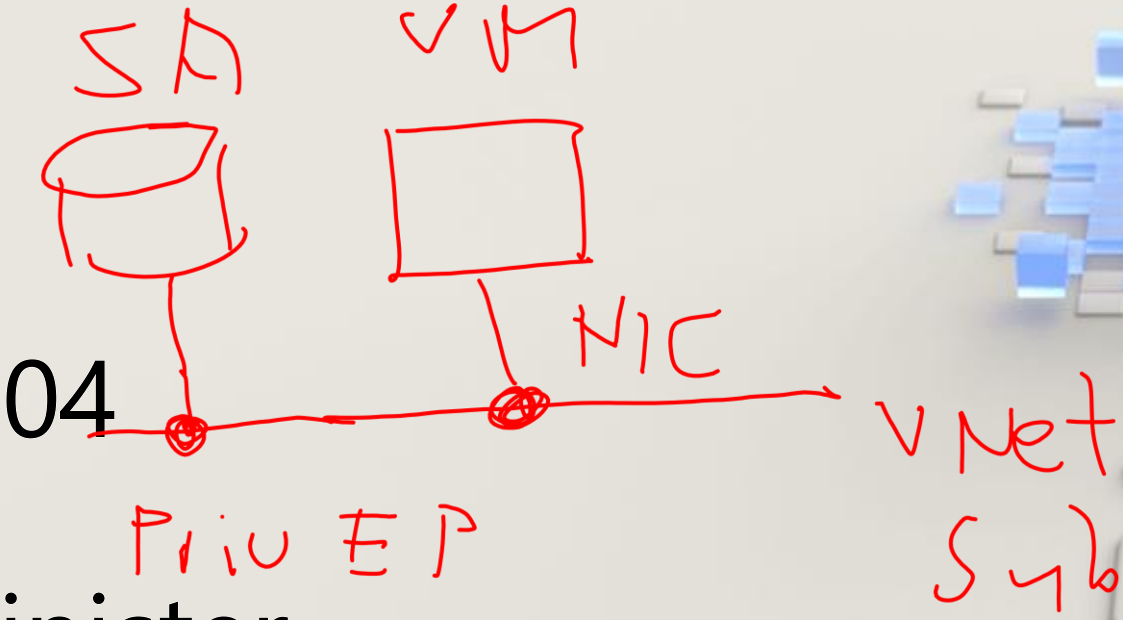


AZ-104

Administer Virtual Networking

AZ-104 Course Outline

01: Administer Identity

02: Administer Governance and Compliance

03: Administer Azure Resources

04: Administer Virtual Networking

05: Administer Intersite Connectivity

06: Administer Network Traffic Management

07: Administer Azure Storage

08: Administer Azure Virtual Machines

09: Administer PaaS Compute Options

10: Administer Data Protection

11: Administer Monitoring

Peering Routing

UDR

NVA

Learning Objectives - Administer Virtual Networking

- Configure Virtual Networks
- Configure Network Security Groups
- Host your domain on Azure DNS
- Lab 04 – Implement Virtual Networks

NSG

22 SSH
25 SMTP
53 UDP
3389
443
~~80~~
~~23~~

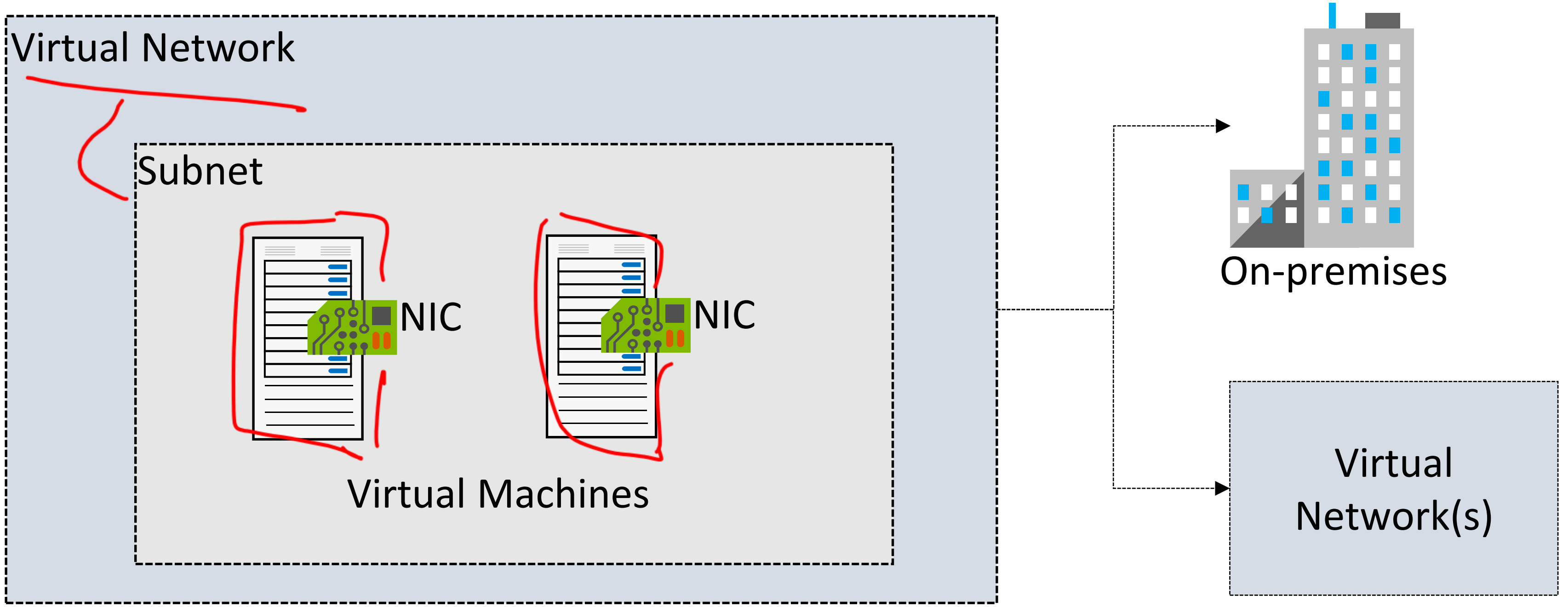
SDN

Configure Virtual Networks

VNet

Plan Virtual Networks

ping
Test-NetConnection -port 3389



Logical representation of your own network

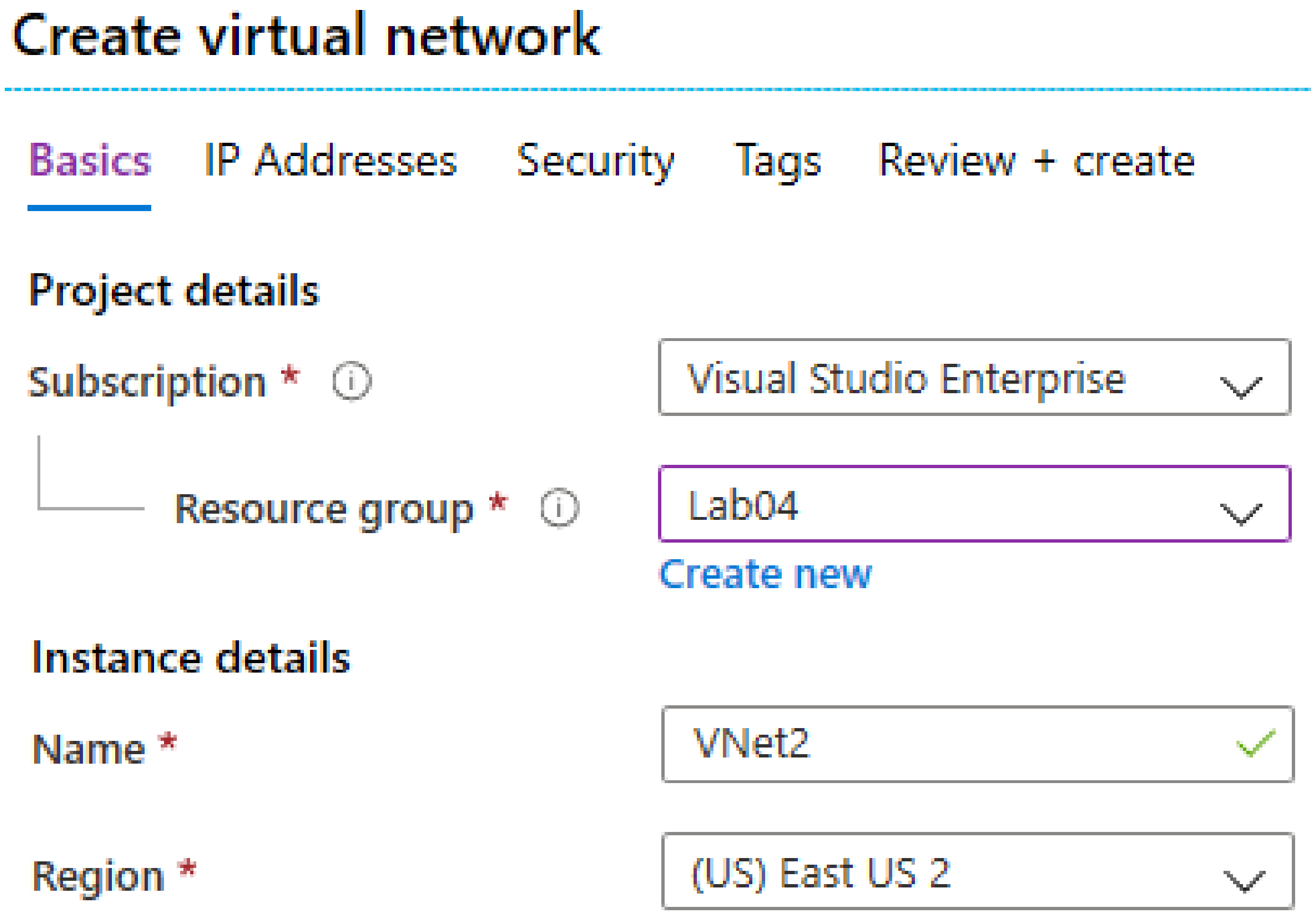
Create a dedicated private cloud-only virtual network

Securely extend your datacenter with virtual networks

Enable hybrid cloud scenarios

Create Virtual Networks

- Create new virtual networks at any time
- Add virtual networks when you create a virtual machine
- Define the address space, and at least one subnet
- Check for overlapping address spaces



Create virtual network

Project details

Subscription * : Visual Studio Enterprise

Resource group * : Lab04

Create new

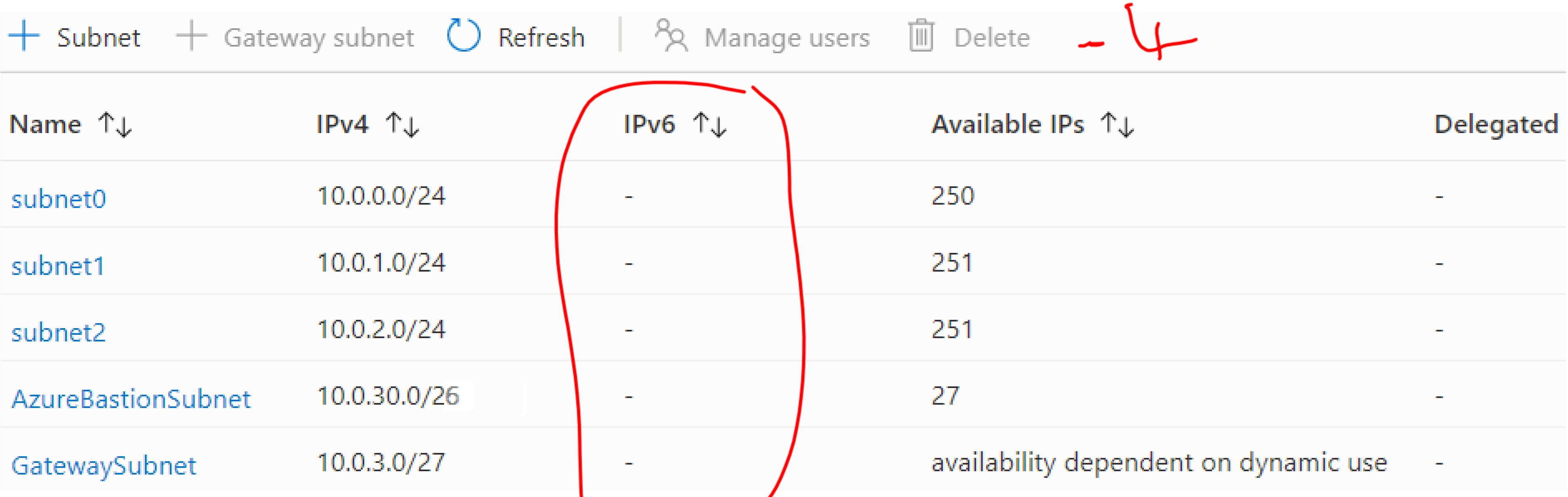
Instance details

Name * : VNet2

Region * : (US) East US 2

Create Subnets

- 1
- 2
- 3 } multicast DNS
- 4



Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓	Delegated
subnet0	10.0.0.0/24	-	250	-
subnet1	10.0.1.0/24	-	251	-
subnet2	10.0.2.0/24	-	251	-
AzureBastionSubnet	10.0.30.0/26	-	27	-
GatewaySubnet	10.0.3.0/27	-	availability dependent on dynamic use	-

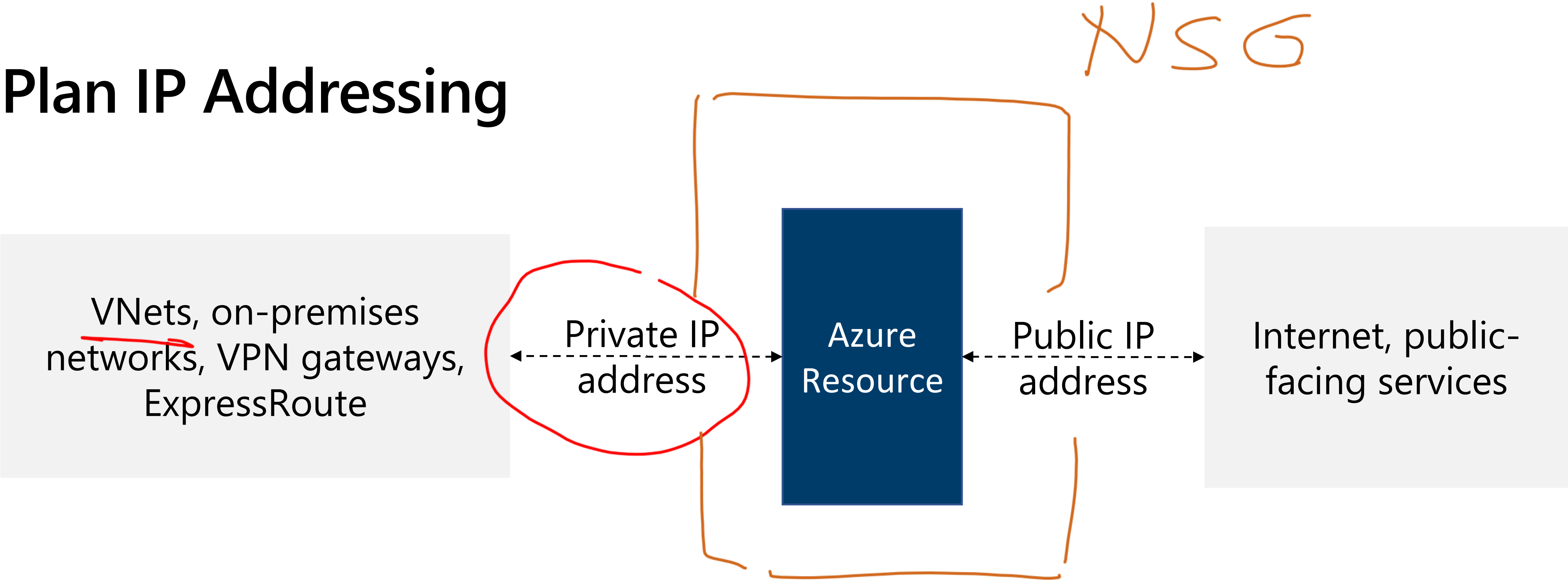
A virtual network can be segmented into one or more subnets

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

Plan IP Addressing


NSG
VNets, on-premises networks, VPN gateways, ExpressRoute
Private IP address
Azure Resource
Public IP address
Internet, public-facing services

Private IP addresses - used within an Azure virtual network (VNet), and your on-premises network, when you use a VPN gateway or ExpressRoute circuit to extend your network to Azure

Public IP addresses - used for communication with the Internet, including Azure public-facing services

Create Public IP Addresses

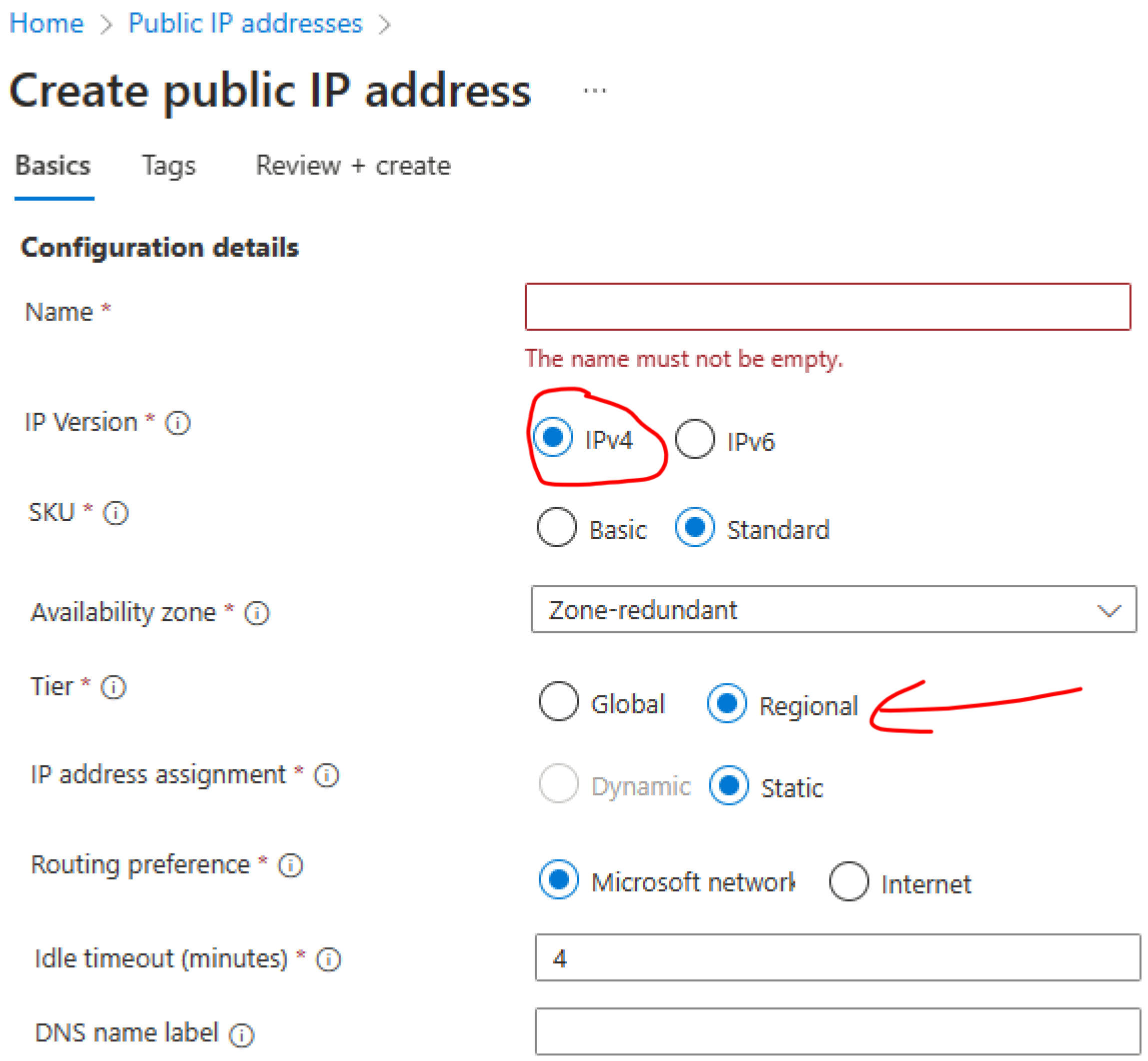
Vint Cerf

Available in IPv4 or IPv6 or both

Basic vs Standard SKU

Dynamic vs Static

Microsoft vs. internet routing



Home > Public IP addresses >

Create public IP address ...

Configuration details

Name *	 The name must not be empty.
IP Version * ⓘ	● IPv4 ○ IPv6
SKU * ⓘ	○ Basic ● Standard
Availability zone * ⓘ	Zone-redundant
Tier * ⓘ	○ Global ● Regional
IP address assignment * ⓘ	○ Dynamic ● Static
Routing preference * ⓘ	● Microsoft network ○ Internet
Idle timeout (minutes) * ⓘ	4
DNS name label ⓘ	

Associate Public IP Addresses

Public IP addresses	IP address association	Dynamic	Static
Virtual Machine	NIC	Yes	Yes
Load Balancer	Front-end configuration	Yes	Yes
VPN Gateway	Gateway IP configuration	Yes	Yes*
Application Gateway	Front-end configuration	Yes	Yes*

A public IP address resource can be associated with virtual machine network interfaces, internet-facing load balancers, VPN gateways, and application gateways

*Static IP addresses only available on certain SKUs.

Allocate or Assign Private IP Addresses

Private IP Addresses	IP address association	Dynamic	Static
Virtual Machine	NIC	Yes	Yes
Internal Load Balancer	Front-end configuration	Yes	Yes
Application Gateway	Front-end configuration	Yes	Yes

Dynamic (default). Azure assigns the next available unassigned or unreserved IP address in the subnet’s address range

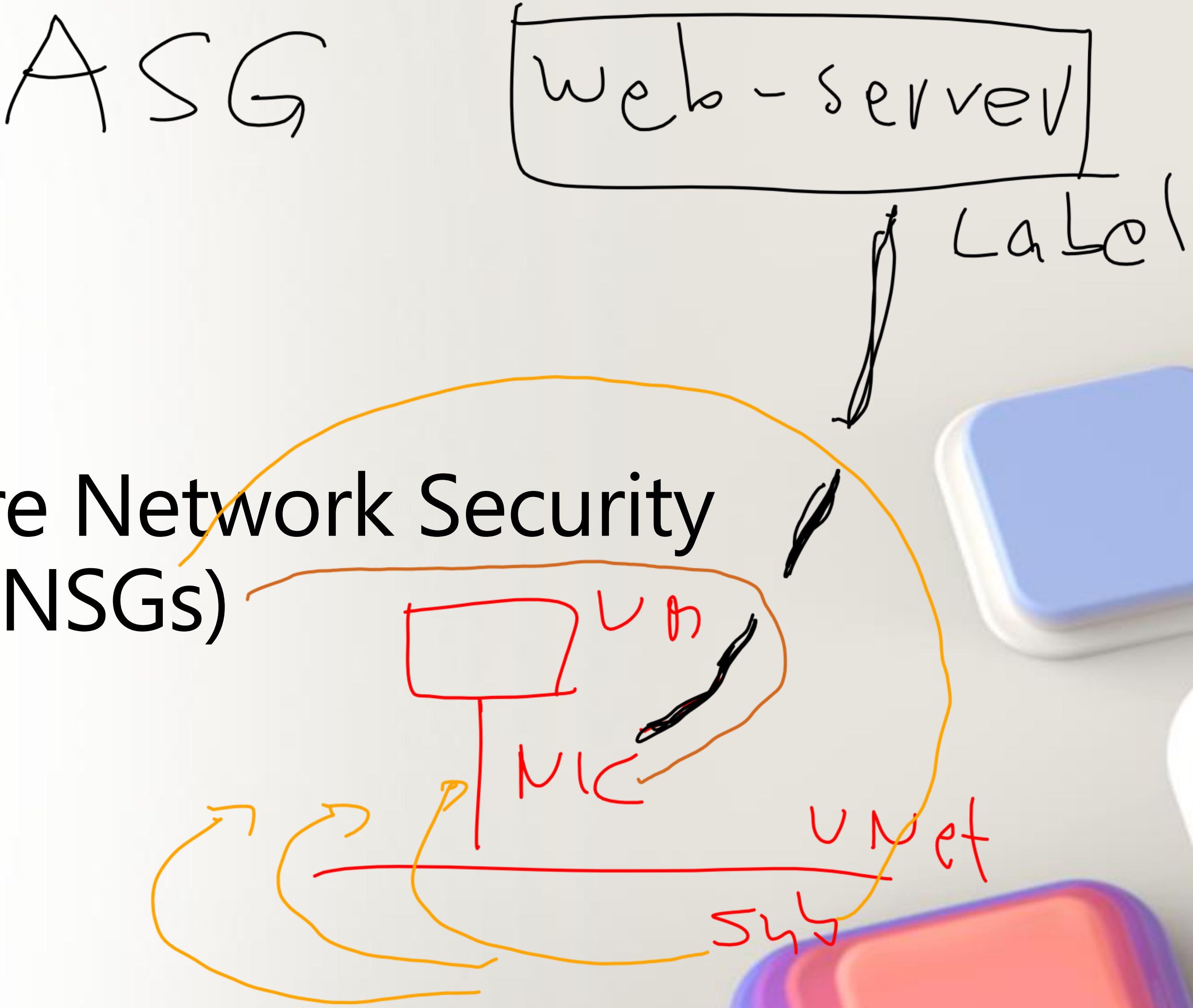
Static. You select and assign any unassigned or unreserved IP address in the subnet's address range

Learning Recap – Virtual Networks

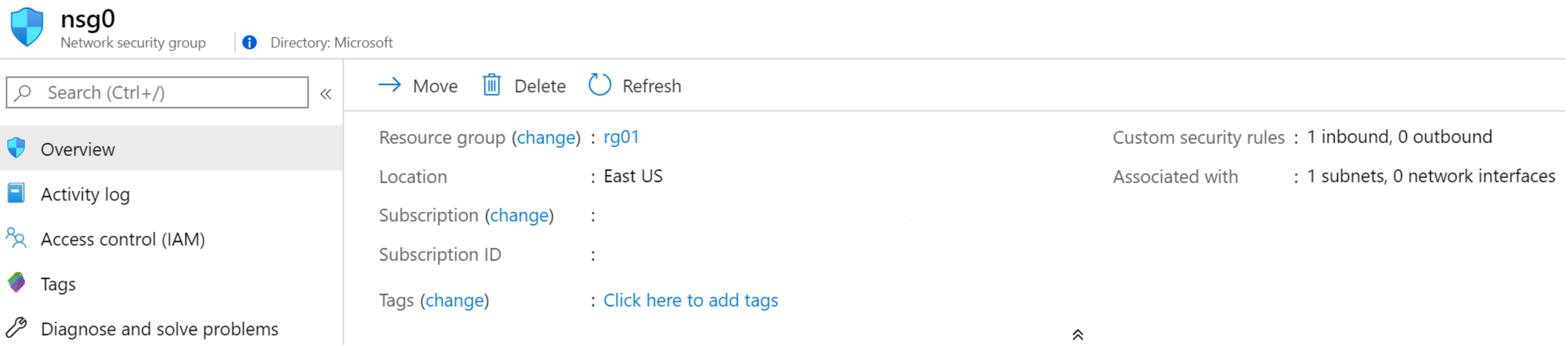
Check your knowledge questions and additional study

- Introduction to Azure Virtual Networks
- Design an IP addressing schema for your Azure deployment
- Implement Windows Server IaaS VM IP addressing and routing

Configure Network Security Groups (NSGs)



Implement Network Security Groups



Resource group (change) : rg01

Location : East US

Subscription (change) :

Subscription ID :

Tags (change) : Click here to add tags

Custom security rules : 1 inbound, 0 outbound

Associated with : 1 subnets, 0 network interfaces

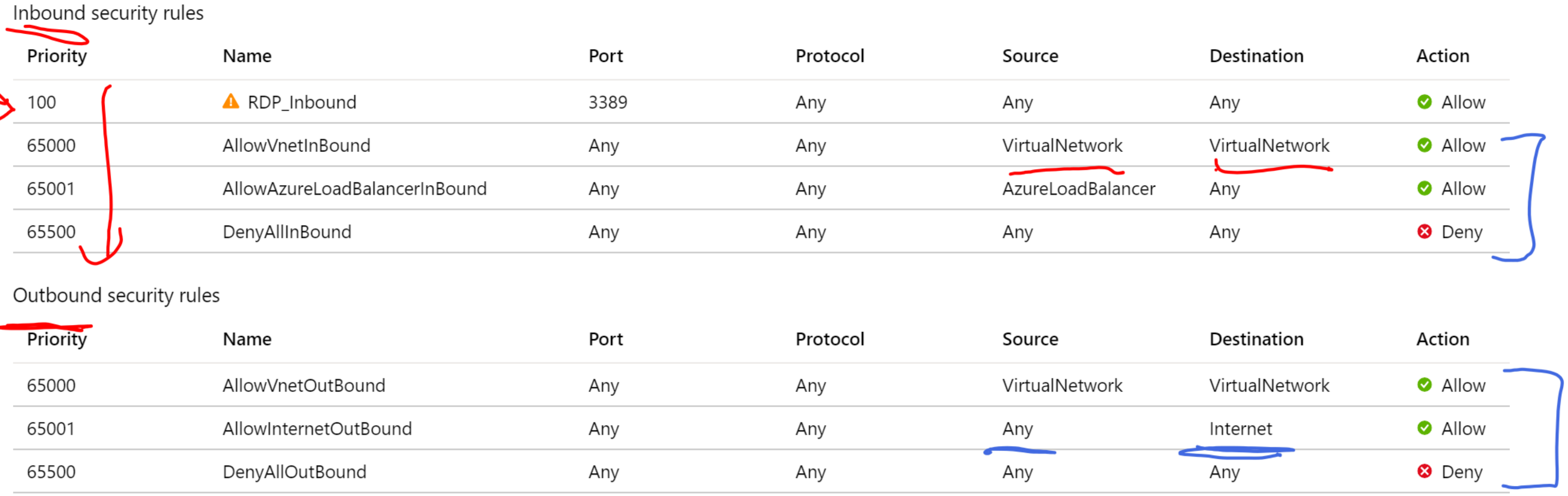
Limits network traffic to resources in a virtual network

Lists the security rules that allow or deny inbound or outbound network traffic

Associated to a subnet or a network interface

Can be associated multiple times

Determine NSG Rules



Inbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action
100	⚠ RDP_Inbound	3389	Any	Any	Any	✓ Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	✓ Allow
65500	DenyAllInBound	Any	Any	Any	Any	✗ Deny

default

Outbound security rules

Priority	Name	Port	Protocol	Source	Destination	Action
65000	AllowVnetOutBound	Any	Any	VirtualNetwork	VirtualNetwork	✓ Allow
65001	AllowInternetOutBound	Any	Any	Any	Internet	✓ Allow
65500	DenyAllOutBound	Any	Any	Any	Any	✗ Deny

Security rules in NSGs enable you to filter network traffic that can flow in and out of virtual network subnets and network interfaces

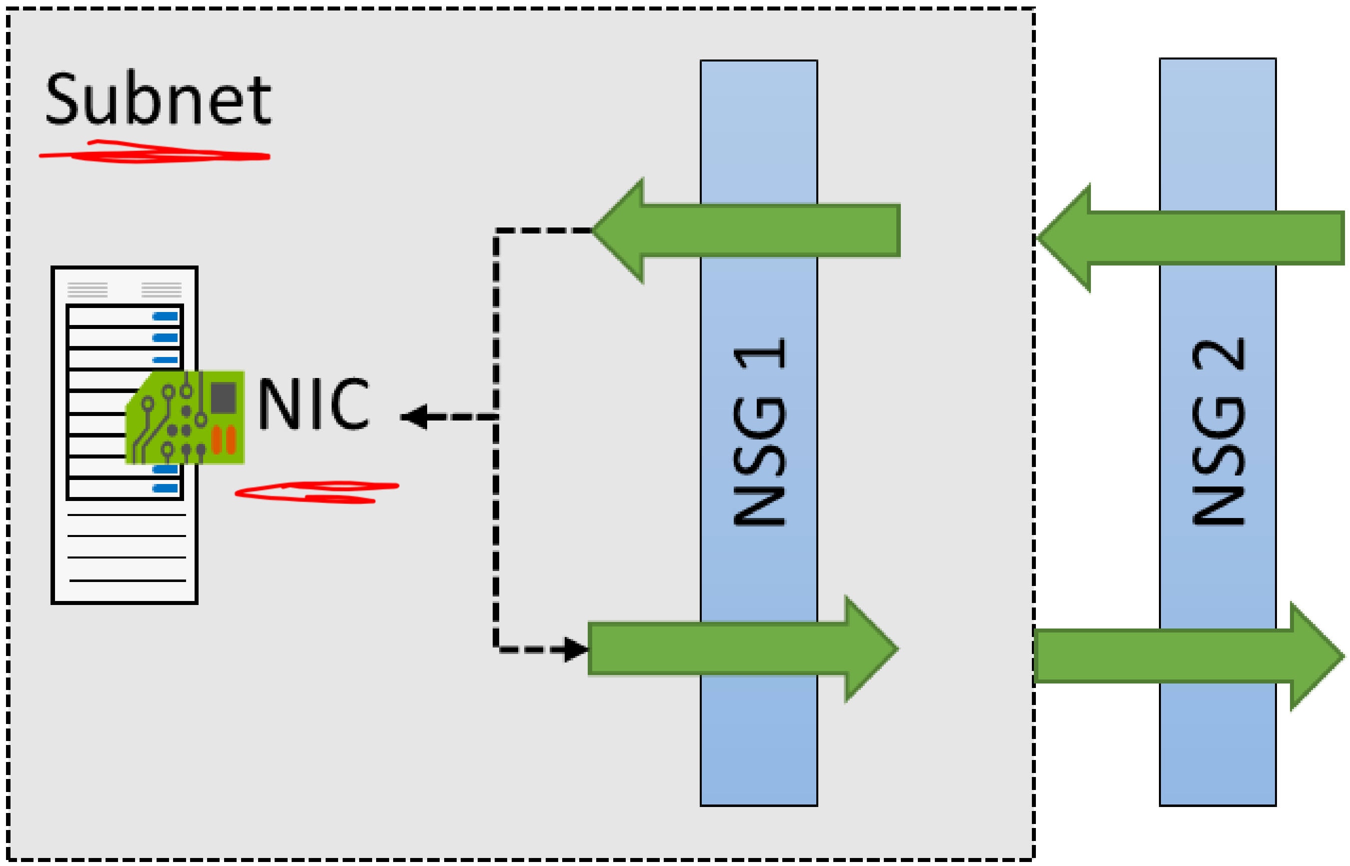
There are default security rules. You cannot delete the default rules, but you can add other rules with a higher priority

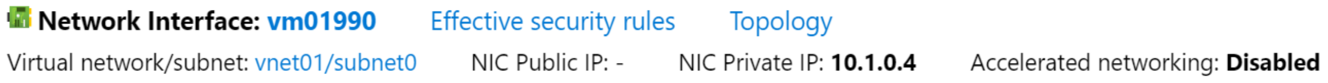
Determine NSG Effective Rules

NSGs are evaluated independently for the subnet and NIC

An "allow" rule must exist at both levels for traffic to be admitted

Use the Effective Rules link if you are not sure which security rules are being applied




Network Interface: vm01990 Effective security rules Topology

Virtual network/subnet: vnet01/subnet0 NIC Public IP: - NIC Private IP: **10.1.0.4** Accelerated networking: **Disabled**

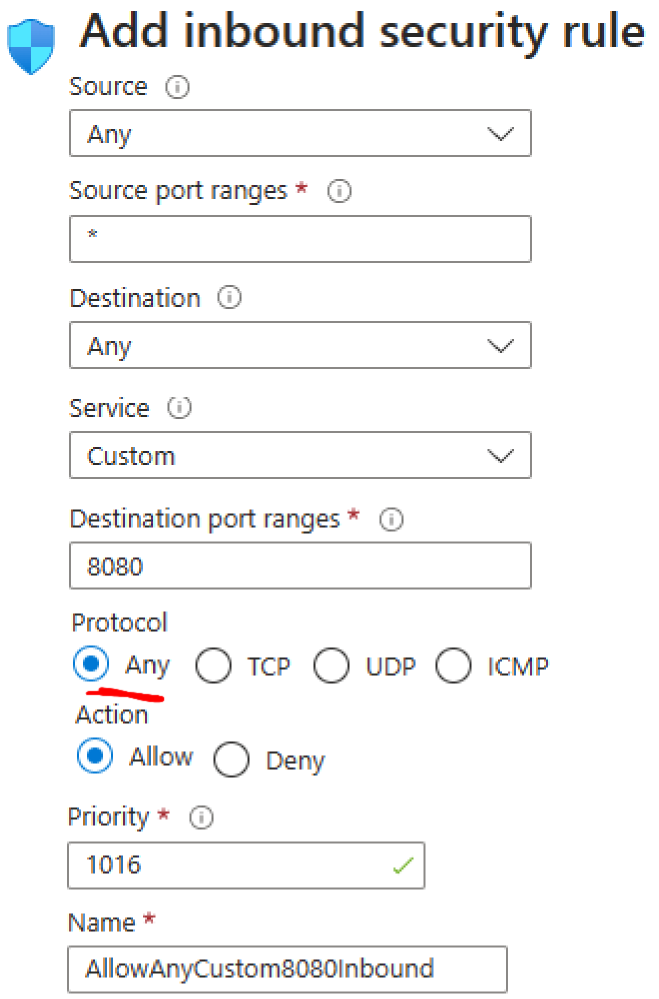
Create NSG rules

Source (Any, IP addresses, My IP address, service tags, and application security group)

Destination (Any, IP addresses, service tag, and application security group)

Service (HTTPS, SSH, RDP, DNS, POP3, custom, ...)

Priority – The lower the number, the higher the priority



Add inbound security rule

Source: Any

Source port ranges *: *

Destination: Any

Service: Custom

Destination port ranges *: 8080

Protocol: ● Any ○ TCP ○ UDP ○ ICMP

Action: ● Allow ○ Deny

Priority *: 1016 ✓

Name *: AllowAnyCustom8080Inbound

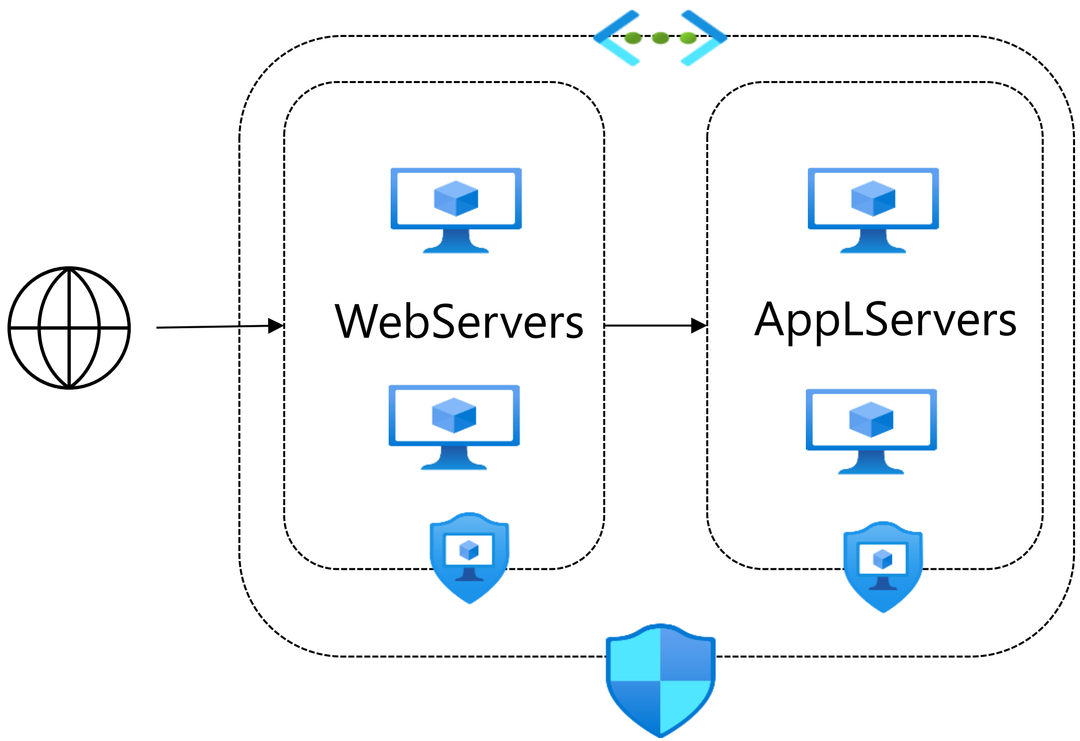
Implement Application Security Groups

Extends your application's structure

ASGs logically group virtual machines – web servers, application servers

Define rules to control the traffic flow

Wrap the ASG with an NSG for added security



Source	Destination	Port
Internet	WebServers	80, 443
WebServers	SQLServers	1433

Learning Recap – Network Security Groups

Check your knowledge questions and additional study

- Secure and isolate access to Azure resources by using network security groups and service endpoints com

contoso.com

DNS Zone
Public

www A 10.0.0.4

SOA

Host your domain on Azure DNS

NS

NS

NS

NS

nsl[illegible]p

www.contosos.a

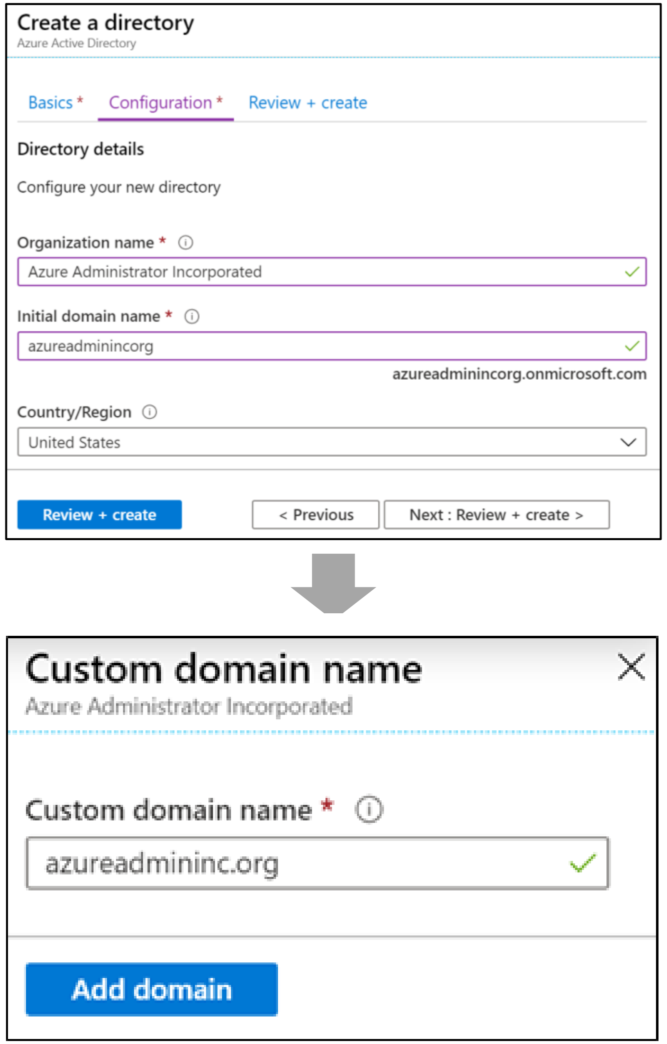
What is Azure DNS?

When you create a new tenant, a new default domain is created

The domain has initial domain name in the form *domainname.onmicrosoft.com*

You can add a custom domain name

After the custom name is added it must be verified – this demonstrates ownership of the domain



Create a directory
Azure Active Directory

Directory details

Configure your new directory

Organization name * : Azure Administrator Incorporated

Initial domain name * : azureadminincorg

azureadminincorg.onmicrosoft.com

Country/Region : United States

Custom domain name
Azure Administrator Incorporated

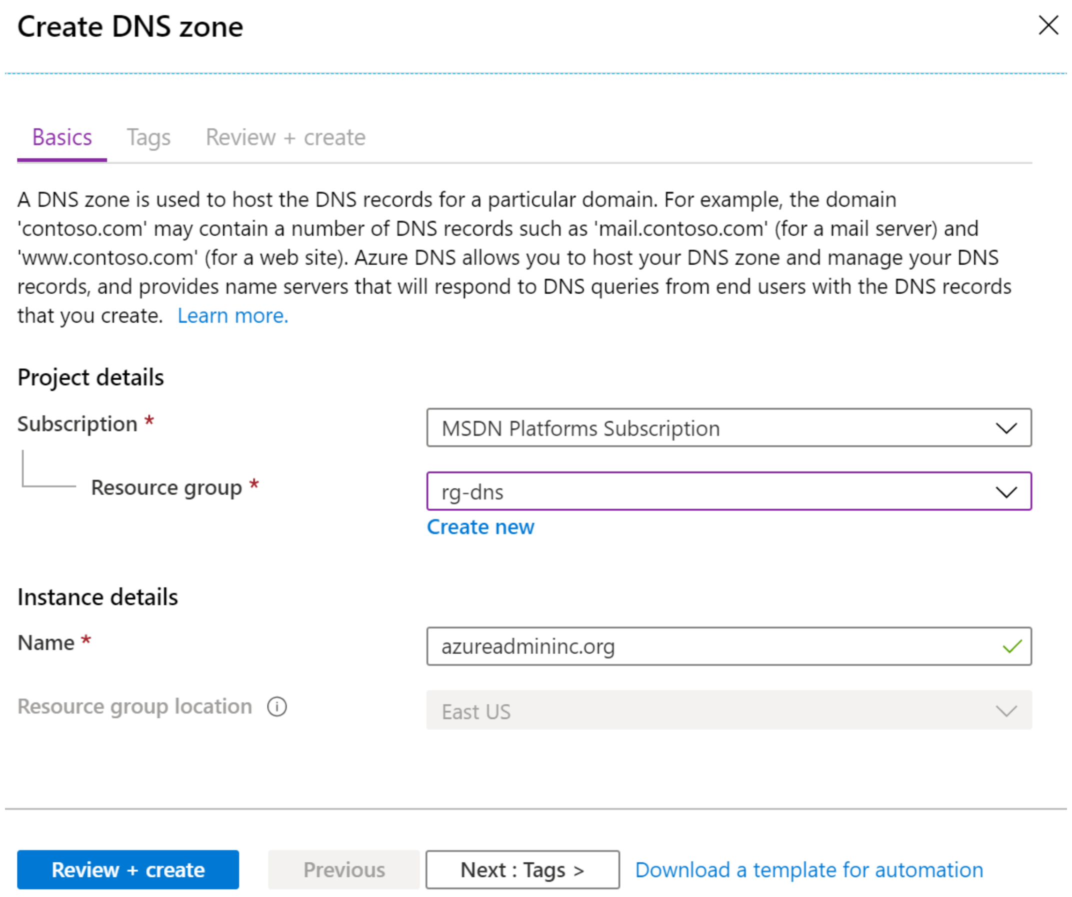
Custom domain name * : azureadmininc.org

Configure Azure DNS to host your domain

A DNS zone hosts the DNS records for a domain

Where multiple zones share the same name, each instance is assigned different name server addresses

Root/Parent domain is registered at the registrar and pointed to Azure NS



Create DNS zone

A DNS zone is used to host the DNS records for a particular domain. For example, the domain 'contoso.com' may contain a number of DNS records such as 'mail.contoso.com' (for a mail server) and 'www.contoso.com' (for a web site). Azure DNS allows you to host your DNS zone and manage your DNS records, and provides name servers that will respond to DNS queries from end users with the DNS records that you create. Learn more.

Project details

Subscription * MSDN Platforms Subscription

Resource group * rg-dns

Create new

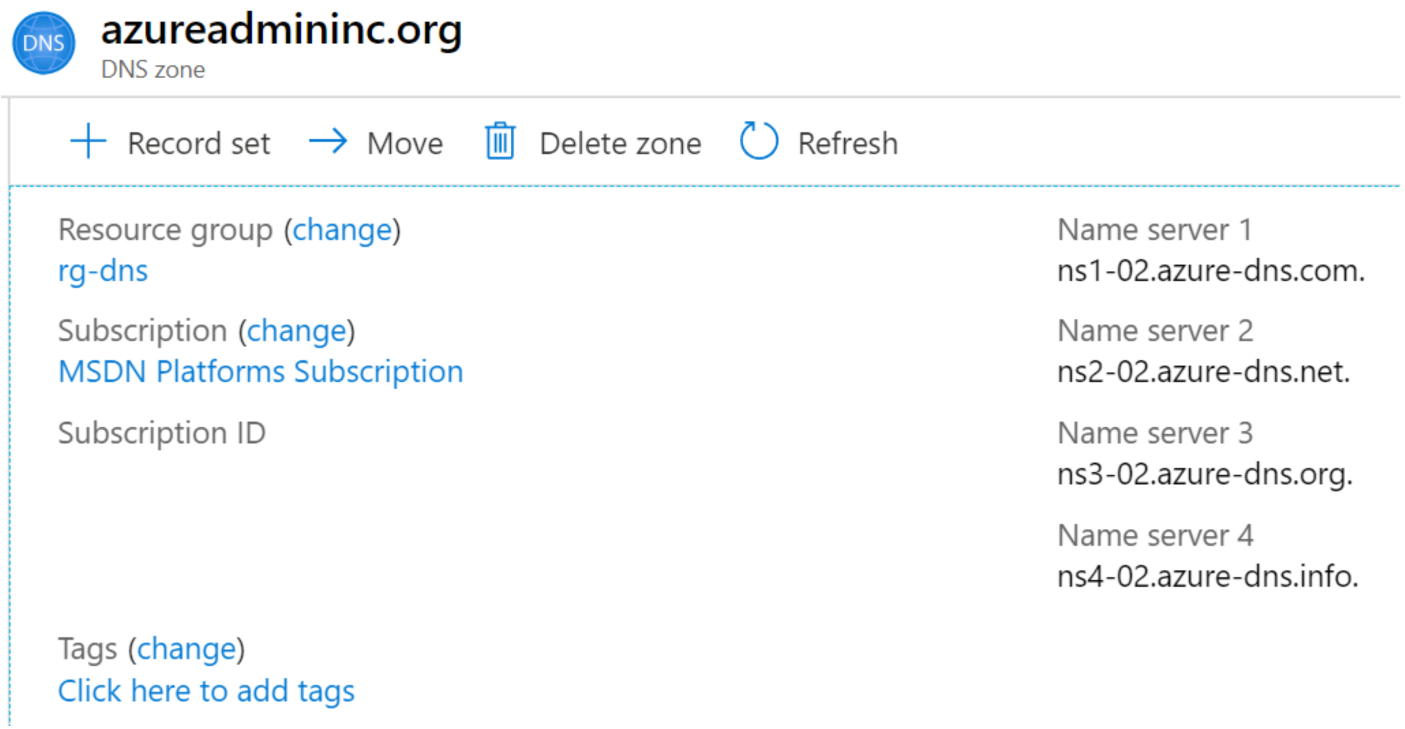
Instance details

Name * azureadmininc.org ✓

Resource group location ⓘ East US

Verify delegation of domain name services

- When delegating a domain to Azure DNS, you must use the name server names provided by Azure DNS – use all four
- Once the DNS zone is created, update the parent registrar
- For child zones, register the NS records in the parent domain



azureadmininc.org
DNS zone

Resource group (change)
rg-dns

Subscription (change)
MSDN Platforms Subscription

Subscription ID

Tags (change)
Click here to add tags

Name server 1
ns1-02.azure-dns.com.

Name server 2
ns2-02.azure-dns.net.

Name server 3
ns3-02.azure-dns.org.

Name server 4
ns4-02.azure-dns.info.

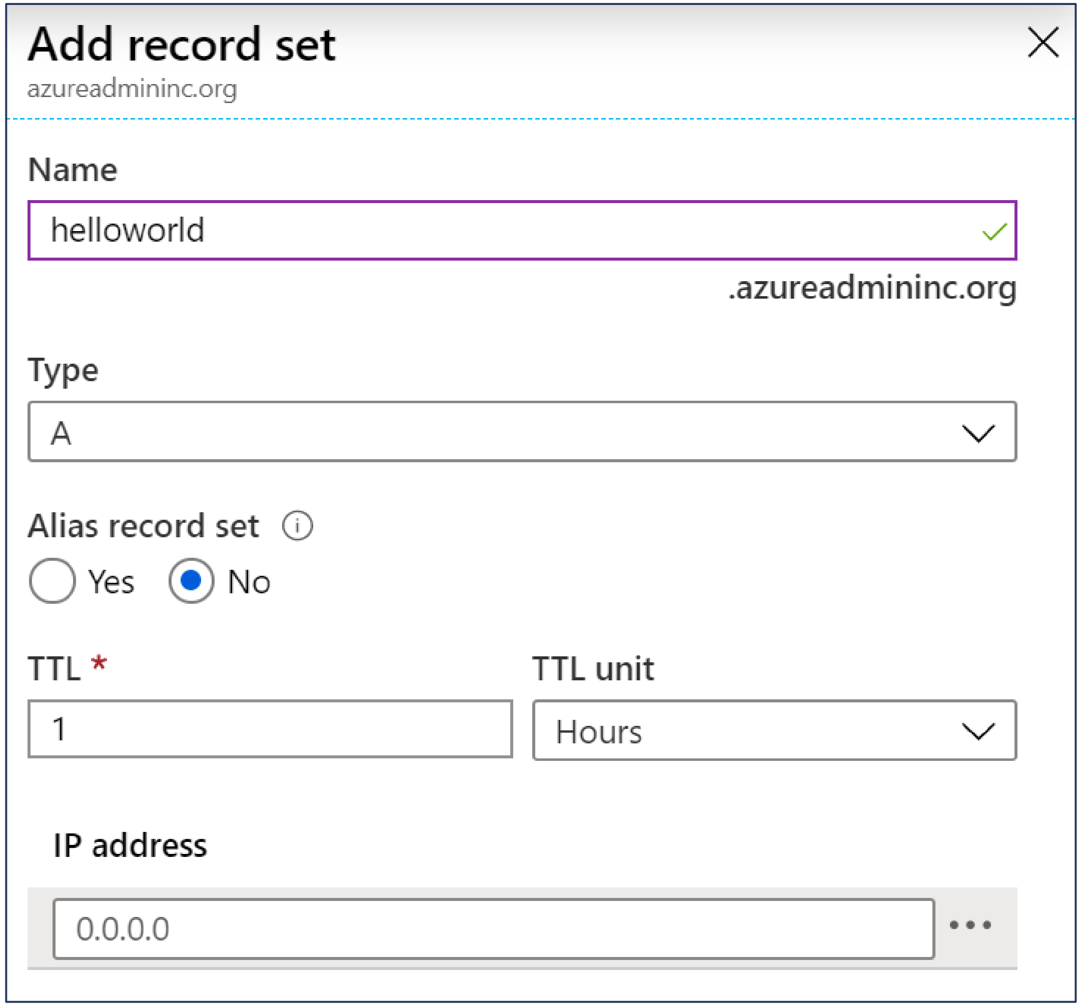
Dynamically resolve resource name by using alias record

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



Add record set

azureadmininc.org

Name: helloworld .azureadmininc.org

Type: A

Alias record set: ○ Yes ● No

TTL *: 1

TTL unit: Hours

IP address: 0.0.0.0

Configure a private DNS zone

Use your own custom domain names

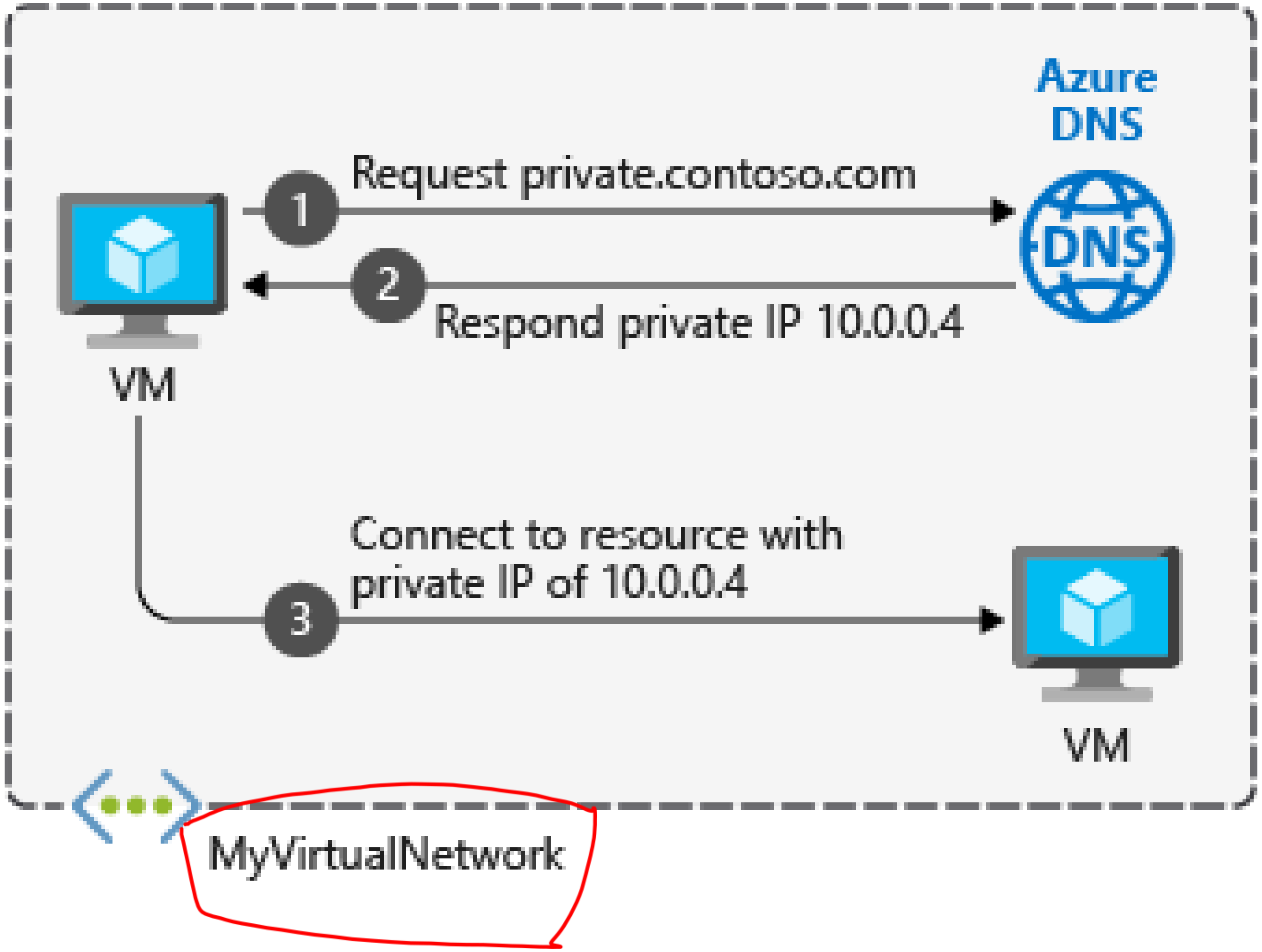
Provides name resolution for VMs within a VNet and between VNets

Automatic hostname record management

Removes the need for custom DNS solutions

Use all common DNS records types

Available in all Azure regions


Azure DNS
1
Request private.contoso.com
2
Respond private IP 10.0.0.4
DNS
VM
3
Connect to resource with private IP of 10.0.0.4
VM
MyVirtualNetwork

Learning Recap – Azure DNS

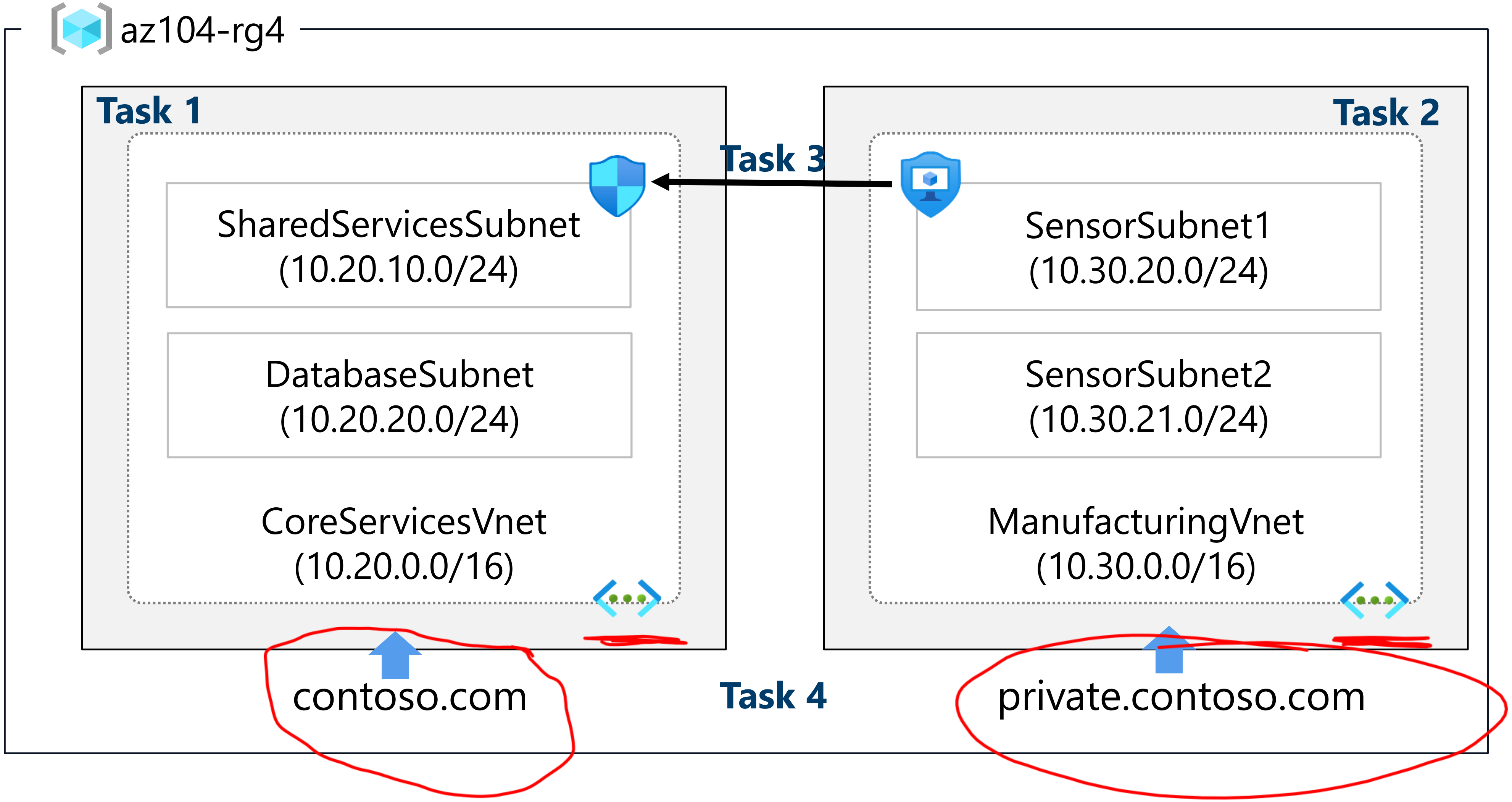
Check your knowledge questions and additional study

Reference modules

- Introduction to Azure DNS
- Host your domain on Azure DNS
- Implement DNS for Windows Server IaaS VMs

Lab – Implement Virtual Networks

Lab 04 – Architecture diagram



az104-rg4

Task 1

SharedServicesSubnet (10.20.10.0/24)

DatabaseSubnet (10.20.20.0/24)

CoreServicesVnet (10.20.0.0/16)

Task 2

SensorSubnet1 (10.30.20.0/24)

SensorSubnet2 (10.30.21.0/24)

ManufacturingVnet (10.30.0.0/16)

Task 3

Task 4

contoso.com

private.contoso.com

End of presentation