clusters, and Kubernetes clusters.



Compare Azure Stack Hub, Azure Stack HCI, and Azure Stack Edge



Use the same application model, self-service portals, and APIs with Azure Resource Manager to deliver cloud-based capabilities whether your business uses global Azure or on-premises resources.



Compare Azure Stack Hub, Azure Stack HCI, and Azure Stack Edge

Azure Stack Hub

Cloud-native integrated system

Connectivity Required: **No** | Nodes: **4-16** | Hardware: **OEM**

Build cloud-native modern apps

Run Azure-consistent IaaS and PaaS services

Comply with data sovereignty laws & regulations

Run connected or disconnected from the public cloud

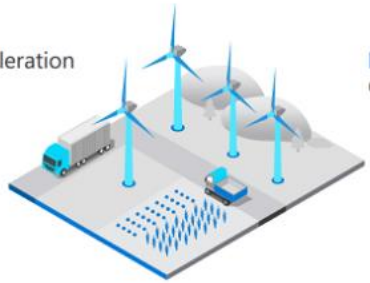
Azure Stack Edge

Cloud-managed appliance

Connectivity Required: **Yes** | Nodes: **1** | Hardware: **Microsoft**

Leverage built-in GPU/FPGA acceleration hardware for ML/AI inferencing

Transfer data from the edge to the cloud



Extend compute, AI, and storage to edge environments

Pay monthly for an Azure-managed appliance

Azure Stack HCI

Hyperconverged infrastructure solution

Connectivity Required: **Yes** | Nodes: **2-16** | Hardware: **OEM**

Consolidate datacenter servers and storage

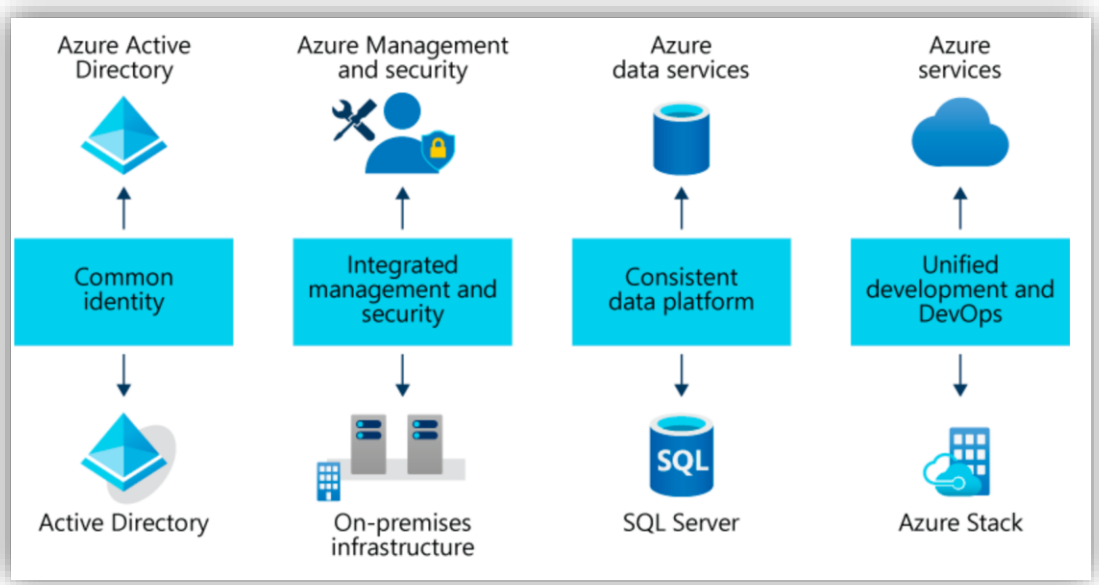
Deploy and manage high-performance, scalable SQL Server

Connect to Azure for virtually bottomless storage

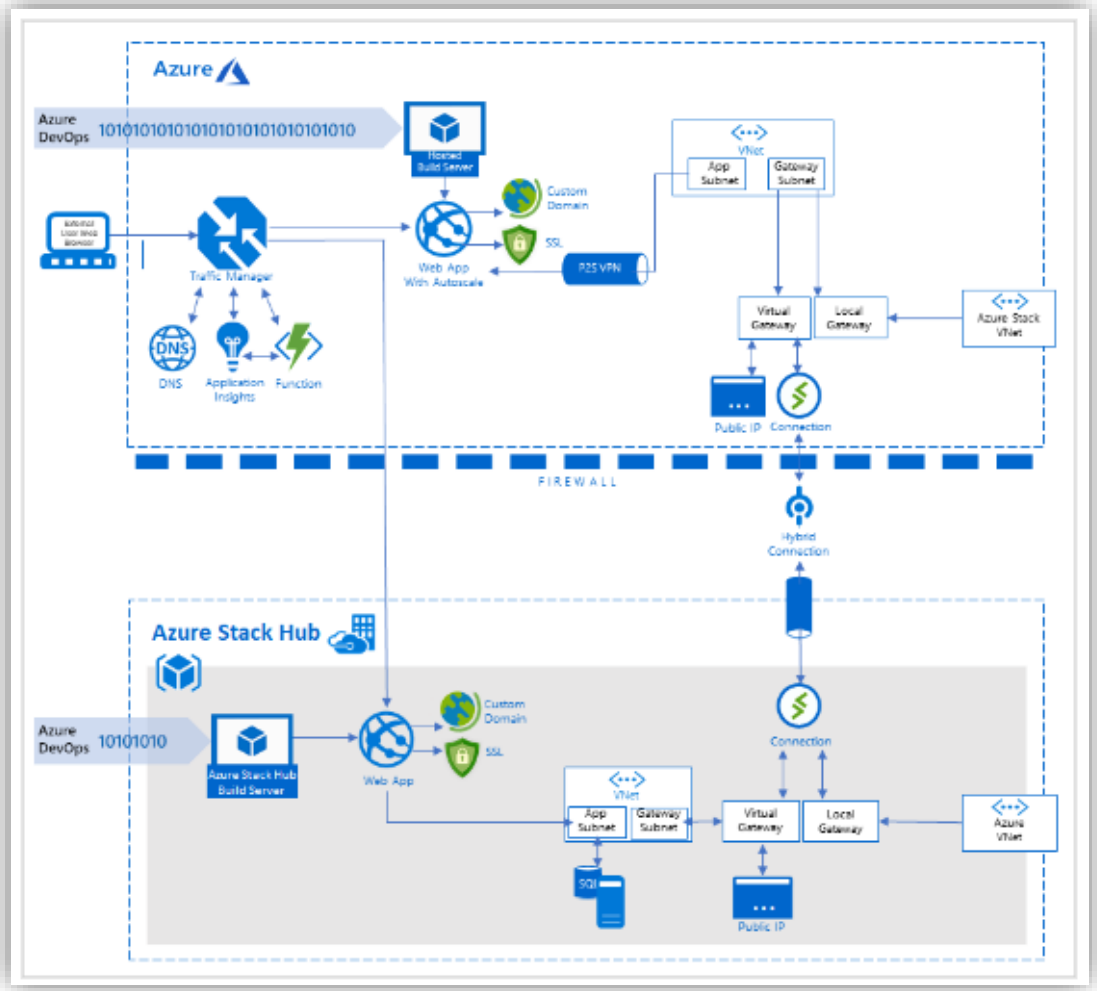
Provide compute and storage at remote branch offices

Integrate hybrid cloud consistency

- **Common identity for on-premises and cloud applications:** This component improves user productivity by giving users single sign-on (SSO) to all their applications. It also ensures consistency as applications and users cross network or cloud boundaries.
- **Integrated management and security across your hybrid cloud:** This component provides you with a cohesive way to monitor, manage, and secure the environment, which enables increased visibility and control.
- **A consistent data platform for the datacenter and the cloud:** This component creates data portability, combined with seamless access to on-premises and cloud data services for deep insight into all data sources.
- **Unified development and DevOps across the cloud and on-premises datacenters:** This component allows you to move applications between the two environments as needed. Developer productivity improves because both locations now have the same development environment.



Integrate hybrid cloud consistency



- Azure Active Directory (Azure AD) works with on-premises Active Directory to provide common identity for all users.
- Azure provides integrated management and security services for both cloud and on-premises infrastructure.
- Azure hybrid cloud provides common tools that ensure secure access to all data, seamlessly and efficiently.
- Azure Cloud Services, combined with Azure Stack on-premises, provide unified development and DevOps.

Azure Stack Hub Systems

With Azure Stack Hub, you can deploy and operate both IaaS and PaaS by using the same tools and offering the same experience as the Azure public cloud. Management of Azure Stack, whether through the web UI portal or through PowerShell, has a consistent look and feel for IT administrators and end users with Azure.

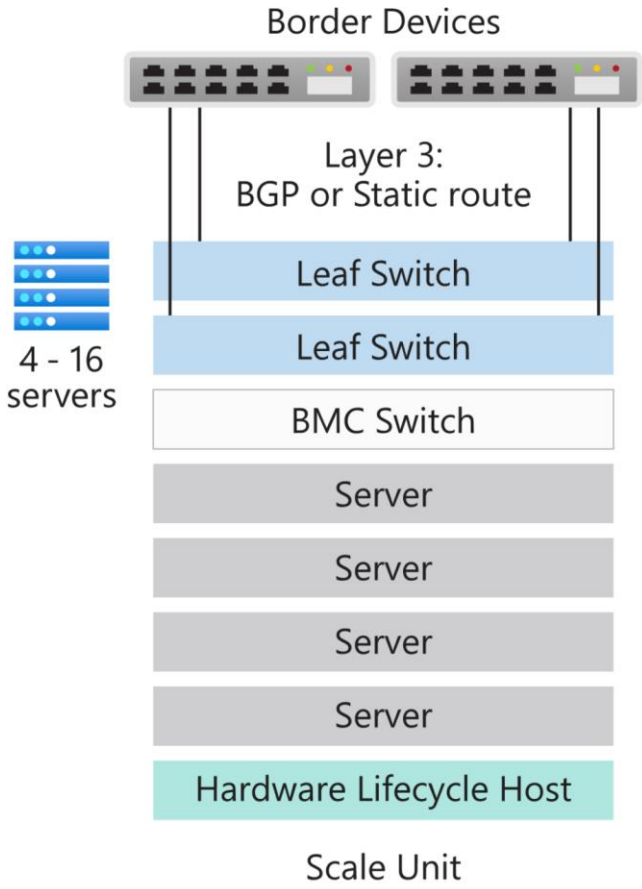
Azure Stack Hub is offered via two deployment options:

Azure Stack integrated systems:

- Offered through Microsoft and hardware partners
- Jointly supported by the hardware partner and Microsoft

Azure Stack Development Kit (ASDK):

- Single-node deployment of Azure Stack
- Used to evaluate Azure Stack
- A developer environment - develop using APIs and tools found in Azure
- ASDK is not intended for use as a production environment

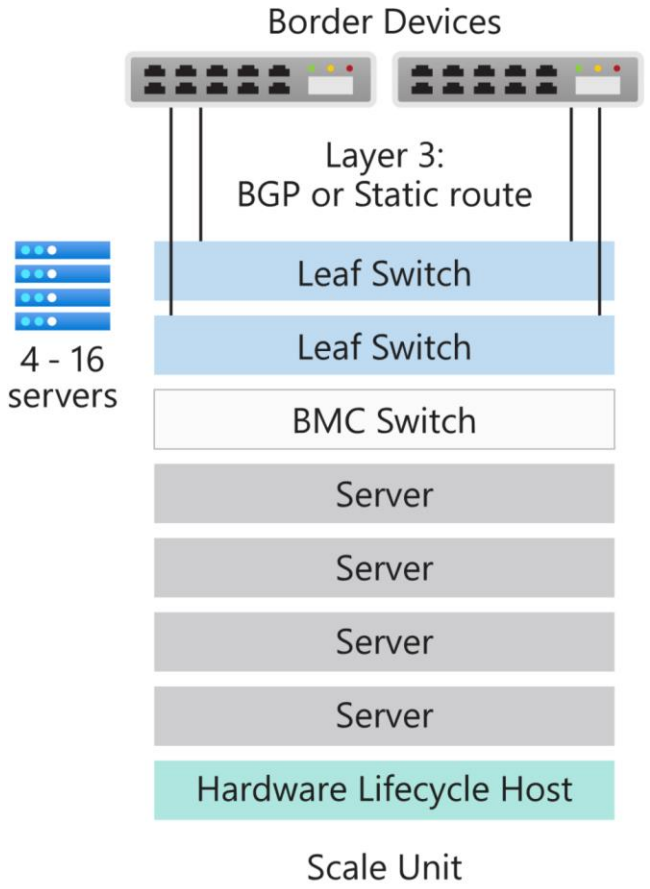


Azure Stack Hub Systems

Integrated systems

Azure Stack Hub integrated systems are offered through a partnership of Microsoft and hardware partners, creating a solution that offers cloud-paced innovation and computing management simplicity. Because Azure Stack Hub is offered as an integrated hardware and software system, you have the flexibility and control you need, along with the ability to innovate from the cloud.

An Azure Stack Hub integrated system can range in size from 4-16 servers, called a scale unit. Integrated systems are jointly supported by the hardware partner and Microsoft. The following diagram shows an example of a scale unit.

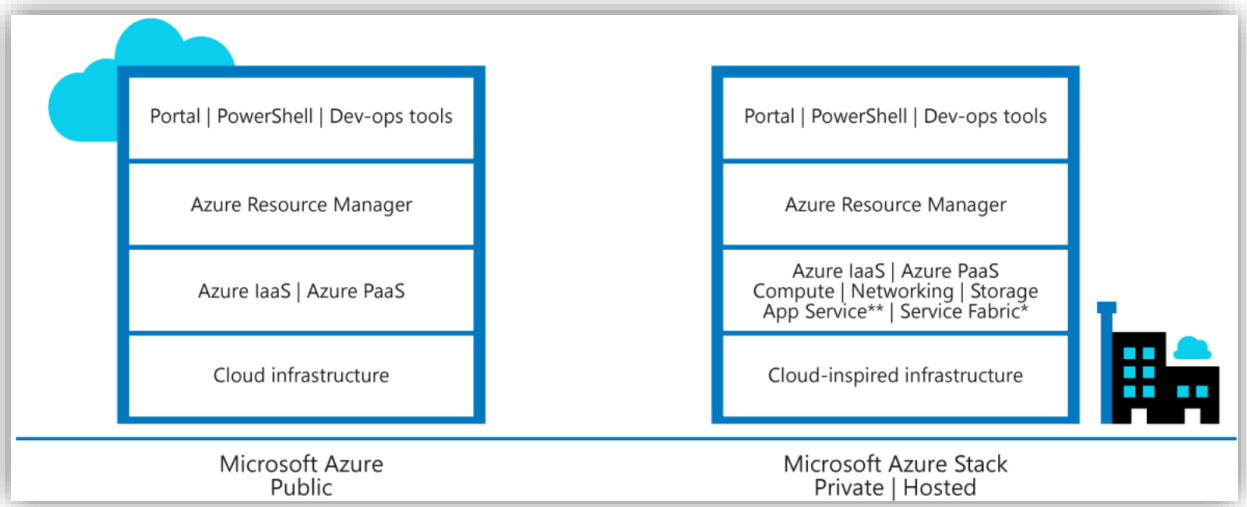


Running Azure in your datacenter

Moving workloads to an Azure Stack Hub deployment IaaS environment provides smoother operations, self-service deployments, standardized hardware configurations, and Azure consistency

Key differences between Azure and Azure Stack Hub:

- Azure offers near limitless capacity. Azure Stack Hub is built on physical hardware in your datacenter, which leads to capacity limitations.
- API versions and authentication mechanisms might be different between Azure and Azure Stack Hub.
- Azure Stack Hub differs in who operates the cloud, which affects the level of workload operations.



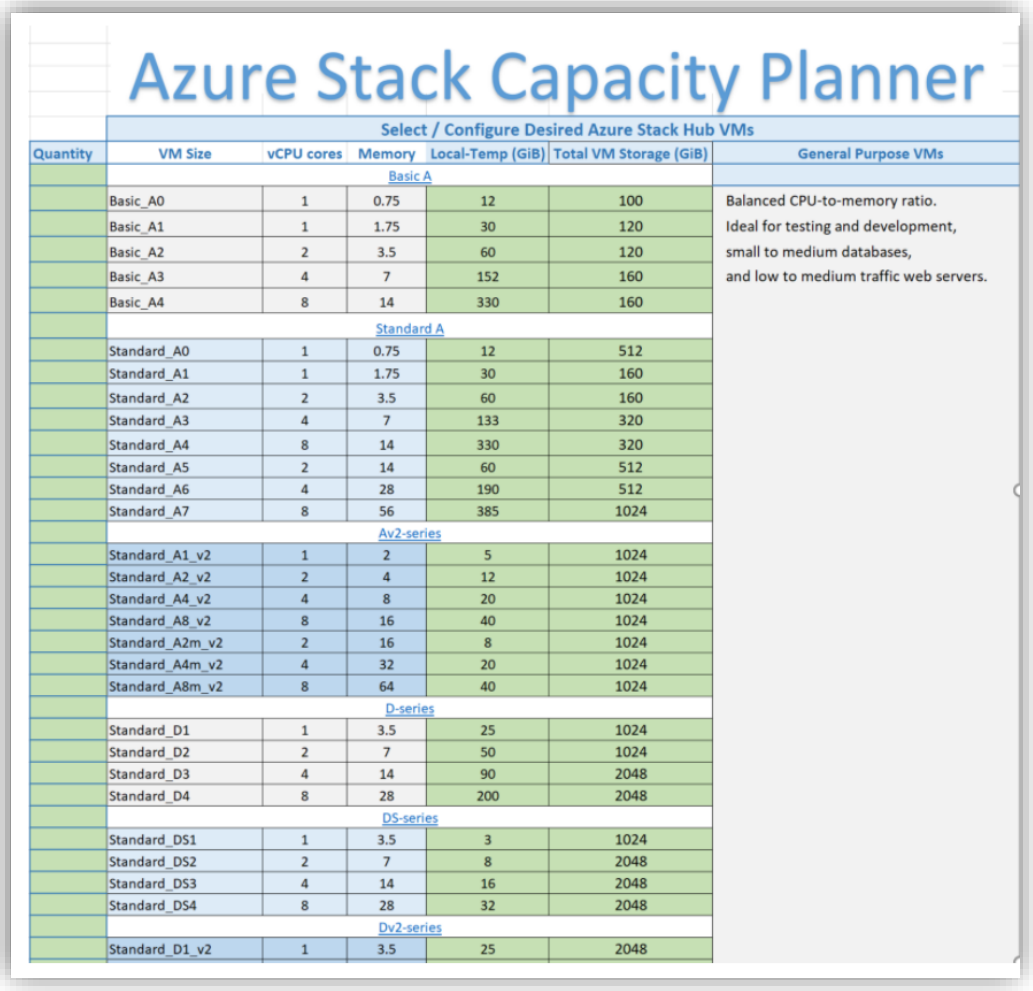
Capacity planning considerations

Running Azure in your datacenter

The Azure Stack Hub capacity planner helps with planning capacity:

- By selecting a hardware offering with the right combination of resources.
- By defining the workloads that Azure Stack Hub is meant to support and viewing the hardware SKUs that fit.

The capacity planner spreadsheet isn't intended to serve as a substitute for your own investigation and analysis.



Azure Stack Capacity Planner

Select / Configure Desired Azure Stack Hub VMs

Quantity	VM Size	vCPU cores	Memory	Local-Temp (GiB)	Total VM Storage (GiB)	General Purpose VMs
	Basic A					
	Basic_A0	1	0.75	12	100	Balanced CPU-to-memory ratio.
	Basic_A1	1	1.75	30	120	Ideal for testing and development,
	Basic_A2	2	3.5	60	120	small to medium databases,
	Basic_A3	4	7	152	160	and low to medium traffic web servers.
	Basic_A4	8	14	330	160	
	Standard A					
	Standard_A0	1	0.75	12	512	
	Standard_A1	1	1.75	30	160	
	Standard_A2	2	3.5	60	160	
	Standard_A3	4	7	133	320	
	Standard_A4	8	14	330	320	
	Standard_A5	2	14	60	512	
	Standard_A6	4	28	190	512	
	Standard_A7	8	56	385	1024	
	Av2-series					
	Standard_A1_v2	1	2	5	1024	
	Standard_A2_v2	2	4	12	1024	
	Standard_A4_v2	4	8	20	1024	
	Standard_A8_v2	8	16	40	1024	
	Standard_A2m_v2	2	16	8	1024	
	Standard_A4m_v2	4	32	20	1024	
	Standard_A8m_v2	8	64	40	1024	
	D-series					
	Standard_D1	1	3.5	25	1024	
	Standard_D2	2	7	50	1024	
	Standard_D3	4	14	90	2048	
	Standard_D4	8	28	200	2048	
	DS-series					
	Standard_DS1	1	3.5	3	1024	
	Standard_DS2	2	7	8	2048	
	Standard_DS3	4	14	16	2048	
	Standard_DS4	8	28	32	2048	
	Dv2-series					
	Standard_D1_v2	1	3.5	25	2048	

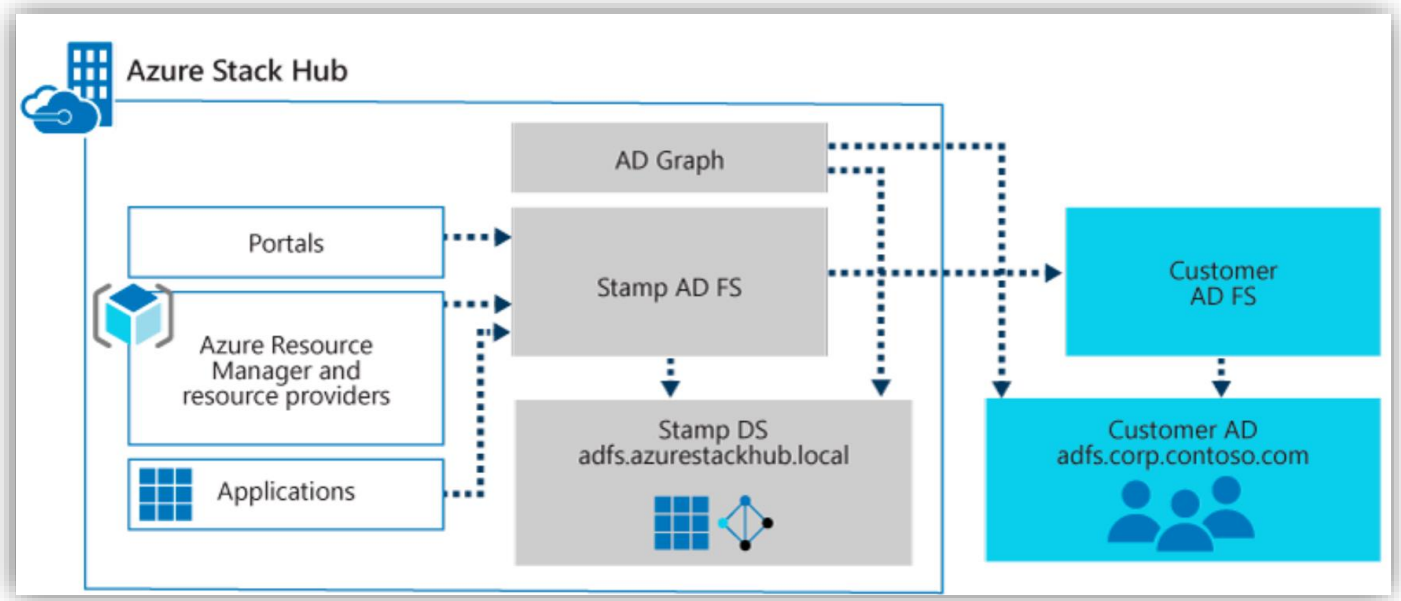
Choose an identity provider

Choosing an identity provider

- Choose identity provider for Azure Stack Hub deployment: Azure AD or AD FS
- Cannot switch identity providers after deployment without full system redeployment

AD FS and Graph integration

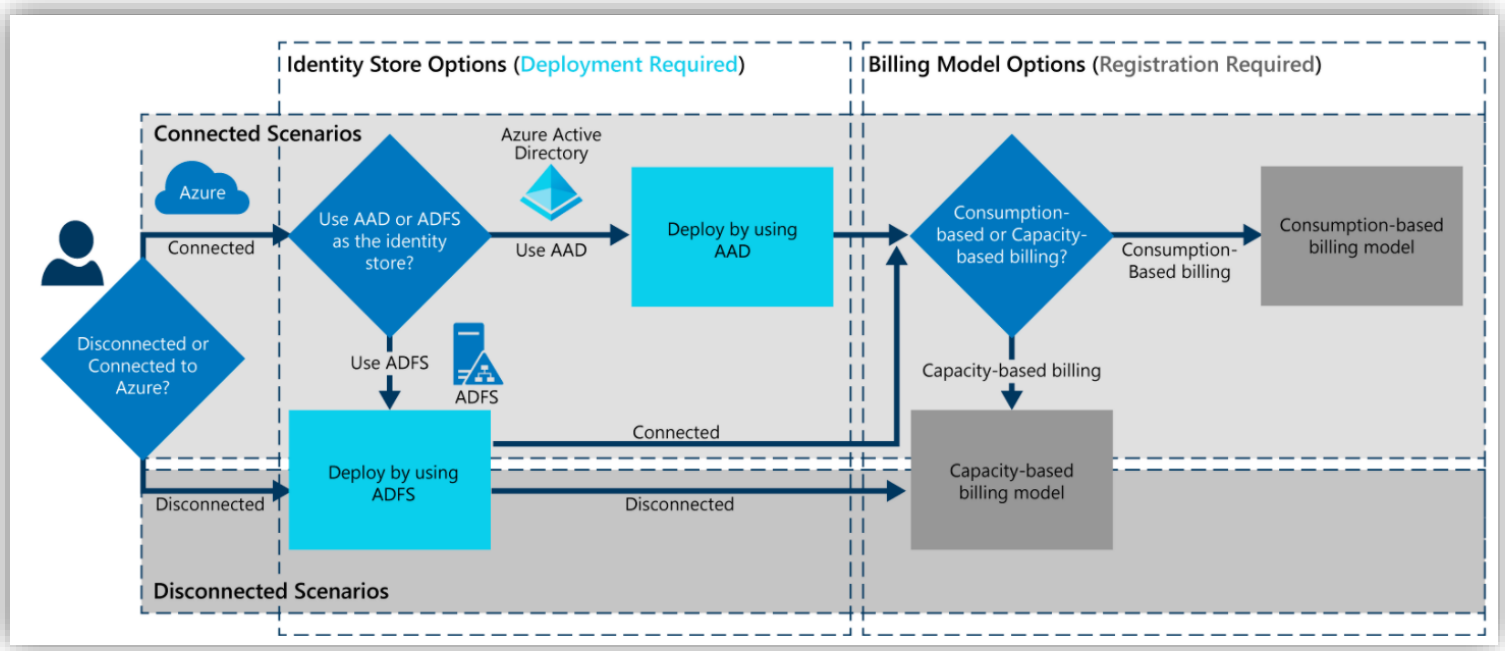
- For AD FS as the identity provider, integrate the AD FS instance on Azure Stack Hub with an existing AD FS instance using a federation trust
- You can also integrate the Graph service in Azure Stack Hub with the existing Active Directory



Connection models

Choosing to deploy Azure Stack Hub as connected to the internet (and to Azure) or disconnected?

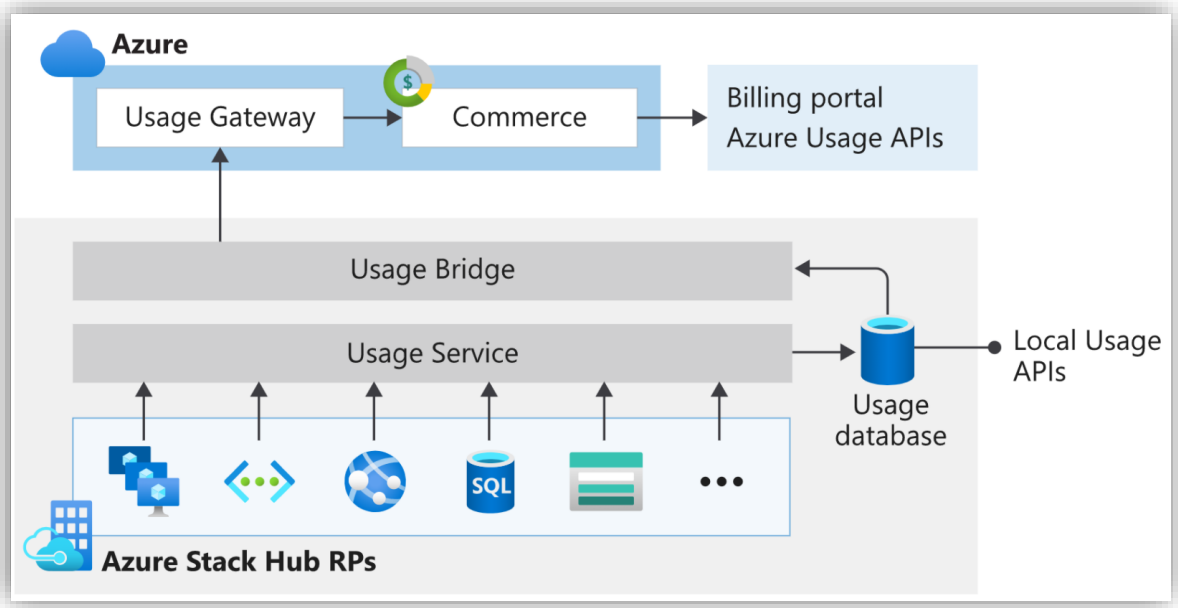
- Deploy connected to Azure to get the most benefit from Azure Stack Hub
- Hybrid scenarios between Azure Stack Hub and Azure also beneficial
  - Defines Azure Active Directory or Active Directory Federation Services?
  - Defines billing model (pay as you use-based billing or capacity-based billing)



Licensing model

The licensing model depends on if you deploy Azure Stack Hub connected to the internet:

- For a connected deployment you can choose either pay-as-you-use or capacity-based licensing
- Pay-as-you-use requires a connection to Azure to report usage (billed through Azure commerce)
- Only capacity-based licensing is supported if you deploy disconnected from the internet



Usage and Billing

- The usage service aggregates usage data and stores it in the usage database
- Operators and users can access the stored usage data through the Azure Stack Hub resource usage APIs
- If Azure Stack Hub is registered with Azure, then Azure Stack Hub is configured to send the usage data to Azure Commerce
- After the data is uploaded to Azure, you access it through the billing portal or by using Azure resource usage APIs

Naming decisions

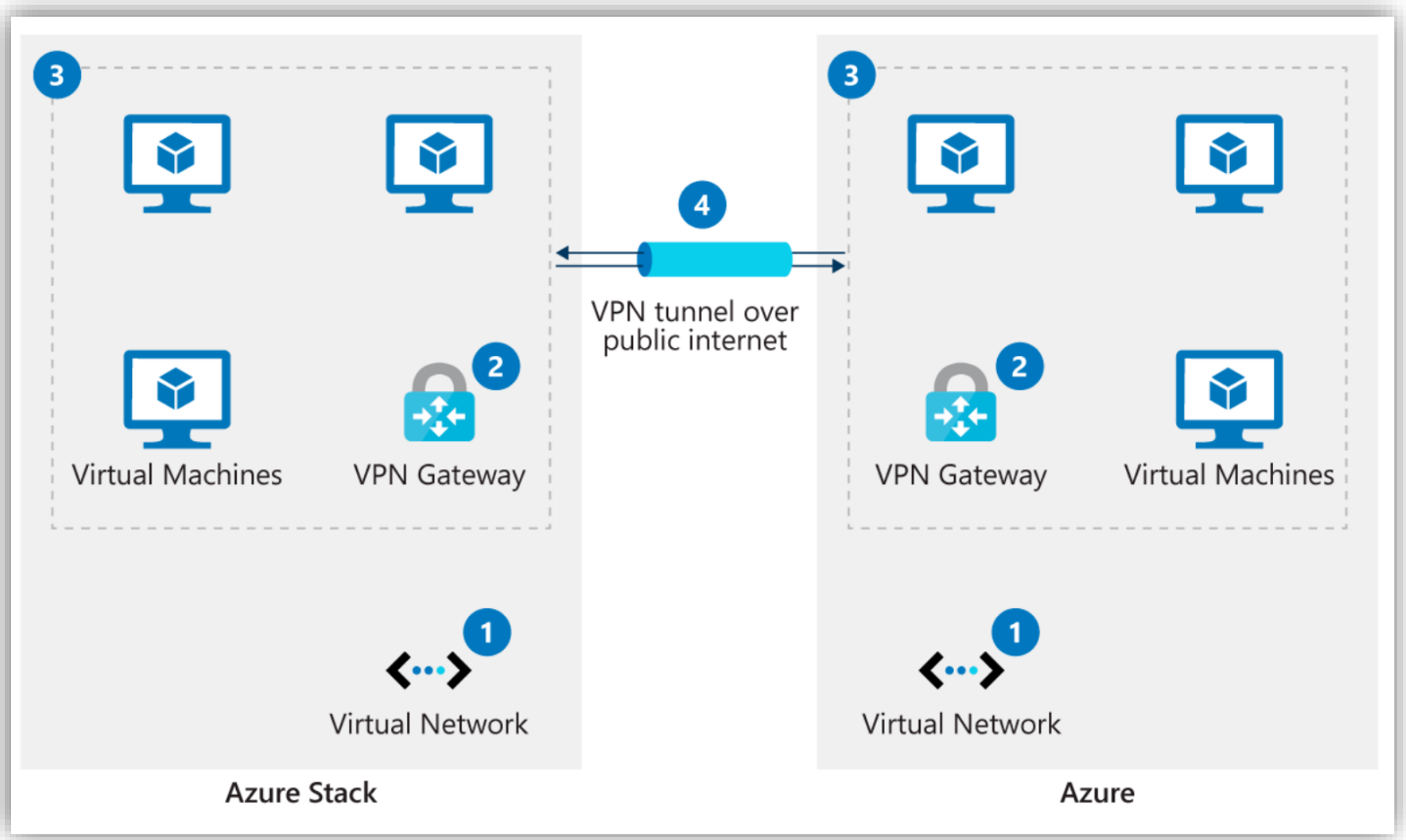
Plan the Azure Stack Hub namespace for region name and external domain name.

- External FQDN for endpoints is a combination of <region>.<fqdn>
- For example, ***east.cloud.fabrikam.com***, the Azure Stack Hub portals would be available at:
  - *https://portal.east.cloud.fabrikam.com*
  - *https://adminportal.east.cloud.fabrikam.com*

Name	Description
Region name	The name of your first Azure Stack Hub region. This name is used as part of the FQDN for the public virtual IP addresses (VIPs) that Azure Stack Hub manages. Typically, the region name would be a physical location identifier such as a datacenter location. The region name must consist of only letters and numbers between 0-9. No special characters (like -, #, and so on) are allowed.
External domain name	The name of the Domain Name System (DNS) zone for endpoints with external-facing VIPs. Used in the FQDN for these public VIPs.
Private (internal) domain name	The name of the domain (and internal DNS zone) created on Azure Stack Hub for infrastructure management.

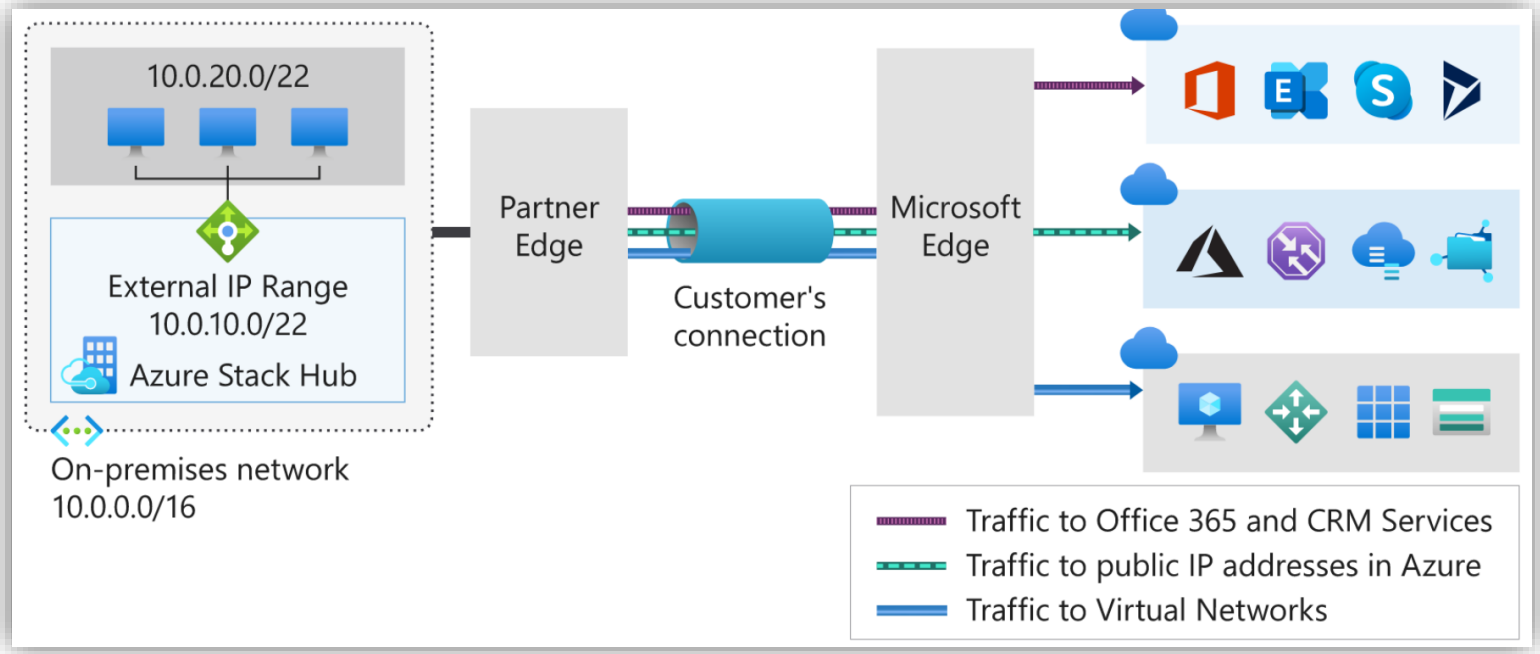
Connect Azure Stack Hub to Azure

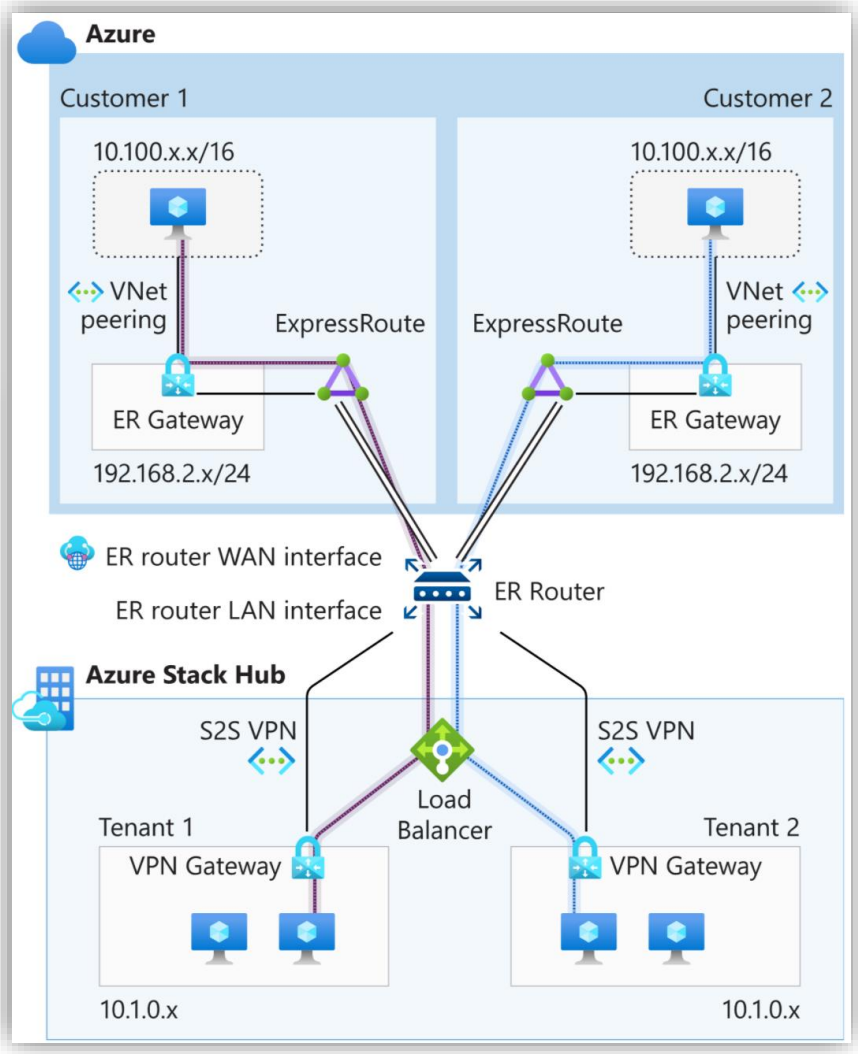
1. Deploy a virtual network in Azure and Azure Stack Hub
2. Deploy a virtual network gateway in Azure and Azure Stack Hub
3. Deploy virtual machines in each virtual network
4. Establish a VPN connection over the public internet between the network gateways



Using ExpressRoute

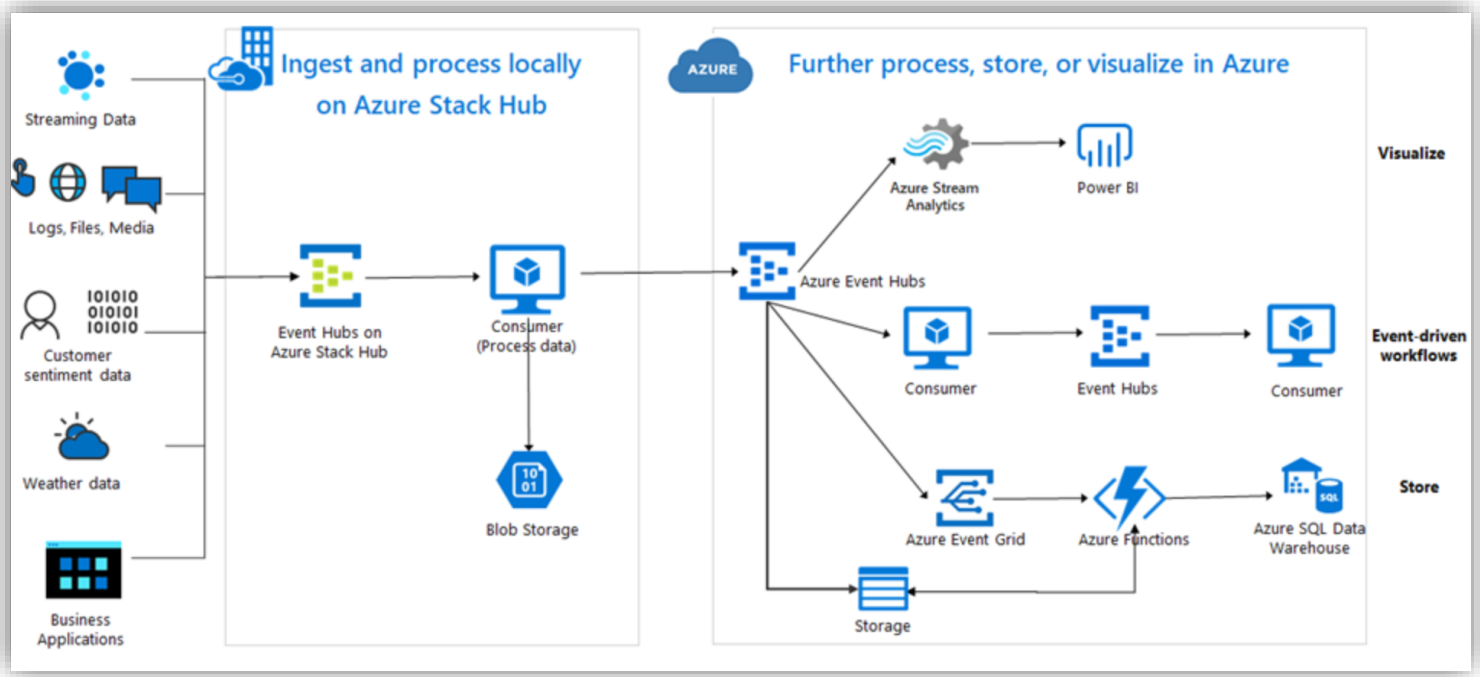
ExpressRoute for a single & multi tenant scenario, where *Customer's connection* is the ExpressRoute circuit





External Monitoring

- The hardware lifecycle host is a computer outside Azure Stack Hub that runs OEM vendor-provided management tools for hardware
- Use tools directly integrate with existing monitoring solutions in your datacenter



Area	External Monitoring Solution
Azure Stack Hub software	Azure Stack Hub Management Pack for Operations Manager Nagios plug-in REST-based API calls
Physical servers (BMCs via IPMI)	OEM hardware - Operations Manager vendor management pack OEM hardware vendor-provided solution Hardware vendor Nagios plug-ins. OEM partner-supported monitoring solution (included)
Network devices (SNMP)	Operations Manager network device discovery OEM hardware vendor-provided solution Nagios switch plug-in
Tenant subscription health monitoring	System Center Management Pack for Windows Azure

Backup and disaster recovery

You backup Azure Stack Hub infrastructure components to an SMB share:

- An external SMB file share on an existing Windows-based file server or a third-party device
- Use this same share for the backup of network switches and the hardware lifecycle host.
- The OEM hardware vendor provides guidance for backup and restore component external to Azure Stack Hub

For catastrophic data loss, use infrastructure backup to reseed deployment data, such as:

- Deployment inputs and identifiers
- Service accounts
- CA root certificate
- Federated resources (in disconnected deployments)
- Plans, offers, subscriptions, and quotas
- RBAC policy and role assignments
- Key Vault secrets

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