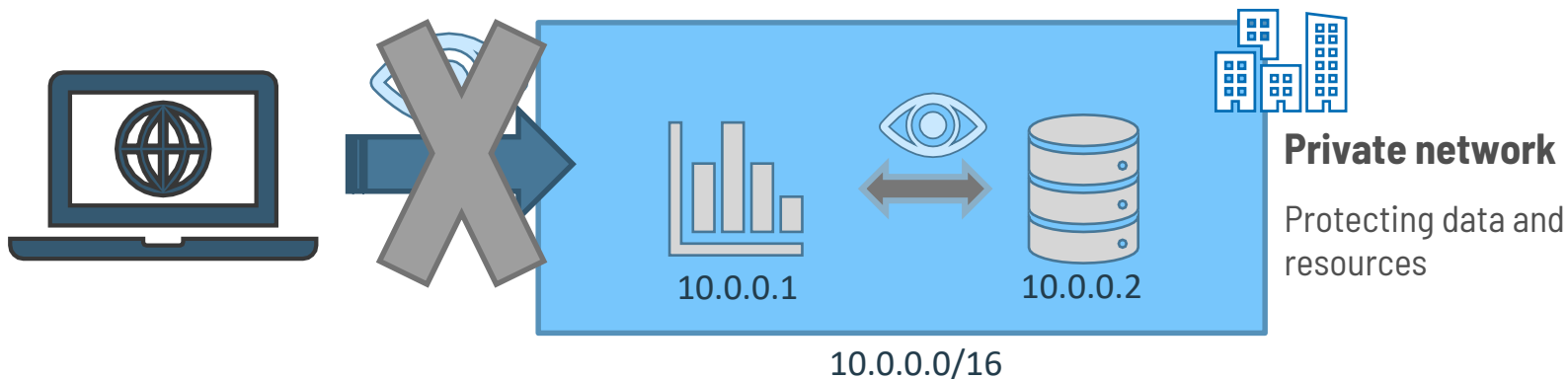


# Virtual Networks



# Virtual Networks

Enables resources to securely communicate with each other or with users over the Internet

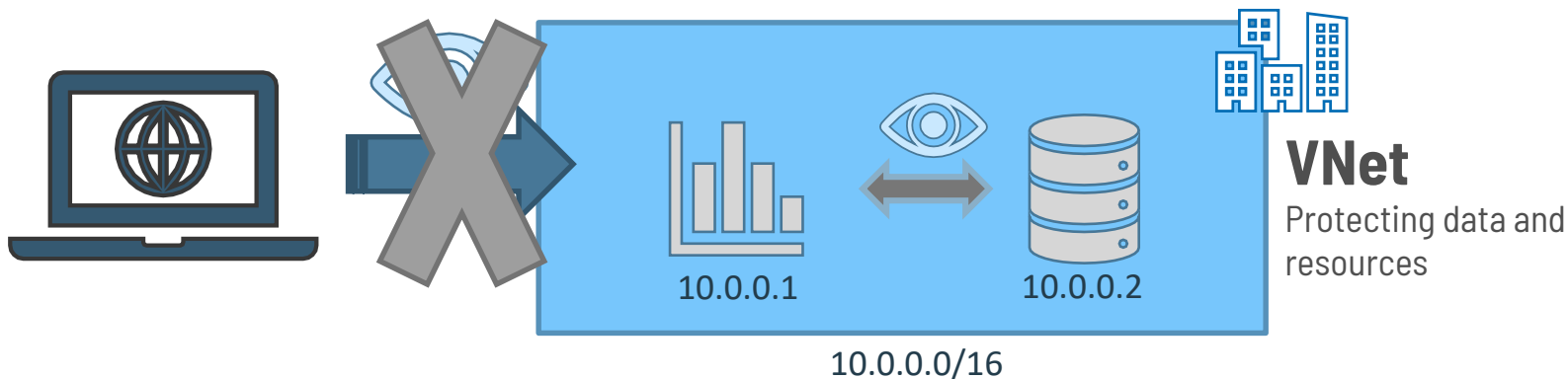


**Azure virtual network:** *Emulates a physical network in the cloud*

Infrastructure-as-a-Service

# Virtual Networks

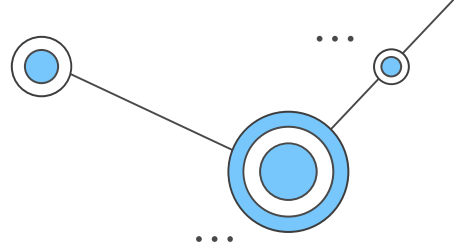
Enables resources to securely communicate with each other or with users over the Internet



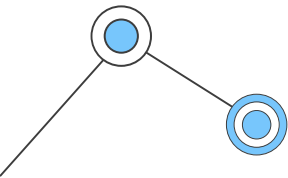
**Azure virtual network:** *Emulates a physical network in the cloud*

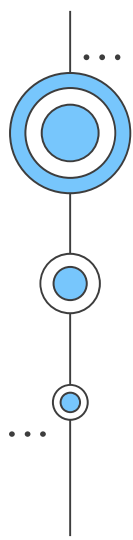
Infrastructure-as-a-Service

# Virtual Networks



- Network traffic is isolated and segmented
- Defining a Private IP address space
- Every resource gets an IP address
- Communication with the Internet
- Communication between Azure resources
- Communication with local resources (cloud & on-premise coverage)

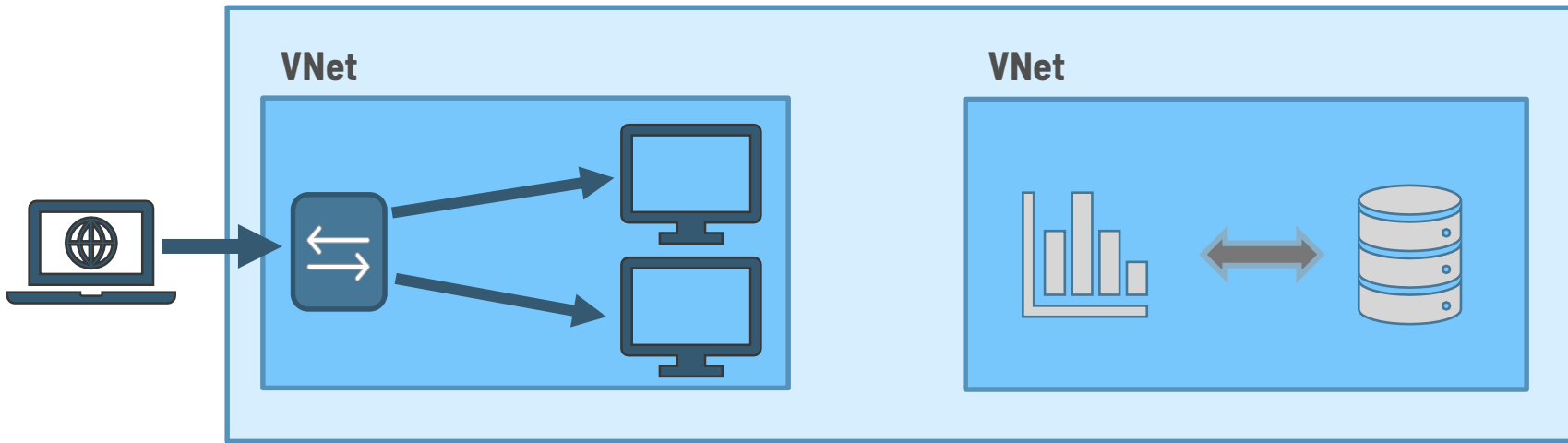
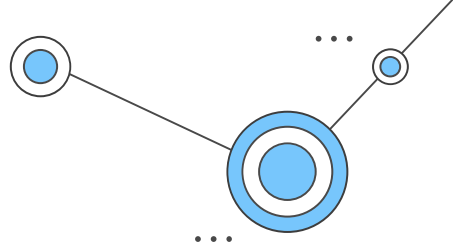




# Virtual Subnets



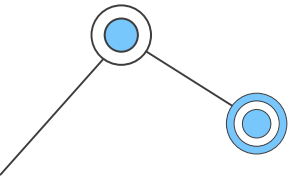
# Virtual Subnets



Resources have very different requirements

⇒ *Need for further partitioning*

⇒ *Organize and group resources in Subnets*

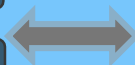


# Virtual Subnets

VNet

Public Subnet

Private Subnet



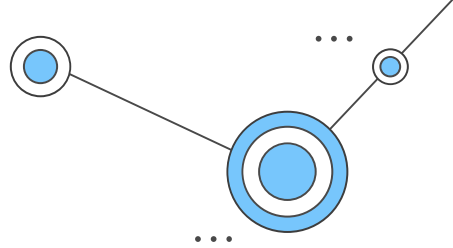
*Organize and group resources in Subnets*

Public subnet CAN be reached from the public internet

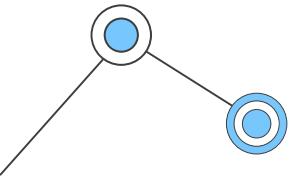
Private subnet CANNOT be reached from the public internet

Public subnet CAN access Private Subnet

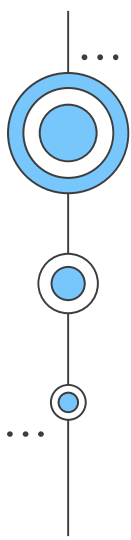
# Virtual Networks



- Network traffic is isolated and segmented
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- Communication with the Internet
- Communication between Azure resources
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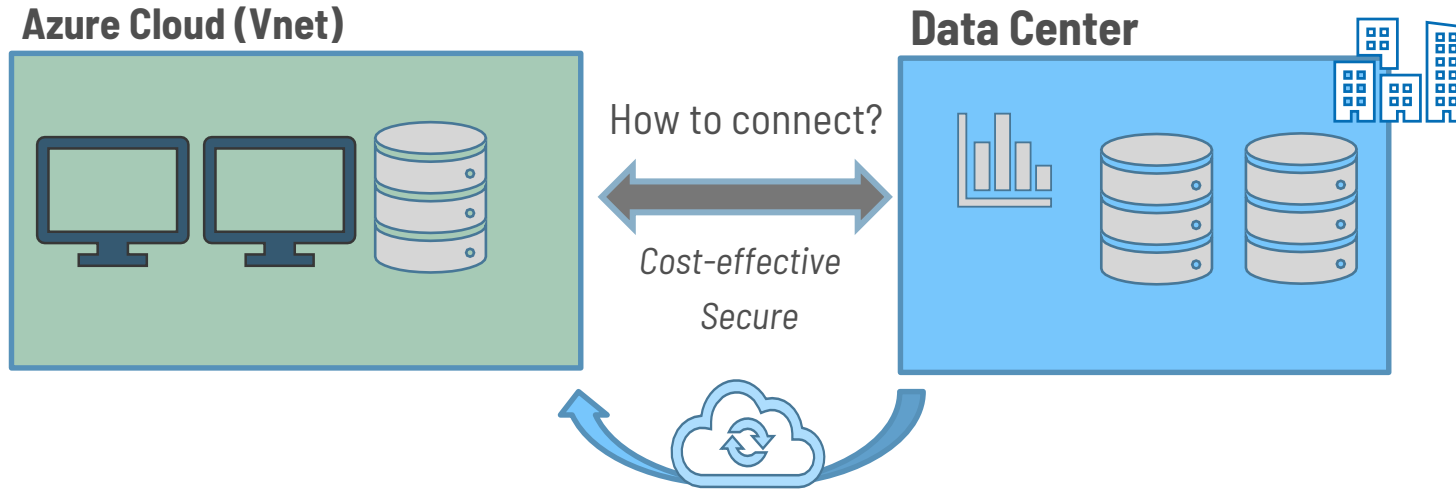


# VPN Gateway



# VPN Gateway

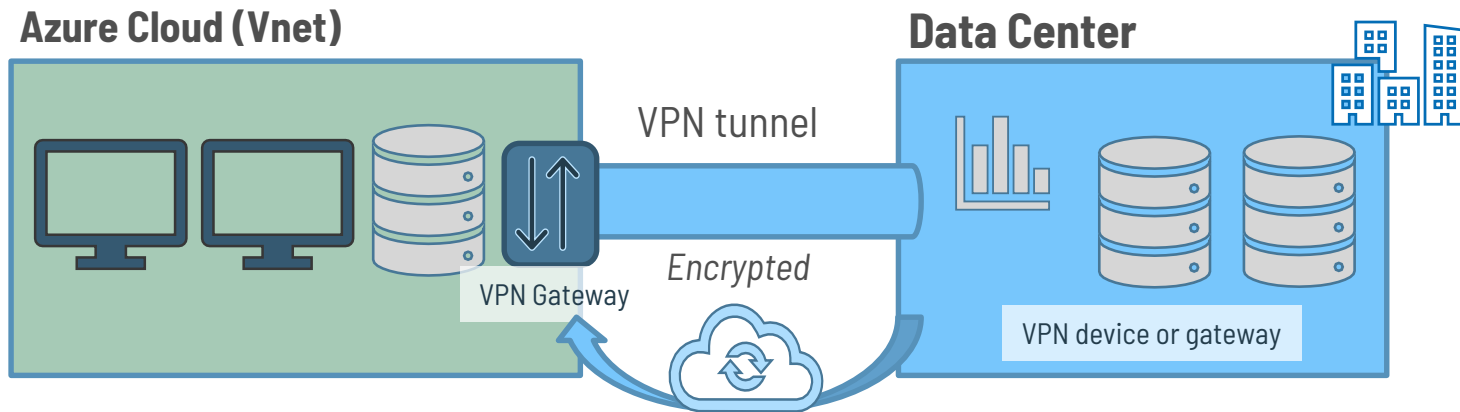
After migration: Hybrid cloud model



**VPN (Virtual private network):** Use an encrypted tunnel to connect two or more networks over an untrusted network (public internet)

# VPN Gateway

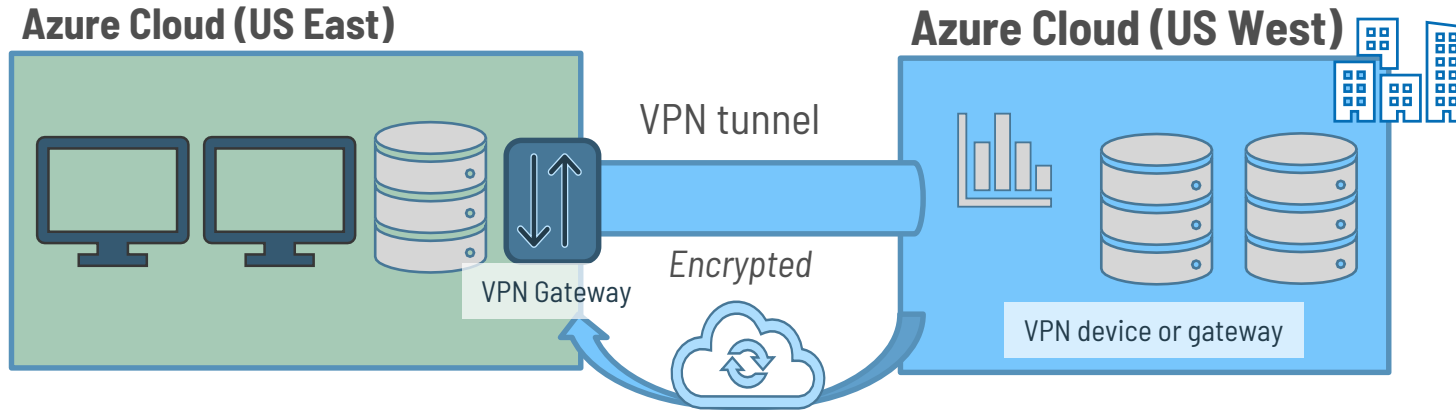
After migration: Hybrid cloud model



**Site-to-site connection:** On-premise datacenter to Azure virtual network

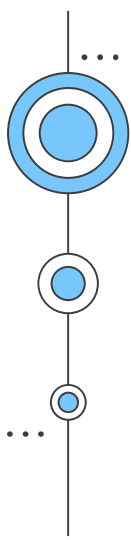
# VPN Gateway

*What if we need more bandwidth?*



**Site-to-site connection:** On-premise datacenter to Azure virtual network

**Network-to-network connection:** Virtual network to another virtual network

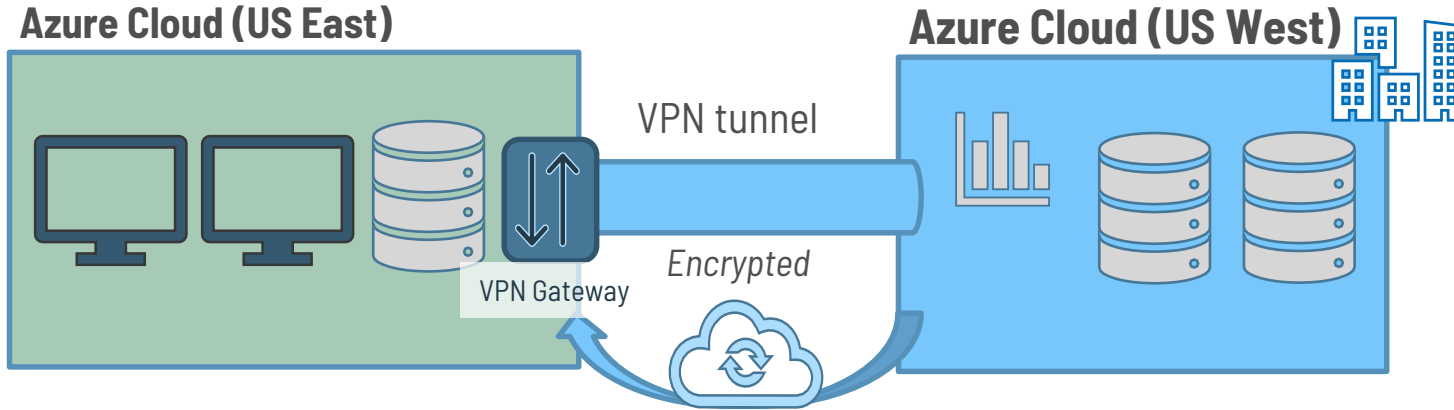


# Express Route



# Express Route

*What if we need more bandwidth?*



# Express Route

*What if we need more bandwidth?*

## Azure Cloud (US East)



## Azure Cloud (US West)



*Private connection*



Doesn't go over public internet

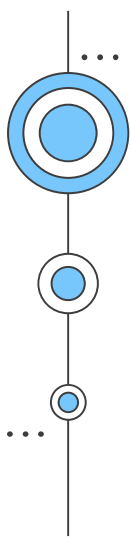
High bandwidth

More reliable

More secure

Not encrypted

**ExpressRoute:** Extend on-premises networks into the Microsoft cloud over a private connection with the help of a connectivity provider.

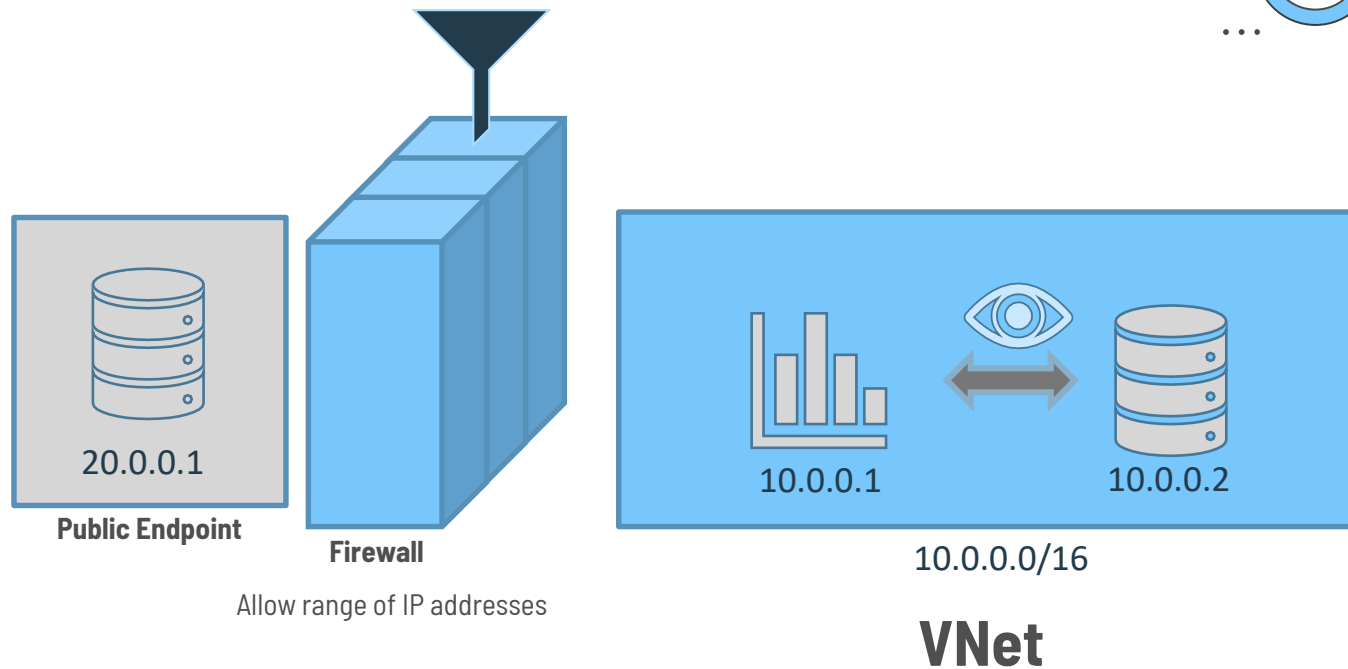


# Private & public endpoints

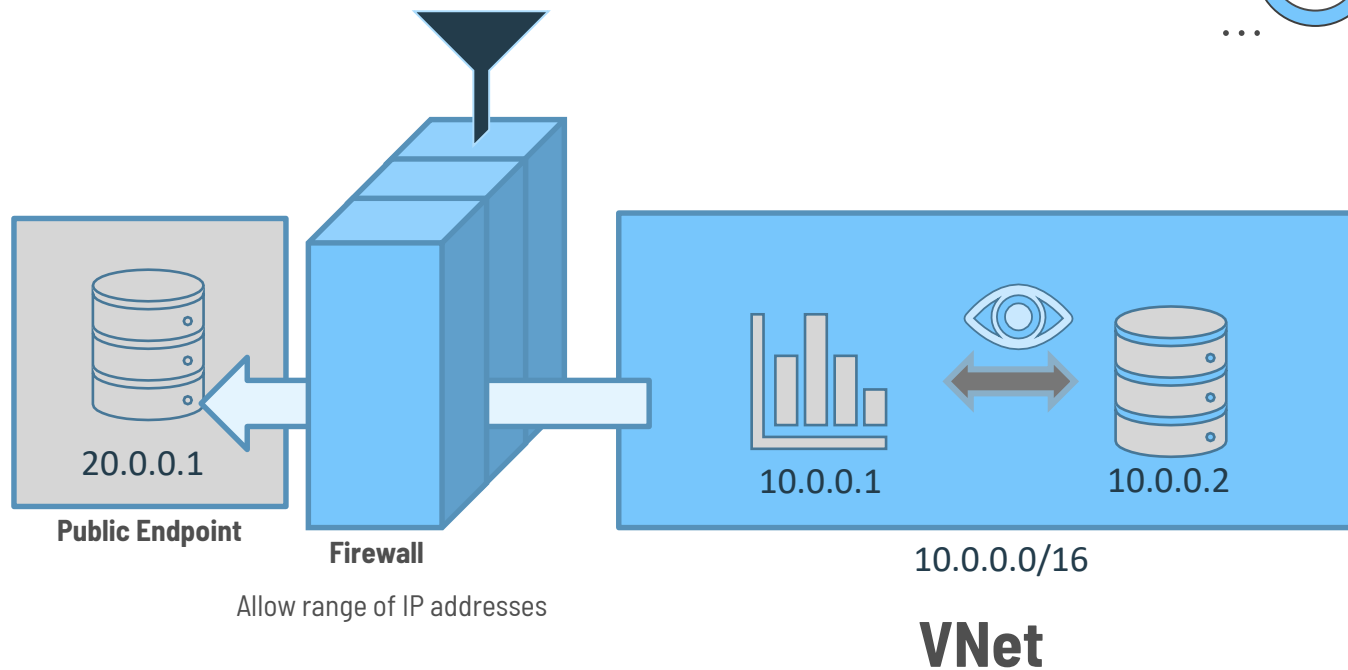




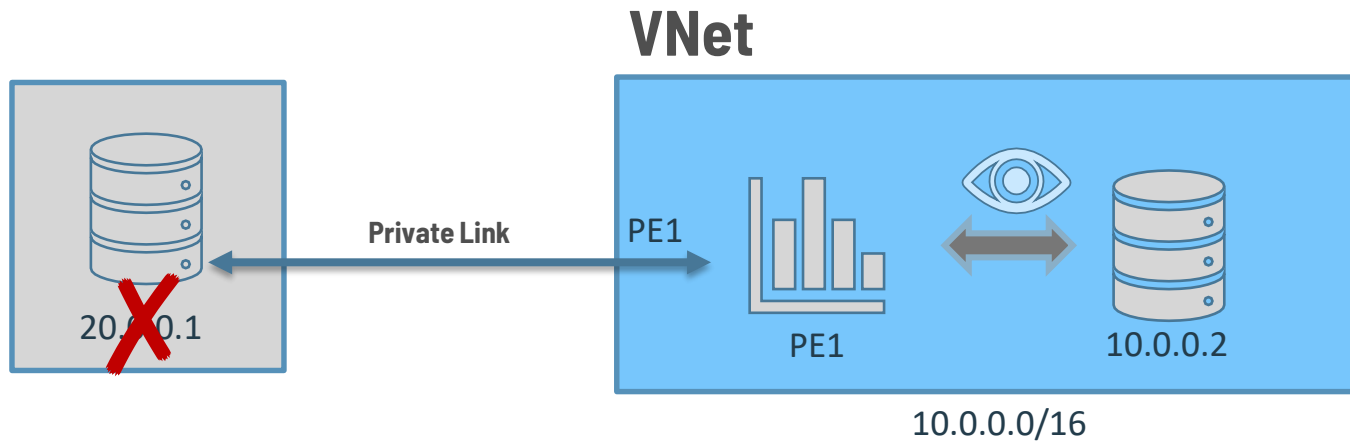
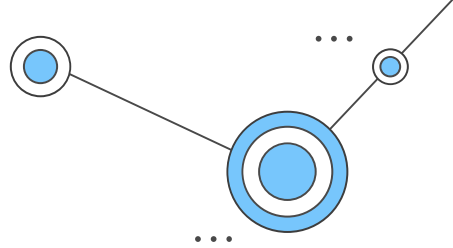
# Private & public endpoints



# Private & public endpoints

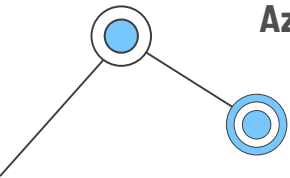


# Private & public endpoints

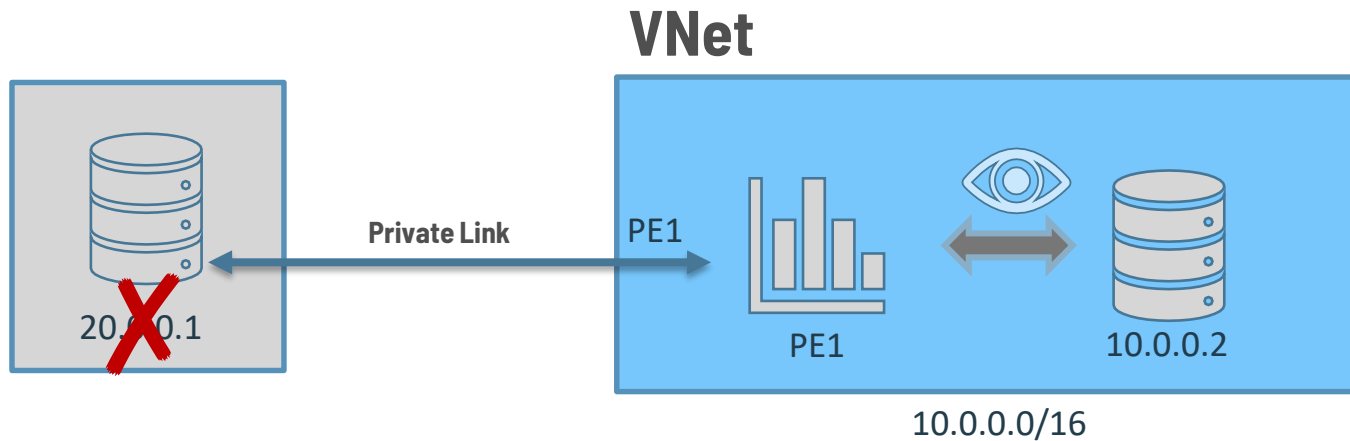
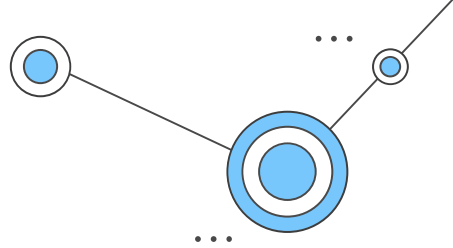


**Private Endpoint:** *Uses private IP address from virtual network*

**Azure Private Link:** *Enables private connection to Azure PaaS services (storage account, Cosmos DB etc.)*



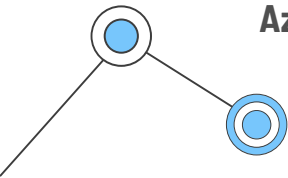
# Private & public endpoints



**Private Endpoint:** *Uses private IP address from virtual network*

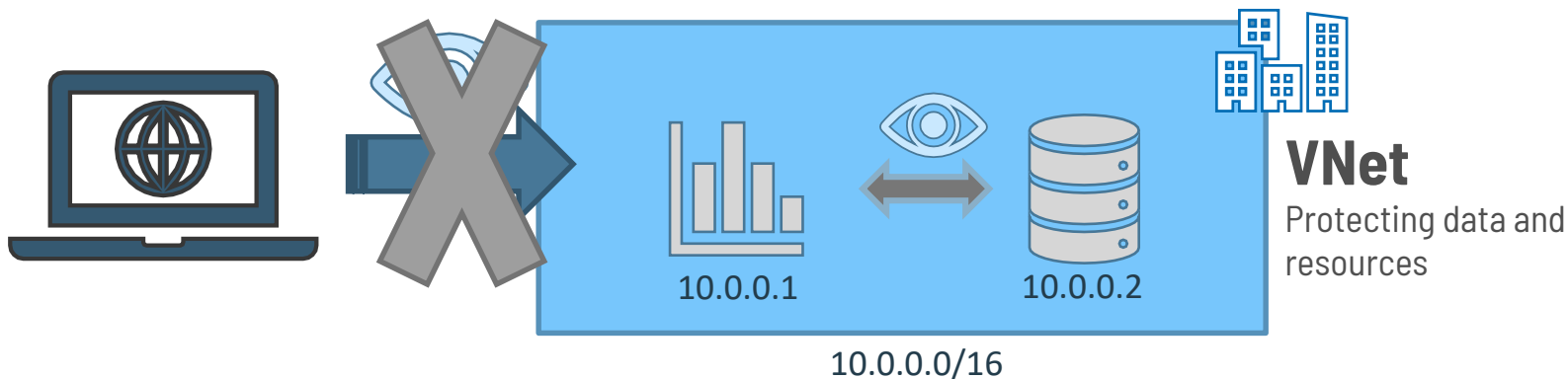
**Azure Private Link:** *Enables private connection to Azure PaaS services (storage account, Cosmos DB etc.)*

*Private endpoint brings the service into your virtual network.*



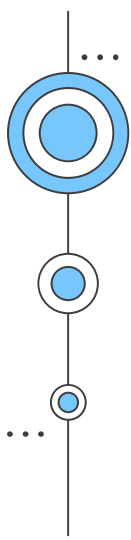
# Virtual Networks

Enables resources to securely communicate with each other or with users over the Internet



**Azure virtual network:** *Emulates a physical network in the cloud*

Infrastructure-as-a-Service

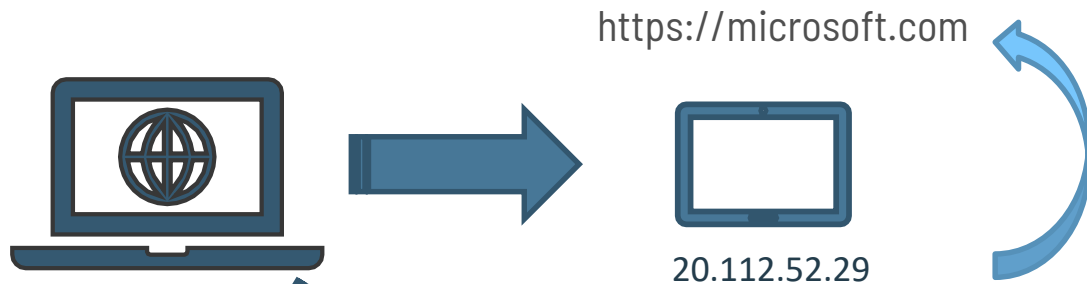
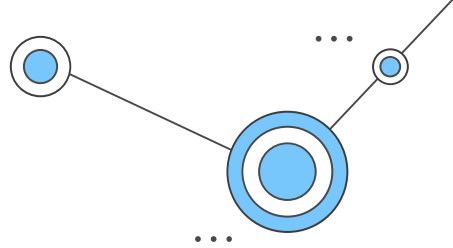


# Azure DNS



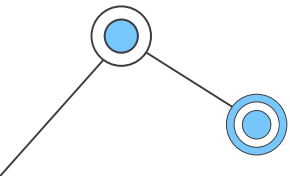
# Azure DNS

What is DNS?

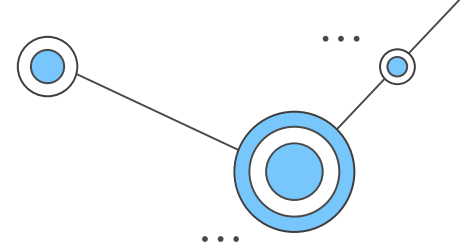


**DNS:** Domain Name System

https://microsoft.com	➔ 20.112.52.29



# Azure DNS

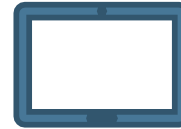


## Azure DNS:

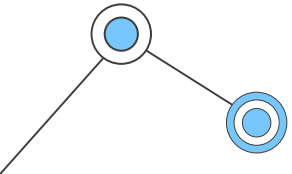
Provides name resolution by using Microsoft infrastructure

<https://data-science-academy.com>

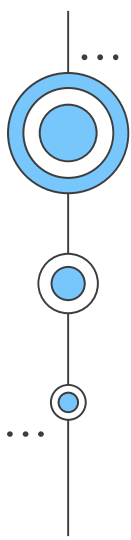
22.152.18.93



<a href="https://microsoft.com">https://microsoft.com</a>	20.112.52.29





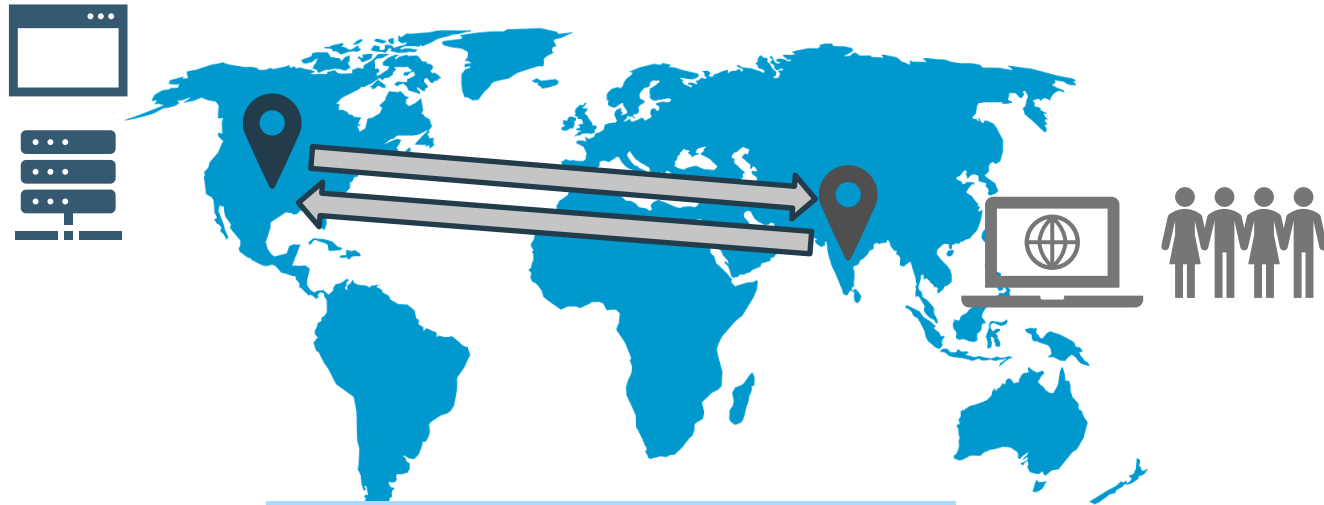


# Content delivery network (CND)



# Content delivery network (CDN)

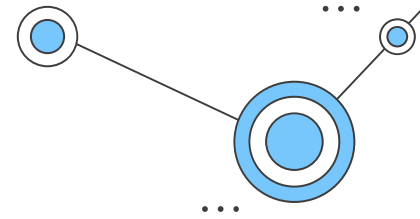
*Global network of servers that efficiently delivers web content to users*



Long distances will result in higher latencies

# Content delivery network (CDN)

Global network of servers that efficiently delivers web content to users



Edge server  
PoP (Point of Presence)



1. Request is sent – file available?

2. File will be delivered: *High latency!*

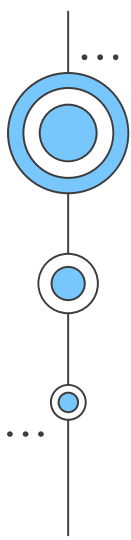
3. File will be cached close to user

4. Next request: *Low latency!*

Long distances will result in higher latencies

Physical nodes strategically placed around the globe

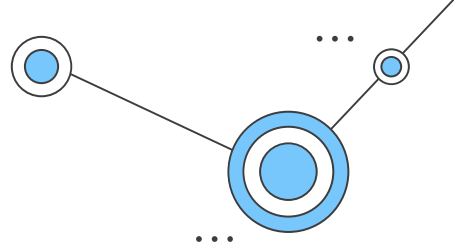
Better performance and user-experience



# Summary



# Summary



## Virtual Networks

- Emulates a physical network
- Traffic is isolated and segmented
- Secure communication of resources
- Cloud resources + local resources

## Virtual Subnet

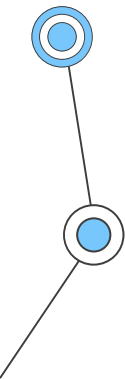
- Further segmentation
- Public subnet CAN be reached from the public internet
- Private subnet CANNOT be reached from the public internet
- Public subnet CAN access Privat Subnet

## VPN Gateway

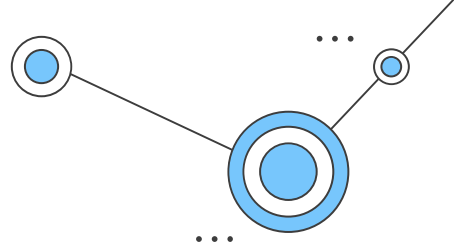
- Connects an Azure virtual network with an on-premise device or network (Site-to-Site)
- Use an encrypted tunnel to connect two or more networks over an untrusted network (public internet)
- Cost-effective solution

## ExpressRoute

- Extends on-premises networks into the Microsoft cloud.
- Over a private connection with the help of a connectivity provider.
- More bandwidth, more secure, and more reliable



# Summary



## Private Endpoint

Uses private IP address from your virtual network to bring PaaS services into your virtual network

Delivered via Azure Private Link

Private connection to Azure PaaS services

## Azure DNS

Provides domain name resolution by using Microsoft infrastructure

## Content delivery network (CND)

Global network of servers that efficiently delivers web content to users

