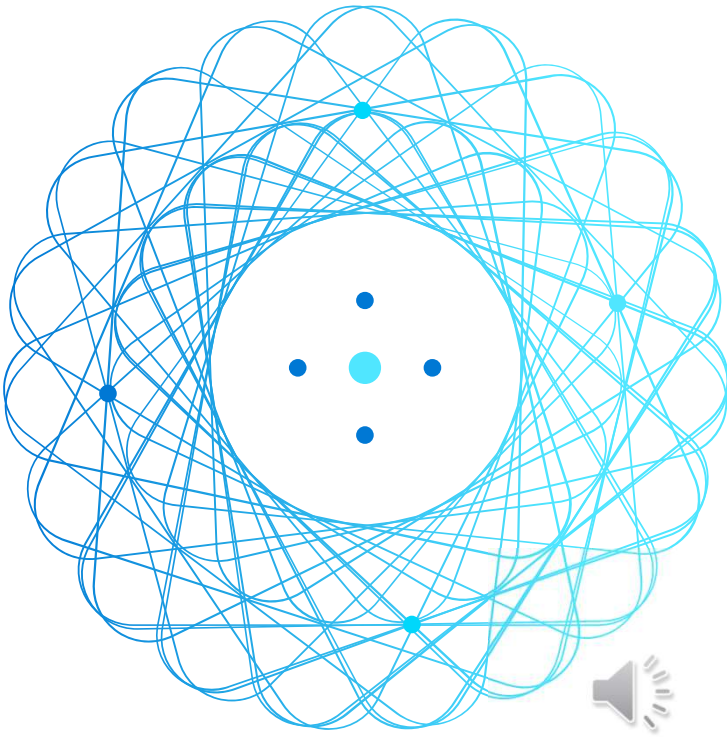
Microsoft Azure

# Azure Networking



# Compute and Networking- Objective Domain

**Describe the benefits and usage of:**

- Virtual Networks
- Azure Virtual Networks
- Azure virtual subnets
- VNET peering
- Azure DNS
- VPN Gateway
- ExpressRoute
- Public and private endpoints.

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https://docs.microsoft.com/learn/modules/describe-azure-compute-networking-services/1-introduction

# Azure networking services

**Azure Virtual Network (VNet)** enables Azure resources to communicate with each other, the internet, and on-premises networks.

- Public endpoints, accessible from anywhere on the internet
- Private endpoints, accessible only from within your network
- Virtual subnets, segment your network to suit your needs
- Network peering, connect your private networks directly together

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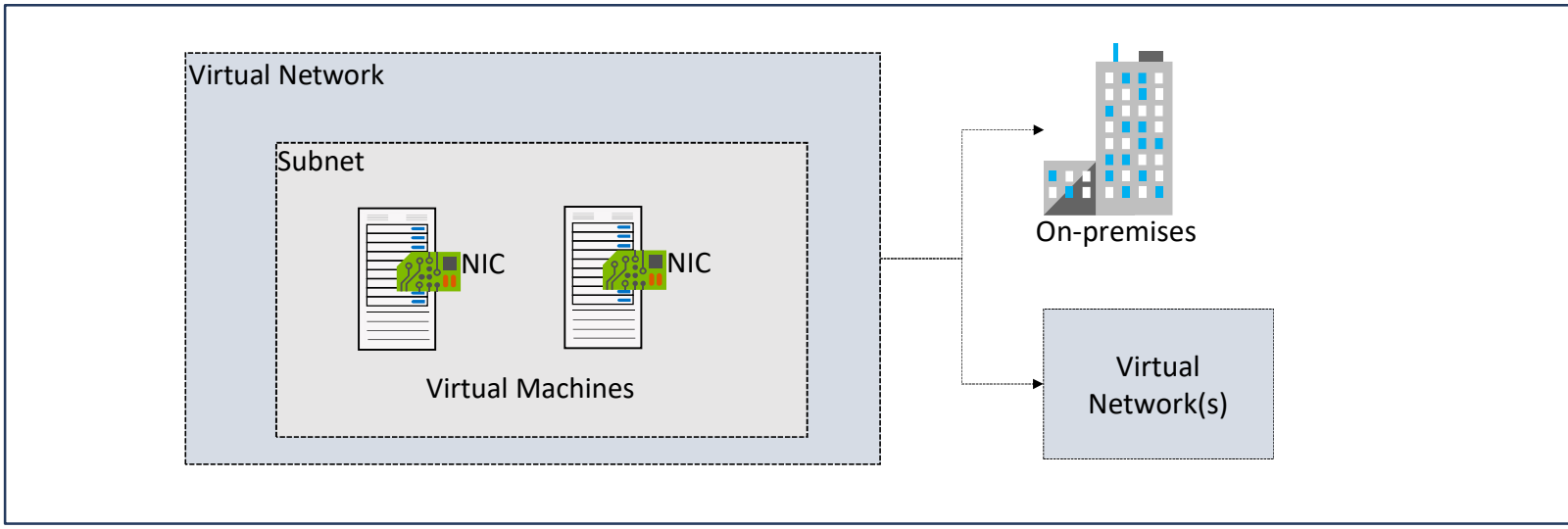
https://learn.microsoft.com/en-us/training/modules/describe-azure-compute-networking-services/8-virtual-network

# Virtual Networks – Planning & Designing




| | | | |
|---|---|---|---|
| Logical representation of your own network | Create a dedicated private cloud-only virtual network | Securely extend your datacenter with virtual networks | Enable hybrid cloud scenarios |

Azure Virtual Networks - https://azure.microsoft.com/services/virtual-network/

What is Azure Virtual Network? - https://docs.microsoft.com/azure/virtual-network/virtual-networks-overview

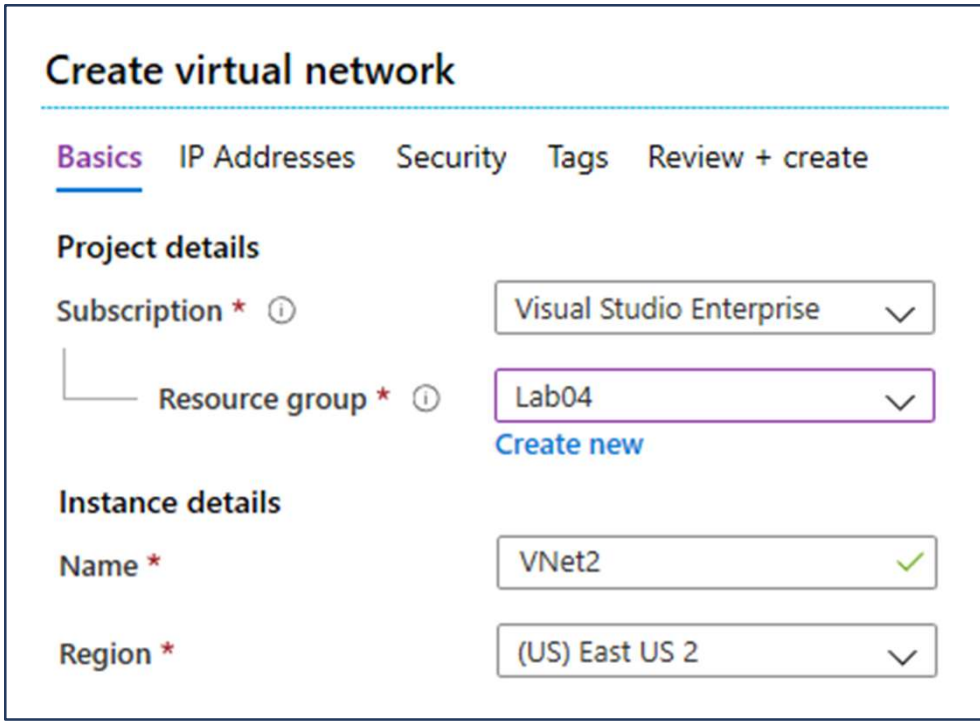
# Create Virtual Networks

Create new virtual networks at any time

Add virtual networks when you create a virtual machine

Need to define the address space, and at least one subnet

Be careful with overlapping address spaces

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QuickStart: Create a virtual network using the Azure portal - https://docs.microsoft.com/azure/virtual-network/quick-create-por

✔ Always plan to use an address space that is not already in use in your organization, either on-premises or in other VNets. Eve if you plan for a VNet to be cloud-only, you may want to make a VPN connection to it later. If there is any overlap in address spac at that point, you will have to reconfigure or recreate the VNet. The next lesson will focus on IP addressing.

# Create Subnets


A virtual network can be segmented into one or more subnets

Subnets provide logical divisions within your network

Subnets can help improve security, increase performance, and make it easier to manage the network

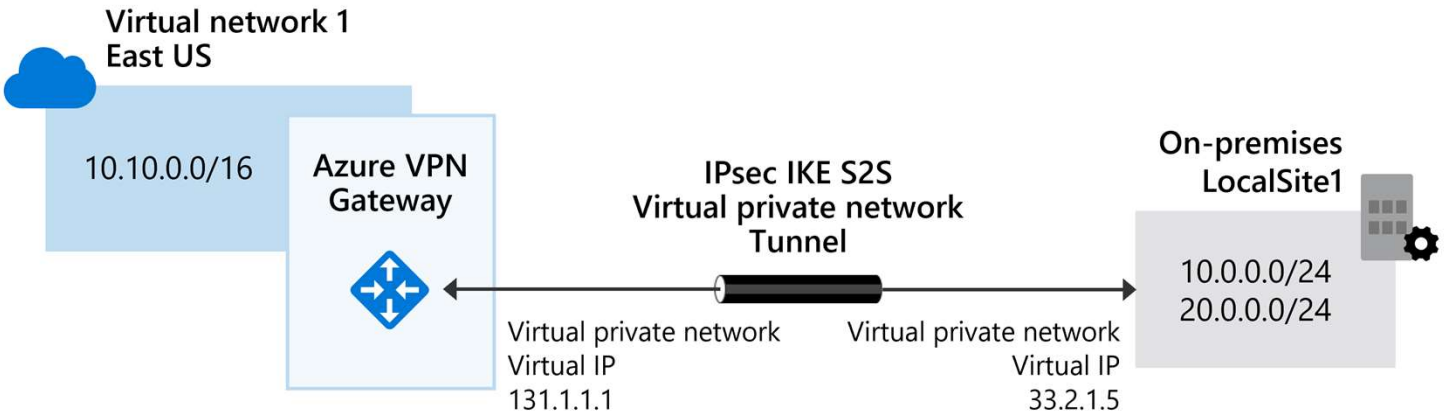
Each subnet must have a unique address range – cannot overlap with other subnets in the vnet in the subscription

## Azure reserves 5 IP addresses within each subnet.

- x.x.x.0: Network address
- x.x.x.1: Reserved by Azure for the default gateway
- x.x.x.2, x.x.x.3: Reserved by Azure to map the Azure DNS IPs to the VNet space
- x.x.x.255: Network broadcast address

# Azure networking services

**Virtual Private Network Gateway (VPN)** is used to send encrypted traffic between an Azure virtual network and an on-premises location over the public internet.

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https://docs.microsoft.com/learn/modules/describe-azure-compute-networking-services/10-virtual-private-networks

Azure VPN Gateway is a service that uses a specific type of virtual network gateway to send encrypted traffic between Azure virtual network and on-premises locations over the public Internet, or between two Azure Virtual Networks.

After you create a VPN gateway, you can configure connections.

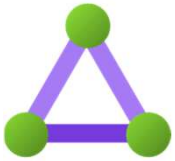
- For example, you can create an [IPsec/IKE] VPN tunnel connection between that VPN gateway and another VPN gateway (VNet-to-VNet), or
- Create a cross-premises [IPsec/IKE] VPN tunnel connection between the VPN gateway and an on-premises VPN device (Site-to-Site).

## Optional

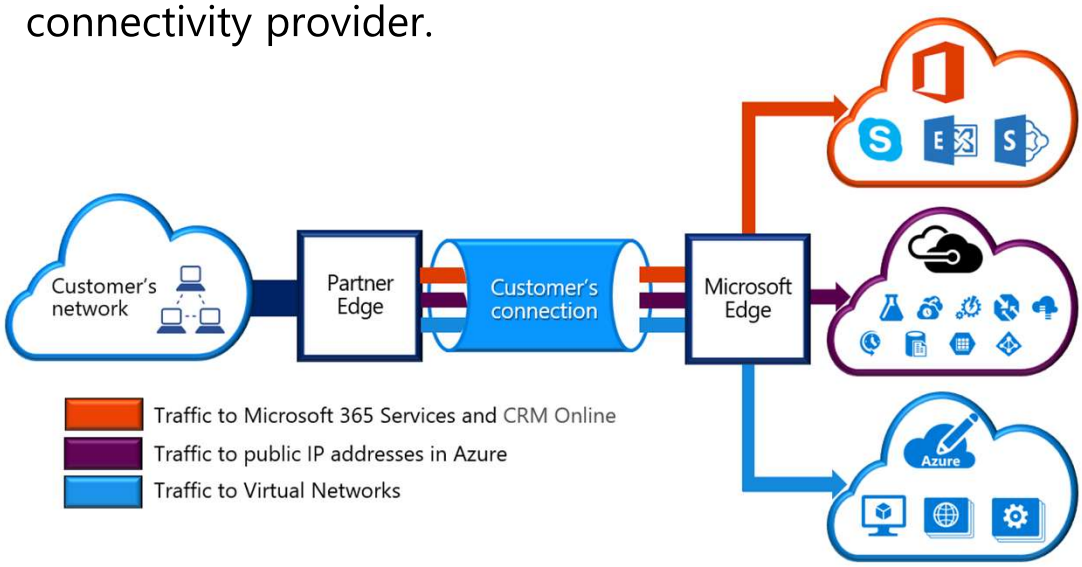
## IPSEC/IKE v1

Understand IPsec IKEv1 Protocol - Cisco

# Azure networking services



**Azure Express Route** extends on-premises networks into Azure over a private connection that is facilitated by a connectivity provider.




https://docs.microsoft.com/learn/modules/describe-azure-compute-networking-services/11-expressroute/

# ExpressRoute – Features and Benefits

ExpressRoute enables direct access to the following services in all regions:

- Microsoft Office 365
- Microsoft Dynamics 365
- Azure compute services, such as Azure Virtual Machines
- Azure cloud services, such as Azure Cosmos DB and Azure Storage

## ExpressRoute – Global Reach

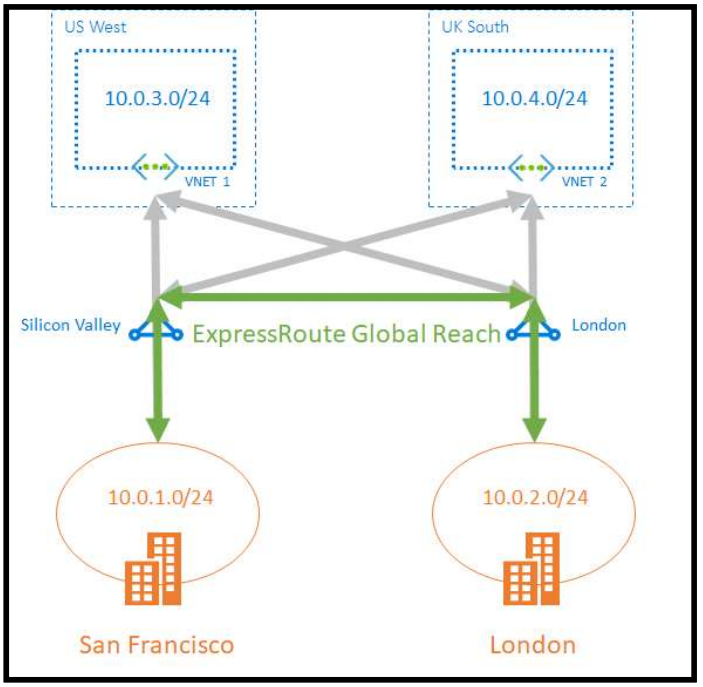
You can enable ExpressRoute Global Reach to exchange data across your on-premises sites through Microsoft Network by connecting your ExpressRoute circuits.

For example, assume you have an office in Asia and a datacenter in Europe, both with ExpressRoute circuits connecting them to the Microsoft network.

*You could use ExpressRoute Global Reach to connect those two facilities, allowing them to communicate without transferring data over the public internet.*

With ExpressRoute Global Reach, you can link ExpressRoute circuits together to make a private network between your on-premises networks.

In our example to the right, with the addition of ExpressRoute Global Reach, your San Francisco office (10.0.1.0/24) can directly exchange data with your London office (10.0.2.0/24) through the existing ExpressRoute circuits and via Microsoft's global network.




https://learn.microsoft.com/en-us/azure/expressroute/expressroute-global-reach

# Azure DNS


- Reliability and performance by leveraging a global network of DNS name servers using Anycast networking.
- Azure DNS security is based on Azure resource manager, enabling role-based access control and monitoring and logging.
- Ease of use for managing your Azure and external resources with a single DNS service.
- Customizable virtual networks allow you to use private, fully customized domain names in your private virtual networks.
- Alias records supports alias record sets to point directly to an Azure resource.

https://docs.microsoft.com/learn/modules/describe-azure-compute-networking-services/12-domain-name-system

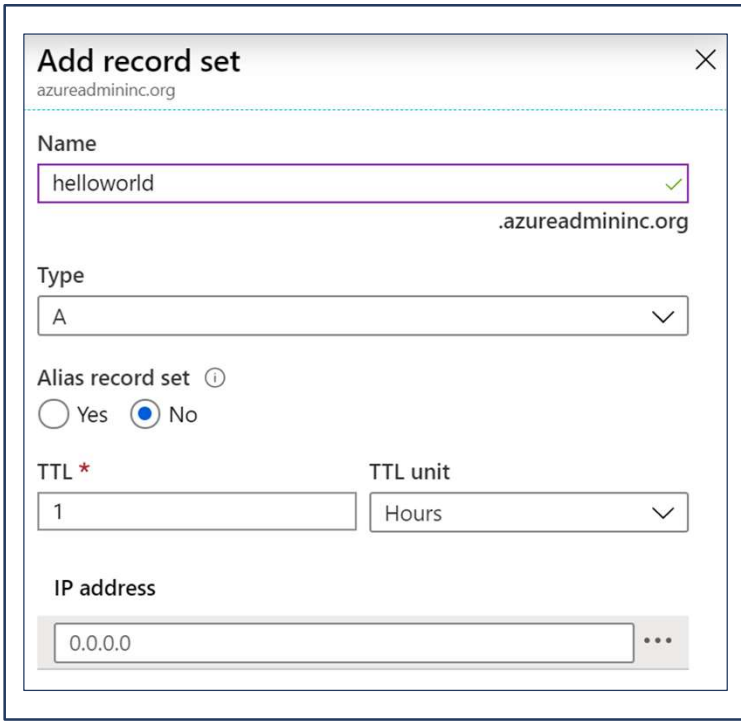
# Add DNS Record Sets

A record set is a collection of records in a zone that have the same name and are the same type

You can add up to 20 records to any record set

A record set cannot contain two identical records

Changing the drop-down Type, changes the information required



# Plan for Private DNS Zones

Use your own custom domain names

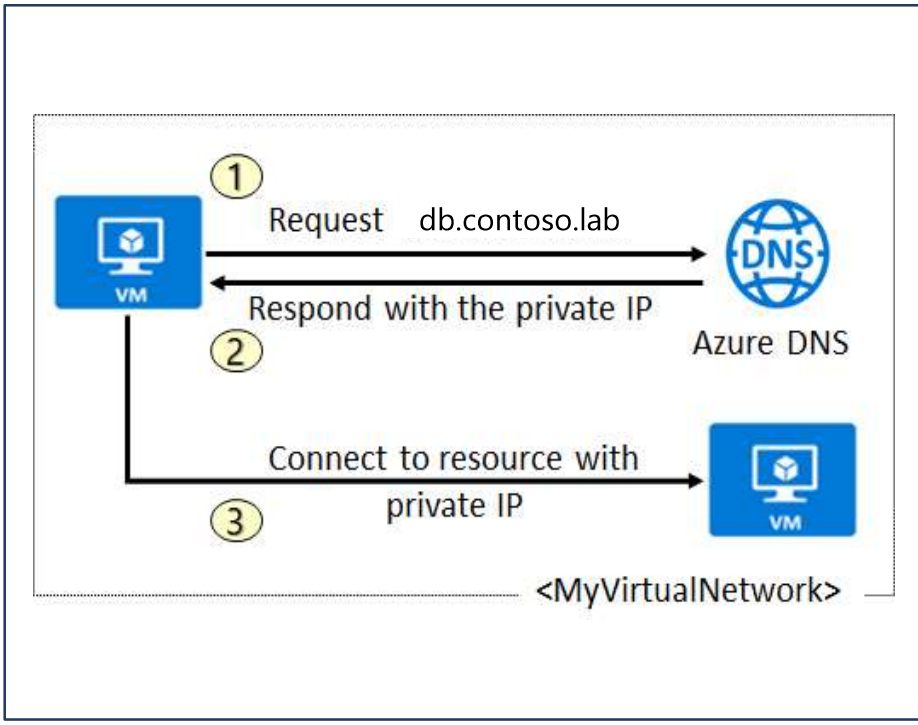
Provides name resolution for VMs within a VNet and between VNets

Automatic hostname record management

Removes the need for custom DNS solutions

Use all common DNS records types

Available in all Azure regions

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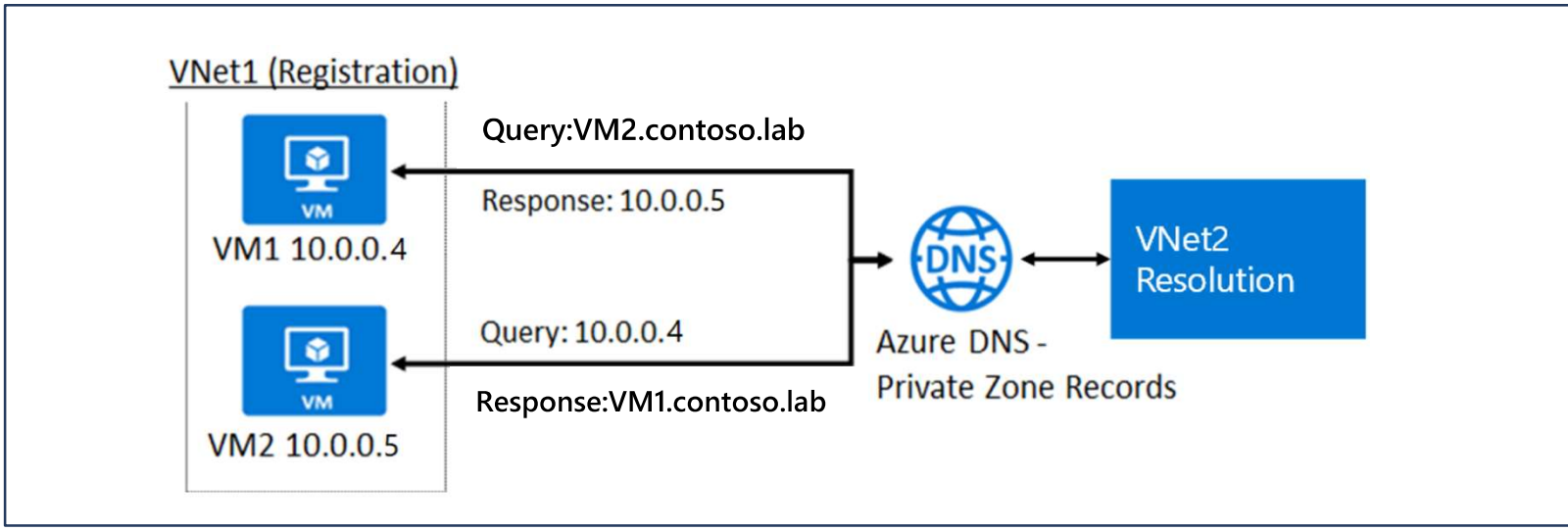
QuickStart: Create an Azure private DNS zone using the Azure portal - https://docs.microsoft.com/azure/dns/private-dns-getstarted-portal

# Determine Private Zone Scenarios




DNS resolution in VNet1 is private and not accessible from the Internet

DNS queries across the virtual networks are resolved

Reverse DNS queries are scoped to the same virtual network