Microsoft Azure Network Engineer: Design and Implement Core Networking Infrastructure

Design and Implement Private IP Addressing for VNets

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Overview

Plan and deploy virtual networks (VNets) on Azure

Consider the need for subnet delegation

Relevant Exam AZ-700 Skills

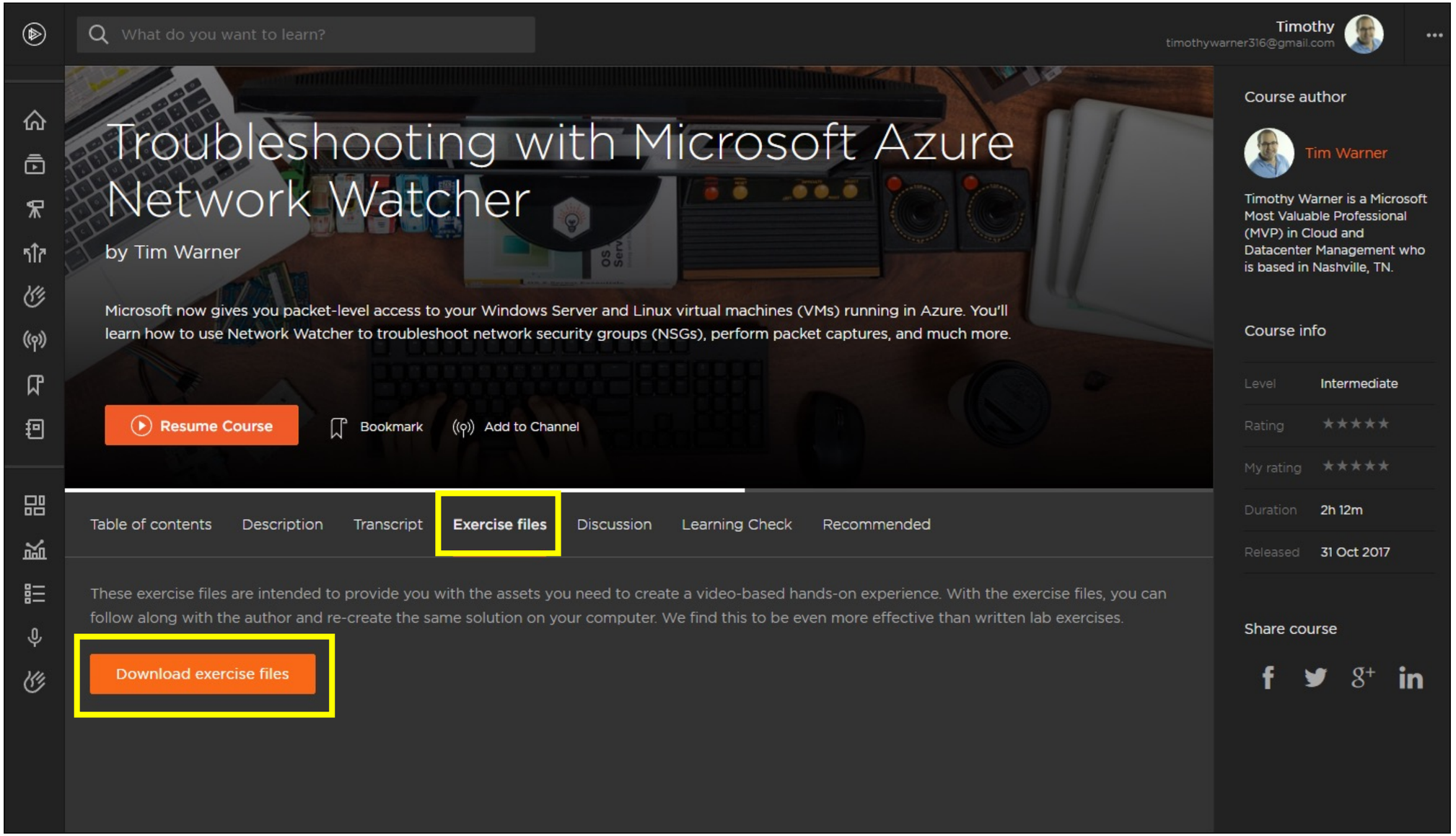
Exam AZ-700: Designing and Implementing Microsoft Azure Networking Solutions – Skills Measured

Design and Implement Core Networking Infrastructure (20–25%)

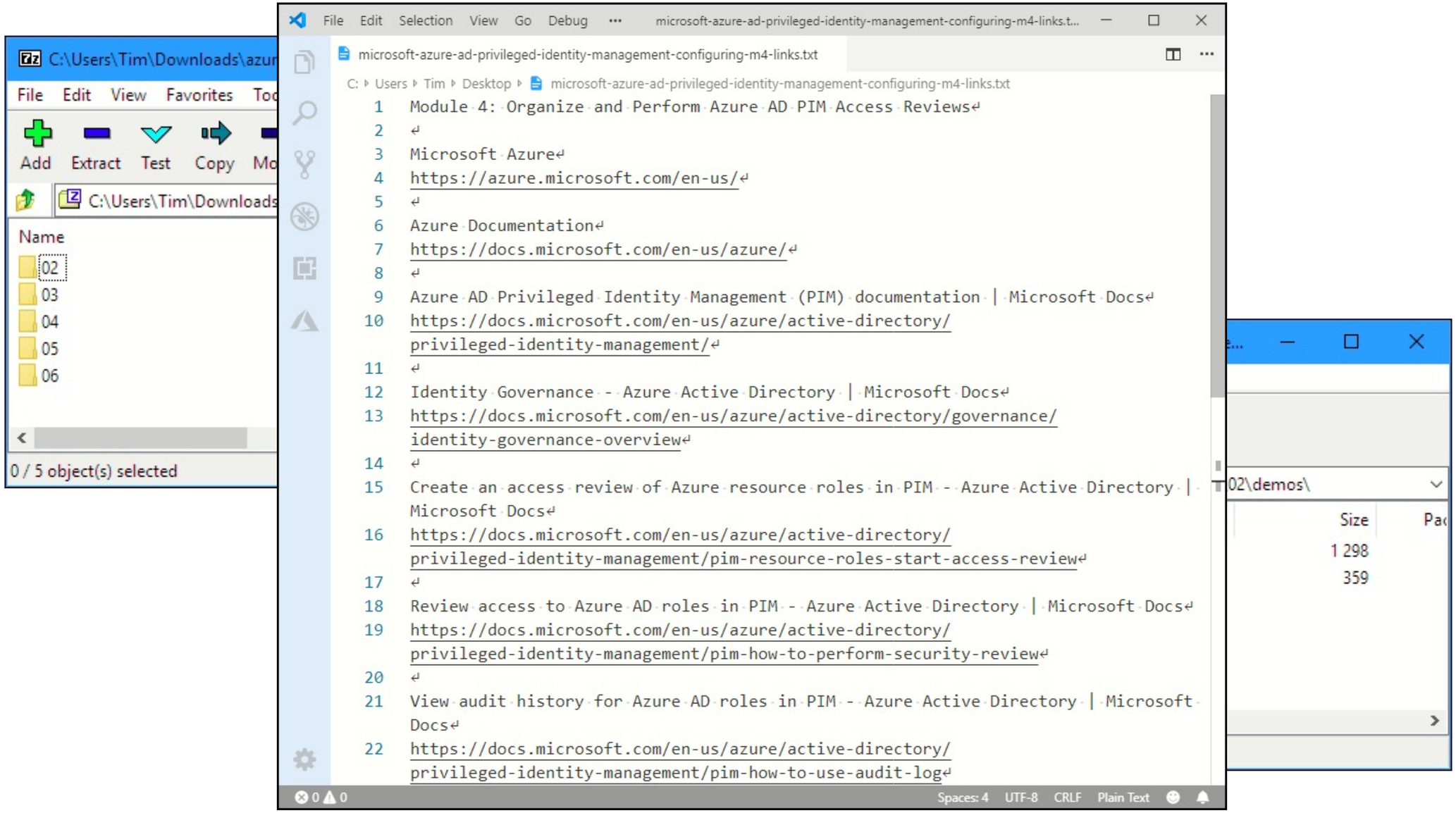
Design and implement private IP addressing for VNets

- create a VNet
- plan and configure subnetting for services, including VNet gateways, private endpoints, firewalls, application gateways, and VNet-integrated platform services
- plan and configure subnet delegation

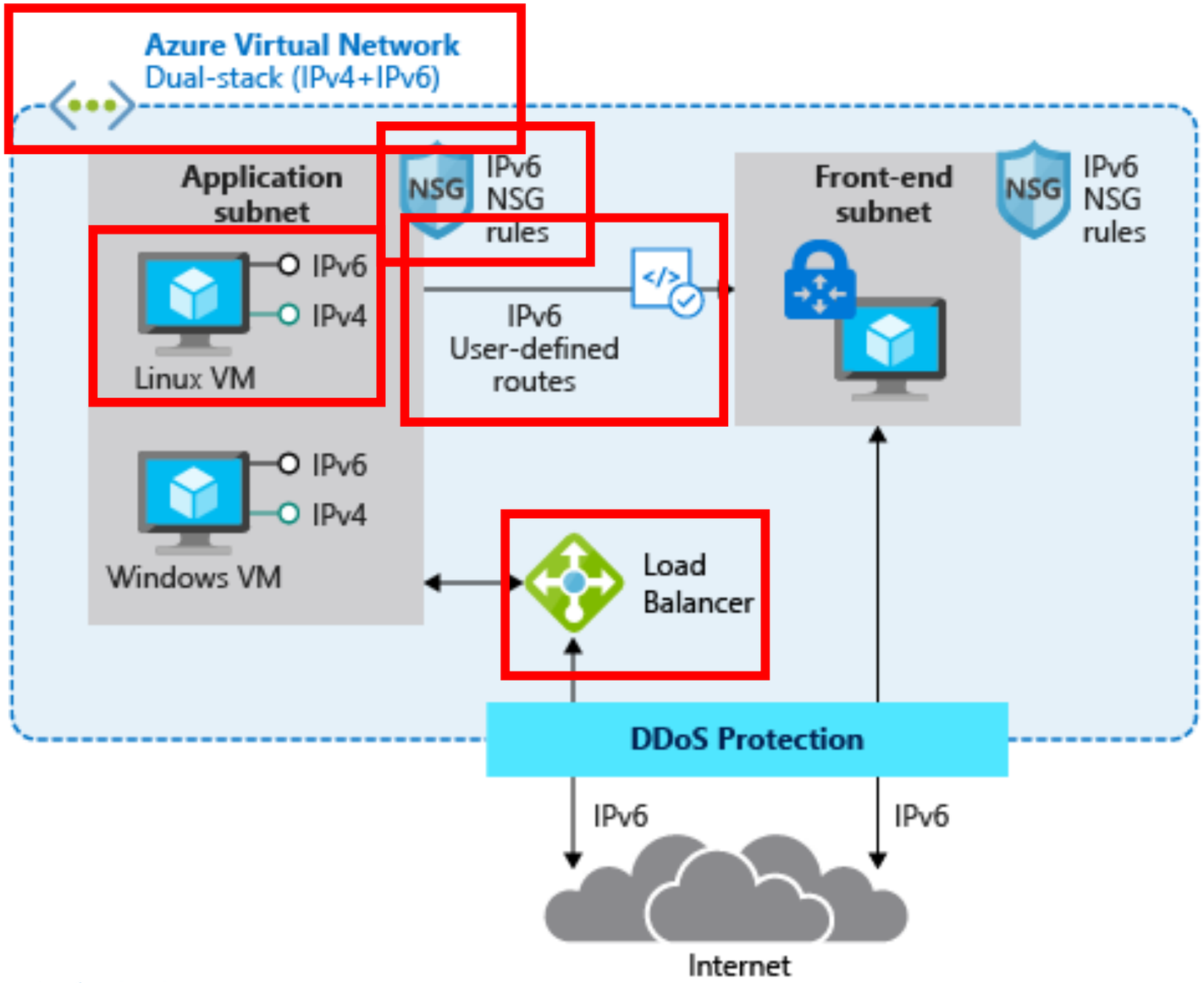
Exercise Files



Exercise Files



A Word About IPv6



No IPv6 on AZ-* exams

No VPN Gateway support

No AKS container support

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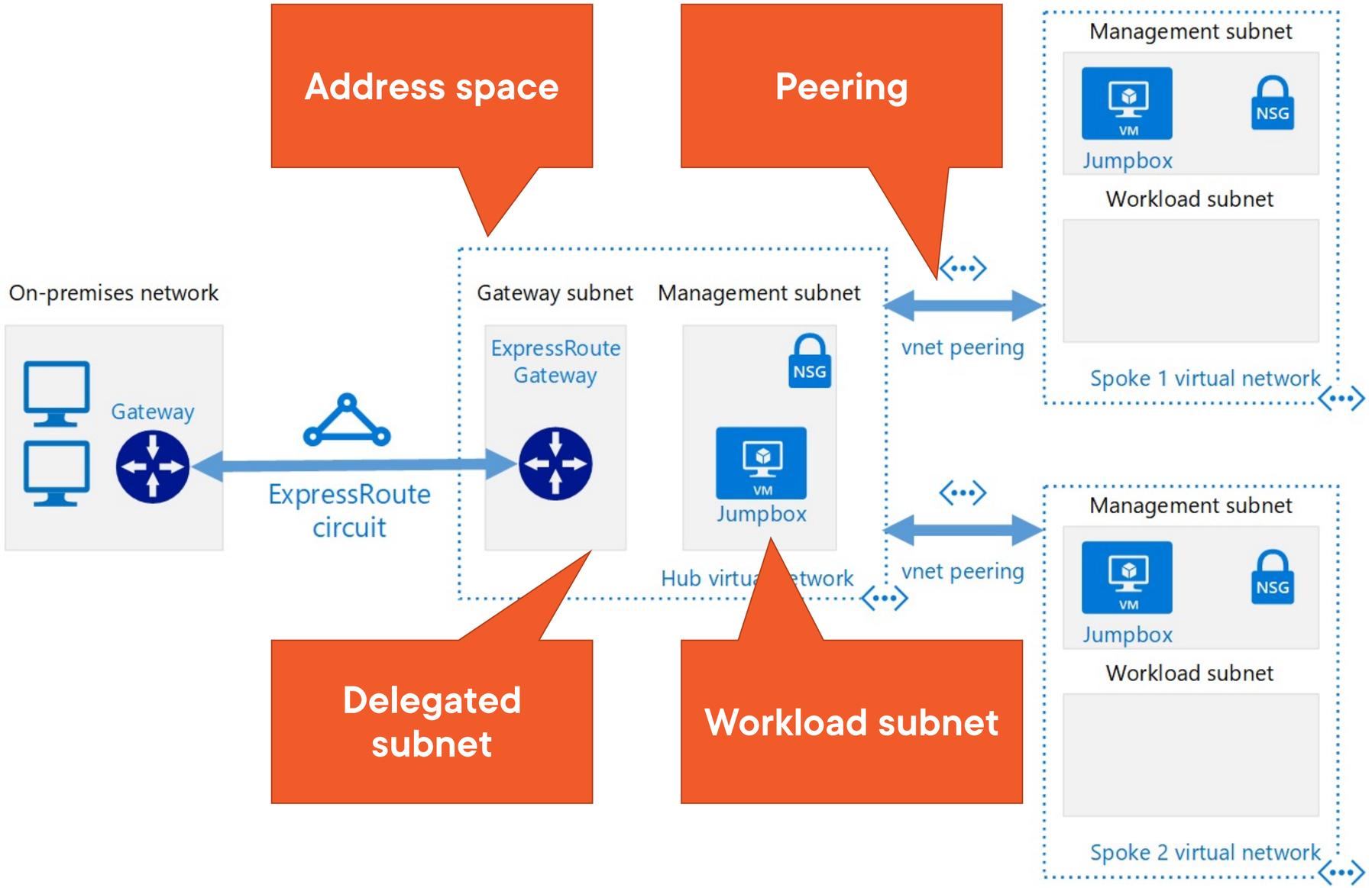
Plan Virtual Networks on Azure

Azure Virtual Network Components



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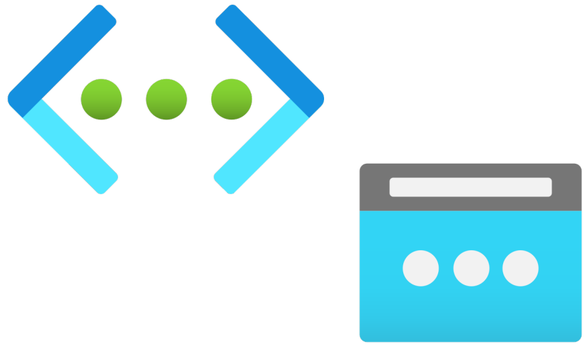
Planning for Private IPv4 Addresses

RFC 1918 ranges

- 10.0.0.0 - 10.255.255.255 (10/8 prefix)
- 172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
- 192.168.0.0 - 192.168.255.255 (192.168/16 prefix)



Restricted ranges

- 224.0.0.0/4 (Multicast)
- 255.255.255.255/32 (Broadcast)
- 127.0.0.0/8 (Loopback)
- 169.254.0.0/16 (Link-local)
- 168.63.129.16/32 (Internal DNS)

Restricted subnet IPs

- 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

Subnets can range in size from /8 to /29

Azure Wire Server 168.63.129.16

Virtual public IP address (VIP)

VM Agent heartbeat

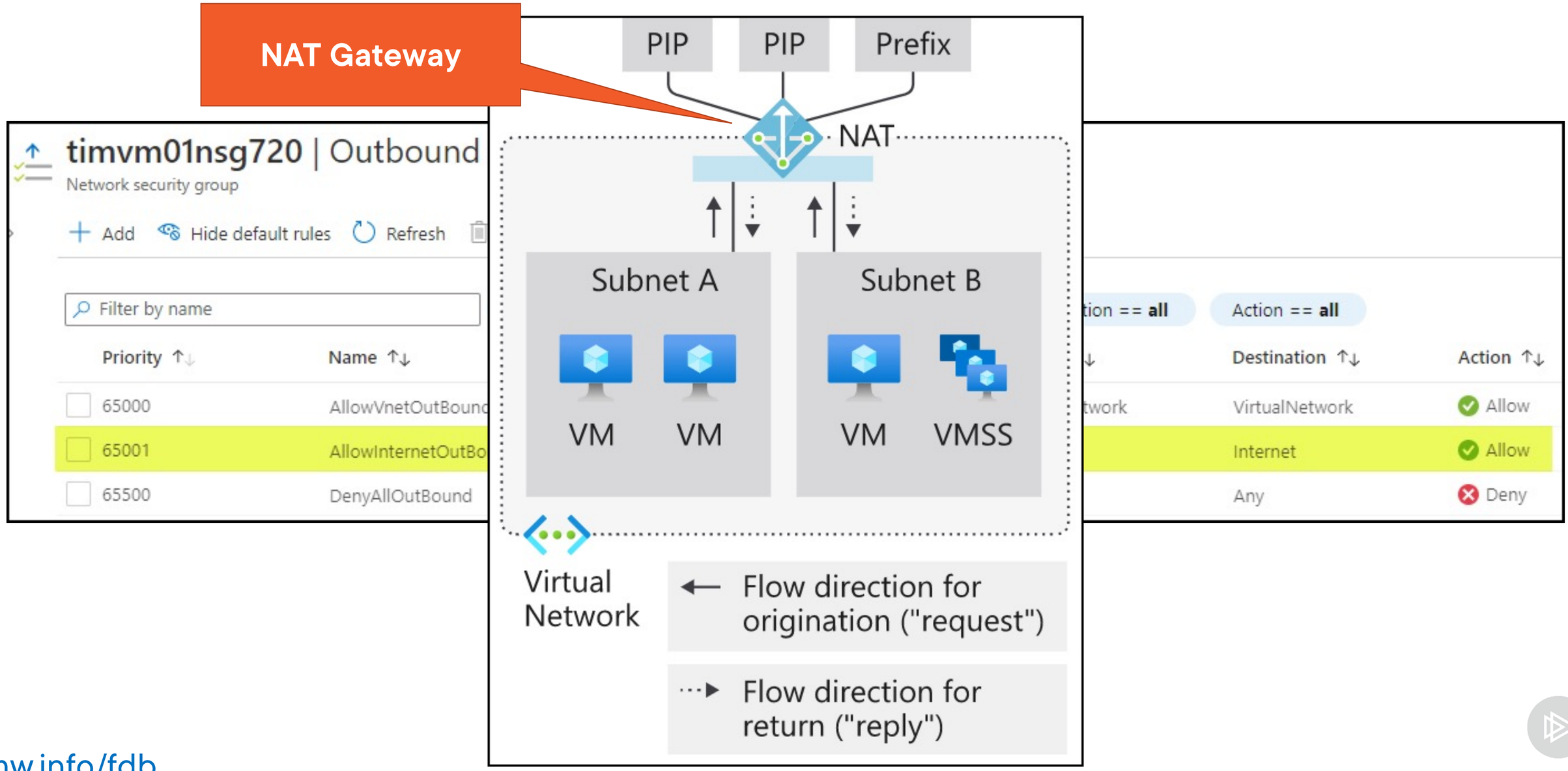
Azure Load Balancer health probes

Azure-provided DHCP

Azure-provided DNS

Azure-provided routing

Azure VM Outbound Internet Connectivity



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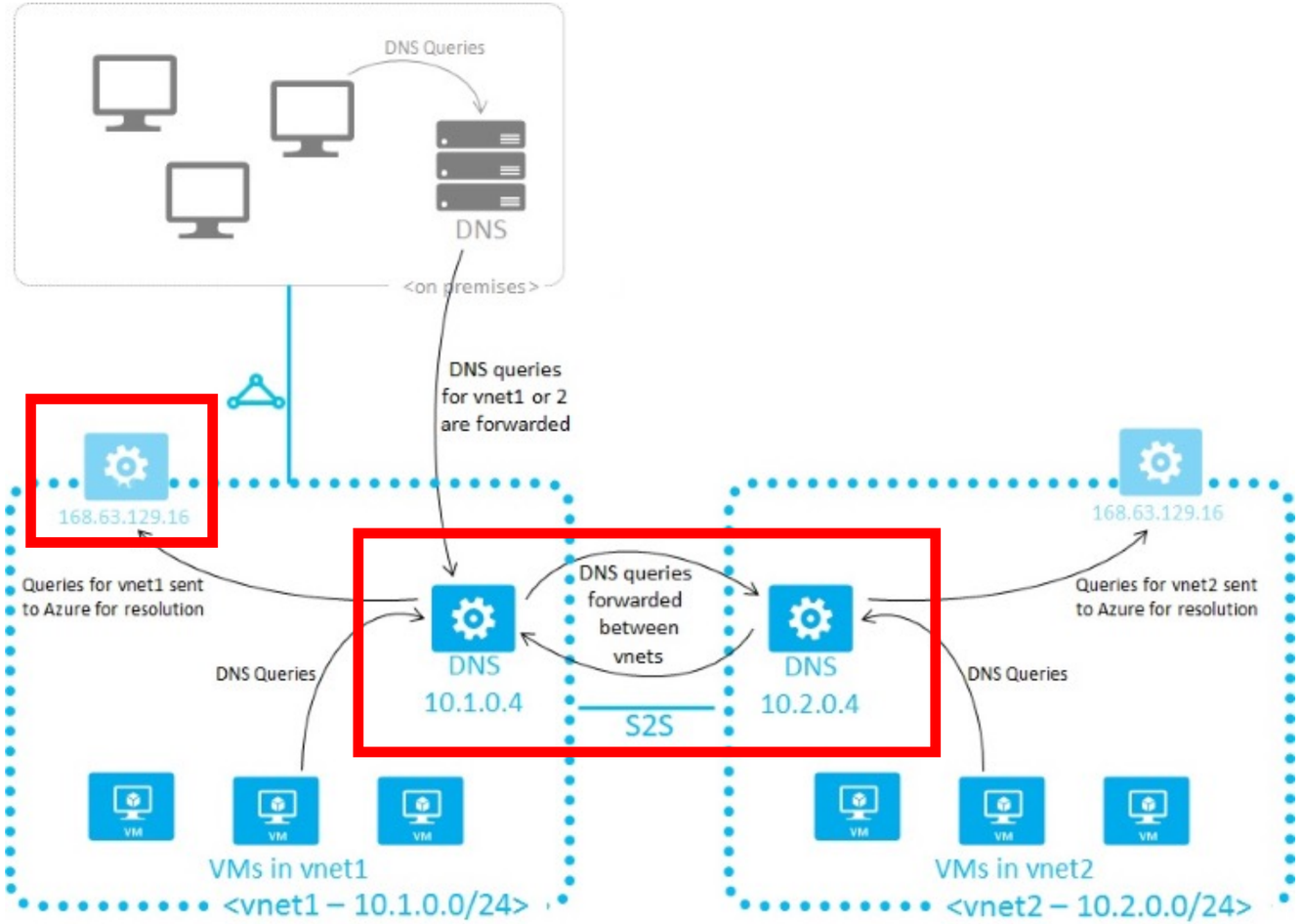
Planning for Name Resolution

- Azure-provided DNS is limited the the VNet scope and uses the Wire Server
- Single-label hostnames (like WINS)
- *.cloudapp.net public DNS name (you can add your own)
- Add your own DNS server IPs at the VNet and/or vNIC scope
- Alternative: private Azure DNS zone

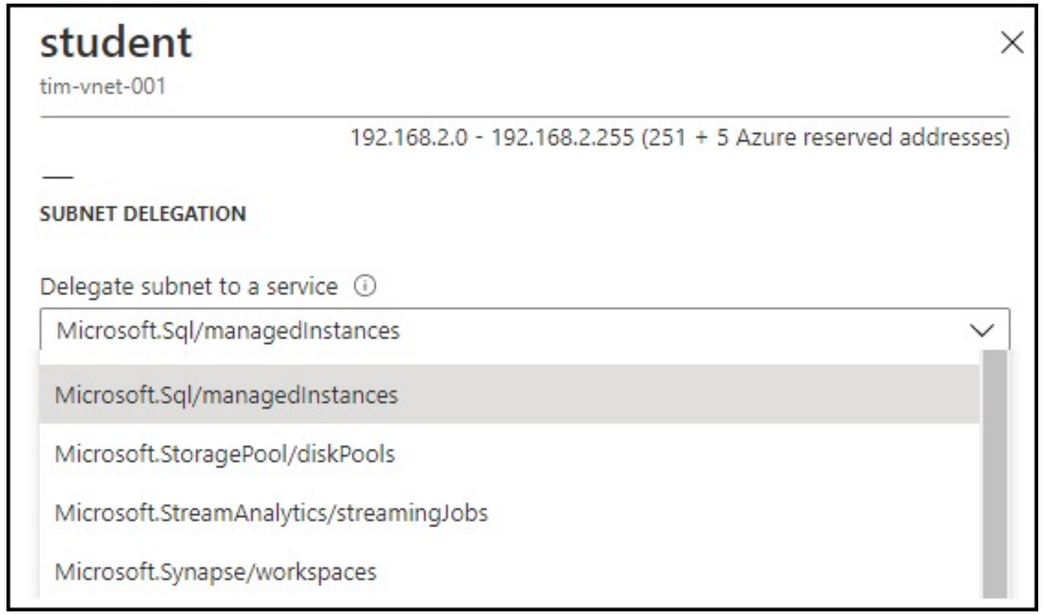


Subnet Delegation

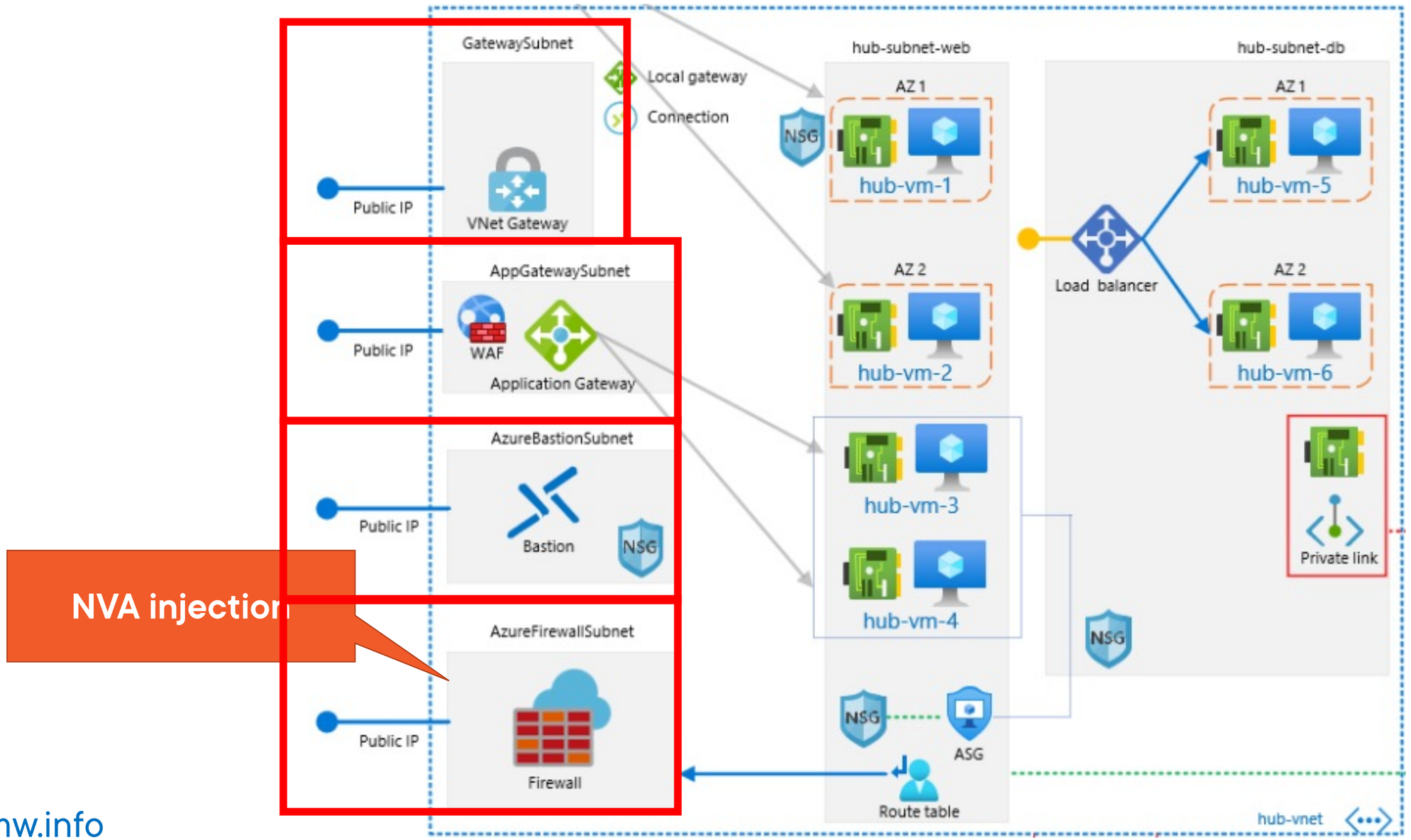
Designate a subnet for a particular Azure PaaS service

Allows PaaS service to establish basic network configuration rules

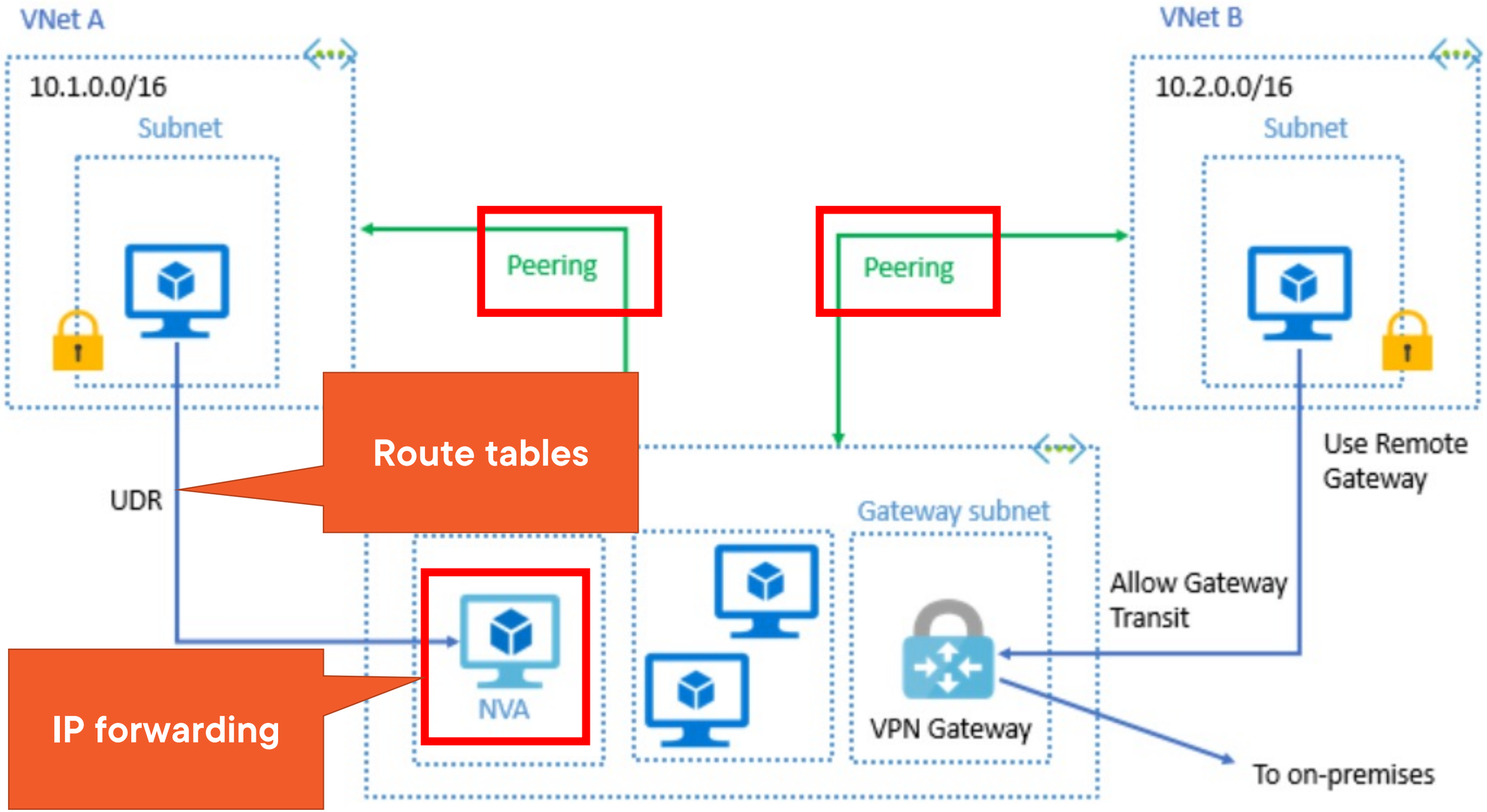
Some Azure network virtual appliances (NVAs) have reserved subnet labels



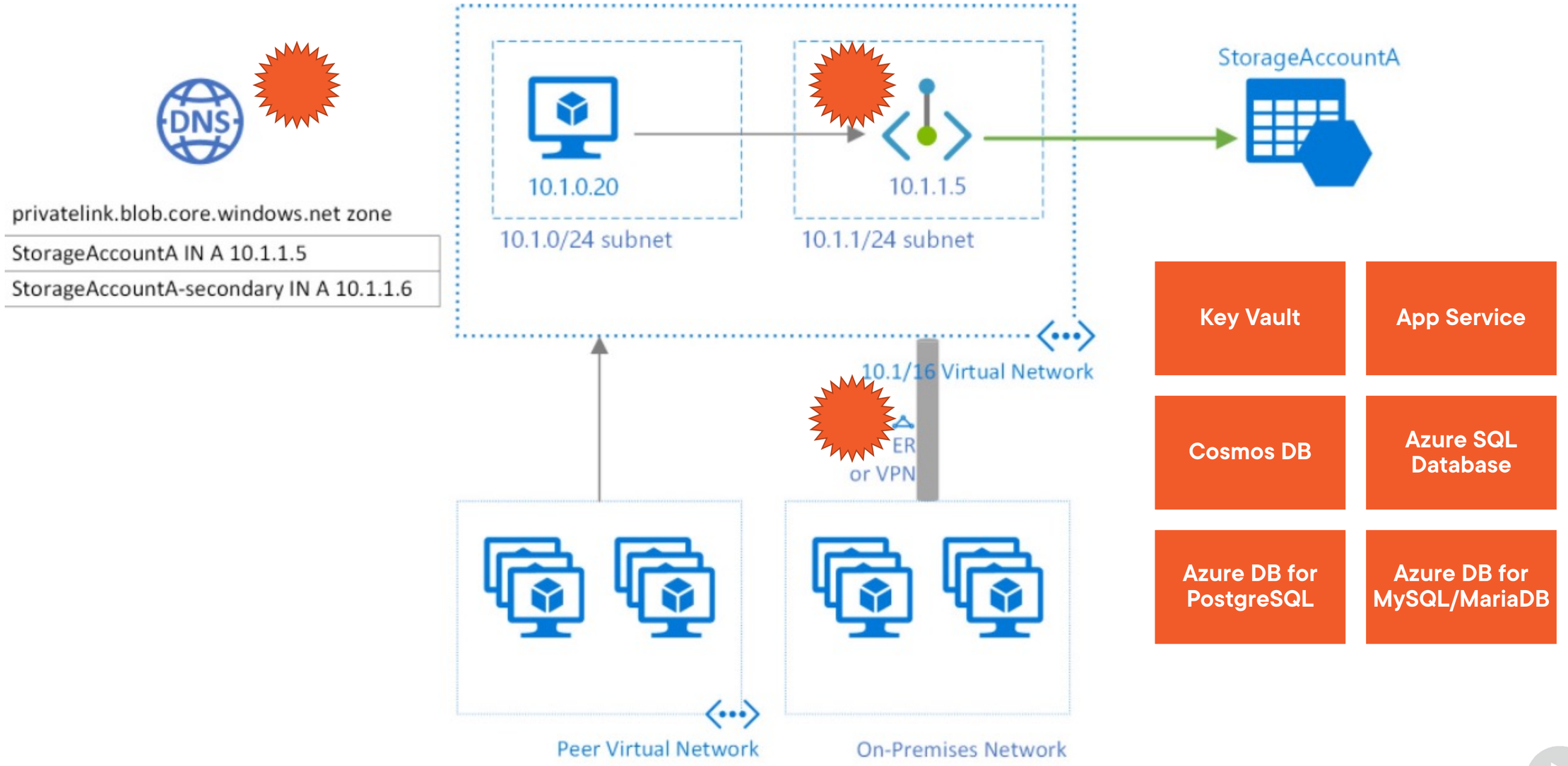
Subnet Delegation Examples



Hub-and-Spoke Topology



Private Endpoints



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Demo

Configure TCP/IP on VM NIC

Name resolution

NAT gateway?

Deploy Virtual Networks on Azure

Azure VNet Deployment Methods

Portal	**PowerShell/CLI**	**Bicep/ARM template**
REST API	**Azure SDKs**	**Terraform**

Demo

Create one VNet in the portal

Create another one with ARM template

- Quickly generate the Bicep

Summary

Ensure all your VM TCP/IP configuration happens at the Azure control plane

- Except for software firewall, etc.

Consider governing your VNets with Azure Blueprints

"How can I join my Azure VMs to our local Active Directory domain?"

Next module: *Design and Implement Name Resolution*

Demo

Configure TCP/IP on VM NIC

Name resolution

- Do custom servers 192.x and wire server
- Verify Internet resolution works

NAT gateway

- Test ipaddress.com before and after

Demo

Create one VNet in the portal

Create another one with ARM template

- Quickly generate the Bicep