

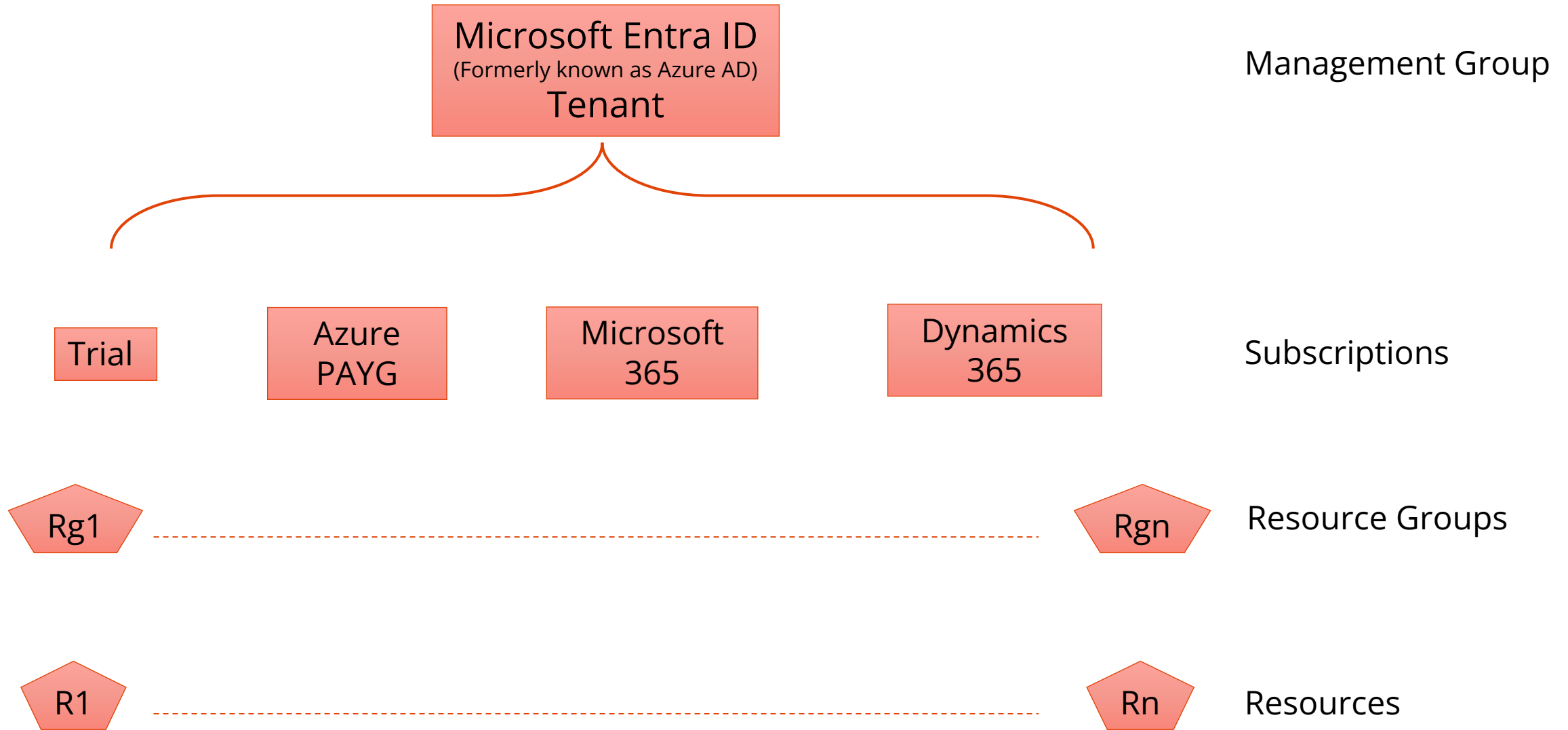


# Azure Networking 101

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ACE Solutions Architecture Team

# Azure Hierarchy



# Microsoft Azure Service and Resource

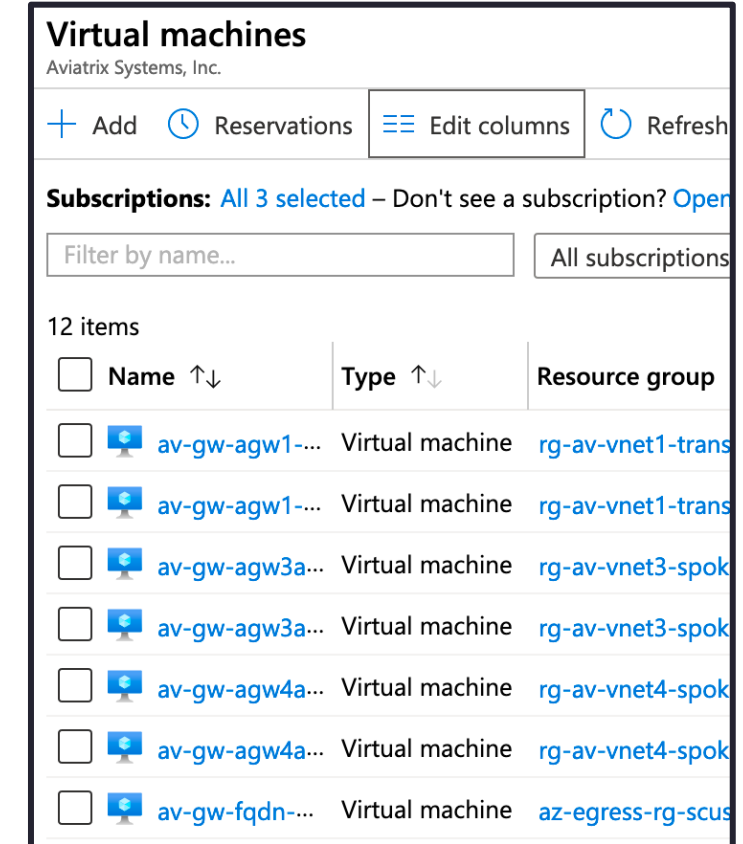
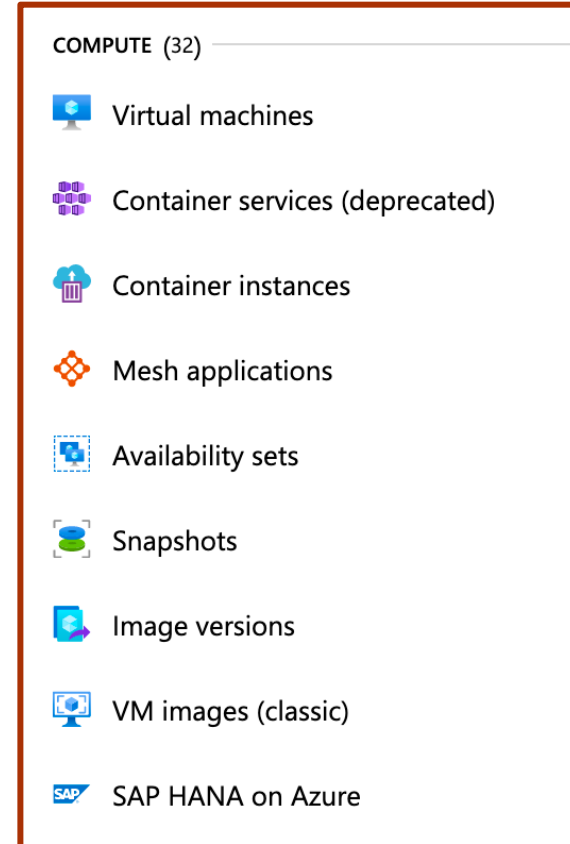
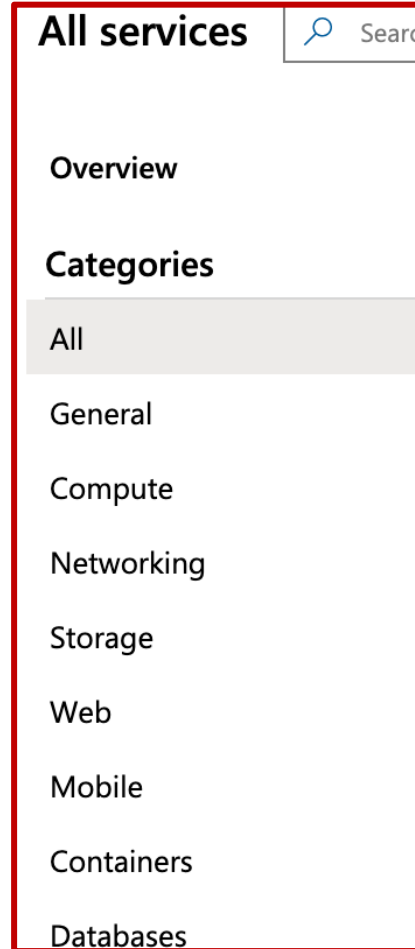
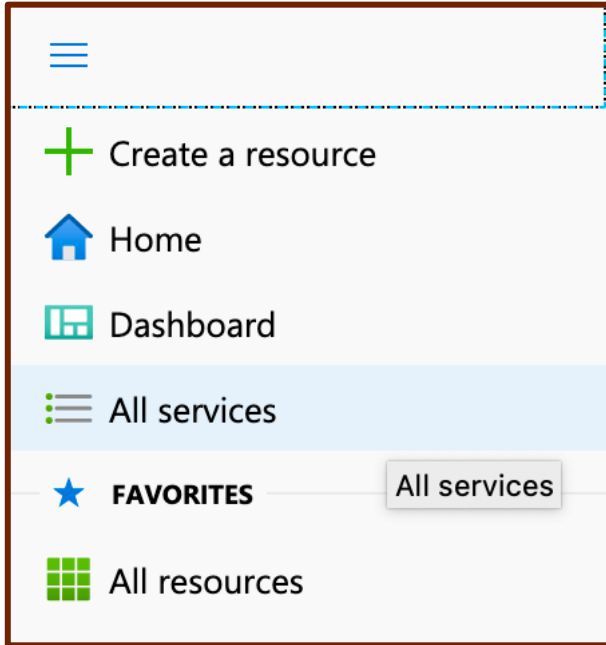


Ability to See All Services

List of Service  
(categories)

Resources are grouped  
inside each Service

Resource is an instance of a  
Service in a Resource Group



# Azure Service Categories

Category Name	Example Services
Compute	Virtual Machines, WebApps, Virtual Machine Scale Sets, Azure Virtual Desktop
Storage	Blob Storage, Disk Storage, Azure NetApp Files
Networking	Virtual Network, DNS, VPN Gateway, ExpressRoute, CDN
Databases	Azure SQL, Azure Cosmos DB, Azure Cache for Redis
Containers	Azure Kubernetes Service, Azure Red Hat OpenShift, Container Registry, Container Instances
Identity	Azure Active Directory
Security	Microsoft Defender for Cloud, Azure Sentinel, Azure Firewall, Web Application Firewall
AI + Machine Learning	Azure Databricks, Azure Cognitive Services

# Azure Core Networking Services



## Virtual Network

Address space can be one or more networks either public or private

- Isolated, logical network providing connectivity for virtual machines and some PaaS services



## Subnets

Provides full Layer 3 semantics and partial Layer 2 semantics (DHCP, ARP, no broadcast/multicast)

- Networks within a VNet which can be used for more granular separation of virtual machines



## Network Interface

Provides network services to virtual machines

- Up to 8 NICs supported on a VM depending on the SKU.
- All NICs must belong to the same Virtual Network



## DNS

Provides name resolution services for resources deployed in Virtual Networks and the Internet

- All VMs in a VNet belong to the same internal DNS zone by default. It is possible to create custom public and private DNS Zones



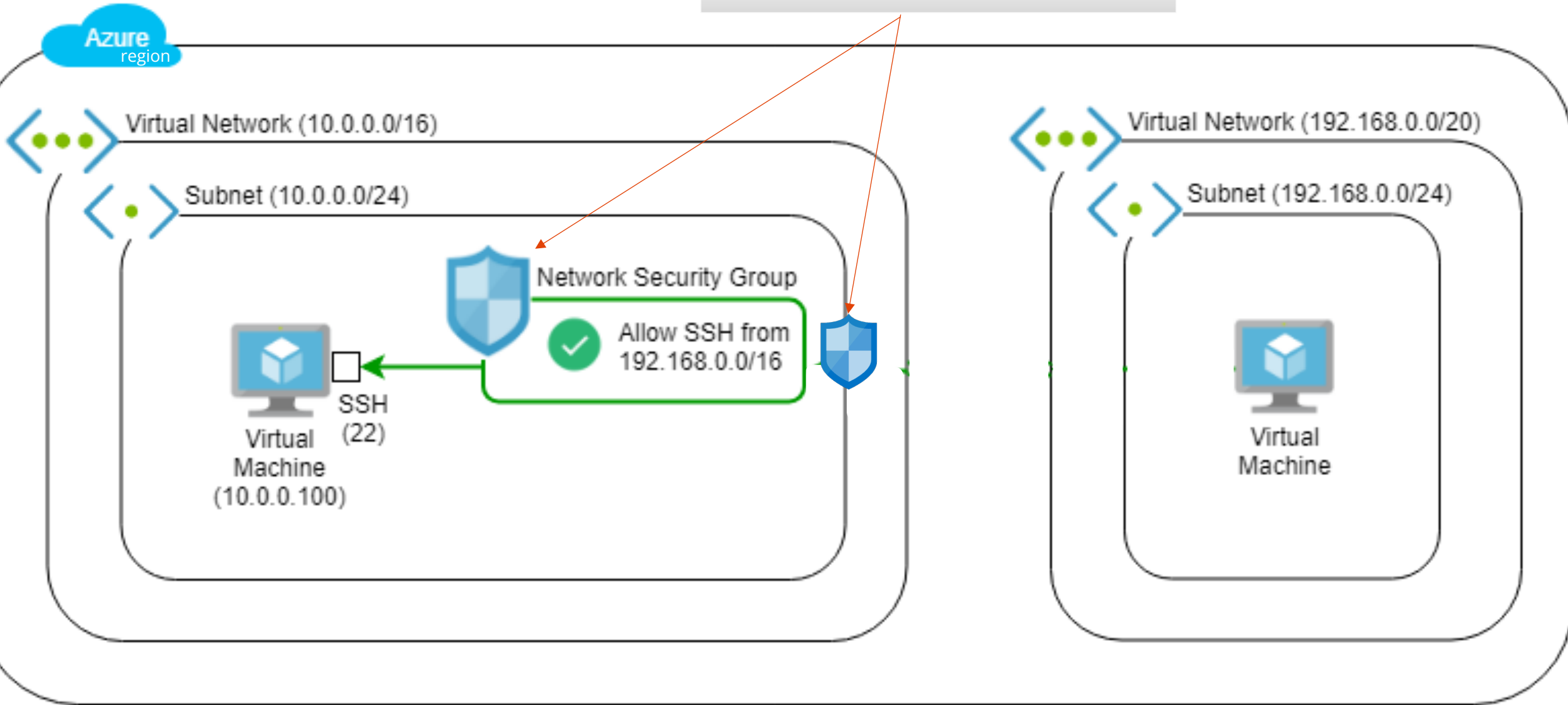
## Public IP Address

Provides communication from the Internet to services deployed in a Virtual Network

- Can be static or dynamic. Assigned by Microsoft
- Used for Internet inbound connectivity

# NSG

NSG can be at Subnet level or NIC level  
You can have NO NSG at all



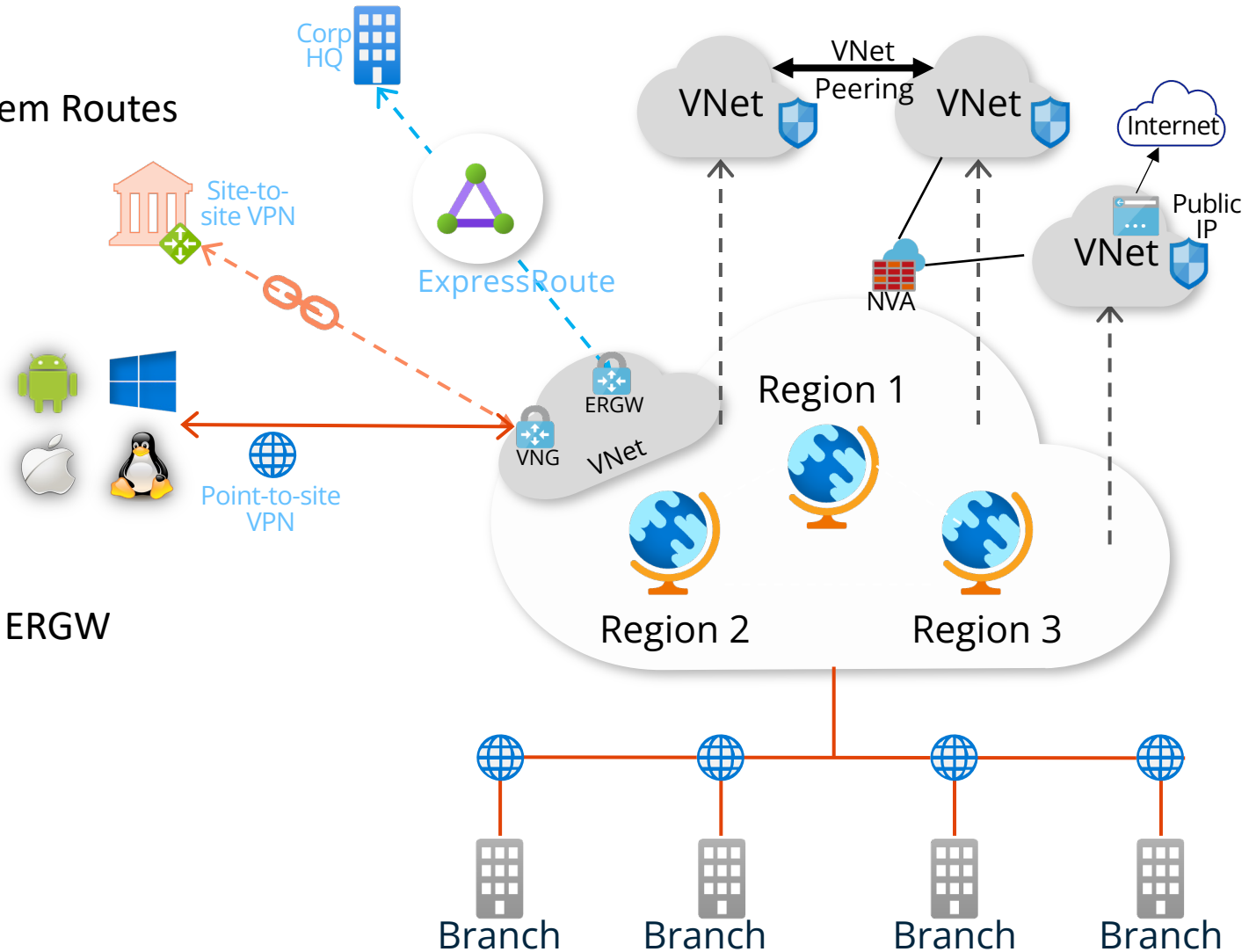
# Azure Networking Components

- VNet (Virtual Network)
  - Routing: User-Defined Route (UDR), BGP and System Routes
  - Availability Zones (**not all regions**)
  - Network Security Group
  - Virtual Network Gateways
1. VPN Gateway (VNG)
    - S2S (max 30 tunnels) and P2S VPN
    - Local Network Gateway (on-prem entity)

## 2. ExpressRoute Gateway (ERGW)

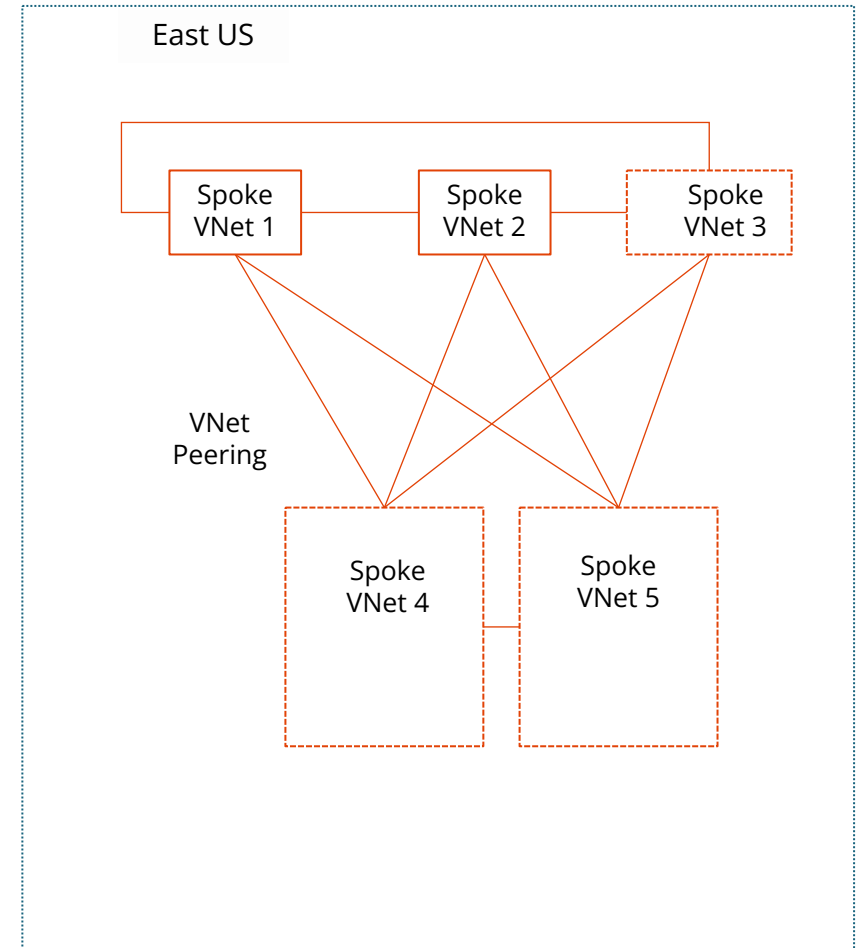
Note: No communication path between VNG and ERGW

- Public and Private IP Address
- VNet Peering
- NVA (Network Virtual Appliance)



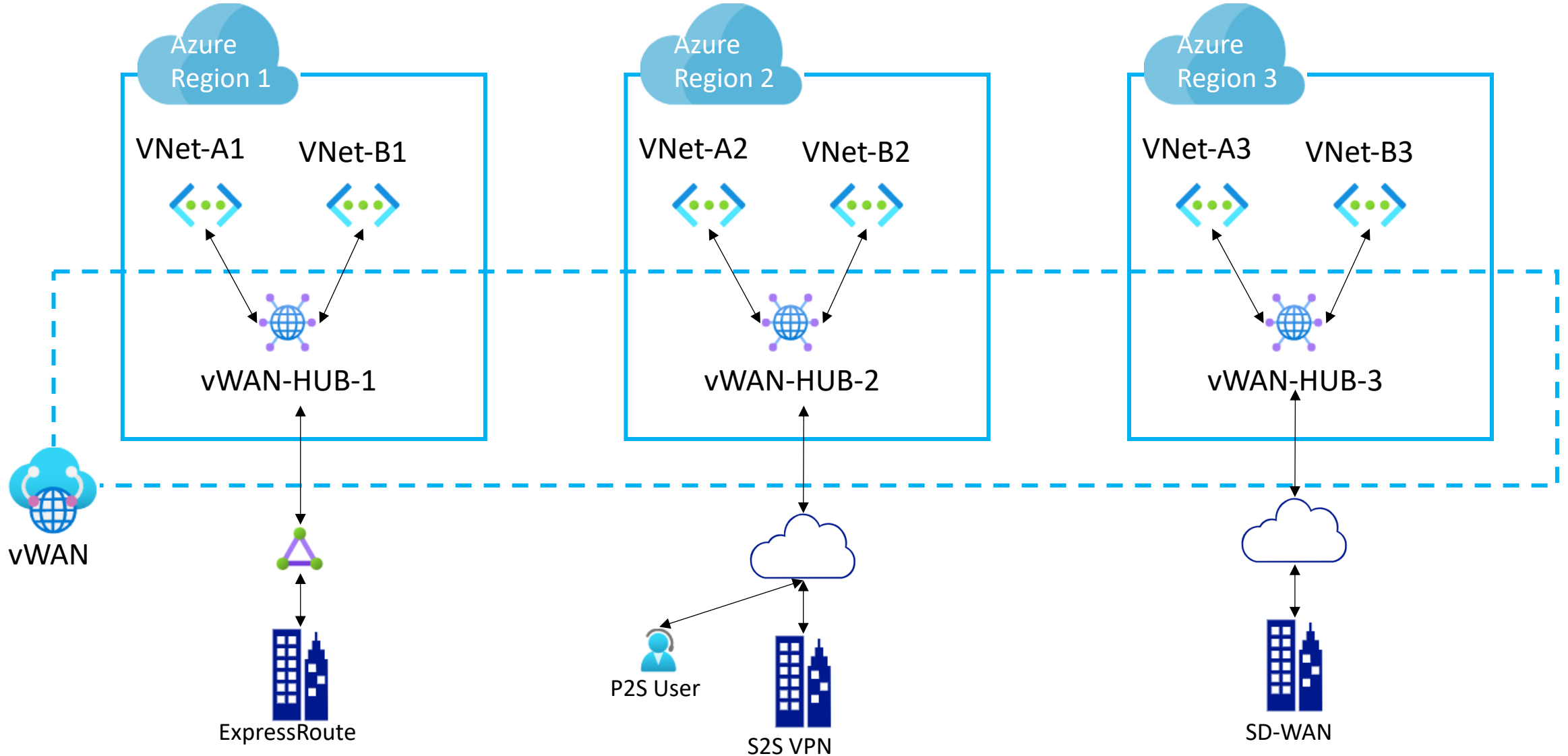
# Azure VNet Peering

- Preferred Method by Microsoft Product Group for Transit in Azure
- No Real BW Limitation
- 1-to-1 Mapping
- Does not scale
- No easy way to insert FWs
- No granularity (all or none subnets)
- VNet peering data charges for ingress and egress in both directions
- Inter-region supported (Global VNet peering)





# Azure Virtual WAN



# Azure Route Server

- Azure Route Server is a fully managed service that allows you to easily manage routing between your network virtual appliance (NVA) and your virtual network.
- No. Azure Route Server is a service designed with high availability. Your route server has zone-level redundancy if you deploy it in an Azure region that supports Availability Zones.



Next: GCP Networking 101