**Microsoft Azure Fundamentals: Azure Network Infrastructure**

**Azure Network Solutions**

* Virtual private network (VPN)
  + Site-to-site
  + Point-to-site
* ExpressRoute
  + Dedicated private circuit tot he Azure backbone Network

**Azure Virual Network**

* Links on-premises network to the Azure cloud
* Supports standard VPN protocols such as Internet Key Exchange (IKE) and Internet Protocol Security (IPsec)

**Azure Virtual Network (VNet)**

* A cloud-based network with one or more Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6) address spaces
* Contains subnets where resources can be deployed

**VNet IP Adress Space**

Ein Bild, das Text, Schrift, Screenshot, Quittung enthält.

Automatisch generierte Beschreibung

**Azure Network Resources**

* Public IP address
* Route table
* Virtual wide area network (WAN)

**Network Security Group (NSG)**

. Inbound/Outbound traffic filtering:

· VM network interface

· Subnet

**Working with Azure Domain Name System (DNS)**

Virtual networks 🡪 DNS servers

Default DNS Server 168.63.129.16

**Creating a DNS Zone Using the Azure Portal**

DNS zones 🡪 Create

Nsloolkup www.quick24x7testing.local ns2-36.azure-nds.net.

**Creating a DNS Zones Using the Command Line Interface (CLI)**

Az network –help

Az network private-dns zone create -g East -n premacan.xyz

Private DNS zones 🡪 Add virtual network

Az network private-dns zone list --query [].name

Az network dns zone list --query [].name

Az network vnet list --query [].name

az network private-dns link vnet create -g East -n vnet1 -z permacan.xyz -v /subscriptions/00da78ac9d0e427b80dae1b07c749f72/resourceGroups/East/providers/Microsfoft.Network/virtualNetworks/vnet1 -e False

az network private-dns record-set a add-record -g east -z permacan.xyz -n vm1 -a 10.0.0.10

az network private-dns record-set list -g east -z permacan.xyz --query [].['aRecords, fqdn' ]

**Creating a DNS Zone Using PowerShell**

New-AzPrivateDnsZone -Name brextil.com -ResourceGroupName East

New-AzPrivateDnsVirtualNetworkLink -ZoneName brextil.com -ResourceGroupName East -Name "vnetlink" -VirtualNetworkId /subscriptions/00da78ac-9d0e-427b-80da-e1b07c749f72/resourceGroups/East/providers/Microsoft.Network/virtualNetworks/vnet1

Get-azprivatednszone

New-AzPrivateDnsRecordSet -Name "www" -RecordType A -ResourceGroupName East -TTL 3600 -ZoneName brextil.com -PrivateDnsRecords (New-AzPrivateDnsRecordConfig -IPv4Address 10.0.0.4)

**Enabling Custom DNS Settings for VNet**

Virtualnetworks 🡪 vnet1 🡪 DNS servers

Virtual machines 🡪 win2022-srv1 🡪 Networking 🡪 win2022\_srv1VMNic 🡪 DNS servers

**Using Public and Private Endpoints**

Virtual networks 🡪 vnet1 🡪 Service endpoints

Virtual networks 🡪 vnet1 🡪 Private endpoints

App Services 🡪 webapp100yhz 🡪 Networking 🡪 Add Private Endpoint

**VNets and Subnets**

**Subnets**

* Contained with VNets
* Are configured with an IPv4 or IPv6 address range that falls within the VNet address spaces

**IPv4**

32-bit IP adress and subnet mask expressed in decimal form (0-9)

Adress: 199.126.129.56

Mask: 255.255.255.0 (/24)

**IPv6**

128-bit IP address and subnet mask expressed in hexadecimal form (0-9, A-F)

Address: fe80 :: bcef:f4d3:a360:9278

Mask: Uses Classless Inter-Domain Routing (CIDR) notation (/32)

**Subnet Configuration**

**Ein Bild, das Text, Screenshot, Quittung, Schrift enthält.

Automatisch generierte Beschreibung**

**Service Endpoint**

* Connectivity to Azure services (Storage, SQL, etc.) uses the Microsoft global backbone network, not the Internet
* Service connectivity is possible as if they were on the same Azure VNet
* Can be configured for many types of Azure services (virtual machines [VMs], Azure SQL
* Database, storage accounts, etc.) in the same region
* Works with any type of virtual machine (Windows, Linux) running in the subnet
* New DNS name is created that resolves to the private IP

**Private Endpoint**

* It is a virtual NIC for a service that does not use NICs (such as Storage Accounts)
* The virtual NIC is assigned a private IP address
* Traffic from on-premises services is supported (unlike with service endpoints)
* Service endpoints apply to an entire service, such as virtual machines
* Private endpoints apply to a single Azureresource

**Managing VNets Using the Portal**

Create a resource 🡪 Marketplace 🡪 Virtual Network

**Managing VNets Using the CLI**

Az network --help

Az network create -g east -n vnet3 --adress-prefix 192.168.0.0/16 --subnet-name subnet1 --subnet-prefix 192.168.1.0/24

Az network vnet list --query [].name

Az network vnet list --query [].subnets[].name

Az network vnet subnet list --resource-group east --net-name vnet3

Az network vnet subnet create -g east -vnet-name vnet3 -n subnet2 --address-prefixes 192.168.2.0/24

Az network vnet subnet list --resource-group east --net-name vnet3

Az network vnet subnet list --resource-group east --vnet-name vnet3 --query [].name

**Managing VNets Using PowerShell**

Get-command \*virtualnetwork\*

$subnet = New-AzVirtualNetworkSubnetConfig -Name Subnet1 -AddressPrefix 30.0.1.0/24

$subnet

New-AzVirtualNetwork -ResourceGroupName East -Location Canada East -name vnet4 -AddressPrefix 30.0.0.16 -Subnet $subnet

Get-AzvVirtualNetwork

Get-AzVirtualNetwork -name vnet4

$vnet=get-AzVirtualNetwork -name vnet4

Add-AzVirtualNetworkSubnetConfig -Name Subnet2 -VirtualNetwork $vnet -AddressPrefix „30.0.2.0/24“

Get-VirtualNetworkSubnetConfig -virtualnetwork $ vnet | Select name, adressprefix

$vnet | set-azvirtualnetwork

**Managing Subnets Using the Portal**

Virtual networks 🡪 vnet3 🡪 Subnets

**Managing Subnets Using the CLI**

Az network vnet subnet --help

Az network vnet list --query [].name

Az network vnet subnet list --resource-group east --vnet-name vnet --query [].name

Az network vnet subnet create -g east --vnet-name vnet3 -n Subnet4 --address-prefixes 192.168.4.0/24 --network-security-group Winows\_Linux\_NSG

Az network vnet subnet list --resource-group east --net-name vnet3 --query [].name

**Managing Subnets Using PowerShell**

Get-command \*subnet\*

$vnet = get-azvirtualnetwork -name vnet3

$vnet

Get-azvirtualnetworksubnetconfig -virtualNetwork $vnet -Name Subnet2

Add-AzVirtualNetworkSubnetConfig -Name Subnet5 -VirtualNetwork $vnet -AddressPrefix „192.168.5.0/24“

Get-azvirtualnetworksubnetconfig -virtualnetwork $vnet | select name, addressprefix

$vnet | set-azvirtualnetwork

**Configuring Routing Table Entries Using the Portal**

All resources 🡪 Create a resource 🡪 Marketplace 🡪 Route table 🡪 Create Route table

All resources 🡪 route\_table\_east1 🡪 Routes

All resources 🡪 route\_table\_east1 🡪 Subnets 🡪 Associate

**Configuring Routing Table Entries Using the CLI**

Az login

Az network --help

Az network route-table --help

Az network route-table create -n route\_table\_east2 -g East

Az network route-table list --query [].name

Az network route-table route create -g East -- route-table-name route\_table\_east2 -n packet\_inspection\_route --next-hop-type VirtualAppliance --address-prefix 0.0.0.0/0 --next-hop-ip-address 10.0.100.4

Az network vnet subnet update -g East -n subnet1 --vnet-name Vnet1 --route-table route-table-easat2

Az network route-table route list -g East --route-table-name route\_table\_east2

**Configuring Routing Table Entries Using PowerShell**

Get-command \*routetable\*

Get-azroutetable | select name

Get-AzRouteTable -ResourceGroupName East -Name route\_table\_east2

Get-AzRouteTable -ResourceGroupName East -Name route\_table\_east2 | Add-AzRouteConfig -Name route3 -AddressPrefix 10.2.0.0/16 -NextHopType VirtualAppliance -NextHopIPAdress 10.0.0.45 |Set-AzRouteTable

$rt = Get-AzRouteTable -ResourceGroupName East -Name route\_table\_east2

$rt

$rt | get-member -type property

$rt.disablegproutepropagation

$rt.disablegproutepropagation = $true