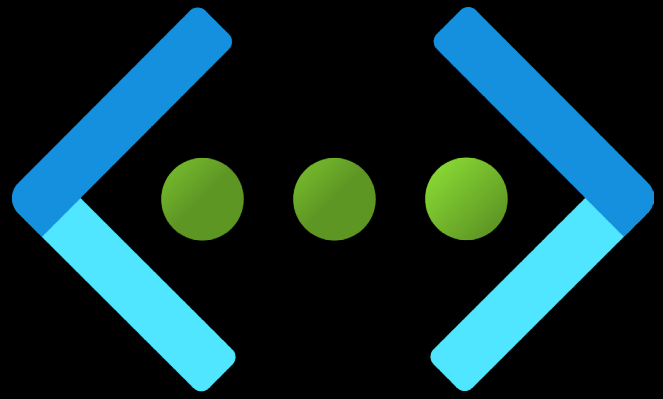
Azure Virtual Network
VNET



Azure Virtual Network - VNET

VNET is private network in Azure.

Azure services like VMs are always attached to a VNET.

Resources within the same VNET could securely communicate with
- each other
- the internet
- on-premises networks

VNET is similar to a traditional network that you'd operate in your own datacenter.

Range of private IP addresses to be used by Azure services.
For example: 10.0.0.0/8

Features of Azure Virtual Network

Communication of Azure resources with the internet
Public IP, Load Balancer, NAT gateway

Communication between Azure resources
By default, resources within the same VNET can communicate with each other

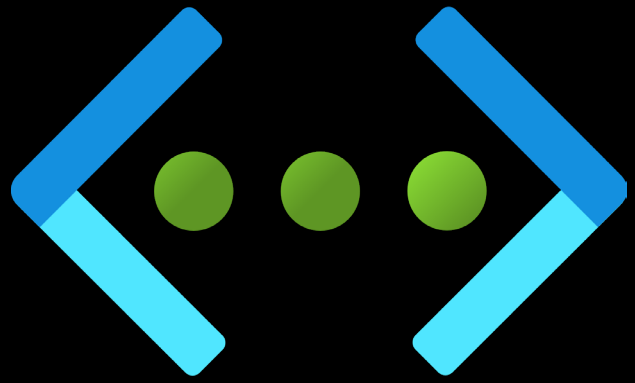
Communication between multiple VNETs
VNET peering in Hub and Spoke topology

Communication with on-premises resources
Express Route, S2S VPN

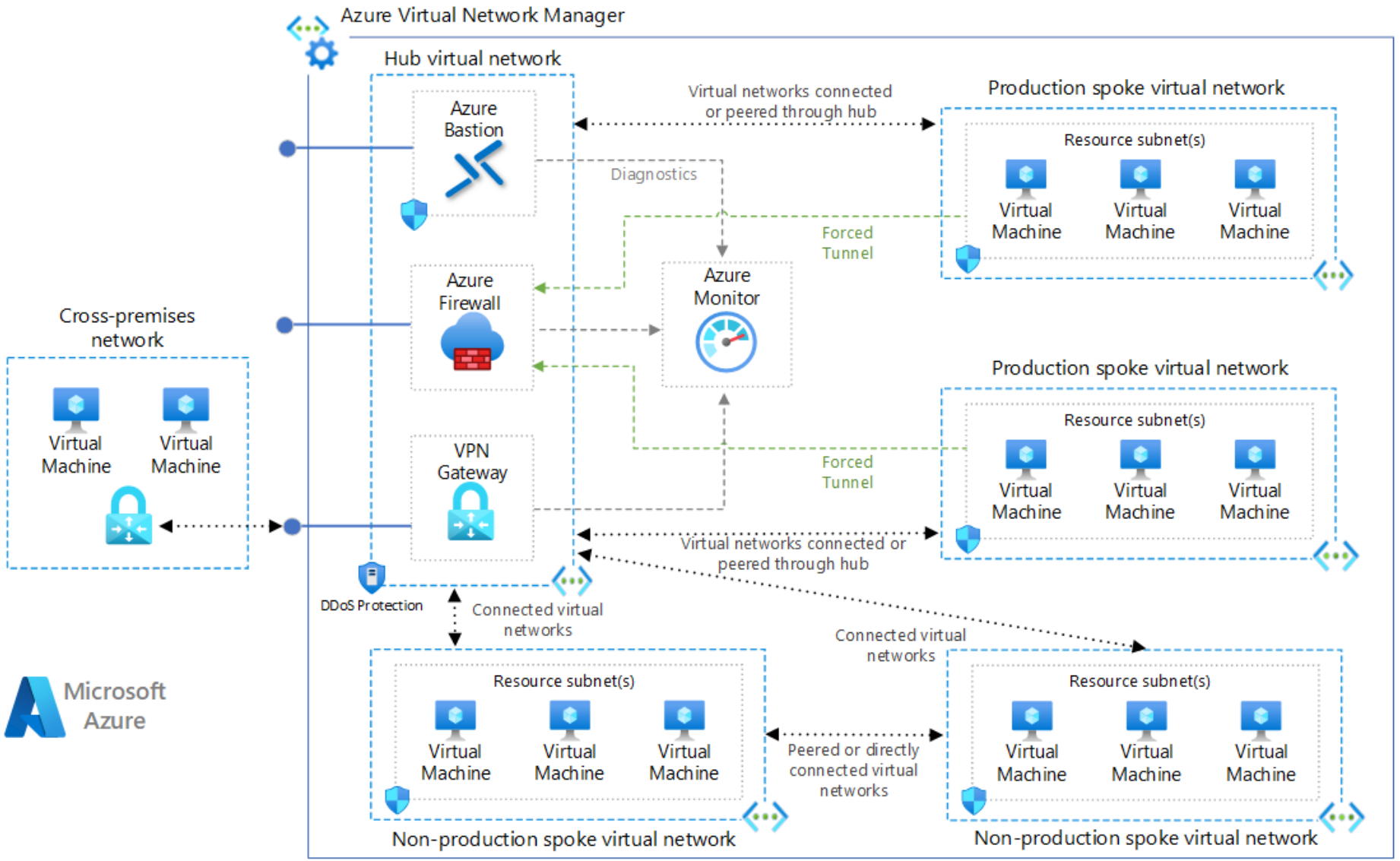
Filtering of network traffic through NSG or NVA (Firewall)

Routing of network traffic through Route Table

Integration with Azure services through Private Endpoint



Azure Virtual Networks in the real world



Virtual Network - Subnet

Segment the virtual network into one or more subnetworks.

Allocate a portion of the VNET address space to each subnet.

You can then deploy Azure resources in a specific subnet.

Subnet can help improve security by using NSGs to control traffic between Subnets.

Virtual Network address space

RFC 1918:

- 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)

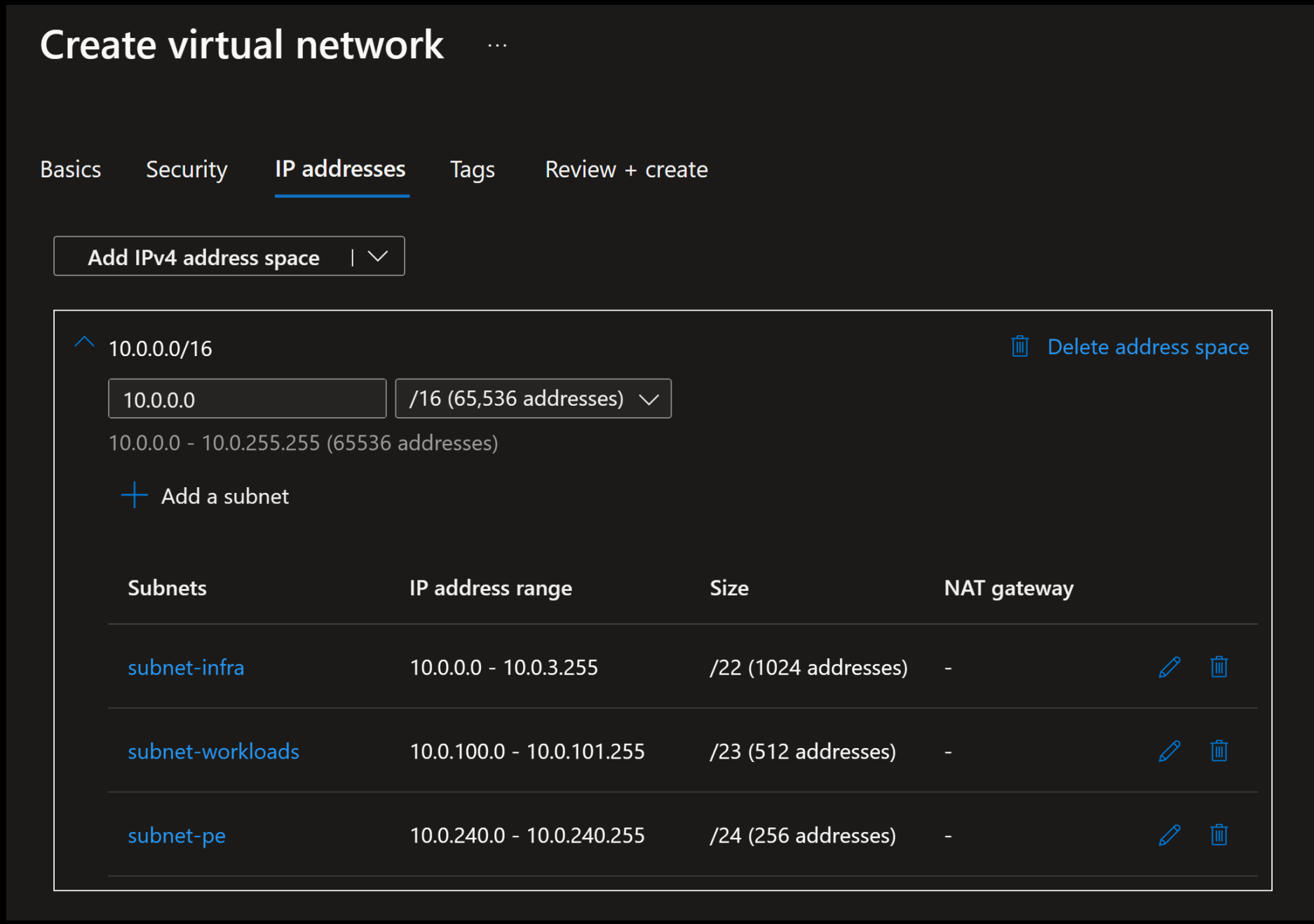
Azure reserves 5 IP addresses:

- 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

Unavailable address 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)

Creating VNET and Subnets



Creating VNET with Azure CLI and Terraform

```
az network vnet create -g rg-demo-vnet -n vnet-demo --address-prefixes ["10.0.0.0/16"]

az network vnet subnet create -g rg-demo-vnet --vnet-name vnet-demo -n subnet-frontend
   --address-prefixes ["10.0.0.0/24"]
```

```
resource "azurerm_virtual_network" "vnet" {
  name                = "vnet-spoke"
  resource_group_name = azurerm_resource_group.rg.name
  location            = azurerm_resource_group.rg.location
  address_space       = ["10.0.0.0/16"]
}
resource "azurerm_subnet" "subnet-frontend-servers" {
  name                                           = "subnet-frontend-servers"
  resource_group_name                            = azurerm_virtual_network.vnet.resource_group_name
  virtual_network_name                           = azurerm_virtual_network.vnet.name
  address_prefixes                               = ["10.0.0.0/24"]
  private_endpoint_network_policies_enabled = false
}
```